Reports on the extent and nature of the materials available for the preparation of a medical and surgical history of the rebellion / War Department, Surgeon General's Office.

Contributors

Woodward, Joseph Janvier, 1833-1884.
United States. Surgeon-General's Office.
Royal College of Physicians of Edinburgh

Publication/Creation

Philadelphia, Pa. : J.B. Lippincott, 1866.

Persistent URL

https://wellcomecollection.org/works/hq6p6czd

Provider

Royal College of Physicians Edinburgh

License and attribution

This material has been provided by This material has been provided by the Royal College of Physicians of Edinburgh. The original may be consulted at the Royal College of Physicians of Edinburgh. where the originals may be consulted.
This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

Eng. xx bi g.36

Digitized by the Internet Archive
in 2015

https://archive.org/details/b2197200x

CIRCULAR No. 1.

WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

WASHINGTON, JUNE 10, 1868.

REPORT

ON

EPIDEMIC CHOLERA

AND

YELLOW FEVER

IN THE ARMY OF THE UNITED STATES,

DURING THE YEAR 1867.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1868.

R35052

CIRCULAR No. 1.

WAR DEPARTMENT,
SURGEON GENERAL'S OFFICE,
Washington, D. C., June 10, 1868.

The following Report on Epidemic Cholera and Yellow Fever, as they occurred in the U. S. Army last year, is published for the information of Medical Officers.

J. K. BARNES,
Surgeon General.

REPORT

ON

EPIDEMIC CHOLERA AND YELLOW FEVER

IN THE

ARMY OF THE UNITED STATES,

DURING THE YEAR 1867.

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

SURGEON GENERAL'S OFFICE, *May* 5, 1868.

GENERAL: In accordance with your instructions, I have prepared an account of the prevalence of cholera and yellow fever in the army during the year 1867, which I herewith respectfully submit:

I.—EPIDEMIC CHOLERA.

In view of the possible appearance of cholera during the approaching summer, the Surgeon General issued a circular on the 20th of April, 1867, which gave instructions as to precautionary measures, and directed that in case the pestilence should appear among the troops at any post, a special report should be made, giving a statement of the facts, and transmitting the names of all officers and soldiers attacked, together with the nativity, age, rank, regiment, company, length of service, date of attack, and date of recovery or of death, in each case. (See Circular No. 3, Appendix, p. 17.)

These reports were made with commendable diligence by the medical officers brought in contact with cholera during the year, and from these, mainly, the following sketch of the epidemic has been prepared.

In compiling the statistical tables appended, (Appendix I, pp. 1–15,) the figures contained in the monthly reports of sick and wounded have been carefully compared with the lists of names, and all discrepancies inquired into and corrected. It is therefore believed that the figures are worthy of all confidence. These tables show the monthly mean strength at each station mentioned, and the monthly number of cases and deaths of cholera, cholera morbus, acute diarrhœa, chronic diarrhœa, acute dysentery, and chronic dysentery, are presented separately; the tables also give a monthly total for these diarrhœal diseases, a total for all other diseases, and an aggregate.

Wounds, accidents, injuries, and violent deaths are not included under the head of all other diseases, and are not considered in this report. This rule was also followed in constructing the tables in Circular No. 5, of 1867, which gave an account of epidemic cholera in the army during 1866.

The second part of Appendix I, under the head of extracts from official reports, contains such portions of the special cholera reports elicited by Circular No. 3, and of other official documents, as were thought to possess professional interest. To these the reader is referred for details, a mere outline of the progress of the epidemic being presented in this report. (See Appendix, pp. 16–69.)

It is well known that cholera prevailed extensively in the army during the year 1866, causing over 1,200 deaths among officers and men.* Circular No. 5, of 1867, giving a detailed account of the epidemic of 1866, was sent to each medical officer, in anticipation of the possible return of the disease in 1867. It will be seen, by consulting that document, that cholera spread over the country during the year 1866, extending as far westward as Forts Leavenworth, Riley, and Gibson; and in the southwest as far as Texas. In its progress the disease followed the lines of travel rather than any general westward course, and, in the case of the army, it especially followed the movements of bodies of recruits, which were the most important movements from infected points during the year. The compiler of Circular No. 5 drew hence an argument in favor of quarantine, and the Surgeon General, in Circular No. 3, instructed medical officers to endeavor, as far as possible, to protect any threatened command by a proper quarantine. The measures thus adopted, in conjunction with the hygienic precautions directed in the same circular, undoubtedly saved many lives in the army, for the total number of deaths from cholera during 1867 was but 230, and it cannot be claimed that the disease in itself was less virulent during 1867, for the proportion of deaths to the total number of cases was 1 death to 2.19 cases, while during 1866 it was 1 to 2.22.

In a general way, it may here be said that the experience of the army during 1867 confirms the views in favor of quarantine formed during 1866, and especially confirms the opinions formed with regard to the danger of distributing recruits or other bodies of troops from an infected point to other garrisons. An additional point, however, is also suggested by the experience of 1867, namely: The possibility of cholera reappearing on the following year at places visited by it during an epidemic, if the most stringent hygienic precautions are not adopted.

It is believed that an examination of the appended documents will convince the reader that, so far as the troops were concerned, such hygienic precautions were rigidly enforced during 1867. But, as the summer opened, cholera reappeared in the valley of the Mississippi, and to the westward, at a number of the places where it prevailed during the previous year. At most of these points it occurred first among the citizens, and afterwards appeared among the troops; but it has not always been possible to obtain the date of the first case among the citizens, and hence it is not possible to assert that this was the invariable rule, though it is believed it was so.

Had the cases thus originating been the only ones, the mortality from the disease would have been comparatively small; but the unfortunate movement of infected troops

* Circular No. 5 reports, page XIII, 2,724 cases, 1,217 deaths. Additional reports from Texas, not received at the date of publication, contain 89 cases and 52 deaths; making a total of 2,813 cases and 1,269 deaths.

and trains during July carried the pestilence across the plains to every post on the Arkansas river and the Smoky Hill Fork, and three other notable instances of the transplantation of the disease occurred: one on the route between Forts Gibson and Arbuckle, one in the case of the posts in New York harbor, the third in that of certain recruits distributed from New York, by way of New Orleans, through Texas.

At New Orleans, where cholera had prevailed extensively, during 1866, among both citizens and troops, continuing during the summer and fall, until January, 1867, it reappeared among the citizens in June. The reports of the Board of Health record 4 deaths during June, and 571 during the following six months. During the same period only six cases and three deaths were reported among the white troops, and but four cases and two deaths among the colored troops. The first of these cases occurred at Jackson Barracks during August, and recovered; the second case, at the same barracks, during September, also recovered. After this, no cases occurred until November. During November and December there were a few cases both at Jackson Barracks and at Greenville, making, in all, but ten cases and five deaths during the six months in a garrison of over a thousand men. Besides these, one case, which recovered, was reported at Jackson Barracks during January, 1868, and two cases of cholera and nine of choleraic diarrhœa during the same month in Company "A," 33d Infantry, which had just arrived from Georgia.

In view of the prevalence of the disease among the citizens of New Orleans, this comparative immunity of the troops must be attributed, to a great extent, to the stringent hygienic measures adopted in view of the approach of yellow fever. These measures are fully recorded in the reports on the yellow fever epidemic.

At Fort Jackson, Mississippi, below New Orleans, one case, a colored soldier who recovered, is reported during September. No particulars have been received

During the month of June cholera also appeared among the freedmen on various plantations in the vicinity of Vidalia, Louisiana. The troops, however, escaped until October. During this month eight cases and three deaths are reported out of a strength of 61 officers and men.

At Vicksburg, Mississippi, where cholera had prevailed among the troops during 1866, it reappeared among the citizens during the month of June. The first case among the troops occurred on the 29th of that month and died the same day. There were eight cases and two deaths among the troops during July; one fatal case during September; during October two cases, which recovered; in all, eleven cases and three deaths, not including the fatal case during June. The average strength of the command during the six months was 267 officers and men.

At Madison, Arkansas, cholera appears to have been introduced by the body of a citizen dead of cholera who was brought from Linden for burial. Shortly afterwards the disease appeared among the troops. Eight cases and three deaths are reported during July; two cases and one death during August; in all, ten cases and four deaths; the average strength for the two months being 75 officers and men.

At Newport Barracks, Kentucky, where cases had occurred during 1866, two mild cases are reported during June, both of which recovered. There was also one fatal case during August. The average strength of the command during the six months was 509. Cases are said to have occurred in both Cincinnati, Ohio, and Covington, Kentucky, a few days before the first of these cases.

At Paducah, Kentucky, four cases and two deaths are reported during August out of a strength of 108. No particulars have been received.

At St. Louis, Missouri, where cholera had prevailed during 1866, it reappeared among the citizens during the month of June, 1867. (See St. Louis Medical and Surgical Journal for July and August, 1867, p. 394.) Cases continued to occur with increasing frequency during the summer and fall. Only one case, however, is reported at the St. Louis arsenal out of an average strength of 125. This case occurred during October; the man recovered.

At Jefferson Barracks, near St. Louis, where cholera had prevailed extensively among the 56th U. S. Colored Infantry during the previous summer, 256 cases and 134 deaths having been reported, one case of cholera and six of cholera morbus occurred during July, all of which recovered. Several fatal cases of cholera were reported, however, among government employés.

It may here also be mentioned that, during June, prior to their movement from the post, a considerable number of cases of diarrhœa occurred among the soldiers of the 38th U. S. Colored Infantry at Jefferson Barracks. To the story of these troops we shall presently recur.

On the 26th of October, Companies "G" and "H," 125 colored volunteers, arrived at Jefferson Barracks for muster-out. They had marched from Fort Bliss, Texas, across the plains, to Fort Harker, and thence been brought by railroad to St. Louis, where cholera was then prevailing. Two days after their arrival at Jefferson Barracks cholera appeared among them, thirteen cases and five deaths occurring before the close of the month, and two cases and one death during November.

At Fort Riley, Kansas, where there had been 59 cases and 27 deaths of cholera, and 641 cases of diarrhœa and dysentery among the troops during 1866, a quartermaster's employé was attacked June 22d, 1867, and died the same day. Company "K," of the 38th Infantry, which left Jefferson Barracks June 9th, and reached Fort Riley June 12th, had moved for Fort Harker on the 19th; and companies "D" and "F," which left Jefferson Barracks on the 19th for Fort Riley, also left that place for Fort Harker on the 22d, arriving on the 25th. All these troops were suffering much from diarrhœa, and Companies "D" and "F" left behind them, when they moved, a number of men sick with diarrhœa. After this, however, no cases of cholera occurred at Fort Riley, where the most stringent hygienic means appeared to have been adopted, until July 11th, when an employé of the Pacific Railroad was attacked and died the same day. He had just arrived from the vicinity of Fort Harker, where cholera was then prevailing. No other cases occurred until November, when two colored recruits for the 10th Cavalry were attacked; one of them recovered; the other died December 1st. Of these men, the first had arrived two days before his attack from St. Louis, Missouri, where he had been taken sick with diarrhœa. No particulars have been received with regard to his comrade. These two cases are included in table 10, Appendix I, p. 6; but the garrison of Fort Riley, averaging for the six months 26 white and 197 colored troops, wholly escaped.

At Fort Harker, Kansas, the disease appeared shortly after the arrival of Companies "K," "D," "F" and "H," of the 38th Infantry. There were three cases and one death among the colored troops in June; fifteen cases and ten deaths during July and August. Among the white troops, twenty-eight cases and twenty deaths are reported during July and August. The average strength of the command for July and August was 84 white and

197 colored troops. There were also at the post over four hundred quartermaster's employés, among whom were many deaths. The hygienic condition of the fort and its vicinity is reported to have been very bad at the date of the outbreak of the epidemic.

Company "K," of the 38th Infantry, reached Fort Harker June 22; Companies "D" and "F" arrived on the 25th; Company "H" on the 27th. Companies "A" and "B" had been stationed there since May 16th, and Company "G" since May 17th.

The first case among the troops at Fort Harker was a soldier of Company "H," who was taken sick June 28th and sent to the post hospital. On the same day, but a little earlier in the day, a citizen in the employ of the beef contractor was attacked. He lived in a dug-out on the bank of the river, near the slaughter-pen, a mile and a half from the fort, and half a mile from the camp of the detachment of the 38th. Stress has been laid on this case in some of the appended reports, as showing that cholera was not introduced at Fort Harker by the 38th Infantry; but the dates of the arrivals of Companies "D," "F," "H," and "K," above given, perfectly accord with the theory that the detachments of the 38th Infantry brought the germs of the disease with them from Jefferson Barracks; and it has not been shown that the beef contractor's employé, living so near their camp, did not communicate freely with the newly arrived troops. At all events, the first cases among the troops at Fort Harker were soldiers of the 38th Infantry, who were carried from their camp to the post hospital; and it was not till a number of these cases had occurred that the disease began to spread among the garrison of the post.

But whatever question may be raised as to the introduction of cholera at Fort Harker by the 38th Infantry, there is no doubt of the mode in which the pestilence, once established at that post, was, unfortunately, carried thence across the plains.

On the 28th of June, the same day on which cholera appeared at Fort Harker, a detachment of the 38th Infantry, consisting of Companies "D" and "F," Brevet Lieutenant Colonel H. C. Merriam in command, and Brevet Lieutenant Colonel George McGill, Assistant Surgeon, U. S. A., in medical charge, left Fort Harker to march by the Arkansas River route to New Mexico.

At the close of the first day's march they reached Plumb creek, and shortly after going into camp a case of cholera occurred among the men. The command marched next day, but cases continued to occur daily until it reached Fort Lyon, Colorado Territory.

The posts visited on this route were Fort Zarah, Fort Larned, and Fort Dodge, and the arrival of the detachment at each of these stations was promptly followed by the appearance of cholera.

The death of Dr. McGill, July 20th, has prevented the receipt of the usual monthly report of sick and wounded for this detachment; but it appears from the appended letter of Colonel Merriam that twenty-nine enlisted men were attacked, and ten died, out of a mean strength of 232 enlisted men. With the exception of Dr. McGill and his wife, the officers and their families escaped.

The headquarters of the 38th Infantry, with Companies "A," "H," and "K," remained at Fort Harker until the 20th of July.

The first case of cholera among the troops at Fort Harker, already mentioned as occurring June 28th, was a soldier of Company "H;" on the 29th another case occurred in the same company, on the 30th another; July 1st five cases were reported, July 2d three. All these cases are included in the statistical table for Fort Harker. July 4th there

were two cases; July 5th and 7th each one case. After this no more cases occurred in this command for some days, although the disease still prevailed among other troops at Fort Harker and among the quartermaster's employés and other citizens. July 20th, Headquarters, with Companies "A" and "K," started across the plains with 12 officers, 220 men, 44 quartermaster's employés, and 37 ladies, children, and servants. After crossing the Smoky Hill Fork they were joined by the sutler of Fort Sumner with a family of ten persons, making in all 324 souls.

July 21st, on the march, a soldier was attacked with cholera and cases continued to occur until July 30th, when the command had reached a camp a few miles west of Fort Dodge, after which no more cases occurred among the troops.

Up to this time there had been forty-six cases and seventeen deaths, all enlisted men; the rest of the party escaped, with the exception of the wife of one of the officers, who was taken sick after the command reached Fort Lyon and recovered. The case reported during August was a man who had been detached with the mail between Forts Larned and Harker, and who was brought sick to camp.

In making this march the command avoided communication with the posts along the route, and, after the 25th of July, avoided the route taken by Col. Merriam's detachment.

Two detachments of the 38th Infantry are thus shown to have carried cholera with them across the plains by the Arkansas River route. It was by the first of these that it was distributed to the military stations on the way.

On the first of July Colonel Merriam's detachment of the 38th Infantry arrived at Fort Zarah, and on July 2d or 3d at Fort Larned, going into camp within 500 yards of the fort, and remaining there for forty-eight hours. July 6th the first case occurred in the garrison at Fort Larned, and subsequently cases occurred at both this post and Fort Zarah.

Fort Zarah being occupied as a picket post of Fort Larned, the cases at both posts are included in the monthly reports of sick and wounded of Fort Larned, and are included in tables 15 and 16, (Appendix, p. 8.) In all, there were five cases and four deaths of white troops during July; of colored troops, one fatal case during July and one during August. There were quite a number of cases among the quartermaster's employés.

According to Brevet Major C. S. De Graw, Assistant Surgeon, U. S. A., Colonel Merriam's command arrived at Fort Dodge on the afternoon of July 7th and went into camp a mile from the post, remaining forty-eight hours. An unsuccessful attempt was made to isolate the command when it was understood that cholera was prevailing in it.

During the evening of July 11th a government employé, living about three hundred yards from the garrison, was attacked; on the 14th another; and diarrhœa became very prevalent among the citizens about the post. On the 18th several trains arrived from Fort Harker with supplies for the post, and a man accompanying one of these trains was found to have cholera. On the 21st a soldier of the garrison was attacked while on guard duty some distance from the post and brought to the post hospital. This was followed by other cases, and during the rest of July and the early part of August, twenty-five cases and fourteen deaths occurred among the troops. The mean strength for the two months was 226 officers and men. There were also a number of cases among the citizens. The pestilence did not extend on this route to posts west of Fort Dodge.

Returning now to the neighborhood of Fort Harker, we find that Company "G," 10th Colored Cavalry, moved from Fort Harker July 16th, leaving behind three or four

men sick of choleraic diarrhœa; they went into camp at Wilson's creek, about 15 miles from Harker, where, during the rest of the month, they had fifteen cases of cholera, eight of which died during July and one in August. The command subsequently went to Fort Hays and became a part of the garrison of that post.

Company "F," 3d Infantry, in camp near Cow creek, Kansas, at the terminus of the Pacific Railroad not far from Fort Harker, reports seven cases and four deaths during July and one case during August, out of a strength of 68 officers and men; the disease was brought from Fort Harker.

Company "C," 10th Colored Cavalry, at Camp Grierson, Kansas, on the Little Arkansas river, reports seven cases and four deaths during July, and ten cases and four deaths during August, the mean strength for the two months being 78 men; the officers escaped. The disease is reported to have been brought to the camp by one of the messengers from Fort Harker.

Leaving, now, the vicinity of Fort Harker, we find cholera transported along the route of the Smoky Hill Fork, towards Denver, as far west as Fort Wallace. The posts on this route are Fort Hays, Downer's Station, Monument Station, and Fort Wallace. The first case at Fort Hays was a citizen, who had just arrived from Salina, whither the cholera had extended from Fort Harker. On the same day, July 11th, a colored soldier of the garrison was taken sick, and died next day. During July, August, and September, thirty-three cases and twenty-three deaths are reported among the colored troops, whose mean strength during the three months was 215 men. September 1st, a white soldier was attacked, but recovered; the rest of the white troops, averaging, during the three months, 34 in number, escaped. Free communication had existed with Fort Harker previous to the appearance of the first cases, and trains with escorts of troops were continually passing from Fort Harker, by way of Fort Hays and the other posts on this route, to Fort Wallace, and back again.

Notwithstanding the free passage of such trains, however, the detachment at Downer's Station, Kansas, escaped until August 9th, when a supply train en route from Fort Harker to Fort Wallace, accompanied by a detachment of Company "B," 38th U. S. Infantry, encamped at Grinnell Springs, a small stage station about 20 miles from Downer's, and guarded by a party from that post. The day after the arrival of the train, two of the men at the stage station were taken sick, and were sent to the hospital at Downer's Station for treatment. One of them recovered, the other died. The mean strength of the command at Downer's Station during August was 91 officers and men, but no other cases occurred.

Company "I," 38th Infantry, which had been stationed at Fort Hays since May 25th, left that place June 24th and established a post at Monument Station, Kansas. During July three cases and one death of cholera are reported in this detachment, the strength being reported at 115 men. No particulars have been received.

June 1st, 1867, a detachment of the 7th U. S. Cavalry left Fort Hays on an expedition to the Platte river, and, after marching over 700 miles, subjected to great hardships, went into camp July 13th, near Fort Wallace. A second detachment of the 7th left Fort Hays on the 12th of July, the day after the first cases of cholera had appeared at that post, and, marching directly to Fort Wallace, went into camp, July 18th, with the first detachment. July 22d, the first case of cholera occurred, and was rapidly followed by

others, seventeen cases and eleven deaths being reported during July and August, besides a number among the citizen employés. The mean strength of this detachment during July and August was 220 officers and men. It is reported that most of the cases occurred among the soldiers and employés who were debilitated and exhausted by the exposure of the Platte River expedition. Notwithstanding the proximity of the camp of the 7th U. S. Infantry to Fort Wallace, the garrison of the latter place wholly escaped, intercourse being restricted, though not wholly prevented.

On the 8th of August, a detachment of the 5th U. S. Infantry arrived at Fort Wallace from New Mexico and encamped about a mile west of the fort. The command is said to have been healthy on the road, with the exception of diarrhœa, after leaving the Arkansas. Seven days before reaching Fort Wallace, they passed, without halting, a camp of colored troops, among whom cholera was prevailing. On the day of their arrival at Fort Wallace a case occurred, followed by others, making in all twenty-five cases and eleven deaths during the month. A quarantine hospital was established on the 10th, in which all the cases were treated. These cases were wholly confined to the detachment of the 5th U. S. Infantry, which, at the time of its arrival, numbered about 343 officers and men. None of the original garrison of Fort Wallace were attacked; as, however, a part of this detachment remained at Fort Wallace, these cases are included in the tabular statement for that post. (See Appendix, table 26, page 11.)

Turning, now, from the plains to the route into Indian Territory, the record will be found equally instructive. One fatal case of cholera was reported at Little Rock, Arkansas, during July. The patient had been intoxicated, and the case is admitted to have been a doubtful one. (See Appendix, page 56.) It is not, therefore, included in the statistical tables of this report.

At Fort Smith, Arkansas, where cholera had occurred during 1866, it reappeared among the citizens August 28th, 1867. The precautions taken to prevent the disease from extending to a company of troops stationed at the post (see Appendix, page 56) were so effectual, that but two cases occurred—the first September 16th, the second September 21st; both proved fatal.

At Fort Gibson, Indian Territory, where cholera also prevailed during 1866, it reappeared towards the close of June, 1867, among the Indians and Negroes. These people, who were surrounded by the worst hygienic conditions, suffered severely till the close of July, when a nest of negro huts, where the disease had been most virulent, was burned, and the survivors removed to a camp in the open prairie, after which the disease abated. The troops, encamped in wall tents on elevated ground near the fort, escaped, having but two cases—one, a negro soldier, attacked July 18th, died July 23d; and the other, a white soldier, attacked August 18th, died next day. The mean strength of the command at Fort Gibson during the six months was 159 white and 80 colored troops.

Towards the close of June, just after the appearance of cholera among the Indians and Negroes near the post, Company "D," 10th U. S. Cavalry, left Fort Gibson for Fort Arbuckle; had much diarrhœa on the road, and one man died July 1st with symptoms of cholera. The company, bringing with them the dead body of their comrade for interment, arrived at Fort Arbuckle July 2d. Immediately after their arrival three cases of cholera occurred in this company, and five cases and four deaths followed, during July, among the white troops stationed at Fort Arbuckle, 166 in number.

On the 11th of June two companies of the 6th U. S. Infantry left South Carolina for Indian Territory, and going by way of Memphis and Fort Smith, set out to march from the latter post to Fort Arbuckle. On the 8th of July a messenger from Fort Arbuckle passed their camp, who reported the existence of cholera at Forts Gibson and Arbuckle; they prevented his intercourse with the detachment, but, unfortunately, followed the road just passed over by Company "D," of the 10th U. S. Cavalry, and did not avoid their camps. July 14th, cholera appeared among them in their camp on Sandy creek, and before the close of the month forty cases and sixteen deaths occurred out of a command of 129 officers and men.

At Fort Columbus, New York harbor, there were thirty-five cases of cholera and eighteen deaths during August and September.

The first case occurred on the 21st of August. The patient was a recruit who had arrived the evening previous with a detachment of recruits from St. Louis, Missouri, where cholera was prevailing. One man had died on the road with symptoms similar to cholera, and the man attacked on arriving at Fort Columbus had been in attendance upon him.

Another recruit, who had also been in attendance on the first patient, was sent to Fort Wood, Bedloe's island, and was attacked by cholera shortly after his arrival there.

No additional cases occurred at Fort Columbus until the 31st of August, an interval of ten days, when ten new cases were admitted to hospital, four of these cases occurring among a fresh detachment of recruits who had arrived on the 28th of August, three days previous.

At Fort Wood, Bedloe's island, New York harbor, there were ten cases of cholera and four deaths during August and September. The first case occurred August 25th, the last September 24th. Of these cases, six were recruits, two belonged to the permanent party of the post, and two to the band. The first case was the recruit from St. Louis, already mentioned.

One fatal case is reported at the Plattsburgh Barracks, New York. The patient had just returned from Governor's island, where he had been sent for trial by court martial. He was attacked the night of his return, August 31st, and died September 2d.

On the 23d of November, a detachment of several hundred recruits left New York harbor, by steamer, for Texas. On the 30th another large detachment sailed.

The first detachment went on the steamer Raleigh, and reached New Orleans December 2d without sickness. Here 110 men were disembarked, but the detachment for Texas was kept on board, and learning that cholera was prevailing among the citizens of New Orleans, an attempt was made to keep them isolated. December 3d, this detachment was transferred to the steamer W. G. Hewes, and sailed for Galveston. During the 4th a number of cases of diarrhœa with rice-water discharges were observed, and in one case there were cramps and collapse, but none died. December 6th, the vessel arrived at Galveston, the men were disembarked and placed in tents, but after three days, on account of bad weather, were transferred to the barracks of the 17th Infantry at that post.

December 11th, the second detachment of recruits which had left New York November 30th arrived at Galveston, and, after remaining a day, sailed for Indianola. This detachment had also stopped a day at New Orleans, and after leaving that place cholera appeared among them. One death had already occurred. This detachment left at Galveston a number sick with choleraic diarrhœa or actual cholera; altogether, twenty-two cases

of cholera and eighteen of choleraic diarrhœa were admitted to the post hospital at Galveston from these detachments; five of the cases of cholera died. Three men of the 17th Infantry, into whose barracks the first party of recruits were received, were also attacked, but all recovered.

On the 13th of December a party of the recruits from Galveston arrived at Hempstead, Texas, where fifteen cases of cholera occurred among them, with, however, but one death. The detachment that went to Indianola reports thirteen cases and two deaths of cholera at that post, but the disease did not extend to the garrison. Finally, a party of these same recruits were quarantined at Onion creek, near Austin, December 24th, where nine cases and one death are reported during December, and one fatal case during January in the same detachment, then at Indianola on their way to Brownsville, Texas.

The extreme mildness of the cases among these recruits cannot escape attention; there were among them, in all, sixty-three cases and but nine deaths. This happy result, which is attributed, by the medical officer at Galveston, to the use of tannin in large doses, was observed also at Hempstead, where reliance appears to have been placed on camphor and opium pills; and at Onion creek, where calomel was employed in large doses.

The foregoing brief statement will serve to indicate the movements of cholera in the army during 1867. The general summary on page 15 shows that the total number of cases among the white troops during the year, including the month of June, was 317, of whom 139 died; among the colored troops, 187 cases and 91 deaths. The mortality was, therefore, 1 to every 2.28 cases for white; 1 to every 2.05 for colored troops. A comparison with the data of Circular No. 5 shows that the mortality during 1866 was, 1 to every 2.5 cases for white; 1 to every 1.9 cases for colored troops. The proportion of deaths to cases during 1867 was, therefore, rather larger for white and rather smaller for colored troops than during 1866.

The list of names already referred to gives a distinct record of 308 of the above cases among the white troops, and of 153 among the colored troops.

From these lists the following tables have been compiled, showing nativities, ages, length of service, and duration of recoveries, and of fatal cases:

WHITE TROOPS.

1. NATIVITIES.

	Cases.	Deaths.		Cases.	Deaths.
United States	145	58	Hungary	1	
Canada	12	2	Sweden	1	1
England	14	7	Denmark	2	1
Ireland	65	29	France	3	1
Scotland	4	2	Switzerland	7	2
Wales	1		Not stated	5	2
Germany	48	24	Total	308	129

2. AGES.

	Cases.	Deaths.		Cases.	Deaths.
20 years or under	45	10	40 to 45 years	2	
20 to 25 years	141	45	Over 50 "	1	
25 to 30 "	44	25	Not stated	41	29
30 to 35 "	19	10			
35 to 40 "	15	10	Total	308	129

3. LENGTH OF SERVICE.

	Cases.	Deaths.		Cases.	Death.
1 month or under	40	17	2 to 3 years	11	5
1 to 3 months	29	6	Over 3 years	21	8
3 to 6 "	15	4	Not stated	62	32
6 months to 1 year	39	21			
1 to 2 years	91	36	Total	308	129

4. DURATION OF CASES WHICH RECOVERED.

No. of days.	Cases.	No. of days.	Cases.	No. of days.	Cases.	No. of days.	Cases.
1	20	10	5	19	2	31	1
2	13	11	5	20	1	32	2
3	11	12	3	21	2	34	1
4	7	13	3	22	1	38	1
5	15	14	5	23	1	40	1
6	10	15	8	26	2	Not stated.	15
7	13	16	1	27	2		
8	8	17	4	28	1		
9	11	18	2	30	2	Total	179

5. DURATION OF FATAL CASES.

No. of days.	Deaths.	No. of days.	Deaths.	No. of days.	Deaths.
1	90	5	2	21	1
2	16	6	3	Not stated.	3
3	4	8	2		
4	7	10	1	Total.....	129

These tables were prepared from the monthly reports of sick and wounded; after which they were carefully compared with the lists of names furnished, every discrepancy being investigated and corrected, as was done in preparing the cholera tables. Some of the appended extracts from official reports give figures differing from the tables by one or two cases. The editor has not felt at liberty to change their text, but believes that in all such instances the corrected tables prepared under his supervision will be found to be accurate.

The extracts from official reports are quite voluminous, (Appendix, pp. 81–156,) but, it is thought, will be found full of interest. From them the following brief history of the epidemic has been prepared.

The more thoroughly the facts connected with the spread of yellow fever in the army during 1867 are known, the more strongly they appear to favor the theory of the exotic origin of epidemic yellow fever in the United States.

It is believed that a careful study of the documents here presented will satisfy the reader that the experience of the medical staff of the army last year furnishes many facts favorable to the doctrine of the portability and transmissibility of the disease, and favorable, therefore, to the establishment of an efficient quarantine in the case of vessels or persons coming from infected places. In this the experience of last year agrees with the general tenor of the experience of the medical staff of the army during the late war.

In addition to this important practical point, the events of last year will serve to direct the attention of medical men and commanding officers to the importance of promptly removing any command exposed to this pestilence to some healthy rural site; and this with every hope of avoiding the spread of the disorder to any serious extent, even if the removal has been delayed until cases have occurred among the men.

These practical conclusions appear the more important because the ordinary hygienic precautions were not found so effectual against yellow fever as experience had shown them to be against cholera, and because therapeutic endeavors have proved comparatively fruitless.

The reports indicate clearly two foreign sources from which the disease was imported into the United States last year—Vera Cruz, Mexico, and Havana, Cuba. From Mexico it was brought to Indianola, and thence to other points in Texas. At all other stations it seems to have been brought directly or indirectly from Havana; and it is worthy of remark that the cases here indicated as of Mexican origin were more fatal than those of Cuban origin, two out of every five cases of the former dying, while the mortality of the latter was but two out of seven. The ratio of deaths was 400 per thousand cases for the first of these groups, 284 per thousand for the second.

From Indianola the pestilence was carried to Galveston, and from each of these points it spread towards the interior of the State, along the chief routes of travel, being carried from Indianola to Victoria and Goliad; from Galveston to Houston, Hempstead, Brenham, and Austin.

At Ringgold Barracks and at Brownsville it was more directly of Mexican origin, as will be presently shown; and at Jefferson, Texas, in the northeastern portion of the State, where there were but two cases, one was a man who had just come up the Red river from New Orleans, the other was his attendant.

The fever was first introduced at New Orleans from Havana. It spread from New Orleans to Ship island, to Baton Rouge, and to all the other places in Mississippi, Alabama,

and Tennessee where cases are reported. At Key West and at Fort Jefferson, Tortugas, it was introduced directly from Havana.

The following paragraphs present a sketch of the facts attending the appearance of the disease at each of these posts:

In the latter part of the month of May, an infected schooner from Vera Cruz, Mexico, arrived at Indianola and landed bedding and other articles; four days afterwards, two of the workmen who handled these effects were taken sick with yellow fever; both died. The disease subsequently spread among the citizens; at first in the neighborhood of the wharf at which the schooner landed, afterwards extending from house to house up Main street. The company of troops on duty at the post was stationed to the southwest of the town, and escaped until the 16th of June, when two men who had been employed guarding quartermaster's property in the town were taken sick, and communicated the disease to the camp. During July other cases occurred, and the medical officer in charge, Acting Assistant Surgeon S. Santoire, recommended the removal of the command to Green Lake, twenty-two miles distant. This was done July 28th, leaving but a small detachment at Indianola, composed chiefly of men who had had the fever. Two cases occurred at Green Lake shortly after the detachment reached there, but none subsequently.

Towards the close of October, a detachment of the 35th Infantry, who had broken up their camp at Victoria, Texas, on account of the prevalence of yellow fever, arrived at Indianola; their arrival was followed by four cases and one death. There were in all 29 cases and 14 deaths among the troops near Indianola.*

The epidemic at Indianola was at first imagined to be bilious remittent fever, as has so often happened on the first appearance of epidemic yellow fever.

The appearance of yellow fever at Indianola was speedily followed by its outbreak at Galveston. There was unobstructed, almost daily communication between the two places, and the Morgan line of steamships made regular trips between Indianola and New Orleans, always stopping at Galveston both going and returning. Brevet Major Samuel Adams, Assistant Surgeon, U. S. A., states, in a letter dated August 13th, (see Appendix, page 83,) that the first case of the fever which occurred at Galveston was brought from Indianola about June 26th, and died, two days afterwards, at one of the boarding-houses in the lower part of the city. He asserts that the introduction of the disease was the result of gross negligence on the part of the city authorities, who did not attempt to establish quarantine until after this fatal case had occurred. Brevet Major Cyrus Bacon, Assistant Surgeon, U. S. A., who arrived in Galveston September 17th, after the death of Dr. Adams, has contributed an interesting report of the epidemic at Galveston. In this paper he states, on the authority of a local physician, that a man from New Orleans had been admitted to the City hospital June 22d with yellow fever, and recovered. The details of the history of this case have not been communicated, and the well-known accuracy of Dr. Adams, who was on the spot at the time of the occurrence of these cases, leads the writer of this report to look upon his statement with regard to the first unmistakable case of yellow fever as being substantially correct. The Galveston and Texas Medical Journal of February, 1868, contains an excellent account of the epidemic in this city, by Dr. S. M. Welch, a resident of Galveston. The writer gives an account of the introduction of yellow fever, which perfectly agrees with the story of Dr. Adams, although he mentions the alleged case of June 22d, which he

*The foot note to table I, Appendix, page 71, says, erroneously, "there were, besides, two cases in June.". It has since been observed that the July list of names duplicates these cases, so that the text above is accurate.

disease. He admits that Dr. Savage's case was probably one of yellow fever. It is difficult to decide between such differences of opinion, the details of which will be found in the appended papers; but if it be admitted that the disease at Brownsville was yellow fever, and of this there appears to be no doubt, it is at least highly probable that the very similar epidemic at Rio Grande City partook of the same nature. The case of Dr. Furley is, therefore, here recorded as yellow fever.

At Jefferson, in the northeastern portion of the State of Texas, two cases and one death are reported during October. The fatal case was a sergeant who had just arrived by steamer from New Orleans. The other case was one of his attendants. The fever did not, however, extend to the little garrison.

Yellow fever was introduced among the citizens at New Iberia, Louisiana, by people flying from the pestilence at Galveston. It prevailed extensively during August and September, but the detachment of colored troops stationed at that place, having been removed to a camp some 15 miles distant, wholly escaped.

The mode in which the pestilence was introduced at New Orleans possesses great interest, on account of the conflicting stories which have been received with regard to the origin of the disease in former years.

As early as May 29th, the general commanding the Fifth Military District announced, in a letter to the commander of the District of Louisiana, that yellow fever was prevalent at Havana, and that, as the proper authorities had failed to establish quarantine regulations, he feared it would, ere long, be introduced into the city, and thence communicated to the troops. This apprehension was, unhappily, fully realized.

Free communication existed not only with Havana, but with Vera Cruz. During May twelve vessels arrived from the infected port of Havana, and two from the infected port of Vera Cruz, no quarantine having been exacted; during June eleven vessels from Havana, and one from Vera Cruz; and during July eight from Havana. In the absence of a vigilant board of health, the precise details of the first outbreak of the pestilence will, probably, never be known; but, so far as can be learned, the first case was a man named John Cowarts, who had been engaged in unloading the cargo of the bark Bessie, recently from Havana, and had been at work in the hold several days when he was taken sick, June 5th; was carried to the City hospital June 7th, and died with black vomit June 10th.

On the 23d of June the bark Florence Peters arrived at Algiers, opposite New Orleans. This vessel left Havana June 3d; no cases occurred during the voyage, but on the day of her arrival the captain's wife was attacked with yellow fever; she died June 30th. June 25th her sister was attacked, and June 26th her infant daughter. About the same date the second mate fell a victim; he died, July 8th, in the Charity hospital. The vessel was now ordered to be cleaned and fumigated, but she had previously twice changed her position to different points on the New Orleans side of the river.

The first case reported among the troops was Lieutenant Orville Dewey, of the 4th Cavalry; he was attacked June 23d, and died June 30th, at the St. Charles Hotel. Lieutenant Dewey had just arrived from Indianola, Texas, where yellow fever was prevailing at the time, and where he undoubtedly contracted the disease. His room in the hotel was disinfected and fumigated, and there is no evidence that any persons were infected by him.

The first case reported among the troops constituting the garrison of New Orleans was taken sick at Jackson Barracks July 1st, the second at Jackson Barracks July 11th;

altogether four cases and three deaths in July. The disease became epidemic in the city, of New Orleans during August, and continued to prevail until December. During this period, out of an average mean strength of 761 white troops, six hundred and fifty-nine cases and one hundred and ninety-five deaths are reported, with one hundred and sixty-three cases and twenty-three deaths, out of an average mean strength of 313 colored troops. Besides the above, sixty-six white seamen, of whom fifteen died, and fifteen colored seamen, all of whom recovered, were treated at the post hospital.

Among the patients were fourteen medical officers, two of whom died.

Over three thousand deaths were reported among the citizens of New Orleans.

The fever having become epidemic at New Orleans, subsequently spread thence to various points between which and New Orleans unrestricted water communication existed.

At Baton Rouge, La., it appeared among the citizens about the 10th of September. Brevet Lieutenant Colonel W. D. Wolverton, Assistant Surgeon, U. S. A., says that his recollection of the cases that occurred among the citizens at that place during the season is, that they were traced from New Orleans. There were, however, but three cases among the troops. The first was admitted to hospital July 31st; he had been on duty, from June 12th to July 11th, on the west bank of Red river, near its mouth, where yellow fever was reported to exist among the citizens. The second patient was attacked September 24th and died September 29th; he contracted the fever in Baton Rouge, where the disease was then prevailing. The third was attacked November 9th and died next day; he also contracted the fever in Baton Rouge. There were no other cases in the detachment stationed at Baton Rouge, the average mean strength of which was 222 officers and men. This immunity is ascribable to the fact that the command was moved away from the town to Camp Coe, about six miles from the river, shortly after the first case occurred.

At Vidalia, La., Acting Assistant Surgeon E. Alexander reports three cases, during August, in Company "K," 20th Infantry; neither of these cases proved fatal. One fatal case, during October, is attributed by him to the receipt by the patient of infected documents from New Orleans. The soldiers stationed at Vidalia were in full communication with Natchez, on the opposite side of the river, where the disease prevailed among the citizens.

At Natchez, Miss., on the opposite side of the river from Vidalia, two cases are reported during September in the detachment there stationed; both of these cases recovered. The disease had previously prevailed among the citizens, and these cases are believed to have been contracted on quarantine guard.

At Vicksburg, Miss., the first case among the troops occurred October 15th, the last, December 21st; in all, thirteen cases and four deaths; mean strength of the command for the six months, 267. Before the first case among the troops, the disease had broken out among the citizens of the town, and most of the cases among the troops were men who were on duty in the city at the time of their attack.

At Jackson, Miss., one fatal case is reported during October, out of a mean strength of 278. A number of cases had previously occurred among the citizens at Byram's Station, some nine miles from Jackson, and a few among the citizens of Jackson.

At Memphis, Tenn., the disease also prevailed among the citizens, but the troops escaped, with the exception of Assistant Surgeon W. S. Tremaine, in charge of a detachment, and the man detailed to nurse him. Dr. Tremaine had visited citizens sick of the fever during the month of October.

One fatal case is reported at Opelousas, La., during October, in a detachment of cavalry numbering 79 men; no particulars have been reported.

At Alexandria, La., on the Red river, there were two cases and one death during October, and two cases and one death during November; two of these were men admitted from steamers ascending the river from Baton Rouge; the third was Acting Assistant Surgeon J. F. M. Forwood, on duty at the post, who had been visiting cases among the citizens; the fourth was the commanding officer of the post, who had been with Dr. Forwood during his attack, and who had also visited the first of the two cases of yellow fever brought by steamer to the place. The case of Dr. Forwood was, unfortunately, overlooked in preparing table 26. (Appendix, page 80.) The company of the 20th Infantry stationed at this post was removed to camp eight miles from the town and wholly escaped. The citizens of Alexandria, however, suffered severely, the disease having been imported among them from New Orleans during September.

At Shreveport, La., still higher up the Red river, the disease appeared about the 24th of August, and, between that time and the close of December, 124 deaths are reported among the citizens. Communication between the troops and the town being forbidden, the command stationed here escaped.

From New Orleans, also, the fever was carried to Ship island, about the 14th of September, by a white prisoner and his guard of colored soldiers. The prisoner died, and three of the guard were attacked, but recovered. During October two other white prisoners were attacked and died. Three companies of colored infantry were at this time stationed at Ship island, with seventy-five white and twenty colored prisoners, but the disease did not spread.

Company "K," 24th Infantry, was stationed at Pass Christian, Miss., where yellow fever made its appearance about the first of October, being introduced from New Orleans by one of the brothers of the Christian Association, who was attacked shortly after returning from New Orleans. October 11th the command was moved to Winchester, Miss., where they arrived October 13th, leaving three sick and a guard of five men at Pass Christian. Four of the guard took the fever, and a few cases occurred after the command reached Winchester. In all, there were fourteen cases and five deaths out of a command of 64 officers and men.

Yellow fever was brought to Fort Morgan, Mobile bay, by Lieutenant J. K. Heslep, of the Engineers Corps, who was taken sick August 9th, having just previously arrived from New Orleans, where the disease was prevailing; he died August 13th. An officer who roomed with this patient, and the physician who attended him, were attacked on the 23d, and, subsequently, others of the command; in all, twenty-four cases and twelve deaths out of a mean strength of 55. The command was removed during September from the post to a camp about four miles distant, with the apparent effect of checking the further progress of the disease.

At Fort Gaines, on the opposite side of the entrance to the harbor, there was but one case reported in December out of a mean strength of 79. This man had just returned from Mobile, where the disease was still prevailing.

There is nothing positive to show how yellow fever was introduced at Mobile, but as officers and others appear to have passed freely between the city and Forts Morgan and Gaines, there can be but little doubt as to the source of infection. At all events, the first

case among the troops at Mobile was that of Major Tracy, attacked September 17th, nearly a month after the fever began to prevail at Fort Morgan, at the mouth of the harbor. About the same time the disease appeared among the citizens of Mobile. September 18th the troops at Mobile were moved to Stark's Landing, on the eastern shore of the bay, about ten miles from the city; a few cases occurred, however, among the troops thus moved, as well as among the few left behind; in all, there were twenty-two cases and seven deaths out of an average mean strength of 306.

At Barrancas, Fla., one fatal case is reported. The patient was taken off a quartermaster's steamer from New Orleans. The disease did not extend to the command.

That the escape of the troops at Barrancas was due to the mode in which they were isolated, and not to the absence of the conditions which favor the development of the disease in persons exposed, is shown by the history of the epidemic among the citizens of the adjacent town of Pensacola and the naval station at that place. At the naval station 161 cases and 34 deaths occurred. The details are presented in the interesting report appended. (See Appendix, page 147.)

At Key West, Florida, yellow fever was imported directly from Havana. The first case among the troops at Key West occurred August 22d; in all, there were seventeen cases and two deaths, the last cases occurring in October. The disease was introduced by the Spanish frigate Francisco de Assiz, which, followed a few hours later by the English steamer Narva, arrived at Key West July 31st, for the purpose of laying the submarine cable between Key West and Cuba. The Francisco de Assiz had been lying for some time in the harbor of Havana, where she had many cases of yellow fever on board. The health officer's wish to quarantine these ships was overruled by superior authority, and free communication permitted between the ships and shore. Shortly after the arrival of the two ships, yellow fever appeared on the Narva. Her sick, officers and men, were brought on shore and treated in the principal hotel, in the Marine hospital, and in private dwellings, where many of them died. Up to this time there had been no yellow fever at Key West, but shortly after cases began to occur among both the citizens and the troops.

According to the report of a board of officers appended, (Appendix, page 153,) the first case of yellow fever at Fort Jefferson, Tortugas, appeared August 19th; and, in all, one hundred and eighty-six cases and thirty-two deaths occurred among the troops, the last cases being in October. There are, besides, thirty-six cases and two deaths reported among the white prisoners at the post, and two cases, not fatal, among the colored prisoners. The report of the board does not account for the introduction of the disease. The schooner Matchless, which arrived on the 25th of August, is said to have brought a case; but as five had occurred previously, the original introduction of the fever remained unaccounted for It has, however, been ascertained, quite recently, that a case had occurred before the first mentioned in the report of the board, which fully explains the mode in which the disease was introduced. An officer who had visited Havana returned to Fort Jefferson on the 3d or 4th of July; on the 18th he was attacked with yellow fever; he recovered and went north, convalescent, August 3d. The death of the medical officer in charge at the time undoubtedly accounts for the omission of this important fact in the original report.

Finally, at Tallahassee, Florida, two cases and one death are reported during the month of October out of a strength of 92 officers and men. Acting Assistant Surgeon

T. Artaud says of the fatal case, that the patient was brought from Madison, Florida, but he states that yellow fever was not existing either at Madison or at Tallahassee.

The foregoing summary statement exhibits the chief facts of the epidemic so far as known. For details the reader is referred to the documents presented in the Appendix. A numerical summary of these facts shows that there were 1,349 cases and 428 deaths of white, 171 cases and 25 deaths of colored troops, including the cases in June; the mortality being 317 deaths per thousand cases, or one death to every 3.15 cases for the white, 146 deaths per thousand cases, or one death to every 6.84 cases for the colored troops. The mortality for the whole number, including both white and colored, was 298 per thousand, or one death to every 3.36 cases.

It will be observed, on comparing the ratios above given, that the number of cases and the ratio of deaths to cases among the colored troops is considerably smaller than among the white. Since, however, the whole number of colored troops exposed was much smaller than that of the white, the comparison will be most fairly made if we take the figures for New Orleans, (see Tables 11 and 12, pp. 74–75,) where white and colored appear to have been exposed. Here it will be clearly seen that the proportion of cases and deaths to strength, and also of deaths to cases, is much greater among the white troops. Of these there were 866 cases and 256 deaths per thousand average mean strength for the six months, while of the colored troops, for the same time, the ratio was but 521 cases and 73 deaths per thousand of strength. The relation between cases and deaths was as follows: For white troops, 296 deaths per thousand cases, or one death to every 3.38 cases; for colored troops, 141 deaths per thousand cases, or one death to every 7 cases.

The weekly progress of the epidemic is well shown in the following tables for Galveston, Houston, New Orleans, and Fort Jefferson, which are the places where the largest number of cases occurred:

1. WEEKLY MOVEMENT OF YELLOW FEVER AT GALVESTON, TEXAS.

Week.	Cases.	Deaths.	Week.	Cases.	Deaths.
Week ending July 6th	2		Week ending Sept. 7th	32	13
" " 13th	2	1	" " 14th	29	19
" " 20th	1	1	" " 21st	23	12
" " 22d	4		" " 28th	19	7
" Aug. 3d	3	1	" Oct. 5th	8	5
" " 10th	13	1	" " 12th	6	3
" " 17th	8	1	" " 19th	2	1
" " 24th	13	5	" " 26th	2	.....
" " 31st	32	7	" Nov. 2d	.....	2
			Total	199	79

2. WEEKLY MOVEMENT OF YELLOW FEVER AT HOUSTON, TEXAS.

Week.	Cases.	Deaths.	Week.	Cases.	Deaths.
Week ending Sept. 7th	1	.....	Week ending Oct. 19th	20	6
" " 14th	5	1	" " 26th	6	6
" " 21st	3	2	" Nov. 2d	5	.....
" " 28th	3	2	" " 9th	1	.....
" Oct. 5th	12	4			
" " 12th	15	4	Total	71	25

3. WEEKLY MOVEMENT OF YELLOW FEVER AMONG WHITE TROOPS AT NEW ORLEANS, LA.

Week.	Cases.	Deaths.	Week.	Cases.	Deaths.
Week ending June 30th	1	1	Week ending Sept. 23th	135	41
" July 6th	2	.....	" Oct. 5th	57	22
" " 13th	1	2	" " 12th	27	14
" " 20th	.....	.....	" " 19th	12	6
" " 27th	1	1	" " 26th	9	6
" Aug. 3d	2	.....	" Nov. 2d	6	4
" " 10th	13	5	" " 9th	4	3
" " 17th	29	4	" " 16th	1	.....
" " 24th	25	8	" " 23d	2	.....
" " 31st	39	14	" " 30th	2	1
" Sept. 7th	43	12	" Dec. 7th	1	1
" " 14th	98	11			
" " 21st	150	40	Total	660	196

4. WEEKLY MOVEMENT OF YELLOW FEVER AMONG COLORED TROOPS AT NEW ORLEANS, LA.

Week.	Cases.	Deaths.	Week.	Cases.	Deaths.
Week ending Aug. 10th	3	.....	Week ending Oct. 12th	12	6
" " 17th	2	.....	" " 19th	5	2
" " 24th	6	2	" " 26th	6	1
" " 31st	4	.....	" Nov. 2d	7	.....
" Sept. 7th	13	1	" " 9th	.....	.....
" " 14th	24	3	" " 16th	.....	.....
" " 21st	29	1	" " 23d	.....	.....
" " 28th	20	5	" " 30th	.....	1
" Oct. 5th	32	1	Total	163	23

5. WEEKLY MOVEMENT OF YELLOW FEVER AT FORT JEFFERSON, TORTUGAS, FLA.

Week.	Cases.	Deaths.	Week.	Cases.	Deaths.
Week ending Aug. 24th	3	1	Week ending Oct. 5th	13	3
" " 31st	9	1	" " 12th	4	1
" Sept. 7th	25	5	" " 19th	3	.....
" " 14th	58	7	" " 26th	1	.....
" " 21st	25	4	Unknown	17	.....
" " 28th	28	10	Total	186	32

Thus, at Galveston, Texas, the greatest number of cases were reported during the weeks ending August 31st and September 7th; the greatest number of deaths during the week ending September 14th. At Houston, Texas, the greatest number of cases during the week ending October 19th; the greatest number of deaths during this week and the next. At New Orleans, La., the greatest number of cases among the white troops were reported during the week ending September 21st; the greatest number of deaths during this week and the next. At the same place, among the colored troops, the greatest number of cases during the week ending October 5th; the greatest number of deaths during the following week. At Fort Jefferson, Tortugas, the greatest number of cases were reported during the week ending September 14th; the greatest number of deaths during the week ending September 28th.

Still further comparisons may be made from the monthly tables in the Appendix: thus, at Indianola, the greatest number of cases and deaths occurred during July; at Galveston, during September; at Victoria, Houston, and Hempstead, during October; at New Orleans, during September; at Vicksburg, during October and November; at Fort Morgan, Mobile harbor, during August; at Mobile, during October; at Key West, during September and October; at Fort Jefferson, during September.

Such facts strongly favor the belief that the period of maximum intensity corresponds to the date of the introduction of the disease, rather than to any supposed controlling influence of season or climate.

The lists of patients already referred to at the commencement of this report have rendered it possible to construct the following tables, showing the nativities, ages, and length of service of the patients, and the comparative duration of the disease in the cases that recovered and in fatal cases:

(WHITE TROOPS.)

1. NATIVITIES.

	Cases.	Deaths.		Cases.	Deaths.		Cases.	Deaths.
United States	572	165	Hungary	2	1	Switzerland	8	2
Canada	29	14	Poland	1	1	Italy	3	1
England	50	13	Russia	3	2	East Indies	1	.....
Ireland	275	68	Sweden	7	3	At sea	2	1
Scotland	11	4	Denmark	2	1	Not stated	49	27
Wales	1	1	Belgium	1	.....			
Germany	180	64	France	7	.....	Total	1,204	368

2. AGES.

	Cases.	Deaths.		Cases.	Deaths.
20 years or under	237	71	40 to 45 years	8	2
20 to 25 years	538	163	45 to 50 "	2	1
25 to 30 "	232	70	Over 50 "	3	1
30 to 35 "	80	26	Not stated	75	30
35 to 40 "	29	4	Total	1,204	368

3. LENGTH OF SERVICE.

	Cases.	Deaths.		Cases.	Deaths.
1 month or under	15	10	2 to 3 years	82	24
1 to 3 months	30	11	Over 3 years	66	10
3 to 6 "	61	25	Not stated	329	99
6 months to 1 year	173	64			
1 to 2 years	448	125	Total	1,204	368

4. DURATION OF CASES WHICH RECOVERED.

No. of days.	Cases.	No. of days.	Cases.	No. of days.	Cases.	No. of days.	Cases.
2	2	16	17	30	5	46	5
3	16	17	29	31	10	47	3
4	14	18	19	32	9	50	3
5	23	19	22	33	7	53	4
6	35	20	21	34	6	58	4
7	48	21	19	35	8	62	6
8	47	22	19	36	1	64	2
9	55	23	12	37	3	67	1
10	48	24	10	38	3	72	5
11	47	25	11	39	2	75	1
12	32	26	14	40	2	85	1
13	38	27	11	41	1	91	1
14	40	28	11	42	1	Not stated.	41
15	24	29	10	44	7	Total	836

5. DURATION OF FATAL CASES.

No. of days.	Deaths.	No. of days.	Deaths.	No. of days.	Deaths.	No. of days.	Deaths.
1	28	10	13	19	1	33	1
2	43	11	7	20	1	34	1
3	61	12	4	21	2	37	1
4	55	13	1	22	1	51	2
5	46	14	1	23	1	54	1
6	30	15	1	25	1	Not stated.	3
7	23	16	1	30	1		
8	18	17	3	31	1		
9	12	18	2	32	1	Total.....	368

(COLORED TROOPS.)

1. AGES.

	Cases.	Deaths.		Cases.	Deaths.
20 years or under.....	33	4	35 to 40 years.....	2	.....
20 to 25 years.....	109	18	Not stated.....	1	.....
25 to 30 years.....	14	2			
30 to 35 years.....	7	1	Total.....	166	25

2. LENGTH OF SERVICE.

	Cases.	Deaths.		Cases.	Deaths.
1 month or under.....	4	1	1 to 2 years.....	35	3
1 to 3 months.....	76	13	2 to 3 years.....	6	1
3 to 6 months.....	13	2	Not stated.....	2	1
6 months to 1 year.....	30	4	Total.....	166	25

3. DURATION OF CASES WHICH RECOVERED.

No. of Days.	No. of Cases.	No. of Days.	No. of Cases.	No. of Days.	No. of Cases.
4	1	19	4	34	1
5	4	20	3	36	4
6	8	21	2	37	4
7	6	22	2	38	2
8	8	23	5	39	5
9	6	24	2	40	1
10	2	25	2	41	1
11	5	26	2	46	1
12	5	27	2	54	3
13	7	28	5	57	1
14	8	29	4	67	1
15	6	30	1	Not stated.	1
16	3	31	2		
17	5	32	2		
18	3	33	1	Total.....	141

4. DURATION OF FATAL CASES.

No. of Days.	No. of Deaths.	No. of Days.	No. of Deaths.	No. of Days.	No. of Deaths.
1	6	6	2	16	1
2	1	7	2	32	1
3	2	9	1		
4	2	11	1		
5	2	12	4	Total.....	25

The lists of patients from which the foregoing tables were constructed, show that second attacks of the same patient, during the same epidemic, occasionally occur; fourteen such cases are reported at New Orleans and six at Fort Jefferson.

Of the medical officers exposed, by their duty, to the epidemic, thirty-one contracted the disease, and of these ten died, as shown in the following list:

LIST OF MEDICAL OFFICERS, U. S. ARMY, WHO DIED OF YELLOW FEVER.

1. Surgeon George Taylor, Brevet Lieutenant Colonel, died August 5, 1867, at Galveston, Texas.

2. Assistant Surgeon C. H. Rowe died September 5, 1867, at Galveston, Texas.

3. Assistant Surgeon J. Sim Smith, Brevet Major, died September 8, 1867, at Fort Jefferson, Florida.

4. Assistant Surgeon Samuel Adams, Brevet Major, died September 9, 1867, at Galveston, Texas.

5. Acting Assistant Surgeon B. S. Reilly died September 28, 1867, at Rio Grande City, Texas.

6. Acting Assistant Surgeon Lucius Smith died October 21, 1867, at Hempstead, Texas.

7. Acting Assistant Surgeon W. E. Savage died November 21, 1867, at Ringgold Barracks, Texas.

8. Acting Assistant Surgeon C. M. Dickerson died July 7, 1867, at Columbus, Miss.

9. Acting Assistant Surgeon E. D. Grinder died November 25, 1867, at New Orleans, La.

10. Acting Assistant Surgeon G. W. Shields died August 10, 1867, at New Orleans. Louisiana.

LIST OF MEDICAL OFFICERS, U. S. ARMY, ATTACKED WITH YELLOW FEVER WHO RECOVERED.

1. Surgeon B. A. Clements, Brevet Lieutenant Colonel, attacked September 15, 1867, at New Orleans, La., recovered October 3, 1867.

2. Assistant Surgeon C. B. White, Brevet Major, attacked September 20, 1867, at New Orleans, La., recovered October 13, 1867.

3. Assistant Surgeon H. E. Brown, Brevet Major, attacked October 28, 1867, at New Orleans, La.

4. Assistant Surgeon M. J. Asch, Brevet Major, at St. Louis during September.

5. Assistant Surgeon E. A. Koerper, attacked September 15, 1867, at New Orleans, La., recovered October 7, 1867.

6. Assistant Surgeon H. McL. Cronkhite, attacked September 23, 1867, at Galveston, Texas, recovered October 12, 1867.

7. Assistant Surgeon Edward Cowles, attacked October 15, 1867, at Brownsville, Texas, recovered November 7, 1867.

8. Assistant Surgeon W. S. Tremaine, attacked October 31st, 1867, at Memphis, Tenn., recovered November 24, 1867.

9. Acting Assistant Surgeon William Deal, attacked September 16, 1867, at New Orleans, La., recovered September 27, 1867.

10. Acting Assistant Surgeon J. J. Auerbach, attacked September 16, 1867, at New Orleans, La., recovered September 30, 1867.

11. Acting Assistant Surgeon F. A. Willmans, attacked September 30, 1867, at New Orleans, La., recovered October 11, 1867.

12. Acting Assistant Surgeon Orsamus Smith, attacked September 23, 1867, at New Orleans, La., recovered October 2, 1867.

13. Acting Assistant Surgeon Samuel Santoire, attacked July 3, 1867, at Indianola, Texas, recovered July 16, 1867.

14. Acting Assistant Surgeon C. C. Furley, attacked September 30, 1867, at Ringgold Barracks, Texas, recovered October 7, 1867.

15. Acting Assistant Surgeon J. F. M. Forwood, attacked October 2, 1867, at Alexandria, La., recovered October 25, 1867.

16. Acting Assistant Surgeon L. Reynolds, attacked August 25, 1867, at Fort Morgan, Ala., recovered August 30, 1867.
17. Acting Assistant Surgeon Heber Smith, at New Orleans, La; no date given.
18. Acting Assistant Surgeon Henry Smith, at New Orleans, La.; no date given.
19. Acting Assistant Surgeon J. T. Payne, at New Orleans, La.; no date given.
20. Acting Assistant Surgeon J. Ridgely, attacked during September at Victoria, Tex.
21. Acting Assistant Surgeon Z. P. Dœhnler, at New Orleans, La; no date given.

To the foregoing summary statement of the progress of yellow fever in the army during the year 1867, it has been thought desirable to add a brief account of the circumstances attending the limited occurrence of this disease among our armies during the war of the rebellion.

The interesting reports and documents from which this account is drawn will, it is hoped, be presented in full in the second volume of the medical history of the war. All that can here be attempted is an outline of the most striking facts.

The strict blockade maintained for military purposes during the rebellion appears to have served to protect our armies from yellow fever. The troops at New Orleans and throughout the Department of the Gulf wholly escaped, and the disease appeared elsewhere to but a limited extent during the years 1862 and 1864.

In July, 1862, yellow fever broke out at Key West, having been imported from Havana by the bark Adventure. It subsequently extended to Fort Jefferson, Tortugas, and to Hilton Head, South Carolina, though at both these places the number of cases was comparatively small.

From the quarterly reports of Surgeon E. S. Hoffman, 90th New York Volunteers, and appended documents, it appears that on June 17, 1862, the bark Adventure cleared from Havana and put into Key West, in distress, about the 20th, was quarantined ten days, and lay at quarantine three days after that time had elapsed. On the third day, or about sixteen days after leaving Havana, the first and second mates were taken sick with yellow fever. Two days later, or about the fourth or fifth of July, these patients, and two others of the crew, also sick with the fever, were taken on shore and placed in the Marine hospital, where the first mate died two days after, and the others ultimately recovered, one of them after a sickness of eleven days. July 27th, a soldier of the 90th New York was attacked, and the disease subsequently spread through the garrison with the results shown in the following table:

Month	JULY.	AUGUST.	SEPTEMBER.	OCTOBER.	TOTAL.
Mean strength	448	447	385	382	415
Cases	2	153	137	39	331
Deaths	2	30	32	7	71

The treatment generally pursued is stated to have been a hot mustard bath, followed by a purge of calomel and castor oil, and subsequently by large doses of sulphate of quinia.

At this time a detachment of the 90th New York volunteers garrisoned Fort Jefferson, Tortugas, the medical officer being Assistant Surgeon J. Chapman, of that regiment. Eleven cases of yellow fever and four deaths are reported by him during the month of October. He, moreover, reports that there were a number of cases amongst the workmen employed by the Engineer Department, and that two of them died.

Dr. Chapman denies that the disease was imported, and states that all vessels arriving from infected ports were quarantined from seven to fourteen days. It hence appears that vessels did arrive from infected ports, probably from Key West, where the greater part of the regiment was stationed; and as the time of quarantine allowed was insufficient, it is, probably, from Key West that the disease was introduced on this occasion. The treatment employed is not reported.

At a still earlier period the epidemic was carried from Key West to Hilton Head, S. C. The report of Assistant Surgeon J. E. Semple, U. S. A., dated January 1, 1863, states that the steamer Delaware, with a detachment of the 7th New Hampshire Volunteers, arrived from Key West early in September, and, after a short quarantine, landed her passengers at Hilton Head September 8th. Shortly after several of them were taken sick and eight died, the last of the fatal cases terminating September 17th. Assistant Surgeon General C. H. Crane, then Medical Director at Hilton Head, expresses his belief that unreported cases had occurred during the passage of the Delaware from Key West.

On the 9th of October a quartermaster's employé was attacked, and subsequently several officers and soldiers. All these cases occurred in the vicinity of the wharf where the Delaware had landed her passengers, and where, also, the hygienic conditions are reported to have been bad.

There were at this time about ten thousand soldiers at Hilton Head and Beaufort, but the disease did not spread among them; and in the general hospital, where most of the fatal cases were treated, the physicians, attendants, and patients sick of other diseases, escaped.

Including the passengers by the Delaware, the whole number of cases at Hilton Head was as follows: September, ten cases, eight deaths; October, twenty cases, eight deaths; November, ten cases, nine deaths: total, forty cases, twenty-five deaths.

In the treatment, reliance appears to have been placed chiefly on calomel and quinine.

The whole number of cases reported during 1862 at Key West, Tortugas, and Hilton Head, was 382, with 100 deaths.

It is interesting to mention, in this connection, that yellow fever occurred during 1862 among the citizens of Charleston, S. C., and Wilmington, N. C. Dr. Hand, in the reports to be presently referred to, states that at Charleston a small number of cases were reported during September and October, and that there can be little doubt that the disease was introduced by blockade runners, several of them having been quarantined with yellow fever on board.

At Wilmington the number of cases was much larger. Out of 3,000 inhabitants, white and black, who remained in the city, 1,200 are reported to have died. August 6th, just before the outbreak of the epidemic, the steamer Kate, blockade runner from Nassau, arrived at Wilmington with yellow fever on board. Dr. W. T. Wragg, in an article published in the Confederate States Journal, February, 1864, states, on the authority of a Dr. Schonwald, that other cases had previously occurred. Dr. Hand found,

upon inquiry, that Dr. Schonwald was an empiric, in whose statements no confidence can be placed. Yellow fever was prevalent at Nassau at this time.

Yellow fever did not again appear in the army during 1863, but during 1864 Key West was again visited, and the disease became epidemic among the troops stationed at Newbern, North Carolina.

At Key West, Surgeon A. E. Stocker, United States Volunteers, reports sixty-four cases of yellow fever and seventeen deaths in the "District of Key West and Tortugas" for July, 1864; fourteen cases and four deaths for August. No particulars have been reported, but most of these cases are understood to have occurred at Key West.

At Newbern, N. C., the fever appeared about the first of September of the same year, and continued until towards the end of November. Seven hundred and five cases and two hundred and eighty-eight deaths were reported among the white troops in North Carolina, chiefly at Newbern, and thirty-eight cases and fifteen deaths among colored troops at same place.

There were at this time about seven thousand white troops in North Carolina. Surgeon D. W. Hand, United States Volunteers, at that time Medical Director of the District of North Carolina, was authorized by the Surgeon General, January 16, 1866, to visit Newbern, N. C., and such other points as might be necessary, in order to collect such facts with regard to this epidemic as could be obtained at that date.

Especial interest attached to the subject on account of the assertion that the fever had been introduced by infected clothing from the West Indies, sent *via* Halifax under the auspices of Dr. Blackburn. On this subject Dr. Hand has made a special report, dated April 1, 1866, in which he recounts his inquiries on the subject, and concludes, that although the infected clothing reached Washington, D. C., and was sold there, no evidence exists to render it probable that any of it reached Newbern.

This source of importation excluded, and the rigid nature of the blockade enabling Dr. Hand to make the statement that no vessel was admitted from an infected port, it must be supposed either that the disease originated at Newbern, or that it was brought overland from Charleston, S. C., where it became epidemic a month earlier than the first case at Newbern.

The following are the facts bearing on this question as collected by Dr. Hand:

Yellow fever appeared in Newbern about the first of September, 1864, and was at the time reported by Dr. Hand to Surgeon C. McCormick, the Medical Director of the department, as an epidemic of hepatic remittent fever of a fatal character. The real nature of the disease, however, was soon recognized.

Dr. Hand enumerates the initial cases as follows:

"Private O. Pollock, 3d N. Y. Artillery, clerk at District Headquarters, corner of Union and East Front streets, was admitted to Foster hospital September 2d and died September 6th.

"Private F. Coates, 3d N. Y. Cavalry, orderly at District Headquarters, had been sick several months; returned to duty August 23d, from Morehead City general hospital; admitted to Foster hospital September 1st and died September 6th.

"Private G. C. Lillie, U. S. Signal Corps, was admitted to Foster hospital September 4th, from Signal Corps office, on opposite corner from District Headquarters, and died September 6th.

"Mrs. Wilcox, a white refugee, corner of George and South Front streets, had chills for a month or more; taken quite sick September 1st; had black vomit; turned yellow, and died September 7th. This woman had lived in that house one month, and in Newbern eight months.

"A Mrs. Prudence Rice, whom I did not see, died September 6th, in the next house to Mrs. Wilcox, with what was probably yellow fever.

"Sergeant M. Rogers, 15th Connecticut, jailer at Confederate prison corner of George and Pollock streets, was taken September 7th; admitted to regimental hospital the same evening; had black vomit, and died September 9th."

It will be seen, from the above extract from Dr. Hand's report, that Mrs. Wilcox was taken sick on September 1st, which is the same date as the earliest case reported among the troops; that her neighbor, another woman, had the same disease, and died September 6th, the date at which she was taken sick being unknown; nor is it possible now to know how many other cases, unobserved and unreported, may have occurred among the refugees at an earlier period.

It has been suggested that refugees from Wilmington, North Carolina, may have introduced the fever; but Dr. Hand's inquiries would appear to show that the epidemic at Wilmington broke out at a later date than at Newbern; and he relates that although a few refugees came in during August, none of them are known to have come from Wilmington. On the whole, Dr. Hand is of the opinion that the disease at Newbern was of local origin, and he recounts the various unfavorable hygienic influences which he supposes may have contributed to its production.

After the existence of the disease was recognized, soldiers and citizens were sent rapidly away from Newbern to Morehead City, Beaufort, Hatteras, Roanoke island, and elsewhere. To this fact we must undoubtedly attribute the large proportion of the troops who escaped. In a number of instances individuals were attacked with the fever among those thus sent away; but, according to Dr. Hand, the disease nowhere spread to others, except at Beaufort, where it prevailed to a limited extent. Beaufort is described as being deficient in police and crowded with refugees from Plymouth and Little Washington.

The following was the monthly number of cases and deaths among the white troops:

September,	174	cases, and		70	deaths.
October,	493	"	"	200	"
November,	38	"	"	18	"
Total,	705	"	"	288	"

This gives the proportion of one death to every 2.4 cases, or about two to five.

At the Foster general hospital there were treated, besides, thirty-eight colored soldiers, of whom fifteen died, and forty-one quartermaster's employés, of whom twenty-six died.

In a letter dated October 31, 1864, Dr. Hand states that sixteen medical officers had been attacked up to that date, and eight had died.

The treatment regarded best was a cathartic dose of calomel, followed by repeated small doses of the same medicine, not, however, pushed to ptyalism.

Precise data as to the prevalence of the disease among the citizens of Newbern and the refugees are not attainable.

Surgeon C. A. Cowgill, U. S. Volunteers, in charge of the Foster general hospital, Newbern, contributes a report to accompany his monthly report of sick and wounded for November, 1864, which contains some interesting statements. It appears that 292 cases were admitted to that hospital during the epidemic; that 118 convalescents and attendants were attacked; making, in all, 410 cases and 181 deaths of white troops. Dr. Cowgill states, on the authority of Surgeon Mayer, of the 15th Connecticut Volunteers, that after a number of cases of the fever had been brought to the hospital, the disease appeared among the inmates of the hospital, convalescents from malarious diseases being first attacked, then convalescents from other diseases, and finally the attendants.

Dr. Cowgill further states, that during August and the early part of September remittent and intermittent fevers were the prevailing types of disease, but that these disappeared during the prevalence of the epidemic.

Previously to the outbreak of yellow fever at Newbern, it had made its appearance, as already stated, at Charleston, South Carolina. The first case was that of Mr. Dallas, living on Calhoun street near the citadel; he was taken sick July 27th, and died nine days afterwards. Two weeks later the disease appeared in several parts of the city. It is known that the steamer Druid, blockade runner, came into port a few days after Mr. Dallas was attacked, with yellow fever on board; but Dr. Hand could not learn of the arrival of any other blockade runner for several weeks before, and could obtain no evidence that any previous ones had fever on board. The disease spread extensively in Charleston, and Dr. Hand estimates the number of cases at 2,000, with a mortality of thirty-five per cent.

At Wilmington, N. C., according to the inquiries of Dr. Hand, the fever of 1864 did not appear until October 10th. He states that about the last of August the blockade runners Clyde and Coquette lay at the quarantine grounds, three miles below the city, with cases of yellow fever on board. This fact excited alarm, and the quarantine was removed from that point to Smithville, near the mouth of Cape Fear river. Here, on October 1st, fourteen blockade runners lay in quarantine, and on all of them the mortality from yellow fever was great. At this time the fever spread from the ships to the shore, the first cases occurring in the houses nearest the quarantine fleet, and nearly one-half the citizens of Smithville died of it. Goods are known to have been smuggled on shore at Smithville, and it is quite probable that some of them were carried overland to Wilmington.

During the summer and fall of 1864, a number of cases occurred, also, on the naval vessels lying before New Orleans. As usual, the disease has been said by some to have originated on the spot, and the bad hygienic condition of certain of the iron-clads has been indicated as furnishing the necessary conditions. But the Spanish ship Pizarro, with yellow fever on board, had been sent to the quarantine station July 4th, and it is believed that, if a full account of all the facts of the case could be obtained, it would be found that the naval epidemic of 1864 would prove no exception to the general rule.

After the epidemic at Newbern, no considerable number of cases occurred in the army until the summer of 1867. During August, 1865, sixteen cases, none of them fatal, are reported in the District of Key West and Tortugas, without particulars. A few cases occurred, also, during 1866. One death is reported at Fort Jefferson during September; three deaths at New Orleans, one during September, one during October, and one during

November; one death at Brownsville, in November, the patient being an officer who had just arrived from New Orleans. Finally, six cases and one death of colored soldiers at Indianola, Texas, in October. It is known that during the summer and fall of 1866 yellow fever prevailed among the citizens of New Orleans.

In conclusion, a few words may be said with regard to the relations of the facts set forth in this report, and in the appended documents, to the prevention of yellow fever. It is to be regretted that the experience of the army throws no more satisfactory light on the treatment of the disease, but it must be admitted that it is most instructive with regard to measures of prevention. Besides those general hygienic precautions which are so important in the prevention or mitigation of all epidemic diseases, two simple and effective measures would appear to be specially indicated by the experience of the army during the war and subsequently. The first is quarantine, as a means of preventing the introduction of the disease; the second is the prompt movement of the command to some rural site on the appearance of the fever among the citizens of the town at which it is stationed, or even after the disease has appeared among the men of the command itself.

With regard to quarantine, it is well known that a great difference of opinion exists among civil physicians; nor is this surprising, since, in populous cities, approached by many routes of travel, a foreign disease may readily be imported by persons eluding an imperfect quarantine. In such a case it may be quite impossible for the physicians of the place to determine the circumstances, naturally concealed by those who have broken the laws or regulations on the subject.

In the case of military detachments, however, especially during times of peace, the movements of individuals being so much more readily known, the mode in which such diseases are introduced can very generally be recognized; and hence it is not surprising that recent distinguished English writers on subjects connected with military medicine—Dr. Aitkin, in his Practice of Medicine, and Dr. Parkes, in his Hygiene—are advocates of the doctrine of importation. Dr. Parkes expresses the opinion that the incubative period is longer than is usually supposed, probably often fourteen or sixteen days. Several facts set forth in the appended documents would seem to show that, in certain cases, the disease may be delayed as long as three weeks after exposure. The minimum period of an effective quarantine against yellow fever may then be set down at about twenty days. Twenty-five or thirty days would be better if attainable.

Should the disease, unhappily, be introduced through neglect to provide an efficient quarantine, it becomes the imperative duty of the medical officer to recommend the immediate removal of the command to some healthy rural site. On this subject the reports here discussed are explicit. At the only places at which any large number of cases occurred during 1867—at Galveston, at Houston, at Hempstead, at New Orleans, at Fort Jefferson—the troops faced the pestilence, and at each the greater portion of those exposed were attacked. On the other hand, the troops moved on the approach of the disease to camp in the country, escaped almost wholly at New Iberia, Baton Rouge, Alexandria, Shreveport, &c.; while at Indianola, Mobile, Pass Christian, &c., the command being moved after the disease had appeared among the men, almost all those thus removed escaped. The Newbern epidemic afforded a similar experience. After the disease had fairly broken out among the troops, the greater part of them were moved away from the town, and nearly all thus moved escaped. When a command is thus moved, it should be encamped on a dry and elevated site, not

previously used for camping purposes; the men should be sheltered by tents, should not be crowded, and should be surrounded by the best hygienic conditions attainable.

The views here expressed agree with the opinions formed by the Surgeon General upon the basis of the army experience of 1867 and of previous years. Accordingly, on the 15th of April, 1868, he recommended to the commanding general of the army that a quarantine should be established along the entire southern seaboard as early as the 1st of May of the present year, and advised the prompt removal of troops from points threatened with infection.

I have the honor to be, General, your most obedient servant,

J. J. WOODWARD,
Brevet Lieutenant Colonel, and Assistant Surgeon, U.S.A.

Brevet Major General J. K. BARNES,
Surgeon General, United States Army.

APPENDIX.

I. STATISTICAL TABLES AND EXTRACTS FROM OFFICIAL REPORTS

REFERRING TO

CHOLERA.

II. STATISTICAL TABLES AND EXTRACTS FROM OFFICIAL REPORTS

REFERRING TO

YELLOW FEVER.

APPENDIX I.—CHOLERA.

A. STATISTICAL TABLES.

1. VIDALIA, LOUISIANA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	47		64		64		61							
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera							8	3					8	3
Cholera morbus														
Acute diarrhœa	20		6		8								34	
Chronic diarrhœa			4	1	2								6	1
Acute dysentery														
Chronic dysentery		1			1								1	1
Total	20	1	10	1	11		8	3					49	5
All other diseases	36		55	1	43		18	2					152	3
Aggregate	56	1	65	2	54		26	5					201	8

2. VICKSBURG, MISSISSIPPI.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	171		196		198		282		377		379		267	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	8*	2			1	1	2						11	3
Cholera morbus														
Acute diarrhœa	21		16		16		15		17		3		88	
Chronic diarrhœa	2		4		2		3		3	1	2		16	1
Acute dysentery			7		4		2		2				15	
Chronic dysentery			3				1						4	
Total	31	2	30		23	1	23		22	1	5		134	4
All other diseases	40	1	63		69		155	2	137	4	69	1	533	8
Aggregate	71	3	93		92	1	178	2	159	5	74	1	667	12

* Also one fatal case in June.

3. MADISON, ARKANSAS.

Month	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	83		67		53		46		45		45		57	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	8	3	2	1	.....	.....	.....	.....	.....	.....	.....	.....	* 10	4
Cholera morbus	7	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	9	.....
Acute diarrhœa	15	.....	14	.....	.....	.....	3	.....	.....	.....	.....	.....	32	.....
Chronic diarrhœa	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Acute dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	31	3	17	1	1	.....	3	.....	.....	.....	.....	.....	52	4
All other diseases	30	.....	49	.....	45	.....	47	2	38	.....	19	.....	228	2
Aggregate	61	3	66	1	46	.....	50	2	38	.....	19	.....	280	6

4. NEWPORT BARRACKS, KENTUCKY.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	434		463		494		500		540		530		509	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	*	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Cholera morbus	5	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	7	.....
Acute diarrhœa	44	.....	26	.....	10	.....	12	.....	13	.....	8	.....	113	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	2	.....
Acute dysentery	2	.....	5	.....	4	.....	1	.....	1	.....	1	.....	14	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	51	.....	33	1	14	.....	16	.....	14	.....	9	.....	137	1
All other diseases	28	.....	45	1	48	1	66	.....	68	1	71	.....	326	3
Aggregate	79	.....	78	2	62	1	82	.....	82	1	80	.....	463	4

* Two cases are reported in June, both recovered.

5. PADUCAH, KENTUCKY.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	131		108		99		101		101		108		108	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	4	2	.....	.....	.....	.....	.....	.....	.....	.....	4	2
Cholera morbus	1	.....	.....	.....	3	.....	.....	.....	.....	.....	1	.....	5	.....
Acute diarrhœa	17	.....	7	.....	5	.....	10	.....	8	.....	11	.....	58	.....
Chronic diarrhœa	6	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	8	.....
Acute dysentery	3	.....	3	.....	2	.....	2	.....	3	.....	5	.....	18	.....
Chronic dysentery	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....
Total	28	.....	15	2	10	.....	12	.....	13	.....	17	.....	95	2
All other diseases	68	.....	54	.....	57	.....	64	.....	68	1	63	.....	374	1
Aggregate	96	.....	69	2	67	.....	76	.....	81	1	80	.....	469	3

6. ST. LOUIS ARSENAL, MISSOURI.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	114		123		124		129		*129		129		125	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....
Cholera morbus	7	.....	1	.....	3	.....	.....	.....	.....	.....	.....	.....	11	.....
Acute diarrhœa	36	.....	12	.....	10	.....	23	.....	17	.....	4	.....	102	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....
Acute dysentery	4	.....	.....	.....	.....	.....	2	.....	3	.....	2	.....	11	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	47	.....	13	.....	13	.....	26	.....	20	.....	7	.....	126	.....
All other diseases	47	.....	35	.....	56	.....	69	.....	52	.....	41	.....	300	.....
Aggregate	94	.....	48	.....	69	.....	95	.....	72	.....	48	.....	426	.....

7. JEFFERSON BARRACKS, MISSOURI.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	131		133		142		148		143		138		139	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Cholera morbus	6	.....	1	.....	1	1	1	.....	.....	.....	.....	.....	9	1
Acute diarrhœa	24	.....	19	.....	21	.....	10	.....	6	.....	5	.....	85	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	1	.....	1	.....	7	.....	1	.....	5	.....	4	.....	19	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	32	.....	21	.....	29	1	12	.....	11	.....	9	.....	114	1
All other diseases	29	.....	32	.....	44	.....	44	.....	52	.....	32	.....	233	.....
Aggregate	61	.....	53	.....	73	1	56	.....	63	.....	41	.....	347	1

8. JEFFERSON BARRACKS, MISSOURI.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.*		TOTAL.	
Mean strength	3		2		4		114		.....		.....		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	.....	.....	.....	.....	13	5	2	1	.....	.....	15	6
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	2	.....	.....	.....	2	.....	25	.....	3	.....	.....	.....	32	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	2	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....
Total	2	.....	1	.....	3	.....	39	5	5	1	.....	.....	50	6
All other diseases	2	.....	1	.....	1	.....	4	.....	.....	.....	.....	.....	8	.....
Aggregate	4	.....	2	.....	4	.....	43	5	5	1	.....	.....	58	6

* No report.

9. FORT RILEY, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	87		31		9		10		10		11		26	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera														
Cholera morbus														
Acute diarrhœa	4		4										8	
Chronic diarrhœa														
Acute dysentery														
Chronic dysentery														
Total	4		4										8	
All other diseases	5	1	2						1				8	1
Aggregate	9	1	6						1				16	1

10. FORT RILEY, KANSAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	4		96		176		179		253		473		197	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera									2			1	2	1
Cholera morbus														
Acute diarrhœa			13		20		17		2		17		69	
Chronic diarrhœa														
Acute dysentery											1		1	
Chronic dysentery					1	1							1	1
Total			13		21	1	17		4		18	1	73	2
All other diseases	1		42		73		61	2	53	1	122	1	352	4
Aggregate	1		55		94	1	78	2	57	1	140	2	425	6

11. FORT HARKER, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	74		94		262		300		211		234		196	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	28	19		1									28	20
Cholera morbus			1										1	
Acute diarrhœa	33		30	1	65		21		6		2		157	1
Chronic diarrhœa														
Acute dysentery	1						1		3		3		8	
Chronic dysentery										1				1
Total	62	19	31	2	65		22		9	1	5		194	22
All other diseases	6		37	1	71		43		29		12	1	198	2
Aggregate	68	19	68	3	136		65		38	1	17	1	392	24

12. FORT HARKER, KANSAS.
(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	260		134		88		158		171		102		182	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	15*	8	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	15	10
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	167	.....	91	1	38	.....	10	.....	11	.....	7	.....	324	1
Chronic diarrhœa	1	2	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	2
Acute dysentery	3	.....	.....	.....	.....	.....	.....	.....	3	.....	5	.....	11	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....
Total	186	10	91	3	38	.....	10	.....	15	.....	13	.....	353	13
All other diseases	31	*5	37	1	32	1	20	.....	19	1	5	.....	144	8
Aggregate	217	15	128	4	70	1	30	.....	34	1	18	.....	497	21

* Also 3 cases and 1 death in June.

13. COMPANIES "D" AND "E," 38th INFANTRY, (EN ROUTE FROM FORT HARKER TO NEW MEXICO.)
(Colored Troops.)
(Report gathered from Col. Merriam's letter.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	232		.....		.....		.....		.....		.....		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	28*	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	10
Cholera morbus†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic diarrhœa†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic dysentery†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other diseases	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aggregate	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Also one fatal case in June. † No data.

14. HEADQ'RS, AND CO'S "A" AND "K," 38th INF'Y, (EN ROUTE FROM FORT HARKER TO NEW MEXICO.)
(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	184		179		.....		.....		.....		.....		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	46	17	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	17
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	1	.....	43	.....	.....	.....	.....	.....	.....	.....	.....	.....	44	.....
Chronic diarrhœa	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
Acute dysentery	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	48	17	46	.....	.....	.....	.....	.....	.....	.....	.....	.....	94	17
All other diseases	95	.....	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	131	.....
Aggregate	143	17	82	.....	.....	.....	.....	.....	.....	.....	.....	.....	225	17

15. FORT LARNED, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	160		172		137		180		218		217		181	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	5	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	4
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	55	.....	9	.....	9	.....	4	.....	*3	.....	4	.....	84	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	1	.....	2	.....	3	.....	3	.....	2	.....	3	.....	14	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	61	4	11	.....	12	.....	7	.....	5	.....	7	.....	103	4
All other diseases	33	.....	22	2	33	.....	19	.....	20	1	8	.....	135	3
Aggregate	94	4	33	2	45	.....	26	.....	25	1	15	.....	238	7

16. FORT LARNED, KANSAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	72		68		68		68		63		95		72	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	31	.....	3	.....	.....	.....	1	.....	.....	.....	.....	.....	35	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	32	1	4	1	1	.....	1	.....	.....	.....	.....	.....	38	2
All other diseases	6	1	5	1	.....	.....	6	.....	5	.....	1	.....	23	2
Aggregate	38	2	9	2	1	.....	7	.....	5	.....	1	.....	61	4

17. FORT DODGE, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	231		221		301		250		317		314		272	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	21	12	4	2	.....	.....	.....	.....	.....	.....	.....	.....	25	14
Cholera morbus	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Acute diarrhœa	30	.....	28	.....	19	.....	4	.....	6	.....	5	.....	92	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	.....	.....	.....	.....	3	.....	.....	.....	11	.....	5	1	19	1
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	51	12	32	2	23	.....	4	.....	17	.....	10	1	137	15
All other diseases	14	.....	13	.....	14	1	20	.....	19	1	19	.....	99	2
Aggregate	65	12	45	2	37	1	24	.....	36	1	29	1	236	17

18. COMPANY "G," TENTH CAVALRY, EN ROUTE FROM FORT HARKER TO FORT HAYS, KANSAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	63		59											
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	15	8		1									15	9
Cholera morbus														
Acute diarrhœa	17		4										21	
Chronic diarrhœa														
Acute dysentery														
Chronic dysentery														
Total	32	8	4	1									36	9
All other diseases	2		16										18	
Aggregate	34	8	20	1									54	9

19. COMPANY "F," THIRD INFANTRY, NEAR COW CREEK, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	76		60											
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	7	4	1										8	4
Cholera morbus														
Acute diarrhœa	12		5										17	
Chronic diarrhœa														
Acute dysentery														
Chronic dysentery	1												1	
Total	20	4	6										26	4
All other diseases	5		4										9	
Aggregate	25	4	10										35	4

20. COMPANY "C," TENTH CAVALRY, CAMP GRIERSON, KANSAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	81		75		78		75							
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	7	4	10	4									17	8
Cholera morbus														
Acute diarrhœa	12		10		2		1						25	
Chronic diarrhœa			1										1	
Acute dysentery	1		2		1								4	
Chronic dysentery														
Total	20	4	23	4	3		1						47	8
All other diseases	12		6		13		19						50	
Aggregate	32	4	29	4	16		20						97	8

21. FORT HAYS, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	22		39		40		85		93		172		75	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera					1								1	
Cholera morbus	1												1	
Acute diarrhœa	12				2						2		16	
Chronic diarrhœa														
Acute dysentery														
Chronic dysentery														
Total	13				3						2		18	
All other diseases	11		5	1	5		2		11		4		38	1
Aggregate	24		5	1	8		2		11		6		56	1

22. FORT HAYS, KANSAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	181		220		243		248		545		299		289	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	19	9	12	14	2								33	23
Cholera morbus														
Acute diarrhœa	60	1	13		16		27		11		10		137	1
Chronic diarrhœa														
Acute dysentery					1								1	
Chronic dysentery														
Total	79	10	25	14	19		27		11		10		171	24
All other diseases	46	1	48	1	8		25		38	4	30	3	195	9
Aggregate	125	11	73	15	27		52		49	4	40	3	366	33

23. DOWNER'S STATION, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	76		91		84		82		84		83		83	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera			2	1									2	1
Cholera morbus														
Acute diarrhœa	4		7		2								13	
Chronic diarrhœa					1								1	
Acute dysentery	4		4		1		1				1		11	
Chronic dysentery														
Total	8		13	1	4		1				1		27	1
All other diseases	7		10		5		10		4		10		46	
Aggregate	15		23	1	9		11		4		11		73	1

24. MONUMENT STATION, KANSAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	115		25		40		41		63		63		58	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	3	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	10	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	15	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	17	1
All other diseases	7	.....	9	.....	8	.....	2	.....	2	.....	2	.....	30	.....
Aggregate	22	1	11	.....	8	.....	2	.....	2	.....	2	.....	47	1

25. DETACHMENT OF SEVENTH CAVALRY, NEAR FORT WALLACE, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	323		117		.....		.....		.....		.....		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	14	9	3	2	.....	.....	.....	.....	.....	.....	.....	.....	17	11
Cholera morbus	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....
Acute diarrhœa	71	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	94	.....
Chronic diarrhœa	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Acute dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	92	9	26	2	.....	.....	.....	.....	.....	.....	.....	.....	118	11
All other diseases	44	.....	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	61	.....
Aggregate	136	9	43	2	.....	.....	.....	.....	.....	.....	.....	.....	179	11

26. FORT WALLACE, KANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	300		425		443		385		355		320		371	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	25	11	.....	.....	.....	.....	.....	.....	.....	.....	25	11
Cholera morbus	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....
Acute diarrhœa	6	.....	16	.....	6	.....	5	.....	16	.....	8	.....	57	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	2	.....	10	2	1	.....	2	.....	.....	.....	2	.....	17	2
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	8	.....	57	13	7	.....	7	.....	16	.....	10	.....	105	13
All other diseases	11	.....	22	.....	24	1	19	.....	40	.....	39	.....	155	1
Aggregate	19	.....	79	13	31	1	26	.....	56	.....	49	.....	260	14

27. FORT SMITH, ARKANSAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	77		70		69		170		171		318		146	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	.....	.....	2	2	.....	.....	.....	.....	.....	.....	2	2
Cholera morbus	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
Acute diarrhœa	13	.....	12	.....	22	.....	20	.....	3	.....	3	.....	73	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	.....	.....	.....	.....	1	.....	5	.....	2	.....	.....	.....	8	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	15	.....	12	.....	25	2	25	.....	5	.....	3	.....	85	2
All other diseases	43	.....	73	.....	58	1	81	1	42	1	40	1	337	4
Aggregate	58	.....	85	.....	83	3	106	1	47	1	43	1	422	6

28. FORT GIBSON, CHEROKEE NATION.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	143		130		144		140		207		189		159	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Cholera morbus	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....
Acute diarrhœa	10	1	7	.....	.....	.....	.....	.....	3	.....	.....	.....	20	1
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....
Acute dysentery	1	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....	4	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	16	1	8	1	1	.....	1	.....	4	.....	1	.....	31	2
All other diseases	15	.....	33	1	55	.....	52	.....	23	.....	26	.....	204	1
Aggregate	31	1	41	2	56	.....	53	.....	27	.....	27	.....	235	3

29. FORT GIBSON, CHEROKEE NATION.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	110		100		60		10		99		99		80	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Cholera morbus	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
Acute diarrhœa	10	1	3	.....	1	.....	.....	.....	1	.....	.....	.....	15	1
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	15	2	3	.....	1	.....	.....	.....	1	.....	.....	.....	20	2
All other diseases	9	1	16	.....	31	.....	1	.....	3	.....	8	.....	68	1
Aggregate	24	3	19	.....	32	.....	1	.....	4	.....	8	.....	88	3

30. FORT ARBUCKLE, CHEROKEE NATION.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	166		128		126		113		171		181		148	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	5	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	4
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	17	.....	5	.....	2	.....	1	.....	7	.....	10	.....	42	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....
Acute dysentery	4	.....	2	.....	2	.....	2	.....	1	.....	.....	.....	11	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	26	4	7	.....	4	.....	4	.....	8	.....	10	.....	59	4
All other diseases	22	.....	56	.....	85	.....	92	3	34	.....	23	.....	312	3
Aggregate	48	4	63	.....	89	.....	96	3	42	.....	33	.....	371	7

31. FORT ARBUCKLE, CHEROKEE NATION.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	64		79		88		86		189		181		115	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	21	.....	.....	.....	3	.....	.....	.....	5	.....	5	.....	34	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	24	.....	.....	.....	3	.....	.....	.....	5	.....	5	.....	37	.....
All other diseases	11	1	18	.....	45	.....	39	.....	18	.....	19	.....	150	1
Aggregate	35	1	18	.....	48	.....	39	.....	23	.....	24	.....	187	1

32. BATTALION SIXTH U. S. INFANTRY, EN ROUTE TO FORT ARBUCKLE, CHEROKEE NATION.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	129		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	40	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	16
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic diarrhœa	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	.....
Acute dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chronic dysentery	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	80	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80	16
All other diseases	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	.....
Aggregate	89	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89	16

33. FORT COLUMBUS, GOVERNOR'S ISLAND, NEW YORK HARBOR.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	827		875		887		777		903		892		860	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	11	5	24	13	.....	.....	.....	.....	.....	.....	35	18
Cholera morbus	.....	.....	.....	.....	11	.....	.....	.....	.....	.....	.....	.....	11	.....
Acute diarrhœa	169	.....	156	.....	259	.....	45	.....	12	.....	21	.....	662	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....
Acute dysentery	12	.....	20	.....	14	5	2	2	.....	.....	.....	.....	48	7
Chronic dysentery	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	1	1
Total	181	.....	187	5	308	18	48	2	13	1	21	.....	758	26
All other diseases	149	.....	138	.....	150	2	77	.....	100	1	118	.....	732	3
Aggregate	330	.....	325	5	458	20	125	2	113	2	139	.....	1,490	29

34. FORT WOOD, BEDLOE'S ISLAND, NEW YORK HARBOR.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	409		292		337		305		382		360		347	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	.....	.....	2	.....	8	4	.....	.....	.....	.....	.....	.....	10	4
Cholera morbus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute diarrhœa	55	.....	53	.....	75	1	31	.....	35	.....	12	.....	261	1
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery	6	1	1	1	6	.....	4	.....	7	.....	5	.....	29	2
Chronic dysentery	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....
Total	61	1	56	1	89	5	36	.....	42	.....	17	.....	301	7
All other diseases	58	3	46	.....	47	.....	39	.....	61	.....	54	.....	305	3
Aggregate	119	4	102	1	136	5	75	.....	103	.....	71	.....	606	10

35. CASES OF CHOLERA DURING THE LAST SIX MONTHS OF 1867, 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.
WHITE TROOPS.														
New Orleans, La	.....	.....	1	.....	.....	.....	.....	.....	4	2	1	1	6	3
Case of Dr. McGill	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Plattsburg Barracks, N.Y.	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	1	1
Recruits en route	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	1
Recruits at Galveston	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25	4	25	4
Recruits at Hempstead	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	1	15	1
Recruits at Indianola	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13	2	13	2
Recruits at Onion Creek	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	1	9	1
Total white troops	1	1	2	.....	.....	1	.....	.....	4	2	64	10	71	14
COLORED TROOPS.														
New Orleans	.....	.....	.....	.....	.....	.....	.....	.....	1	1	3	1	4	2
Fort Jackson, La	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Total white and colored.	1	1	2	.....	1	1	.....	.....	5	3	67	11	76	16

36. TOTAL NUMBER OF CASES OF CHOLERA.*

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
White troops	141	75	58	27	36	21	11	3	4	2	64	10	314	138
Colored troops	135	58	24	22	3	.....	13	5	5	2	3	2	183	89
Total white and colored.	276	133	82	49	39	21	24	8	9	4	67	12	497	227

* Besides the above, there are reported during the month of June 3 cases and 1 death of white, 4 cases and 2 deaths of colored troops.

APPENDIX 1.—CHOLERA.

B. EXTRACTS FROM OFFICIAL REPORTS.

(CIRCULAR No. 3.)

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,
Washington, D. C., April 20, 1867.

In view of the possible prevalence of cholera during the approaching summer, the following instructions are promulgated:

Every endeavor will be made by medical officers to prevent the introduction of cholera from infected commands, or its conveyance from point to point, by a "quarantine of observation" upon all detachments of recruits or troops arriving or departing from depots, posts, or recruiting stations at or near which this disease prevails; prompt reports of its appearance in commands either *en route* or in garrison; and isolation of all cases so far as practicable.

In addition to the strictest hygienic police, enforcement of personal cleanliness and thorough disinfection, attention should be paid to the quality of the water used for drinking and cooking purposes. When pure rain water cannot be procured in sufficient quantities, and the spring or river water contains organic impurities, it should be purified by distillation, or the noxious matter precipitated by permanganate of potash. From half a grain to one grain of the crystalized permanganate (or its equivalent in solution) added to one gallon of water should produce a decided pinkish hue, which disappears within twenty-four hours, (if the salt has not been used in excess,) the water should then be drawn off, and is ready for use.

Turbid water, such as that of the Rio Grande, lower Mississippi and its tributaries, should be filtered, or allowed to settle before using. The deposit of impurities can be hastened by the addition of powdered alum in small quantities, well diffused by stirring.

It is always, but more especially in times of threatened danger of pestilence, the duty and privilege of medical officers to submit the practical suggestions of experience and professional knowledge for the protection of the health of troops to their commanding officers; and the history of the epidemic of cholera in 1866 shows that only by combined and untiring vigilance, energetic action, and rigid enforcement of hygienic measures, within the reach of every commander, can we hope to avoid, keep in check, or eradicate this disease.

Besides the usual reports of sick and wounded, every medical officer in charge of cholera cases will forward to the Surgeon General's Office, at the close of each month, a list of cholera patients in the following form:

Special Report of Cholera Patients at ..... ,
Month of ..... 186...

Name.	Nativity.	Age.	Rank.	Regim't.	Comp'y.	Length of service in months.	Date of attack.	Date of recov'ry.	Date of death.	Remarks.

..... *Surgeon, U. S. A.*

Successful methods of treatment and results of autopsies will also be communicated.

The senior medical officer at every post at which cholera appears, will make a special report to the Surgeon General, setting forth any facts he may be able to ascertain as to the introduction of the disease, and especially those bearing upon its importation from infected points by recruits or others, or its apparently spontaneous origin at the post.

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

NEW ORLEANS, LA.

Extract from Monthly Report of Sick and Wounded, New Orleans Post Hospital, Greenville, La , November, 1867. *E. A. Koerper, Assistant Surgeon, U. S. A.*

A tendency to choleraic diarrhœa is showing itself. Henry Sadler, Private, Company "A," 39th U. S. Infantry, (colored,) was admitted to hospital at 11.30 o'clock a. m., in a state of collapse, and died at quarter before nine of the same day, in spite of all efforts to save him.

Extract from Monthly Report of Sick and Wounded, New Orleans Post Hospital, Greenville, La., December, 1867. *E. A. Koerper, Assistant Surgeon, U. S. A.*

Simon Green, Private, Company "A," 39th U. S. Infantry, (colored,) died eleven hours after admission. When admitted he was in a collapsed condition, from which he could only partially be made to react. Two cases of choleraic diarrhœa were successfully treated.

Extract from Monthly Report of Sick and Wounded, Greenville, La., December, 1867. *Wm. Deal, Acting Assistant Surgeon, U. S. A.*

The three cases of epidemic cholera noted on the tabular list of diseases, contracted the disease whilst on guard duty in New Orleans. They were sent to the post hospital as soon as reported. Two recovered, and the third died within ten hours after the attack; he was in a dying condition when the ambulance arrived with him from the city. Great care has been taken in keeping the wards clean, and disinfecting the water-closets. Daily, for over three months, a solution of sulphate of iron has been put in the privies. Many cases of incipient diarrhœa have been treated and checked without the soldiers being relieved from duty; the eight in the tabular list did not reach an average of two days in quarters. No case of cholera during the summer or fall originated in camp here.

JACKSON BARRACKS, NEW ORLEANS, LA.,
February 4, 1868.

GENERAL: I have the honor to enclose herewith tabular lists of all the cases of cholera and choleraic diarrhœa which have occurred at this post during the month of January last; also, of those occurring in September, November, and December, 1867. No cases occurred in October, 1867.

The cases of cholera number only three, and of choleraic diarrhœa four, and the cases of each disease thus recorded did not differ from each other except in the degree of severity of their symptoms, and, with the exception of the case in December, were all distinctly traceable to imprudence in eating or intemperance in drinking.

In view of the extensive prevalence of the disease in the city of New Orleans during the past four months, the small number of cases occurring in this command during the same period is noticeable, and may be considered due to the general excellent sanitary condition of the post as to cleanliness, ventilation, &c., of the quarters and hospital, the thorough daily disinfection of the sinks of the post, and the immediate disinfection of the dejections of all the sick in the hospital, which measures doubtless prevented any spread of the disease, the predisposing causes of which are apparent in the adjacent city, and inherent in the habits of the soldiers of the command, a considerable portion of whom are recruits.

Very respectfully, your obedient servant,

B. A. CLEMENTS,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

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

Extract from Monthly Report of Sick and Wounded of Co. "A," 33d U. S. Infantry, New Orleans, Louisiana, January, 1868. *Heber Smith, Acting Assistant Surgeon, U. S. A.*

EPIDEMIC CHOLERA: This report is for Co. "A," 33d Infantry, (67 men,) and the post band, (17 men.) Under the head of epidemic cholera, all cases of choleraic tendency are reported, although only two of them became fully developed. The others should, in my opinion, be called "choleraic diarrhœa, or cholerine." Company "A" arrived on the 10th inst. from the mountainous section of Georgia, and cholera made its appearance almost immediately among the men.

VIDALIA, LA.

BATON ROUGE, LA., *November* 5, 1867.

GENERAL: I have the honor to forward special report of cholera, and brief history of the same as it appeared in camp at Vidalia, La., at the commencement of the month of October, 1867.

During the months of June, July, August, and September, cholera appeared amongst the freedmen on many plantations, only several miles from our camp. This made us very vigilant. By my advice and direction, every sanitary measure was enforced in order to prevent the disease. The camp was twice daily policed. The sinks were every day disinfected either with chloride of lime or solution of sulphate of iron. Chloride of lime was liberally spread all over the camp, and the men were daily instructed to be careful of what they ate and drank.

The first case that appeared was that of Private John Long, which terminated fatally; though it is not without some diffidence that I so pronounce it, because I know that he had cardiac dropsy, for which he was under treatment; furthermore, I am informed that he had no rice-water discharges, but severe cramps in his legs and constant vomiting.

Having been sick myself at the time for several days, I engaged the services of a good practicing physician to attend the troops. John Long, as mentioned, the first case that occurred, was under the treatment of said physician. He took sick on the 30th September, and died October 1st, 1867. The circumstance that from this day nearly every man in the command was attacked with diarrhœa makes it, however, probable that it was a real case of epidemic cholera. Most of the diarrhœa cases were, however, easily managed, by a pill composed of equal parts of opium, sugar of lead, and camphor.

The first undoubted case was Private John Enders, who was admitted October 6th, 1867. At his admission he presented all the symptoms of true cholera asiatica: violent vomiting and purging of rice-water, cramps, cold extremities, and suppression of urine. * * * * This patient rapidly recovered, but suffered a relapse by indiscretion in eating on the 14th of October. I am informed by some of the men that the preceding evening he ate apples and gingerbread in great quantities, and walked many times to the sink barefooted. On the morning of the 15th I was called to see him, and found him in a collapsed state, vomiting and purging rice-water, with cramps, cold surface, cold extremities, cold tongue, and a very weak pulse. * * * * He recovered very slowly, but at the date of this report he is strong and restored to duty.

Private John Leyden was the next case, admitted October 7th, 1867. I am informed that the night he took sick he ate at least a half dozen of apples and some gingerbread. He went, as I am told, about fifteen or twenty times to the sink, and was found early in the morning lying near the water-closet. Nobody knows how long he was lying there. When I was called to see him, I found him in a complete collapse, with excessive spasms of the abdominal and other muscles, his pulse was quick and small, the skin was ice-cold, his features shrunken, the extremities cold and of a blueish color. * * * * His vital powers failed rapidly; he died at 6 p. m., October 8th, 1867.

The same day Charles Kopp was admitted. He had all the symptoms of cholera, but in the incipient state. He recovered.

Jones, Conners, and Schrivenhold were admitted on the 8th of October, while they had the first symptoms of cholera. They all recovered.

Joel L. Tuttle was the next case admitted. He had, as I am informed, diarrhœa for several days, but did not call for medicines, through dread and fear that he would be obliged to go to hospital, where the former cases of cholera had been taken. October 10th I was called to see him, about 7 o'clock in the morning, and found him in collapse, with cold surface, cold tongue, cold extremities, and a quick weak pulse; violent vomiting and rice-water discharges; his features were shrunken; his fingers had the appearance of what is called the "washerwoman's hands;" there was a great similarity between this case and that of Leyden. Died October 10th, 1867.

The company having been removed to a healthy camp and highest available ground, about four miles from Vidalia, La., diarrhœa prevailed among the men for some time, but the epidemic disappeared entirely.

As to the probable cause of the epidemic, I have the honor to respectfully state that cholera was sporadic at and around Vidalia through all the summer, especially among the freedmen. Another cause may have also been that our cistern gave out, and we were obliged to use the dirty Mississippi water. This water has been boiled and purified, but, no doubt, the men have more often partaken of the water as it came from the Mississippi than otherwise.

At this time a grocer at Vidalia, who had his store near the camp, received several barrels of apples, which the men of our command purchased profusely. Having been informed of this, I requested the grocer to sell no more of the apples to the troops, which he agreed to do, but the men got the apples by sending citizens and negroes to buy for them.

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

E. ALEXANDER,
Acting Assistant Surgeon, U. S. A.

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

VICKSBURG, MISS.

Extract from Monthly Report of Sick and Wounded, Vicksburg, Miss., June, 1867. *A. A. Yeomans, Assistant Surgeon, U. S. A.*

Maurice Kennelly, Private, Company A, 24th U. S. Infantry, was attacked with what appeared to be a severe form of cholera morbus on the morning of the 29th of June, 1867; he was immediately admitted to the hospital. In the course of two hours well-marked symptoms of Asiatic cholera presented themselves, his extremities became cold, the action of his heart weak, he had severe cramps, and rice-water purging and vomiting. Under the influence of warm external applications, frictions and the

internal use of stimulants, &c., he rallied for a time, but died at about a quarter past three p. m. in a state of collapse. It cannot be ascertained that Kennelly has been away from camp since the disease has been reported in Vicksburg.

The sanitary condition of the camp has been pronounced excellent by several inspecting officers who have recently visited the post. Disinfectants have been freely used, and such vegetables as occasion diarrhœa in this climate have been prohibited. Nothing but cistern water is used by the command for drinking purposes. Two or three other cases have occurred, but as the disease did not go beyond the incipient stages, they do not appear on this report as cholera.

MEDICAL DIRECTOR'S OFFICE, FOURTH MILITARY DISTRICT,
Vicksburg, Mississippi, July 6, 1867.

GENERAL: I have the honor to forward herewith Assistant Surgeon Yeomans' report of cholera at Vicksburg post hospital for June.

The soldier reported was taken sick shortly after sunrise, on the morning of the 29th ult., and died about 3.30 p. m. the same day.

A citizen in good circumstances was taken sick and died the same day, with cholera, in Vicksburg.

June 30th a colored boy was attacked with cholera about 10 p. m., at the house occupied by General Ord and staff, and died in about twelve hours. All of these were undoubted cases of cholera.

I have made careful inquiry in regard to the previous history of these cases. The soldier reported does not seem to have been exposed to cholera; on the 28th, the day before his attack, he ate tainted meat, and about tattoo the same day bathed in a pond of stagnant water; otherwise his habits had been correct. Of the citizen taken sick the same day, I have no facts to report bearing on the subject—his friends say he had not been exposed. The colored boy above reported left town on the 29th to come to headquarters, which is four miles from Vicksburg; two cases of cholera are reported to have occurred in the house he left after his leaving. Some twenty cases are reported to have occurred in town, but no new cases have appeared at the post, and I know of none, for several days, in town. The troops have been ordered to drink no more river water, but cistern water; their quarters and grounds are in excellent police.

Very respectfully, your obedient servant,

JOSEPH R. SMITH,
Surgeon, and Brevet Colonel, U. S. A., Medical Director Fourth Military District.

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

MADISON, ARK.

POST OF MADISON, ARK., *September* 18, 1867.

COLONEL:-In accordance with instructions received from your office, I have the honor to submit the following report of cholera that prevailed at this post.

The first case of cholera of which I had any knowledge was that of a citizen who had been engaged in rafting timber from the upper St. Francis river. He came down the river by raft to Linden, a town eight miles below this, where he was attacked, and died within twenty-four hours, from what was there understood and pronounced by his attendants to be cholera. A relative of his had the body inclosed in a box and conveyed in an open wagon from Linden through the town of Madison to a point further up the river for burial before his actions could be prevented by the authorities. This man had inclosed his deceased relative in the box, and had accompanied it to Madison, and there made application, in person, at the military post, for transportation to take it still further into the country. The commanding officer could not prevent the body being brought to the town, for it was already there; but he ordered it not to stop, and to be taken immediately away by the same conveyance in which it had come, and refused the request for assistance in transporting it. Of the previous history of this case I have no knowledge. I was informed that a number of deaths from cholera had occurred at Linden.

According to newspaper and other reports, cholera has existed at Memphis, Helena, and points on the St. Francis river, for some weeks prior to its visit to Madison. We have been in weekly communication by boat with these infected places, although I have heard of no death occurring on the vessels engaged in this trade; this, however, can be accounted for by the fact that the great majority of the passengers transported, probably seven-eighths, are local or way passengers, whilst those who travel the whole distance are obliged to be aboard only about two days. I merely state these facts in order to show that there is a possibility, and even a strong probability, that cholera was directly imported either by the body of the Linden subject and his attendants, or by steamboat communication with the places above mentioned.

About July 20th, I was called in the night to see the wife of a soldier—a laundress—who was suffering from vomiting, cramps,

and frequent painless rice-water evacuations, accompanied by considerable prostration. I treated her case as cholera morbus, controlling discharges with astringents and opiates; vomiting by a sinapism laid over stomach; prostration by slow and gradual stimulation; and cramps by friction with cloths and hand; thirst, which was intense, was alleviated by pellets of ice allowed to dissolve in the mouth. Under this treatment she rapidly improved, and the extremities, which had given evidence of coldness, soon regained wonted warmth. * * * * * * * * * * * *

At this time diarrhœa became prevalent to an alarming extent; out of a mean strength of about 75 men, almost one-half were more or less affected, although they did not all report at regular morning "sick call."

Preceding this, one or two cases of scurvy had reported for treatment, in consequence of which I had recommended a full supply of vegetables to the whole command. Thinking that probably the unusual quantity of vegetables might account for the unusual number of diarrhœa cases, I again suggested that the amount and kind of vegetable food be diminished; that only those of known healthfulness, as potatoes, onions and ripe berries, be allowed. This change of diet did not, however, produce any material reduction either in the number or obstinacy of diarrhœa cases.

If an ordinary dose of castor oil was administered, it often produced a diarrhœa that was almost uncontrollable, and the same applies to other mild cathartics. The administration of Epsom salts, or anything drastic, could not be thought of in any case. Cholera morbus also prevailed; the attacks could generally be traced to some imprudence or irregularity in diet, or to exposure: they were amenable to treatment. Among the cases of this kind that are worthy of notice is that of Private Comstock, who, in company with Private Gallagher, (both of Company "E," 19th Infantry,) had deserted their command at Fort Gibson, and after an absence of nearly a month gave themselves up to the commanding officer of this post. These men had been exposed to the deleterious night air, from which they had no protection, and had fared rather indifferently in the matter of food. Comstock was admitted to the hospital July 20th. His symptons were violent vomiting and purging, which were succeeded by cramps of the abdomen and spasmodic contraction of the muscles of the lower extremities; rice-water discharges from the bowels were frequent and copious, accompanied by prostration; skin was cold; lips blue; discoloration and rings beneath the eyes. This case, as well as the laundress above described, recovered without any untoward event, although it might not probably have been going wide of the truth to have classed them both as gastro-intestinal cases of cholera.

The first case of epidemic cholera that occurred was that of Private Jacob H. Amon, teamster. He had been sleeping in an open ambulance, and had, in consequence, been much exposed to miasm, night air, and dew. His personal cleanliness had not been exemplary. On the morning of July 26th, he reported at "sick call" with diarrhœa. A combination of blue mass, opium and acetate of lead, was administered, and he was ordered to report again after a lapse of two hours. He did not report as instructed, thought it a mere diarrhœa that would soon cease without remedy, and, from what I subsequently learned, did nothing throughout the entire day to arrest the disease. In the evening one of his comrades reported him very ill, when he was immediately conveyed to hospital for treatment. * * * * He died from 25 to 30 hours after first reporting sick.

The next case was that of Corporal Henry C. Bennett, July 29th, two days after the death of Amon. He was in the performance of his duty as corporal of the guard; at 9 p. m. he reported sick with diarrhœa; medicine was at once given to check the disease, and some was given him to take during the night should his condition demand it. He was relieved from duty on guard, and instructed to go immediately to his quarters and to bed. At 6 a. m., July 27th, he reported no better, and was at once taken into the hospital. This case also terminated fatally. * * * * * * *

The third fatal case was that of Terrence Gallagher, Company "E," 19th Infantry, who was one of the deserters from Fort Gibson, elsewhere mentioned. He was admitted to the hospital with remittent fever; had been suffering from remittent some days before attacked with cholera. Suddenly, on July 30th, vomiting and purging, accompanied with other choleraic symptoms, commenced. He sunk into collapse, and died the following day. * * * * * *

The fourth case was that of Private Henry Prendergast, who had been an inmate of the hospital from the beginning of the epidemic, and was convalescing from an attack of remittent fever. Owing to the fact that hospital accommodations were limited, cholera patients could not be far removed from others. He had known of the three preceding deaths, and was no doubt mentally depressed thereby. He was attacked with diarrhœa on the evening of July 31st, and died on the morning of August 2d, in less than thirty-six hours from the time of attack.

Of about six other cases that were attacked, and which had progressed so far as to have rice-water vomiting and discharges, but with only slight symptoms of cramp, their recovery seemed to be mainly due to calomel, which was administered in large doses, and repeated until either discharges were checked, or some evidence of constitutional effect of the medicine was observed. Whether these cases would have recovered as well under a different course of treatment, I have no opportunity of knowing.

As to the local causes that conjoined to excite the disease, I would state that the camp was situated on an elevated ridge back of the town, and was several hundred feet higher; that the town and surrounding country are subject to overflow from the St. Francis, Mississippi, and L'Anguille rivers, and during the freshet of last spring were completely submerged; that the town was and is dirty, owing to the want of proper drainage, stagnant water in ponds, and decaying vegetable matter and garbage, thrown out by the inhabitants and allowed to lie festering in the sun; that low lands and swamps are in the immediate vicinity, and that miasmata must of necessity arise therefrom. The water used was from a well which had been dug by the troops, on a side-hill, protected by embankment around its mouth, to keep debris from being washed into it. Previous to the appearance of cholera the water had a tainted taste. The well was cleaned out, when, among other dirt found in its bottom, were a couple of dead rats. Whether they had anything to do with the production of the disease I cannot say. After the well was cleaned, lime was thrown into it as a purification. The camp and quarters for the men were as clean and comfortable as they could be made. Each tent had a floor, and bowers had been built for protection from the rays of the sun. Fatigue and other duty was suspended during that part of the day when the heat of the sun is most intense; and everything that good judgment and prudence on the part of the commanding officer could effect to preserve the health of the command was enforced. The bread issued was well baked and good, and the ration generally was well prepared.

I have a knowledge of ten or twelve citizens in and around the town who died of cholera. The epidemic made its first decided appearance July 26th. On the evening of August 2d we moved camp some four miles from Madison. It is on the

western slope of the ridge formerly occupied. We have here an excellent spring of pure water. One case in which cholera symptoms were prominent has occurred since the change: it yielded to treatment, however, and the man is now well.

Very respectfully, your obedient servant,

J. B. DOWNEY,
Acting Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel C. C. BYRNE, *Surgeon, U. S. Army,*
Surgeon-in-Chief Sub-district of Arkansas.

Extract from Monthly Report of Sick and Wounded, Company "C," 19th U. S. Infantry, Madison, St. Francis County, Arkansas, July, 1867. *J. B. Downey, Acting Assistant Surgeon, U. S. A.*

With reference to the cholera which made its appearance at this post July 26th, and of which there are three deaths recorded on the report, I would state that the camp at Madison I considered to be in good sanitary condition. It was situated on an elevated ridge immediately back of the town, and was considerably higher than either the town or surrounding country. The citizens, however, consider the eastern slope of the ridge more unhealthy than the western. The two first cases that occurred were purely epidemic cholera. They died within twenty-four hours after being attacked. Two other deaths that occurred were cases of cholera supervening on the debility which follows remittent fever.

The stimulant plan of treatment was a failure. Of a number of cases that were attacked, but which did not result in death, it seemed that if the secretions could be once unlocked by the influence of mercurials, the discharges were controlled. Of the cases that died, the symptoms were violent and uncontrollable; vomiting and purging; cramps in body and limbs; shriveled, shrunken, and dark-colored skin; hands and fingers looking as if they had been soaked in water; extremities cold from the beginning; pulse weak and slow; involuntary discharges from the bowels which were frequent—rice-water, or watery with flocculent masses floating in the liquid; eyes sunken; conjunctiva dry and dirty; insatiable thirst, and cold breath and death.

NEWPORT BARRACKS, KENTUCKY.

NEWPORT BARRACKS, KY., *July* 3, 1867.

SIR: I have the honor to transmit herewith my monthly report of sick and wounded at this post during the month of June, 1867; also the special report upon epidemic cholera required by Circular No. 3, dated Surgeon General's Office, April 20, 1867.

Although diahrrœa and dysentery have been quite prevalent during the latter part of the month, but two cases of cholera have occurred. This disease was distinctly marked in its stages, but proved of mild type, terminating favorably. The treatment pursued was practically the same as that adopted by Surgeon J. B. Brown, at Fort Columbus, last year.

In reference to the origin of cholera, whatever may be said of overcrowding as a direct agent in the production of the disease, it certainly presents the most favorable conditions for the inception and spread of the poison.

Neither of the men attacked were exposed directly to the contagion so far as I have been able to learn.

Cases are said to have occurred both in Cincinnati, Ohio, and Covington, Ky., a few days before these men were taken sick.

Private William Anderson, a prisoner, joined from desertion, February 7, 1867, and has not been away from the post. The other recruit, Thomas Piper, general service, joined June 20, 1867, from Quincy, Illinois.

The guard-house, from whence the first case came, is occupied by seventy-one prisoners, forty-three of whom belong to regiments. These men are all confined for grave offences—a few under charges, the others undergoing punishment. The three rooms now occupied by the prisoners contain but eleven thousand seven hundred and ninety-one cubic feet of air space, and are arranged according to the enclosed plan.* The police of the prison and the personal cleanliness of the prisoners may be considered faultless. I have frequently called attention to the crowded condition of this guard-house, suggesting means of ventilation, and that additional rooms be given for the use of the prisoners. My suggestions have been approved and carried out to the extent of the means in the power of the commanding officer. Representations were made to the authorities sending prisoners from organized regiments to this post, setting forth the want of capacity in the guard-house to accommodate them with safety to the health of the troops at this depot, but the evil continues. Estimates were also made for the enlargement of the prison, but they failed to meet with approval. I deem this a subject worthy the attention of the general commanding, and would respectfully recommend that either the forty-three prisoners, from organized regiments, confined here, be sent elsewhere, or that the prison be enlarged without delay. Enclosed I send you a copy of a communication recently addressed to the commanding officer on this subject.

The second case, that of Recruit Thomas Piper, general service, occurred in the recruit barracks. There are but four rooms assignable as dormitories for enlisted men at this depot; the dimensions of these are as follows, viz: two, 83 feet 6 in. × 28 feet × 12 feet each; two, 58 feet 8 in. × 28 feet × 12 feet. Three of these rooms are occupied by the permanent party, which consists, with the field musicians, of two hundred and thirty-five men. On the 30th ult., two hundred and seventy men nominally occupied the fourth and only room assignable for recruits. This room has a capacity of 83 feet 6 in. × 28 feet × 12, thus giving 103 cubic feet to each man.

* Not published in this report.

I say nominally occupied, because the men are out drilling and for other purposes during the day, and at night they can occupy four porches, the length of the building, in addition to their proper quarters.

This want of proper barracks accommodation was pointed out to one of the assistant inspectors general, and to the superintendent of the recruiting service last summer.

The most unremitting attention has been given to general police and to the personal cleanliness of the men. The drinking water, which is brought from the Ohio river, has been freed from all impurities by the addition of permanganate of potassa.

As a measure of further precaution, I have recommended that camp equipage for two hundred men be provided and kept on hand, so that at any time when the health of the command appears to suffer from overcrowding, a part may be sent into camp on one of the hills in the neighborhood.

Very respectfully, your obedient servant,

G. PERIN,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

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

NEWPORT BARRACKS, KY., *September* 3, 1867.

SIR: I have the honor to enclose herewith the special report of cholera patients at this post during the month ending August 31, 1867.

The recruit, Allen Burton, V. R. C., was received at this post July 30th from the rendezvous at Evansville, Indiana. The day previous to his admission to hospital he was suffering from diarrhœa and came for medicine; having taken a dose of Squibb's mixture, he was directed to return if the diarrhœa continued. He went on guard, paid no attention to the direction given him, but ate the rations of two men in company kitchen; his diarrhœa continued, and the next morning as I passed by his post I observed him vomiting. He was immediately relieved from guard and placed in bed, but it was too late.

The treatment was the same as previously reported. He died 32 hours after admission to the hospital.

Very respectfully, your obedient servant,

G. PERIN,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

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

JEFFERSON BARRACKS, MO.

JEFFERSON BARRACKS, MO., *July* 16, 1867.

GENERAL: I have the honor to report the following case, which I consider modified cholera asphyxia:

At 5.45 o'clock this morning I was called to the hospital to see Private Jones, of the Engineer Battalion, who had been conveyed there sick. I found him almost pulseless; eyes sunken, nails blue, and skin cyanosed. He had been vomiting and purging some time, and now his dejections were nearly colorless. He was suffering from cramps, and two men were employed rubbing his extremities. Sinapisms had been placed to his wrists, ankles, and abdomen. I immediately applied a compress firmly to his stomach, and gave him 20 drops each of tincture of chloroform and tincture of opium. This was at once ejected, and with such force and in such quantity as to cover my clothing, standing at the time three feet from the patient. I now gave him 20 drops each of tincture of chloroform and tincture of capsicum, and followed this prescription with 10 grains each of calomel and quinine and 2 grains of opium, which was retained after considerable efforts at ejection. At the end of fifteen minutes his pulse could be counted, and was found to be 138, while his respiration was 26, hurried and difficult. At 6.30 some improvement was plainly indicated, both in his pulse and his respiration, and an hour later the former was reduced to 120 and the latter to 22; vomiting and purging had ceased, and his tongue was moist and clean. I now allowed the patient to melt small pieces of ice in his mouth to allay in some degree his parching thirst. After waiting some time for another patient to be brought to this hospital who had been reported to me as similarly affected, (not, however, arriving,) I went to see a patient at the laundry building, and, returning to the hospital at 9 o'clock, found Jones much the same as when I left him. I now ordered for him blue mass and sulphate of quinine, 10 grains each. At a subseq ent visit at midday, his pulse still 120 and respiration 21, I repeated this latter prescription, and allowed him, in addition to ice, a cold infusion of tea, his thirst being distressing. On my visit at 3 p. m. reaction was well established; pulse full, at 120, respiration 19; extremities warm and tongue furred; removed the compress from the abdomen.

Private Jones is a strong and rather muscularly developed man, of temperate habits, unmarried, and aged 20 years and 10 months. Had taken for f od the day previous, bread and coffee for breakfast and supper, and pork, cabbage, and bread for dinner. The day previous his diet had been much the same, at which time he suffered from a slight diarrhœa, which he did not think required any attention. Yesterday was fair, after a heavy rain the night previous, and the thermometer indicated 85° at 3 p. m. Last night was unusually cool; thermometer 58°, and 70° this morning at 8 o'clock, with a light breeze from the northeast.

Dr. Culbertson, Assistant Surgeon, United States Army, on duty at this post, attended an aggravated case of cholera morbus yesterday, and we have had two cases in hospital with the same disease to-day, both doing well.

If we are to consider this a case clearly of Asiatic cholera, I can only attribute its origin to emanation from last year's deposits from this disease. The police of this post is bad, and its sanitary condition not good, though improving.

Very respectfully, &c.,

EBN. SWIFT,
Surgeon, and Brevet Colonel, U. S. A.

Brevet Brigadier General M. MILLS,
Medical Director, Department of Missouri.

JEFFERSON BARRACKS, MO., *July* 17, 1867.

GENERAL: I have the honor to report, in the case of Private Jones, well-established convalescence. At 9 o'clock this morning he had a free discharge of urine, which had been suppressed 29 hours; and at 3 o'clock this p. m. his thirst is greatly diminished, feels comfortable, and has had a natural evacuation of his bowels. His respiration is good, and his pulse full, strong, and 84. Prescribed rest and a milk diet.

At noon to-day I was called to see the child of a laborer employed in the soldiers' cemetery at this post. I was not at my quarters when the messenger arrived. I saw the child at 12.45 p. m. He had died about 20 minutes before. His limbs were cold and his chest warm; his features compressed, and his eyes deeply sunk. While getting the history of the case, the right shoulder was observed to raise and the arm to move. Some bystander remarked, "He is alive!" I immediately placed my hand over the region of the heart, and for a moment was myself deceived, so great was the motion observed in the chest. Three or four pulsations were imitated, and the ribs moved under my hand. Some fruitless efforts at resuscitation soon convinced me the spark of life had fled. Would the electric fluid recall it in these cases, not uncommon, of sudden deaths?

This boy, John Keevans, aged 12 years and four months, was of slight frame, though well developed in body and limbs. Had generally been healthy. Yesterday he was employed at some light work, errands, etc., in a family of the garrison. He had taken bread, meat, coffee, and molasses at breakfast and supper, but had eaten no dinner at home or anywhere else, so far as I could learn. During the night, towards morning, his mother knew of his leaving his bed and room; that he was sick and vomited. At 6 and at 7 his bowels were purged; also at 9 and 11. These latter motions, not copious, were frothy and whiteish. He now complained of excessive thirst, and had cramps in his legs. Previous to this his mother thought his sickness did not "signify anything;" he had had something like it a year ago in Illinois. This was in reply to my inquiry why she did not send for me sooner.

From such history of this case as I have been able to collect, its sudden fatal termination from apparently insufficient evacuations, I am constrained to look upon it as one of cholera asphyxia not unlike that of Private Jones, reported yesterday. This boy's father was attacked with cholera morbus yesterday, and Dr. Culbertson gave him calomel, rhubarb, and morphia, and to-day he is able to be about the house.

Also, Pat McBride, laborer in the cemetery, and John O'Neil, ambulance driver, took the same complaint during last night. These are doing well.

Very respectfully, &c.,

EBN. SWIFT,
Surgeon, and Brevet Colonel, U. S. A.

Brevet Brigadier General M. MILLS,
Medical Director, Department of Missouri.

JEFFERSON BARRACKS, MO., *July* 17, 1867.

SIR: I desire respectfully to call your attention to the urgent necessity of having a large detail from your command employed in removing the rank vegetable growth of grass, weeds, etc., about the quarters occupied by the men under your charge, to permit the sunlight and heat to exercise its sanitary influence upon the surface of the ground. They should disinfect all slop vessels, drains, privies, etc., by means of chloride of lime or zinc, sulphate of iron, or carbolic acid. Strict cleanliness should be enforced in dormitories, kitchens, etc., and the former should be fumigated with fumes of burning sulphur. Care should be observed, in the preparation of food, that meats and vegetables are thoroughly cooked. Since the spring at the quarry, from its location, may receive the sub-surface drainage of the cemetery, I must recommend that its use be at once discontinued by all. No disinterments at the cemetery should be made for the present.

The unfortunate family which lost one of its members by cholera to-day should be furnished with other quarters, and those now occupied by them should be thoroughly cleansed and disinfected.

Respectfully, &c.,

EBN. SWIFT,
Surgeon, and Brevet Colonel, U. S. A.

F. W. COOPER, *in charge of Cemetery.*

JEFFERSON BARRACKS, MO., *July* 18, 1867.

GENERAL: I have the honor to report continued convalescence on the part of Private Jones.

At 12 o'clock last night I was called to see Henry Hardy, employé of the quartermaster's department, at work getting out rock in the quarry for the cemetery. Found him suffering exceedingly from cramps in the legs, thighs, and abdomen. Three men were industriously employed in rubbing him. His complaints were loud and constant, his pulse feeble and 108, and his respiration hurried. Had him immediately conveyed to a ward in the hospital, about one hundred yards distant, and gave him tincture of chloroform, twenty drops, tincture of opium and tincture of capsicum, each fifteen drops, and applied a large mustard plaster to his abdomen. This movement of the patient did not occupy more than ten minutes, and did not seemingly exhaust him, yet his pulse went up to one hundred and eighteen. Vomited little, but purged excessively. His evacuations were tinged with bile, and fœcal in character; the first more so than the succeeding. Gave him of calomel and quinine each ten grains, and sulphate of morphia half a grain. Removed mustard and placed a compress firmly to his abdomen. At 1 o'clock I repeated the chloroform mixture previously given, which succeeded in arresting the cramps. At 2 o'clock I left the patient quite comfortable. I saw him at 6 this morning, and gave him blue mass and quinine, of each ten grains, which I ordered to be repeated at 10 o'clock, should there be no evacuation of the bowels. At 11 o'clock, his pulse being still feeble and 120, I gave him a milk punch, which seemed to establish complete reaction, and at 3 this p. m. his pulse is full, strong, and 100. I can only consider this case as exaggerated cholera morbus. The excretions were not at any time quite destitute of bile, but from the severity of the symptoms I feared the result.

This case occurred in the dormitories near the rooms occupied by the family whose son died suddenly yesterday.

Very respectfully,

ERN. SWIFT,
Surgeon, and Brevet Colonel, U. S. A.

Brevet Brigadier General M. MILLS,
Medical Director, Department of Missouri.

Extract from Monthly Report of Sick and Wounded of Company "E," United States Engineers, Jefferson Barracks, Mo., September, 1867. *H. Culbertson, Assistant Surgeon, U. S. A.*

As cholera has been prevailing at St. Louis, and so near to this post, the following sanitary measures were adopted here:

The disinfection of all sewers, drains, vaults, and latrines, with a saturated solution of sulphate of iron, and also with chloride of lime, and the placing of the latter salt in the quarters of the men; thorough ventilation and cleansing of the quarters, and policing of the grounds; frequent airing of the bedding of the men; the proper cooking of the food, and the interdiction of all fruits and vegetables; the use of river water purified with alum; the disinfection of the clothing and discharges of all patients in hospital who have diarrhœa or cholera morbus; and the removal of the dejections at once, and the frequent disinfection of the hospital with burning sulphur; also with chlorine. In addition, the men were enjoined to report at once for treatment so soon as they have diarrhœa; and, further, to cut off as much as possible malarial diseases, or the debilitating effects of miasmatic agencies, reveillé is called at seven o'clock a. m. each day, and the men are enjoined to keep within their quarters after sunset.

No cases of cholera have occurred at this post during the month. We have been employing subcutaneous injections of sulphate of morphia in acute dysentery (introduced an inch from the margin of the anus) with excellent results. This plan of treatment was accompanied with the exhibition of sulphate of magnesia, quinine, or aromatic sulphuric acid, and was used when the ordinary injections failed. It aided materially the action of the other agents mentioned.

JEFFERSON BARRACKS, MO., *December* 12, 1867.

GENERAL: I have the honor to report for your information the following circumstances connected with the outbreak of cholera at this post in the month of October last:

On the evening of October 26th, two companies, "G" and "H," 125th Colored Infantry, arrived at Jefferson Barracks for muster out of the service of the United States. They had left Fort Bliss, Texas, a few weeks previously, marching across the plains to Fort Harker, whence they had come by railroad through St. Louis to this place. During the whole journey they had enjoyed excellent health. They numbered four officers and one hundred and fourteen soldiers. Several families also accompanied the command. They were assigned to quarters in the south row of buildings constituting Jefferson Barracks. At sick call on the 27th of October, two soldiers of this command appeared; one of them suffered from bronchitis, and one from chronic dysentery. On the 28th three cases of cholera occurred which proved fatal within 24 hours. On the 29th, seven cases appeared; on the 30th, two; on the 31st, one; and on November 1st, two. No other cases occurred among the troops. Of this number, six died, as follows: on the 29th, three; on the 30th, two; and November 1st, one.

The command was mustered out of service and left the post November 1st.

All the above-mentioned fifteen were well-marked cases of epidemic cholera, characterized by frequent and profuse rice-water evacuations, cramps principally in the extremities, and more especially in the legs, more or less complete colapse, mental clearness and unconcern, and, in nearly all the cases, vomiting. In every case but one, the patients stated that diarrhœa had existed from 24 to 48 hours before I saw them, but that they neglected to come to the doctor, because they did not want to take medicine, or be put on diet, or detained in hospital while their comrades were mustered out and going home.

During this same period of time twenty-eight cases of diarrhœa occurred among the men of these two companies, all of which yielded to Squibb's mixture in drachm doses, or sulphate of morphia in half-grain doses, repeated pro re nata.

Outside of the colored command no cases of cholera occurred; nor did diarrhœa increase or prevail among the other residents of the post, who consisted of a company of engineer troops about one hundred and forty strong, of a gang of workmen in the national cemetery, about eighty strong, and of a number of families of officers, soldiers, and citizens.

The first two cases were seen by me about 10 a. m., October 28th, and were at once diagnosed as cholera. The third case was seen about 3 p. m. All three of these cases occurred in Company "G." I proceeded at once to inspect these companies in their quarters, especially the company in which sickness existed. Both companies occupied similar quarters, which were clean and well ventilated. Company "G," however, was larger than Company "H," and hence more crowded in quarters, so that I at once caused additional rooms to be assigned to this company, into which they moved on the evening of the same day, the 28th.

All the quarters occupied by these companies had been for some months vacant. I caused them to be policed, and had big fires made in the fireplaces. The food of the command consisted of soldiers' rations, and seemed good, and well cooked. The whole command strenuously denied having eaten anything but their ordinary food, save once in a while a man acknowledged to have eaten a single apple or a few hickory nuts. The water used was that of the Mississippi river, the same used by the other occupants of the barracks. This water was forced by a steam engine and pump from the river into large iron reservoirs in a covered building, whence it was distributed by iron pipes to hydrants throughout the post. None of the command had seen a case of cholera, or been exposed to one that they knew of. In coming to this place they passed through the city of St. Louis, where cases of cholera were said to be daily occurring.

No delay occurred in taking steps calculated to check the progress of the disease; and first and foremost, I deemed it necessary to change the water used. For this purpose many barrels of water were drawn from the hydrants, and were disinfected by the addition of Bowers' solution of permanganate of potash in quantity sufficient to color the water perceptibly. Directions were given to use no other water but that thus disinfected, and to use that for the present sparingly, and principally in coffee. The men were also periodically questioned by their officers concerning the existence of diarrhœa, upon the first appearance of which they were directed to report to me without delay. The use of easily digestible food was directed, and temperance in that. I further recommended that the healthy men should be kept occupied, and they were kept almost constantly busy at various work about the post. As the remainder of the 125th Regiment was ordered to this post for muster-out, and were hourly expected, I wrote to the headquarters Military Division of the Missouri, reporting the appearance of cholera, and recommending that no more troops be sent here until the disease disappeared. This recommendation was carried out.

As the disease first appeared in Company "G," so did that company also suffer most during the epidemic. Thus, of the fifteen cases reported, nine occurred in Company "G," with four deaths, while in Company "H" there were six cases, with two deaths. This I attribute to the greater crowding in quarters of the first-mentioned company, as I found no other appreciable difference in the circumstances or surroundings of the two companies.

The medical treatment consisted in the use of sulphate of morphia and Squibb's mixture in the first stage of the disease, followed by whiskey and chloroform in the stage of collapse. Frictions, sinapisms, and bottles of hot water to the abdomen and extremities, and essence of beef, tea and toast, as soon as the patient could retain them.

One case of cholera occurred in addition to the fifteen above mentioned; this was in the person of the wife of one of the officers of the 125th colored infantry, who was attacked on the 29th and recovered under the above-named treatment.

Thus, in all, occurred twenty-eight cases of diarrhœa, and sixteen of cholera. Of the latter, six, or 37.5 per cent. died.

In the six fatal cases, death occurred in one case in 16 hours; in one case in 22 hours; in one case in 23 hours; in one case in 24 hours; in one case in 26 hours; and in one case in 31 hours.

This time is reckoned from the hour that the cases first presented themselves to me. Previous to October 28th the weather had been warm. On this day it became cooler. On the night of the 28th there was a slight frost, and on the night of the 29th a heavy frost. This change of temperature may have aided the measures above related in cutting short the duration of the epidemic. The abatement certainly followed promptly the disuse of unpurified water; and I am satisfied, under all the circumstances, that this outbreak of cholera was caused by the change of habit of these soldiers from their out-of-door camp life in marching across the plains to life in somewhat crowded quarters, and to change in drink from the pure clear water of the mountains and prairie streams to the impure turbid water of the Mississippi.

Very respectfully, your obedient servant,

JOSEPH R. SMITH,
Surgeon, and Brevet Colonel, U. S. A.

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

FORT RILEY, KANSAS.

FORT RILEY, *June* 22, 1867.

SIR: In view of the fact that cholera in an epidemic form visited this station last summer, and that the warm season may bring with it a return of the disease, I respectfully suggest, for the consideration of the post commander, the necessity of instituting and maintaining, during the summer and autumn, a thorough system of hygienic police, which should be rigidly enforced throughout the garrison and its vicinity. I would suggest the propriety of having all the latrines and water-closets cleansed, whitewashed, and ventilated.

Twice each week quicklime should be freely distributed in the sinks, and one quart of vinegar should be thrown into each sink in use twice a week, while there is any tendency to a return of the disease.

The quarters of the enlisted men and civil employés should be kept scrupulously clean, frequently whitewashed, and all refuse garbage and effete matter promptly removed to a distance. Slop barrels should be provided for the use of kitchens, and all persons held to a strict accountability for the cleanliness of their premises. A general police of the garrison should be made at least once a week.

Very respectfully, your obedient servant,

B. J. D. IRWIN,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

Brevet Captain C. N. WARNER,
4th U. S. Artillery, Post Adjutant, Fort Riley, Kansas.

[Post Order No. 7.]

HEADQUARTERS, FORT RILEY, *June* 24, 1867.

I. Upon recommendation of Brevet Lieutenant Colonel B. J. D. Irwin, U. S. A., Post Surgeon, and in view of the fact that cholera in an epidemic form visited this post last summer, a thorough system of hygienic police will at once be instituted throughout the whole garrison and its vicinity, and will be rigidly enforced during the summer and early autumn months.

II. All the latrines and water-closets of the post will be cleansed, whitewashed, and provided with ventilators—the latter to extend from the vaults to about twelve inches above the roof, and to be six inches square in the clear.

Twice each week—namely, on Tuesdays and Saturdays—quicklime will be freely distributed in the sinks, and one quart of vinegar will be thrown into each sink in use on such days.

The quarters of the enlisted men and civil employés will be kept scrupulously clean, whitewashed, and all refuse garbage and other offensive matter will be promptly removed to a safe distance.

Slop barrels will be provided for the kitchens, and all persons will be held to a strict accountability for the sanitary condition of the premises occupied by them.

A general police of the post will be made on Saturday of each week.

By order of
Brevet Lieutenant Colonel C. C. PARSONS.

C. N. WARNER,
First Lieut., 4th U. S. Artillery, Brevet Captain, U. S. A., Post Adjutant.

Extract from Special Report of Cholera Patients at Fort Riley, Kansas, June, 1867. *Brevet Lieutenant Colonel B. J. D. Irwin, Surgeon, U. S. A.*

Thomas Cafflen, age 25, employé of the quartermaster's department, attacked June 22d, and died the same day. Admitted to hospital June 18th with an attack of diarrhœa, which yielded readily to treatment consisting of 1 grain of camphor, ½ a grain of capsicum, and ¼ of a grain of opium. At the morning visit on the 22d he showed symptoms of cholera: cold surface of body; eyes sunken; voice husky; tongue cold; has had three serous stools during the latter part of the night, and vomited twice. Sinapisms over epigastrium and to the calves of the legs; hot water to feet; aromatic spirits of ammonia and Hoffman's anodyne, twenty drops each, were given, with toddy every half hour. 11 o'clock, cramps severe in lower limbs; administered chloroform, one fluid drachm internally, which gave prompt relief. Complete collapse. Died at 1 o'clock p. m.

Post mortem examination: Age 25; dark hair, blue eyes; about five feet seven inches high, and 130 pounds weight. Eighteen hours after death, rigor mortis well marked; upper surface of intestines blanched; lower congested, with distinct erosion of mucus surface in small patches; contents wheylike fluid devoid of feculent characteristics; bladder empty and strongly contracted; kidney highly congested; the small quantity of urine turbid and peculiar; liver small, about 2½ pounds; friable, serous covering removed with ease.

Extract from Special Report of Cholera Patients at Fort Riley, Kansas, July, 1867. Brevet Lieutenant Colonel B. J. D. Irwin, Surgeon, U. S. A.

Peter Kehoe, Irish, age 30; attacked July 11, 1867, and died the same day. This patient was an employé in the service of the Union Pacific Railroad Company, Eastern Division. Himself and wife lived on a construction train, keeping a mess for the other employés of that train. On the 9th they visited the vicinity of Fort Harker, Kansas, where cholera was then epidemic. The train returned on the morning of the 11th. I saw him at about 4 o'clock p. m., and found him rapidly running into the collapsed stage of epidemic cholera, from which he died in about an hour afterwards.

Extract from Case, Diet, and Prescription Book, Fort Riley, Kansas. Brevet Major G. M. Sternberg, Assistant Surgeon, U. S. A.

Henry Gorns, Recruit, 10th United States Cavalry, arrived at the post November 11th, from Vincennes, Indiana, via Saint Louis; was taken sick with diarrhœa at St. Louis; had no treatment until he was brought to the hospital on the morning of November 13th; had been purging and vomiting, and had cramps in his legs all night; no one took pains to inform the post surgeon of his condition. When first seen he was in a state of partial collapse, but still able to stand up; pulse very feeble; extremities cold; fingers shriveled in appearance; voice husky and weak, and tongue cold; had but one rice-water discharge after being admitted to hospital; vomited several times, but the vomiting was no longer severe, and but little was ejected besides the water he drank. Administered ten grains of calomel, and applied tin warmers to abdomen and feet; gave brandy and water, each one fluid drachm every ten minutes. November 13th, 3 p. m: has rallied considerably; pulse stronger; tongue and extremities warmer; brandy has been well borne and reaction is fairly established; had several copious watery passages of a light greenish color during the day; vomited several times, ejecting nothing but a little water; had cramps in his legs. To have beef essence, a tablespoonful every half hour; during the night sinapisms to the calves of the legs and to abdomen; brandy continued during the night, about every half hour, in drachm doses.

November 14th, 9 a m: pulse quite full; surface warm; had two or three passages during the day—not so copious, and containing some fœcal matter. Brandy discontinued; chicken broth ad libitum, there being no beef essence. November 14th, 1 p. m: since brandy was discontinued, pulse has become weaker; resume brandy every half hour. November 15th, 9 a. m: vomiting and diarrhœa has entirely ceased; continue treatment. November 16th, 9 a. m: continues to improve; beef essence ad libitum; to have sherry wine, an ounce and a half three times a day. November 17th, 9 a. m: still improving; continue treatment. November 18th, 9 a. m: still improving; no passage since the evening of the 16th; continue treatment, and to have castor oil, half an ounce, and 15 drops of tincture of opium; oil operated at 6.30 a. m. Returned to duty November 25th.

FORT HARKER, KANSAS.

Extract from Monthly Report of Sick and Wounded, Companies "A," "B," and "G," 38th Infantry, Fort Harker, Kansas, June, 1867. Brevet Major Geo. M. Sternberg, Assistant Surgeon, U. S. A.

At 3 o'clock a. m., June 28th, Acting Assistant Surgeon Perry, U. S. A., was called in haste to see George W. Keeton, a citizen employed by the beef contractor as a herder and butcher. The man was found in a state of profound collapse, with all the symptoms of epidemic cholera, (cramps, rice-water discharges from stomach and bowels, shriveled appearance of the fingers, coldness of extremities, &c., &c.) The patient died at 3.30 p. m. the same day. He had been suffering from diarrhœa for two days. At 7 p. m. the same day, Private George Groom, Company "H," 38th Infantry, was sent to hospital by Assistant Surgeon Ely McClellan, U. S. A. (This soldier's company is temporarily at the post *en route* from Jefferson Barracks, Missouri, to New Mexico.) The patient had all the symptoms of cholera, and was in a state of collapse when admitted. He died at 11 a. m., June 29th.

William Jackson, Company "G," 38th Infantry, was sent to hospital, by Assistant Surgeon McClellan, at 9 a. m., June 30th, and died at noon, July 1st; an unmistakable case of cholera. Tony Powell, Company "B," 38th Infantry, was admitted at 6 p. m., June 29th, in a state of collapse from cholera. Treated with chloroform in drachm doses. July 2d, is considered out of danger. A child of George Irwin (quartermaster's employé) was taken sick with cholera at 2 p. m., June 29th. His wife was taken at 10 a. m. the same day, and himself at 2 p. m., June 30th. The wife and child died at 5 p. m. on the 30th; the man is now (July 2d) in a fair way of recovery, but not yet out of danger. Wm. Edwards, quartermaster's employé, taken sick at 6 p. m., June 30th; died at noon, July 1st. G. H. Arnold, taken sick at 3 p. m., June 30th; July 2d, is doing well.

In addition to the above cases, three cases occurred this morning (July 2d) among the quartermaster's employés—one has already proved fatal—but I have not yet had the opportunity to get the names from Acting Assistant Surgeon Chase, U. S. A., who is attending them.

No cases have as yet occurred in the garrison proper. George Keeton lived in a dug-out (hole in a bank) about a mile and a half from the post, near the slaughter-pen on the banks of the Smoky Hill river. The soldiers of the 38th Infantry, reported above, are recently from Jefferson Barracks, Missouri. They are encamped three-quarters of a mile from the post, and over half a mile from where the first case occurred. George Irwin and family lived in a dug-out in the banks of a creek one-quarter of a mile from the post. He says they sometimes drank the creek water, (stagnant nearly,) and had been eating wild gooseberries stewed. The men, Arnold and Edwards, had recently come from Fort Riley, and were in camp on the creek bottom not far from Irwin's dug-out. The death reported to-day is at the stone quarry, over two miles northeast from the post. The wind has been blowing steadily but gently from the south for several days. The days have been warm and oppressive; the nights cool and comfortable; the mornings misty.

We have had for some time very poor bread at the post; it is often sour and heavy. I have recommended the issue of hard bread in the place of the bread from the post bakery. I made a thorough sanitary inspection of the post on Sunday, June 30th, and all my recommendations in regard to policing have been carried out by the post commander. The camps of the companies of the 38th Infantry have been moved to higher and better grounds. The old sinks have been filled up and new ones dug. A hospital tent has been pitched for the sick in the quarters of each company. The cases received into the post hospital have been treated in a hospital tent pitched 50 yards in the rear of the hospital. Disinfectants are freely used, and requisition has been made for more.

Report on Epidemic Cholera at Fort Harker, Kansas, during the summer of 1867, *by Brevet Major G. M. Sternberg, Assistant Surgeon, U. S. A.*

Fort Harker, Kansas, is located on high ground, about a mile east of the Smoky Hill river, at the junction of the Smoky Hill road to Denver city and the road to Santa Fé, via Fort Zarah and the Arkansas River route. It is eighty-five miles west of Fort Riley, and since the 10th of July has been in railroad communication with the east by the completion, thus far, of the Union Pacific Railroad, Eastern Division.

The elevation above the bed of the river is from sixty to seventy feet; the surface descends to the east, south, and west, affording excellent drainage. The soil is but six or eight inches thick, and below it is a bed of fine gravel, about thirty feet thick, composed mostly of quartz and flint; below this is a bed of clay. The bluffs to the north and east of the fort are composed of a recent red sandstone, which contains impressions of the leaves of trees of existing species, (oak, ash, willow, &c.) In places there is a large amount of iron in the sandstone.

The water used at the post is obtained from a spring in the bank of a creek one-quarter of a mile west from the post. The spring issues from the bank about fifteen feet above the level of the creek, over the stratum of clay, above which is the gravel. An examination of the water from the spring, made in July, 1867, showed but a small trace of organic matter. One grain of permangante of potash to a gallon left a distinct pinkish tinge after 24 hours.

During the past year diarrhœa has been of rare occurrence among those who have been at the post for any length of time. During the month of June, 1867, but twelve cases of diarrhœa are reported.

A company of the 37th Infantry ("E") came to the fort in October, 1866, from Little Rock, Arkansas. Very many of the men were suffering from diarrhœa, and nearly every one from intermittent fever. After being at the post five or six months, nearly every man in the company became healthy and robust, and diarrhœa among them of rare occurrence. But two men of this company died of cholera.

The garrison of the post, when cholera first made its appearance, consisted of Company "E," 37th Infantry, (white,) and Companies "A," "B," and "K," 38th U. S. Infantry, (colored.) The companies of the 38th Infantry had been recently organized at Jefferson Barracks, and came from there here, "A" and "B" Companies stopping a little more than a month at Fort Riley on their way. In addition to these troops, "H" Company, 38th Infantry, and "F" Company, 10th Cavalry, (colored,) were temporarily at the post under the medical supervision of Brevet Major Ely McClellan, Assistant Surgeon, U. S. A. The troops (with the exception of "E" Company, 37th Infantry, which was in a stockade building) were in camp at a distance of from one-eighth to half a mile from the post, on high ground.

Four companies of Kansas militia were mustered into the United States service, and remained at the post about two weeks in July, during the worst of the epidemic. There were also encamped at and around the post from five hundred to eight hundred quartermaster's employés, (masons, carpenters, laborers, and teamsters.) The number of these was constantly varying, many leaving in consequence of the epidemic, and others coming from the east.

The police of the camps was not good when cholera first made its appearance. Some of the company sinks were in wretched condition, and there were several offensive holes about the post where slops and garbage from the kitchen had been thrown. Measures were at once taken to remedy these evils; a strict system of policing was inaugurated; the camps were all moved to new grounds, and disinfectants were procured and freely used. The men were in wedge tents, from two to four in a tent. On my recommendation a hospital tent was pitched for the use of the sick in the quarters of each company, (for slight cases of diarrhœa, etc.) The hospital patients were all treated in hospital tents, which were pitched about fifty yards in rear of the post hospital. Convalescent and uncertain cases were kept in separate tents from the cholera patients. The discharges from the patients were all disinfected as soon as passed.

The first case of cholera in this neighborhood, and, so far as I can learn, the first case this year in the State of Kansas, was that of Geo. W. Keeton, a citizen employed by the beef contractor as a herder and butcher. He had been so employed for three

weeks, previously to which time he worked in the mess-house of the quartermaster's employés. He was first seen by Acting Assistant Surgeon Perry, U. S. A., at 3 o'clock a. m., June 28th; was found in a state of collapse; had rice-water discharges from stomach and bowels; cramps and shriveled appearance of fingers; had been suffering from diarrhœa for two days, but had not applied for treatment. The patient died at 3.30 p. m. the same day. This man lived in a dug-out (hole in the bank) near the slaughter-pen, at a distance of a mile from the post or any camp. At 7 p. m. the same day Private George Groom, Company "H," was sent to the post hospital by Assistant Surgeon E. McClellan; was in a state of collapse when admitted, with all the symptoms of cholera. Died at 11 a. m., June 29th. A child of Geo. Irwin, quartermaster's employé, was taken sick with cholera at 10 o'clock a. m., June 29th; his wife at 12 m. same day, and himself at 2 p. m., June 30th. The man recovered; the wife and child died on the 30th. This family lived in a dug-out in the bank of the creek running near the post, (not far from the spring.) They were over half a mile from either of the other cases. They had drank the creek water. Tony Powell, Company "B," 38th Infantry, admitted to hospital at 6 p. m., June 29th. Recovering.

The following is a record of cases and deaths occurring among the troops at the post under my supervision:

Date.	No. of cases.	No. of deaths.	Date.	No. of cases.	No. of deaths.	Date.	No. of cases.	No. of deaths.
June 28th	1	.....	July 10th	1	.....	July 22d	.....	.....
" 29th	1	1	" 11th	1	1	" 23d	1	2
" 30th	1	.....	" 12th	1	.....	" 24th	.....	.....
July 1st	.....	1	" 13th	4	.....	" 25th	.....	1
" 2d	.....	.....	" 14th	3	6	" 26th	.....	.....
" 3d	.....	.....	" 15th	2	1	" 27th	2	2
" 4th	1	.....	" 16th	.....	2	" 28th	1	.....
" 5th	2	.....	" 17th	1	1	" 29th	1	.....
" 6th	3	.....	" 18th	4	1	" 30th	1	.....
" 7th	.....	1	" 19th	11	6	" 31st	2	.....
" 8th	.....	.....	" 20th	2	.....	August 1st	.....	3
" 9th	.....	.....	" 21st	.....	3	Total*	47	32

In addition to the above cases, quite a number of citizen employés of the quartermaster's department were treated at the post hospital. Many cases, that I am now satisfied were mild cases of cholera, were diagnosed at the time as choleraic diarrhœa, and do not appear in the above report, which only contains the clear and unmistakable cases.

During the first few days of the epidemic, Acting Assistant Surgeon Perry, U. S. A., rendered valuable assistance in the care of the sick. He was then ordered to Fort Zarah, Kansas, where the cholera had made its appearance. Acting Assistant Surgeon Squier, U. S. A., assisted me in a most faithful and efficient manner for about a week, and was then ordered away with the Kansas militia. He shortly after fell a victim to the disease. On the 22d of July, Brevet Colonel Swift, Surgeon, U. S. A., and Brevet Major Brewer, Assistant Surgeon, U. S. A., arrived at the post and kindly relieved me of any further care in regard to the sick, and on the 26th I left the post on leave of absence.

Acting Assistant Surgeon Chase, U. S. Army, attended to the sick among the quartermaster's employés dusing the greater part of the time, but was prevented from doing so from July 18th to 28th by sickness. He reports 79 cases, and 26 deaths. His last case occurred on the 30th July. Many of his worst cases were treated at the post hospital, and the deaths occurring there are not included in his report.

At first we tried the chloroform treatment, as recommended by Assistant Surgeon E. McClellan, in doses of from 15 minims to one fluid drachm, repeated every half hour, or at larger intervals. The chloroform seemed to have a decided effect in controlling the diarrhœa and vomiting, but I could not see that it had any effect in the way of producing reaction from a state of collapse. We afterwards adopted the calomel treatment, giving from 10 to 20 grains every hour until three or four doses had been administered, and the results of this treatment were more satisfactory than of any other tried. A number of apparently hopeless cases rallied under this treatment, but were afterwards carried off by the consecutive fever. We used Squibb's mixture very extensively in the treatment of the prevailing diarrhœa, and found it to answer admirably.

This spring the Smoky Hill river overflowed its banks to an unusual extent, and the low lands near it were extensively flooded. There was an unusual amount of moisture in the atmosphere during the months of April, May, June, and July, and a great deal of rain for this section of the country. Decomposition of animal and vegetable matter has taken place with unusual rapidity. The air here is usually so pure and dry, that a piece of meat, cut thin, will dry when hung in the air without becoming tainted; but this summer the reverse was the case. There have been an unusual number of flies and mosquitoes. Houses have been infected with a large fly which differs from the common house fly. During the prevalence of the epidemic the nights were cool, and often almost cold. More deaths occurred during the coldest nights than at any other time. After a thunder storm the number of cases decreased in a marked degree. A large proportion of the cases were among those who had recently arrived at the post, or had just returned from a tour of escort duty.

A number of cases could be traced to an attack of indigestion from the use of improper food, and others to the immoderate drinking of river water. The disease was most fatal among the Kansas militia, who were for several days encamped on the banks of the river near the slaughter-pen where the first case occurred. They drank the river water.

*The above table contains one case more than the list of names received from Fort Harker.

The disease has traveled from here westward on both the Santa Fé and Smoky Hill route, but has not extended eastward, although most of the fugitives from it went in that direction. One mild case of cholera occurred on the route from Fort Riley to this post late last year, and was brought here, where the patient recovered.

I cannot find any evidence that the disease was brought here from the east by troops, or that any cases had occurred at Fort Riley, Fort Leavenworth, or Jefferson Barracks; nor can I find any local causes that seem sufficient to account for its appearance here. I can only suppose that the disease, having traveled as far westward as Fort Riley last year, the germs have been preserved in some way until a condition of the atmosphere prevailed favorable to their extension; and in conformity with the usual law, the disease has this summer continued its westward march.

Nearly every officer at the post suffered from choleraic diarrhœa; but no case of cholera occurred among them. One of the ladies of the garrison died of cholera on the 15th of July.

FORT RILEY, *December* 8, 1867.

GENERAL: I have the honor to request that the following explanatory note may be appended to my report in regard to the epidemic of cholera at Fort Harker, Kansas, during the past summer. The ratio of deaths for the number of cases is not fairly shown by my report, as the four companies of Kansas militia, "H" Company, 38th U. S. Infantry, and "F" Company, 10th Cavalry, were independent commands in camp near the post, under their own medical officers. Only the most severe cases from these commands were taken into the post hospital, and are reported by me. Many of the milder cases were treated in camp, and many of the cases sent to the hospital were in a hopeless state of collapse when admitted.

Very respectfully, your obedient servant,

GEO. M. STERNBERG,
Assistant Surgeon, and Brevet Major, U. S. A.

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

FORT LEAVENWORTH, KANSAS, *August* 5, 1867.

GENERAL: I have the honor to inform you that, on the morning of the 22d ultimo, I left this place in company with Assistant Surgeon Brewer, U. S. A., en route for Fort Harker, having been apprised of the alarming increase of the cholera epidemic at that place. At Lawrence I was joined by Dr. Swift, U. S. A., whom I had ordered up from Jefferson Barracks, and Doctors Wiggins and Renick, physicians under contract, engaged by the Medical Purveyor at St. Louis, at my request, for service at and about Fort Harker. At 10.30 p. m. I arrived at my place of destination, and found both medical officers at the post disabled from duty, and many sick in quarters and in hospital. Dr. Sternberg, Post Surgeon, on account of fatigue, had gone to bed. Dr. Chase, overwhelmed with grief on account of the loss of his wife, who had suddenly died at 4 o'clock that afternoon, was not in condition to do any kind of duty.

In company with Doctors Swift and Brewer, I at once visited the sick in hospital, and found Ed. McEntire, Private, 3d U. S. Infantry, entered the day previous, convalescing from cholera, and now suffering from irritation of the bowels, and restive. Sulphate morphia, ½ grain, and mustard to the abdomen, was prescribed.

Private Henry C. Irvy, 18th Kansas Cavalry, aged 23, unmarried, entered the hospital on the 19th instant with symptoms of cholera; his dejections were now small and frequent, tinged with bile; had taken 50 grains calomel. Diarrhœa mixture—calomel and sulphate of quinine, of each ten grains, morphine, ½ grain—and compress to the abdomen, were ordered. Visited at 2.30 o'clock and 4.30 o'clock a. m., by Dr. Swift, with other inmates of the hospital tents. At the latter hour it was discovered that the compress had been neglected, and it was immediately applied. The pulse, from being imperceptible at the wrist, could soon be distinctly counted, and found to be 116; bandage could not be tolerated, consequently his pulse fell rapidly; brandy and milk punch prescribed every half hour to no purpose. Irvy died at 12 m.

John Scott, a Private of the 3d U. S. Infantry, aged 21, unmarried, entered the hospital on the 18th instant with unmistakable evidences of cholera; had taken diarrhœa mixture and 40 grains of calomel, and had mustard applied to the abdomen. Respiration labored and pulse 105, though not then suffering from any irritation of the intestinal canal; his debility was so great that convalescence could not be considered as established. Cold tea and milk punch were prescribed.

D. O. Duffy, Private, Kansas Volunteers, aged 20, unmarried, entered hospital on the 19th instant; pulse full and 108; respiration oppressed, comatose; had taken 30 grains of calomel and diarrhœa mixture; brandy and milk punch every half hour; diarrhœa recurring at 9 a. m., camphorated tincture of opium, 2 drachms, and compress to abdomen, were prescribed.

Frank Hunt, citizen, aged 19, unmarried, was brought to hospital at 10.15 a. m., pulseless, restive, and cyanosed; had vomited his breakfast and purged twice; complained of pain in the umbilical region, for which Dr. Brewer administered, endermically, a solution of ¼ grain of sulphate of morphia; half a drachm of chloroform was given, followed by calomel and sulphate of quinine, of each 15 grains. At the end of 45 minutes, 20 grains of sulphate of quinine was administered; no effect was recognized, unless that produced by the morphine, and death at noon resulted.

Joseph De Foy, aged 57, married, a laborer in the quartermaster's department, entered the hospital at the same time with the above-mentioned Frank Hunt; had been vomiting and purging excessively for several hours, or since half-past five, and was seized with excruciating cramps in the abdomen and inferior extremities; pulseless, voice weak and husky; gave him chloroform, ½ drachm, camphorated tincture opium, 2 drachms, which, being retained, was followed by calomel and quinine, of each 10 grains. Assistant Surgeon Brewer injected, endermically, a solution of 1 grain of sulphate of morphia; entire relief from pain and cramp followed. A compress had also been placed upon the abdomen, though the evacuations from the bowels were entirely suppressed, and stimulants in the shape of brandy and milk punch were freely administered; no reaction followed; and death occurred at 5 o'clock p. m. An autopsy of the patient was prevented by his hasty interment.

Large details have been made from the command, and from the employés of the quartermaster's department, to thoroughly police the grounds, move tents, and disinfect privies and latrines, etc. Tents are being put up for the accommodation of cholera patients on the opposite side of the garrison from the hospital now occupied.

Requisitions for ice and an abundant supply of disinfectants, medical and hospital supplies, etc., have been made.

The following communication has been presented to Brevet Major General Smith, commanding the District of the Upper Arkansas, for his consideration and action:

FORT HARKER, *July* 23, 1867.

GENERAL: In view of the fact that cholera prevails at this post, I feel it my duty to suggest that all labor, not absolutely necessary to the forwarding of supplies, be suspended for a time, and that the command be turned out under a commissioned officer for general police. All tents should be struck and spread in the sun, inside out, and all sinks and privies should be filled up, and new ones should be dug to the leeward of the post and camps, when practicable. All filth should be sought out, and, when found, should be burned or buried, as it is impossible to say how far the decaying, dead, and decomposing vegetable and animal matters may affect the health of the troops and employés. All rank-growing grass and weeds should be cut down and burned, and a general and thorough policing of all camps, as well as the post, ordered.

Inasmuch as the mechanics are leaving the post, I beg leave to suggest the propriety of suspending, for a fortnight, the buildings going on.

Very respectfully, your obedient servant,

MADISON MILLS,
Medical Director Department of Missouri, U. S. A.

General A. J. SMITH,
Commanding District Upper Arkansas,
Fort Harker, Kansas.

July 24th: McEntire, Scott, and Duffy doing well. Dr. Swift visited all the camps and trains in and about the post, advising a change of position for some, and a thorough policing of grounds for all; digging of sinks and using them; boiling all water for drinking purposes, or, when practicable, making tea to be drank cold; cleanliness of person, etc., to be strictly observed. The doctor found J. Rourke, a teamster, in one of the cook's tents in articulo mortis. He had been visited by Dr. Chase, contract physician. Dr. Chase found him in the stage of collapse; had vomited and had rice-water evacuations, cramps, etc., following a diarrhœa of four or five days' continuance, before calling for assistance. The doctor gave him ¼ grain of sulphate of morphia, and a mixture of chloroform, brandy, and camphorated tincture of opium every 20 minutes, to no purpose.

N. N. Steele, aged 56, married, was brought to the hospital at 7 p. m., suffering from diarrhœa and a large hernial protrusion from the right inguinal region. This he had had since a boy, and had controlled it without difficulty till the present time, when he found himself unable to reduce it. He had no nausea or vomiting, but his pulse was 108 and feeble; his skin bathed in perspiration, and his countenance expressive of anxiety; would rather not have the hernia reduced until next day; without the aid of chloroform, by means of local anesthesia, with firm but gentle pressure, the sack and contents gradually disappeared, with distinct gargouillement; he became calm, and slept comfortably, but died suddenly and without pain the following morning. A post mortem examination revealed evidence of strangulation of the hernial sack. This case is mentioned because of a feeling prevailing that a choleraic influence was to some degree the cause of its sudden and unexpected fatal termination.

July 25th: The morning calm, clear, and bright, after a thunder storm of unusual violence; not a breath of air to drive away the warm vapors from the low grounds. In one of these localities near the river, a wagon train still remained in camp. In this camp a case of cholera was reported about 10 o'clock. Medical officers immediately repaired to the spot, and found the assistant wagon-master, —— Hanse, aged 29, unmarried, with cholera, in the stage of collapse. The attack was ushered in by purging about two hours before; had vomited but twice. He was now pulseless, bathed in perspiration; breath and tongue cold; eyes sunken, skin cyanosed and shriveled, cramps and thirst excessive. He was lying on the ground, a wagon cover stretched over him to protect him from the sun, and several men were employed in rubbing his limbs. Chloroform, half a drachm, combined with 20 drops each of camphorated tincture of opium and tincture of capsicum, was given him, which seemed to control the cramping, and a bandage with a large compress arrested the involuntary rice-water discharges from the bowels. Calomel and quinine, of each 15 grains, sulphate of morphia, ¼ grain, was given, and repeated two hours later. Pieces of ice were freely given, and cold tea as desired. Milk punch was administered with great caution, and at 2 o'clock p. m., and later, some feeble efforts at reaction were apparent, which, however, soon passed away, and he died at 4 p. m. A post mortem examination at 6 o'clock revealed nothing beyond the congestions and lesions usually found in such cases. Hanse was a man of unusual health, strength, and vigor, and up to the moment of attack was as well as usual.

At the same time, and in the same locality, the medical officers were called on to see —— Neide, ambulance driver, aged 24, unmarried, fair complexion, slight form, and delicate organization. He had suffered from diarrhœa several days, but the day previous, and up to the moment of the attack of cholera, he felt himself to be convalescent. Symptoms, except in degree of severity, and treatment, were almost the same as in the above-mentioned case; reaction, however, seemed to be more complete, and gave promise of continuance.

Dr. Swift, whom I left last night in charge at Fort Harker, makes the following provision for the command at Wilson's creek, near the terminus of the railroad track:

FORT HARKER, *July* 25, 1867.

DOCTOR: An ambulance will be set to you in a few moments to take you to Wilson's creek, about fifteen miles from here, where it is reported two men died with cholera last night. They also report many cases of diarrhœa. You will provide yourself

with all necessary medical and hospital supplies, and take them with you in the ambulance. Estimate for the kind and quantity of disinfectants you will require. If, in your opinion, the water used in the camp in any way conduces to the increase of diarrhœa, you will advise the officer in command to have it boiled, or made into tea for drinking purposes. Disinfect privies and dejections promptly, and recommend a thorough police of the camp, or its immediate removal to another place on the creek. Report to me in detail the history of the cases presumed to have been cholera, and each case in full as it occurs.

Very respectfully, your obedient servant,

EBN. SWIFT,
Surgeon, and Brevet Colonel, U. S. A.

A. W. WIGGINS, *Acting Assistant Surgeon, U. S. A.*

July 26th. Neide, ambulance driver, died this morning. Dr. Renick saw the following cases at 2 o'clock this morning, (citizens belonging to hay party and trains passing the post,) and reports as follows: Charles Ferolin, aged 18, unmarried, laboring at haymaking one and a half miles from the post, was attacked with severe vomiting and purging at 6 o'clock on the evening of the 25th. Saw him at 2 o'clock the following morning in profound collapse; pulse imperceptible at wrist, and heart fluttering; had had rice-water evacuations and vomiting, which had ceased. Gave him brandy, a teaspoonful every 15 minutes. No reaction took place, and at 9 a. m. he died. Patrick Day, married, belonging to the same party, was seized in the same manner and at the same time; saw him at 2 o'clock a. m.; symptoms and treatment as above. He was transferred to the post hospital, and died at 11 a. m. David Gillispie, Mexican, belonging to the train, aged 50, married, was attacked at 9 p. m., the 25th, with vomiting and purging. Saw him at 2 o'clock the following morning, with cramps, rice-water evacuations, pulse soft and 120. Gave him calomel, grains 10, and morphine, ½ grain, which, being vomited, was at once repeated and retained. Half a grain of morphine was subsequently repeated every hour. Saw him again at 11 a. m. on the 27th; vomiting and purging had ceased; hands shrunken, pulse imperceptible, heart fluttering; sunk rapidly, and soon died. José Maria Villareal, Mexican, aged 30, belonging to a passing train, was attacked yesterday, about 4 p. m., with diarrhœa and vomiting. His symptoms (12 m., July 26th) are those of profound collapse—cramps in the extremities; vox choleraica; coldness of hands and feet; hands also shrunken; tongue and breath cold. Gave him 10 grains calomel, ½ grain sulphate morphia, and a teaspoonful of brandy every fifteen minutes. His pulse was imperceptible at the wrist. July 27th, 2 o'clock p. m., tongue moist, breath warm; could detect the pulse at the wrist; has had no cramps or vomiting since yesterday evening. Had one passage this morning; ordered the brandy to be continued and the man to be transferred to hospital; arrived at hospital at 6.30 p. m., not much improved; still in collapse; injected sulphate atropia, $\frac{1}{24}$ grain, in arm; his pulse rose. Dr. Brewer injected atropia in two cases, also, one of which recovered, and the other survived four days. Dr. Renick also reported, July 27th, two fatal cases, Ford and Prior, in passing trains, in the stage of collapse, and rapidly sinking when he saw them.

The following communications were to-day received from Dr. Wiggins by Dr. Swift, and his requirements at once complied with:

WILSON'S CREEK STATION, *July* 26, 1867.

DOCTOR: I have the honor to make the following report: I arrived at this station at 4 p. m. yesterday, (25th inst.) I cannot at present give in full detail a history of the four fatal cases that occurred before my arrival, as both the officers with the company are quite unwell, and unable to give me the necessary data. Such facts as I could obtain from nurses are as follows:

James Ferguson was taken sick while on guard during the night of July 23d and 24th, and drank very largely of water; was attacked with violent pain in the stomach, cramps in limbs, frequent discharges from the bowels of "whitish water, like the white of an egg;" no vomiting; died at 2 o'clock p. m. July 24th, post mortem appearance shriveled and shrunken. George Kelly was taken sick on evening of the 23d, with very nearly the same symptoms throughout as Ferguson; died 3 p. m., July 24th. Charles Herman was taken sick at 3 p. m., July 24th; vomited dinner, which had consisted mainly of underdone beans; no further vomiting; diarrhœa (rice-water) and cramps; died at 8 a. m., July 25th.

Lieutenant Amick is of opinion that in some of these cases there was a greenish color to the evacuations, but the nurses that attended them constantly describe them as uniformly watery and whitish. I have now eleven men under treatment, none of them as yet cases of cholera, and I am sanguine of the recovery of all. Two are in a typhoid condition, resulting from diarrhœa, fatigue, improper food, &c. The cases of diarrhœa are, I believe, under control. I found the company on my arrival in process of moving from the west to the east side of creek—an improvement in location, perhaps, though either locality seemed very clean and healthy. The water is very much like that used at Fort Harker. I have requested that, for drinking purposes, it be boiled or made into tea.

I am unable to see any adequate cause for the prevalence of this disease here; possibly epidemic influence is at the bottom, but modified materially by bad drinking water and improper diet. The rations consist of very fat bacon, hard bread, beans, &c. Fresh meat has been had only once, and that buffalo meat. If we can bring about more variety of food, and enforce temperance in the use of water, I am convinced that the epidemic will soon be checked.

Lieutenant Kennedy and Lieutenant Amick are both quite indisposed—the effect of constant labor with the sick, anxiety, and, in part, I have no doubt, from too liberal use of Squibb's cholera mixture. I will report progress as frequently as occasion requires.

Very respectfully, your obedient servant,

A. W. WIGGINS,
Acting Assistant Surgeon, U. S. A.

Brevet Colonel EBN. SWIFT, *Surgeon, U. S. A.*

CAMP AT WILSON'S CREEK, *July* 26, 1867.

DOCTOR: I beg leave to request that, if possible, a small quantity of fresh beef be sent to this post for the use of the sick, in lieu of beef extract, or until the latter can be obtained. A supply of canned milk would also, under the present circumstances, be of great advantage to the sick. I would further ask if it would be feasible to have ice forwarded to the end of the railroad—say twice a week, on designated days—whence it could be conveyed to camp by company wagons.

More than anything else, we need proper food for these sick men. No medicine can avail much while the sick have to subsist on fat bacon, hard bread, and beans. The company commander concurs with me in an earnest request to have supplies suitable for sick men provided as soon as possible. We cannot wait to have business forwarded "through the proper channels." There have been several new cases of diarrhœa to-day, but no deaths since those I reported to you in my communication of this morning, and which occurred before I arrived.

Three men are dangerously ill, but I hope to save them, and feel convinced that, with proper food and hospital supplies, the disease can soon be brought under subjection. Lieutenant Kennedy, commanding the company, is quite ill with remittent fever; he has, in fact, taken too much medicine during the past few days, and been only partially able to attend to his duties. Second Lieutenant Amick is also unwell, having been afflicted with diarrhœa attended with choleraic symptoms.

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

A. W. WIGGINS,
Acting Assistant Surgeon, U. S. A.

Brevet Colonel E. SWIFT, *Surgeon, U. S. A.*

Dr. Reynolds, Acting Assistant Surgeon, serving with troops at the terminus of the railroad, reports, July 28th, five cases and three deaths. A report of these cases, and seven others, only one of which, a colored soldier, belonged to the command at Fort Harker, will be furnished by Assistant Surgeon Brewer, U. S. A. Captain Helm is reported to have died at Fort Zarah yesterday. The report of Dr. McGill's death is not credited.

Dr. Swift, by request, visited the town of Ellsworth, four miles distant, where the epidemic raged fearfully, and with great fatality. The physicians relied mainly on chloroform, opium, camphor, capsicum, and calomel. Some gave creasote and carbolic acid, and one was found administering chloroform by inhalation; neither success nor any marked improvement rewarded their labors. At Salina, permanganate of potassa was used with no better results. At the former place the panic-stricken inhabitants have left their workshops and merchandise and have fled to distant parts for safety. A woman found by Dr. Swift in the stage of collapse, who had taken freely of cholera mixture, improved, and probably recovered, with no other treatment than blue mass and quinine, 20 grains of each, cold tea, a bandage and compress to the abdomen, and small injections of starch, laudanum, and catechu. This injection was often used with patients in hospital.

Fort Harker is situated on an elevated platform, near Smoky Hill creek. The formation is coarse red sand to the depth of fifteen feet, imposed upon a thick strata of coarse ferruginous sandstone, covered with a thick coat of soil. All the water used at the post is taken from a spring located in the bank of the creek, about fifteen feet above its surface, and about the same distance below the plateau. It contains, according to analysis by Dr. Heger, five parts to 100,000 of organic matter in solution, besides what is held in suspension; about four times as much as is contained in the water of the Mississippi river. After standing twenty-four hours it becomes disagreeable to the taste, and animalculæ are perceptible to the naked eye.

Though the water is clear and beautifully translucent, in a few hours it deposits a very perceptible slimy substance upon the bottom and sides of the vessels holding it. A small trace of iron is discovered in solution. This is undoubtedly surface water, and the organic matter it contains, both in solution and suspension, comes along with it from the top of the ground, where the supply is abundant, having accumulated, in the numerous camps of troops and supply trains, from men and animals.

The water of the Smoky Hill Fork is still more objectionable, being really offensive at times. The bottom of this stream abounds in quicksands, into which cattle and entire herds of buffalo sink and are drowned; its waters wash these rotten carcasses, and bear away their decomposing elements of the flesh of to-day and the decaying bones of ages.

The atmosphere seemed to breathe a pestilential breath, nauseous to the unacclimated. Carrion flies (*musca cadaverina, Linn.*) have superseded the common house fly and swarm everywhere.

The command numbers something over 200 men, and there are between four and five hundred employés of the quartermaster's department.

The first case of cholera made its appearance on the river; the second was the assistant butcher, living some distance from the post. The epidemic seemed to have originated here, where causes are as abundant as among the pilgrims to Mecca and the caravans of the Great Desert.

Other reports will be furnished when completed.

Very respectfully, your obedient servant,

EBN. SWIFT,
Surgeon, and Brevet Colonel, U. S. A.

By order of—

Brevet Brigadier General MILLS,
Medical Director Department of Missouri.

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

LABORATORY OF THE SURGEON GENERAL'S OFFICE,
Washington City, D. C., August 27, 1867.

SIR: On examining two samples of water from Fort Harker, Kansas, together with two others from this city, with reference to the amount of permanganate of potash required for their purification from organic matter, I obtained the following results:

Water No. 1, from Fort Harker	.43	grains pure permanganate per gallon.
" No. 2 " "	.25	" " " "
Water from pump in yard of Surgeon General's Office	.17	" " " "
Aqueduct water from tank, in which much of its impurities had been deposited	.23	" " " "

The water No. 1 contains 29 grains of solid matter per gallon, of which 11 grains were destroyed by ignition. No. 2 contains 19.3 grains per gallon of solid matter, of which 8.2 grains were destroyed by ignition.

Very respectfully, your obedient servant,

B. F. CRAIG,
Acting Assistant Surgeon, U. S. A.

Brevet Lt. Col. J. J. WOODWARD, *Assistant Surgeon, U. S. A:*

FORT HARKER, KANSAS, *July* 31, 1867.

GENERAL: I have the honor to forward the following report in reference to the prevalence of epidemic cholera at this post:

On the evening of the 22d of July I arrived at Fort Harker, Kansas, accompanied by the Medical Director, Surgeon E. Swift, and Acting Assistant Surgeons W. H. Renick and A. W. Wiggins, U. S. A. Cases of epidemic cholera were occurring daily at that time, and the disease had existed with a certain degree of regularity since the 27th of June, the date of the occurrence of the first case at the post.

I was at once assigned to duty, relieving Brevet Major G. M. Sternberg, Assistant Surgeon, U. S. A. He had recently met with a severe loss in the death of his wife, at the post, of cholera, and was unfitted for duty from physical and mental prostration. His assistant, Acting Assistant Surgeon T. B. Chase, U. S. A., had lost his wife but an hour previous to my arrival, from puerperal convulsions.

I immediately went on duty and visited the cholera wards, in company with the Medical Director and Dr. Swift. Measures such as the most recent investigations warranted, assisted by the advice and experience of the senior medical officers present, were immediately put in force. I took personal charge of the cholera wards. The most recent and approved methods of treatment were adopted, and every known means resorted to for the cure or alleviation of the disease. I regret to say that the result of any treatment after the disease was fully established was highly unsatisfactory. A large majority of the cases were not seen until the stage of collapse had ensued; and to this I attribute, in part, the large mortality.

The following tables show the number of cases, also the number of deaths, from the commencement of the epidemic until its disappearance:

Table showing the number of cases and deaths from Cholera among troops, for June and July, 1867.*

	JUNE.				JULY.																													Total.
Date	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Cases	...	1	1	1	...	...	...	...	2	3	...	...	...	1	1	1	3	3	2	...	...	3	11	1	...	...	1	...	...	...	2	1	1	1	2	42
Deaths	...	...	1	...	1	...	...	...	...	...	1	...	...	1	1	...	...	6	1	2	...	1	6	...	2	...	2	...	1	...	2	1	...	...	...	29

* This table is not perfectly correct; the nominal list of cases gives four cases in July, without date, which are not here included. There were also three deaths in August.

Table showing the number of cases and deaths from Cholera, for June and July, among citizens and employés of the Quartermaster Department.

	JUNE.				JULY.																													Total.
Date	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Cases	1	...	...	3	3	...	...	...	...	...	4	2	3	5	2	3	4	3	3	4	4	2	4	3	2	...	1	6	3	7	3	4	2	2	...	83
Deaths	...	1	...	2	2	2	...	1	...	...	...	...	...	...	1	...	1	...	1	...	1	...	1	1	2	3	1	...	1	2	1	2	2	1	...	29

It will be seen that a larger relative mortality prevailed, apparently, among the troops than among the citizens or quartermaster's employés. The greater number of deaths among troops occurred among the recently enlisted Kansas volunteers.

I am satisfied that some deaths occurred, which are not included in the tables, among citizens; also, that many of the cases reported as cholera among the citizens and employés were not genuine cases of the disease. It was with great difficulty that I could collect the necessary data on which to base a report. The record was in many cases deficient; thus, none of the cases occurring during the first seven days of July were recorded. I ascertained that Acting Assistant Surgeon Ira Perry, U. S. A., who had charge of these cases, had left no record of them. He had left the post previous to my arrival. I immediately wrote to him and obtained all the cases he had kept any record of. No detailed account of the treatment of these cases, nor of those occurring previously, could be obtained, as the hospital prescription books had not been kept up since September last. The cases which were admitted into hospital after my arrival I treated variously. At the commencement of the attack calomel seemed to exercise a marked effect, both in allaying the irritability of the stomach and re-establishing the biliary secretion. I used opiates and alcoholic stimulants very cautiously. I saw no good effects follow their use in the early stages of the disease; but, after reaction, very small doses of brandy and beef tea, associated with diluents, I believe, contributed much towards a speedy recovery.

In the stage of collapse I found no remedy so efficacious as that practised by Brevet Brigadier General J. J. B. Wright, Surgeon, U. S. A., and afterwards by Brevet Brigadier General J. B. Brown, Surgeon, U. S. A., during the prevalence of cholera last year in New York harbor, viz: the exhibition of large doses of calomel, either alone or followed by a bolus of powdered capsicum. I am satisfied that I have seen good results follow this plan of treatment. In three cases, after collapse was fully established, I tried the plan first proposed and put in practice by Professor J. T. Hodgen, of the St. Louis medical faculty, viz: the subcutaneous injection of atropine, followed by saline injections per rectum. Dr. Hodgen attributes the reaction which he claims is brought about by this agent to its powerful influence over the sympathetic system of nerves. In the first case no result followed its use; in the second, reaction was promptly established, but the patient died at a subsequent period from uræmia; in the third case, reaction was brought about, but was not established until the remedy had been used four times, at intervals of one hour. After the saline injections had been used some time, a marked change in the appearance ensued; the patient lost the peculiar livid hue of collapse, and became blanched; a decided increase of bulk was manifest at the same time. The patient recovered without unpleasant symptoms. The proportions of atropine used were from $\frac{1}{30}$ to $\frac{1}{60}$ of a grain. I have seen no notice of this remedy other than a modest pamphlet issued by Dr. Hodgen. I believe it is deserving of further trial. Other remedies were used by the medical officers present, and a measure of success claimed for each of them. Acting Assistant Surgeon Wm. H. Renick, used calomel and morphia, in the proportion of 10 grains of the former, and $\frac{1}{4}$ grain of the latter; and in collapse, carbonate of ammonia, combined with quinine and morphia. I had assigned Dr. Renick to the duty of attending the cases which occurred among contractors' trains and citizens in the immediate vicinity of the post; he also rendered me much valuable assistance in the hospital. I am unable to speak of the mode of treatment practised most successfully by Surgeon E. Swift, U. S. A. I had hoped to derive much valuable information from his former experience in the treatment of the disease, but he was called away to places so distant from the post that this was rendered impossible; he remained but a short time at Fort Harker.

Other auxiliary measures were adopted for the alleviation of the symptoms. Hypodermic injections of morphia were used for cramps, also to allay irritability of the stomach; chloroform for vomiting; frictions, sinapisms, &c. Patients were allowed to drink moderately of cold tea, and, during convalescence, of milk punch and beef tea, in small quantities.

The following case I report in full, because it presented all the symptoms of a well-marked case of Asiatic cholera; its occurrence, moreover, under the worst hygienic conditions, and in a stout, hearty man, previously in good health, is calculated to verify the fact, already, I think, so well established, viz: that bad hygienic influences are eminently concerned in developing and characterizing the disease:

Foster Hanse, age 30 years, unmarried, an assistant wagonmaster in the employ of the quartermaster, was seized, on the morning of the 25th of July, at 8 o'clock, with vomiting and purging of a fluid resembling rice water, attended with cramps of the abdomen, upper and lower extremities; he had no premonitory diarrhœa. Patient was seen at 10 minutes past 8 o'clock by Drs. Chase and Renick; was ordered Squibb's mixture, and sinapisms to abdomen, and friction to extremities. I saw the patient at 40 minutes past 10 o'clock, with Dr. Swift, who removed the sinapism, substituting therefor a compress and bandage. Dr. Renick also prescribed calomel, 10 grains, morphia, $\frac{1}{4}$ grain, which was immediately rejected; he prescribed, also, morphia, $\frac{1}{4}$ grain; followed by quinia, 10 grains; capsicum, 2 grains. The quinia and capsicum were rejected and repeated; the last dose was retained. Patient was allowed ice and cold tea for drink. Died at 4 p. m.

I examined the abdominal viscera two hours after death, assisted by Dr. Renick: surface of body warm; no muscular spasms; muscles of abdomen healthy in appearance, and red blood followed the track of scalpel; intestines highly injected. The region of intestine about the ilio-cœcal valve was in a state of intense inflammation. The stomach and intestines contained the characteristic rice-water fluid. The epithelium was extensively detached, and, in some situations, the mucus membrane presented a scraped appearance. Liver, spleen, and kidneys highly congested; the right kidney contained a substance resembling lymph; bladder empty and contracted. The head and thorax were not examined.

The above case presented all the symptoms of Asiatic cholera, and the autopsy verified the diagnosis. The patient had been subjected to the worst hygienic influences. The train to which he was attached was camped on a bottom, near the banks of Page creek, and received all the drainage from the fort above. I saw scattered about on the ground, in a state of decomposition, refuse articles of food, bread, meat, beans, &c. The stench arising from these sources of filth, together with that of decomposing excrement from the mules, was intolerable. There were no sinks for the use of the men. I was informed that they were accustomed to defecate on the banks of the creek, the water of which was used for bathing, and, in some instances, for drinking purposes, though the springs, situated but a short distance above, furnished the general water supply for the whole garrison and its attachés. I could discover no trace of disinfectants, though I believe it had been claimed by the quartermaster that disinfection had been practised. I reported the condition of this camp at once, and it was promptly removed to a better site.

As to the origin of the epidemic of Asiatic cholera at Fort Harker, nothing can be established with any great degree of

certainty. That the disease was imported in some manner, would agree with the most generally accepted theories of the means of its propagation; but no positive evidence of its importation can be obtained. The evidence I have succeeded in obtaining in favor of its importation is meagre, and yet not so much so, I believe, as to preclude the possibility of its derivation from this source. The post commander at Fort Riley, Bvt. Lieutenant Colonel C. C. Parsons, Captain, 4th U. S. Artillery, informed me that two days previous to the departure of the 38th U. S. Colored Infantry from that post for Fort Harker, a case of sudden death occurred, the patient being an employé of the quartermaster's department, and that the post surgeon, Surgeon B. J. D. Irwin, U. S. A., reported it to him as a case of sporadic cholera. After the 38th left Fort Riley, and had arrived at Junction City, but three miles distant, he received information from Asst. Surgeon G. M. McGill, U. S. A., that he would leave a number of men at Junction City sick with diarrhœa. These men were brought back to Fort Riley. Two days after the arrival of the 38th at Fort Harker the first case of cholera occurred, but the patient was a butcher, in the employ of the commissary department. Cases soon made their appearance, however, among the 38th, and continued to prevail among them with great fatality. Now, it is well known that cholera prevailed at Fort Riley last year, but did not extend further westward. Associated with this circumstance is the fact that, since last year, the facilities for travel westward have been greatly increased by the extension of the railroad to Fort Harker. It is also known that, as soon as the railroad reached Fort Harker, that post at once became the outfitting depot for the plains. A large number of quartermaster employés were brought thither from Fort Riley, partly on account of its being the depot and partly to construct the fort. It seems not unreasonable to suppose that the cholera germ might have been transplanted from Fort Riley by these means; and after having once reached Fort Harker, that the essential conditions for its development and spread were abundantly afforded, I shall presently proceed to show.

Another supposed origin of the disease (but one to which little value should be attached) is based on a report brought to Fort Harker that one company of the 38th came direct from Nashville, Tennessee, to Fort Harker, stopping but two days en route at Jefferson Barracks, Missouri. I have no means of establishing this fact, and, moreover, it is not even known that cholera prevailed at Nashville at the time of the company's departure.

In favor of the local origin of the disease, much can be urged. That the essentials for its development and propagation (after the specific germ had been presented) existed at Fort Harker, there can be no doubt, provided the views of Professor Pettenkoffer on this subject are correct, viz: a porous soil, the existence of subsoil water, and the presence of a certain degree of heat and moisture; but, in addition to these, there were certain other influences at work, influences which have been long recognized as essential elements in the production of diarrhœa, dysentery, and certain diseases characterized by a low degree of vitality. Dr. Peters states, in his recent work on cholera, "that no amount of filth, imprudence, or diarrhœal disease, without the addition of the peculiar cause, can give rise to the disease in temperate climes." Recent investigations, moreover, point to these very causes, viz: filth, imprudence, &c., operating in tropical climes, as the factors in the production of the disease. Thus, in a recent article in Ranking's Abstract for January, 1867, Dr. Norman Cheevers attributes the origin of the disease at its presumed source, the Delta of the Ganges, to drinking water contaminated by emanations from sewers, burning ghâts, stable manure, night-soil, &c. That most of these causes, or their equivalent, were (with the exception of a tropical clime) in full operation at Fort Harker at the time of the breaking out of the epidemic, I think I can satisfactorily show.

The water for drinking purposes at Fort Harker is derived from two springs situated about 30 feet below the general level of the ground; the soil at their mouths is composed of coarse sand, immediately beneath which, and composing the surface soil for miles around the post, lies a porous soil of a character eminently fitted for absorbing and transmitting to the subsoil water the products of the decomposition of animal and vegetable matters. Specimens of the drinking water from each spring, with samples of the surface soil and new red sandstone from the vicinity of the post, were forwarded to the Surgeon General's Office. An incredible amount of filth had been allowed to collect in and around the post. Dead animals were left at no great distance from the post unburied, and subjected to the full influence of a sun almost tropical. Refuse articles of food—beef, pork, beans, &c.—were cast out to putrify on the ground, without regard to cleanliness. Trains were accustomed to camp around the post, sometimes remaining for one night only, sometimes for several days and nights; and no regard was paid to the construction of sinks or receptacles for the refuse food, &c. But the neglect of sanitary measures was not confined to this class. After my arrival at the post, I found, on more than one occasion, meat, bread, cabbage, &c., undergoing decomposition in the sun, and that within a few feet (in more than one instance) of the officers' quarters. Rank weeds were allowed to grow on the parade ground and about the quarters of the officers and men. The stables of the post were situated at one end of the parade ground, on a piece of ground sloping gently to the creek. These stables, it is true, were not built until February, 1867; but for months previous to that time their site had been occupied by the horses of two companies of the 7th Cavalry. I think there can be no reasonable doubt that the drinking water was impregnated with organic matters derived from these several sources.

One other source of contamination deserves special mention. As soon as evening closed in, a horrid stench settled down on the fort. The source of this was for a time veiled in obscurity; it could not be accounted for by the emanations from the sinks and privies, (though these last were not in a cleanly condition,) for the same odor continued after disinfection had been practised. The Medical Director soon discovered the source of this impurity, which was a large pit, situated directly in the quarter whence came the prevailing wind, from one-quarter to half a mile from the post; this was and had been (for how long a time it is not known) the receptacle of every conceivable kind of filth, decomposing meats, offals, &c. This hot-bed of disease swarmed with large maggots, and the stench emanating therefrom was intolerable. Swarms of large green flies filled the quarters of the officers and men, and attacked all food left exposed. There was nothing peculiar in this species of fly; it is one which is found everywhere where filth is allowed to accumulate in large quantities.

With reference to the hygienic measures adopted, as soon as I reached the post I put in operation every means available for correcting the deplorable condition of affairs. I deemed it of first importance to place the hospital, the cholera tents, and surroundings in as good hygienic condition as possible. With this view, I had all sources of filth removed; weeds were uprooted and burned or buried; the grounds were thoroughly policed daily; sinks were frequently disinfected and removed; the cholera

tents were removed to new sites every second day, and the tents fumigated daily; disinfectants were constantly kept in the cholera tents, and all vomited and other matters disinfected as soon as discharged. The drinking water was treated with permanganate of potash before use. To the free use of disinfectants in the cholera tents and sinks, I attribute the immunity from the disease enjoyed by the nurses and attendants. No case of cholera occurred among them after I took charge. I desire to bear testimony to the energy and zeal displayed by the medical officers on duty with me at the post, Acting Assistant Surgeons Chase and Renick. They did their duty. Hospital Steward Darling, U. S. A., a recently enlisted steward, also deserves commendation. The nurses and attendants in the cholera wards were almost all of them negroes. I was very much surprised at their fidelity; they placed great faith in disinfectants, and after their use they seemed to have no fear of the disease. In conclusion, I desire to state that I do not claim that cholera originated, de novo, at Fort Harker; but, in the absence of any certain proof of its importation, save the existence of the disease at Fort Riley last year, with the one isolated case mentioned this year, and the free communication with that post this spring, together with the known tendency of the disease to progress westward, I have deemed it proper to enumerate the causes which, under some circumstances, might be considered sufficient to originate the disease.

Very respectfully, your obedient servant,

J. W. BREWER,
Assistant Surgeon, and Brevet Major, U. S. A.

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

DETACHMENT OF THE 38TH INFANTRY EN ROUTE FROM FORT HARKER, KANSAS, TO NEW MEXICO.

Statement of the movements of Headquarters and the several Companies of the 38th Infantry, in 1867.

ADJUTANT GENERAL'S OFFICE,
Washington, April 18, 1868.

The regiment was organized at Jefferson Barracks, Missouri; first return on file, February, 1867.

Headquarters left Jefferson Barracks, Missouri, June 22d, 1867; arrived at Fort Harker, Kansas, June 27th, 1867; left Fort Harker, Kansas, July 20th, 1867; arrived at Fort Dodge, Kansas, July 30th, 1867; left Fort Dodge, Kansas, August 1st, 1867; arrived at Fort Union, New Mexico, August 31st, 1867; left Fort Union, New Mexico, September 4th, 1867, and arrived at Fort Craig, New Mexico, September 24th, 1867; at which post they remained during the rest of the year 1867.

Company "A" left Jefferson Barracks, Missouri, March 20th, 1867; arrived at Fort Riley, Kansas, March 24th, 1867; left Fort Riley, Kansas, May 13th, 1867; arrived at Fort Harker, Kansas, May 16th, 1867; left Fort Harker, Kansas, July 20th, 1867; arrived at Fort Dodge, Kansas, July 30th, 1867; left Fort Dodge, Kansas, August 1st, 1867, and arrived in New Mexico August 31st, 1867, taking post at Fort Cummings, New Mexico.

Company "B" left Jefferson Barracks with Company "A," and remained with that company until its arrival at Fort Harker, Kansas, at which post the company served during the remainder of 1867.

Company "C" left Jefferson Barracks, Missouri, May 12th, 1867; arrived at Fort Hays, Kansas, May 25th, 1867; left Fort Hays, Kansas, September 7th, 1867; and arrived at Fort Craig, New Mexico, October 19th, 1867, where it remained stationed.

Company "D" left Jefferson Barracks, Missouri, June 19th, 1867; arrived at Fort Harker, Kansas, June 25th, 1867; left Fort Harker, Kansas, June 28th, 1867; arrived at Fort Bayard, New Mexico, September 12th, 1867, where it remained stationed.

Company "E" left Jefferson Barracks, Missouri, May 12th, 1867; arrived at Fort Hays, Kansas, May 25th, 1867, where it remained stationed.

Company "F," same as Company "D."

Company "G" left Jefferson Barracks, Missouri, May 12th, 1867; arrived at Fort Harker, Kansas, May 17th, 1867; left Fort Harker, Kansas, June 5th, 1867, and arrived at Fort Hays, Kansas, June 15th, 1867, where it remained stationed.

Company "H" left Jefferson Barracks, Missouri, June 22d, 1867; arrived at Fort Harker, Kansas, June 27th, 1867; left Fort Harker, Kansas, October 17th, 1867, and arrived at Fort McRae, New Mexico, December 7th, 1867, where it remained stationed.

Company "I" left Jefferson Barracks, Missouri, May 12th, 1867; arrived at Fort Hays, Kansas, May 25th, 1867; left Fort Hays, Kansas, June 24th, 1867, and established a post at the Monuments, Kansas, where it remained stationed.

Company "K" left Jefferson Barracks, Missouri, June 9th, 1867; arrived at Fort Riley, Kansas, June 12th, 1867; left Fort Riley, Kansas, June 19th, 1867; arrived at Fort Harker, Kansas, June 22d, 1867; left Fort Harker, Kansas, July 20th, 1867; arrived at Fort Dodge, Kansas, July 30th, 1867; left Fort Dodge, Kansas, August 1st, 1867; arrived at Fort Union, New Mexico, August 31st, 1867; left Fort Union, New Mexico, September 4th, 1867, and arrived at Fort Selden, New Mexico, September 27th, 1867, where it remained stationed.

SAML. BRECK,
Assistant Adjutant General.

FORT BAYARD, NEW MEXICO, *November* 9, 1867.

SIR: I have the honor to acknowledge the receipt of your letter dated October 15th, and am very happy to furnish you all the information in my power upon the matter of which it treats. I will suggest, however, that Dr. Kirke, Acting Assistant Surgeon, ought to be able to give a more complete medical history of the battalion of the 38th Infantry, late under my command, than any other person, as he took charge soon (two days) after the death of Colonel McGill, with the same hospital steward and all the records.

The command left Fort Harker, Kansas, on the 28th of June, apparently in good health. The following table shows the cases as they occurred, according to the records and recollection of company commanders:

Date.	No. of cases.	No. of deaths.	Place of command.	Remarks.
June 29	1	1	Cow Creek, Kansas.....	Taken in the morning and died in the evening.
July 1	1	.....	Left Fort Zarah.	
" 2	2	1	30 miles west of Fort Zarah..	Case of July 1st died.
" 3	1	.....	Arrived at Fort Larned.....	Sergeant Wort, of Co. "D," taken sick.
" 6	3	1	40 miles west of Fort Larned.	Sergeant Wort, of Co. "D," died.
" 7	2	1	55 miles west of Fort Larned.	
" 8	3	.....	65 miles west of Fort Larned.	
" 10	2	1	East of Fort Dodge.	
" 11	1	.....	West of Fort Dodge.	
" 12	1	.....	Do. do.	
" 13	1	.....	Do. do.	
" 15	2	.....	Do. do.	
" 16	2	.....	East of Pretty Encampment.	
" 17	4	2	Salt Bottom.....	Mrs. McGill took cholera about 8 a. m., and died about 10.30 p. m.
" 18	1	.....	Sandy Creek.	
" 19	2	.....	Old Fort Lyon, C. T.....	Dr. McGill took cholera while behind column at Salt Bottom.
" 20	2	2	Do. do.	Dr. McGill died, at 3.30 p. m., at Salt Bottom (head of), near bluff.
" 21	.....	1	Do. do.	
" 23	.....	1	New Fort Lyon.	
" 26	.....	1	South of Arkansas.	
	31	12		

Ten enlisted men died, and Dr. and Mrs. McGill.

The above table gives the number of deaths correctly, but the number of cases is probably larger than would have been reported as cholera by a medical officer, as there was a natural tendency to name every case cholera. It will be seen that we had no new cases after leaving old Fort Lyon.

The most malignant cases were at Salt Bottom.

It is difficult, perhaps impossible, to determine where or how the cholera originated. There were no cases in the companies at or before reaching Fort Harker, but I was informed by Colonel McGill that there was a case of cholera among the employés of the quartermaster's department at Fort Harker the day before we left, viz: the 27th June.*

My march, after the appearance of cholera, was continued and conducted strictly under the advice of Colonel McGill. He was always consulted upon the selection of camps when we were in the vicinity of posts. It is proper to add here, that he regretted the selection of the camp at Fort Larned, on account of the flow of water from our camp toward the post, which he did not notice when the ground was first examined. In view of this fact, I determined to change the camp, but was prevented by Colonel McGill, who said the troops needed rest, and that it would do my command more harm to move than it could possibly benefit the post.

Colonel McGill gave it frequently as his opinion that the disease in my battalion resulted from the patients having been exposed to choleraic influence the year before; and that the bad water of the Arkansas, and worse of the tributaries, was the exciting cause. He also gave it as his opinion that, unless the disease became more malignant in its character, persons who had not been exposed to choleraic influence last year were almost certainly safe. He seemed to be borne out in this opinion by the fact that almost every man who had cholera had been enlisted in cities where cholera was most malignant in 1866. For instance, Co. "D" had been partly organized at Jefferson Barracks, Missouri, (near St. Louis,) during the prevalence of cholera at St. Louis, and said company lost eight of the ten men who died in the battalion.

Brevet Major and Assistant Surgeon Tilton, at Fort Lyon, agreed with Colonel McGill upon the question of continuing the march; both thought it better to march, care being taken not to exhaust the troops.

I regret that I am not able to give you a minute report—such as a medical officer might make—but such information as we

can supply shall be given. If there is anything further which, in your judgment, we may be able to give, please write again and let us have questions to answer, or in some other manner indicate the points upon which you wish information.

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

HENRY C. MERRIAM,
Major 38th Infantry, Brevet Colonel, U. S. A.

Brevet Lieutenant Colonel J. C. McKEE, *Surgeon, U. S. A.*

WASHINGTON, D. C., *February* 8, 1868.

GENERAL: Learning that the reports regarding cholera, as it appeared in the 1st Battalion, 38th U. S. Infantry, during its march from Fort Harker, Kansas, to Fort Bayard, N. M., has been lost in transmission, I have the honor to offer the following from memory, all papers, books, &c., being left with the command: While on duty with Company "C," 3d U. S. Cavalry, then encamped on the Purgatoire river, learning of the death of Dr. McGill, Assistant Surgeon, U. S. A., and that the 38th U. S. Infantry, suffering greatly from cholera, was destitute of medical assistance, my proper command being entirely free from disease of any kind, having received permission from Brevet Captain W. Cain, commanding "C" troop, I joined the detachment of 38th Infantry July 23d, 1867, they then being in camp on the Arkansas river, two miles below old Fort Lyon. The camp was, in my opinion, ill chosen, being on the bottom; though the high bluffs, with excellent camping grounds, were within two hundred yards. The men had dug wells at some distance from the river bank, using the water that percolated through, though it was highly impregnated with the alkali that abounds in those regions. The two considerations mentioned caused me to urge upon Brevet Colonel Merriam, Major 38th Infantry, commanding detachment, the immediate necessity of moving the command to a better position, besides the effect which would be produced upon the morale of the men by the constant and varied changes incident to the march. The hospital was in a Sibley tent, which, from its defective ventilation and excessive heat, was anything but calculated for hospital purposes during the summer. There were about twenty men in hospital suffering or convalescing from cholera and choleraic diarrhœa diseases. On the 24th one new case occurred, coming under observation about 11 a. m. The late Dr. McGill had confined himself to the chloroform treatment, which had met with success in his hands during the cholera epidemic on David's island, New York harbor, so it was continued in the present case. A most inopportune rain storm, flooding the whole bottom, with over two feet of water in the hospital, it being in the lowest portion, prevented a fair test of the chloroform treatment, as the patient was drowned, the other patients in the hospital giving him no assistance, and all outside communication being cut off by the violence of the storm, which prostrated every tent except the Sibley.

On the 25th the command crossed the Arkansas river; after which four new cases occurred, two of them being teamsters. They were all put under the treatment thoroughly tried by myself during the epidemic of cholera which occurred in Chicago in 1853, and afterward in New York city in 1866. My belief that the extreme prostration, nervous in its character, which always accompanies a violent invasion of the disease, indicated that its force was expended almost altogether upon the spinal cord, suggested to me the use of strychnia in large doses as a powerful and certain excitant of the nervous system, combined, in the first instance, with an aqueous solution of capsicum, to stimulate the stomach and promote rapid absorption of the strychnia, The treatment, therefore, adopted was a tablespoonful of the solution, and $\frac{1}{10}$ of a grain of strychnia; the strychnia to be repeated in 15 minutes. In all the four cases in which this treatment was adopted the improvement was so immediate and marked that, in a few minutes after the second dose, the patient fell into a calm sleep, the cramps being perfectly, and other symptoms very much relieved. The treatment afterward was expectant, and all recovered. In all cases the usual symptoms of cholera, such as rice-water discharges, collapse, and apathy, were present. The last case occurred about one day's march from Iron Springs. There were of course many cases of diarrhœa and dysentery, about sixty men presenting themselves daily at sick call, but the vast majority of them were of such a light character that they were not put upon the sick report, or relieved from duty with the command. After crossing the Raton range, all diseases, except those common to every column upon the march, disappeared; and one week's quarantine on the Upper Ocate put the command in a thoroughly healthy condition. Of the cases found by me upon joining the command, three died on the march. I cannot close this report without calling the attention of the Department to Hospital Steward D. D. Peabody, U. S. A., whose devotion and care of the sick was so unremitting as to prostrate himself completely. Trusting that the circumstances under which this report is written will be sufficient excuse for its meagreness,

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

H. M. KIRKE,
Acting Assistant Surgeon, U. S. A.

FORT LYON, C. T., *July* 22, 1867.

GENERAL: I have the honor to report that the 38th U. S. Infantry (two companies) arrived at old Fort Lyon, C. T., July 20th, with cholera among them. I visited the command by direction of the post commander, and ascertained from Brevet Colonel Merriam, commanding the detachment, that the first case occurred the day after they left Fort Harker, and that a citizen employé of the quartermaster's department died of cholera at Fort Harker the day before the 38th U. S. Infantry left there; that there had been twenty cases among the troops, with six deaths; that Mrs. Dr. McGill died of cholera on the 17th instant; that Dr. McGill, U. S. A., had been left 30 miles back, too sick to travel.

I found five mild cases of cholera in the hospital tent. I advised Colonel Merriam to encamp at least six miles from the post, where supplies could be sent him without any of his command visiting the post. I then started to visit Dr. McGill; it was 9 o'clock p. m. when I arrived at the Doctor's wagon, and found that he had died at 3 o'clock p. m., 20th inst. He was taken sick on the morning of the 19th inst. On the 21st I returned to the command, and found two additional cases, one of whom died. Colonel Merriam had gone towards the new post, leaving instructions for the command to follow. On my way back to the post I was very much surprised to find that the Colonel had pitched his camp only three miles from the post, and had gone on to the fort. When I saw him I urged him to make the distance twice as great. The post commander requested me to return and see where the troops would be encamped. They were marching into camp when I arrived. Colonel Merriam went with me to the point I selected, but declined to take his men back, saying that he thought it would do them more harm than it would benefit us by the change. He expressed regret that he had got so close, and said that just before selecting the camp he had met an ambulance driver from the post, who told him that he was about seven miles off. At the same time, he denied the authority of the post commander to place him in quarantine.

Under the circumstances, I advised the post commander to fill their requisitions as soon as possible, and then let them march around the post, cross the ferry five miles above, and march at least five miles above the ferry before encamping.

No new cases have occurred to-day. Acting Assistant Surgeon H. M. Kirke, U. S. A., who was on duty with the 3d Cavalry, Company "C," was detached and sent to the 38th this morning. Company "C," 3d U. S. Cavalry, is acting as escort to an engineering party; it has no sickness, and there are four citizen doctors with the surveying party. Acting Assistant Surgeon R. Schiffman, U. S. A., had been sent down the Arkansas river to visit various detachments at the stage stations, and men not available. I deem it much safer for the command to continue its march than to go into a permanent camp.

There is no excitement nor alarm among the men. To quarantine them would, in my opinion, greatly increase the mortality. Every day's march brings them nearer the mountains, and I have strong hopes that, by strict sanitary measures, the disease will be entirely eradicated before they cross the Raton Mountains. The commanding officer at Fort Union has been notified.

Very respectfully, your obedient servant,

H. R. TILTON,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General MADISON MILLS,
Medical Director Department of the Missouri.

SECOND DETACHMENT OF THE 38TH INFANTRY EN ROUTE FROM FORT HARKER, KANSAS, TO NEW MEXICO.

FORT CRAIG, NEW MEXICO, *September* 25, 1867.

COLONEL: I have the honor to acknowledge the receipt of your letter of the 16th inst., enclosing a communication from the Surgeon General's Office relating to the reports of sick and wounded, for the months of June and July of this year, in the detachment of the 38th U. S. Infantry under my charge, and to report that, until the 27th of June, 1867, I performed no duty as medical officer with that command, having been ordered by Special Order No. 61, headquarters 38th U. S. Infantry, dated Jefferson Barracks, Mo., June 10th, 1867, to proceed to Fort Leavenworth, Kansas, and make requisitions for and prepare the medical supplies and ambulances for the regiment, in view of their expected march to New Mexico.

I would further report that, on arriving at Fort Harker, Kansas, with the headquarters and one company of the 38th Infantry, on the 27th of June, I found that, owing to the damage to the Union Pacific Railway by the severe floods, no medicines or hospital stores had arrived for the command; and that, until their arrival on July 2d, the sick of Company "H," then on duty with the headquarters of the regiment, were treated in the post hospital at Fort Harker, under the charge of Brevet Major and Assistant Surgeon Sternberg, U. S. A., in whose report of sick and wounded for June, 1867, such cases as occurred were embraced.

The monthly report of sick and wounded for July, 1867, (a copy of which is herewith enclosed,) was duly forwarded, and I have made every effort to promptly furnish all required reports while the command was on the march, forwarding them from military posts or mail stations.

I am now engaged in preparing, and will forward as soon as possible, a detailed report of the late epidemic of cholera, as it occurred under my observation.

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

E. McCLELLAN,
Assistant Surgeon, and Brevet Major, U. S. A.

To Brevet Lieutenant Colonel J. C. McKEE, *Surgeon, U. S. A.*,
Chief Medical Officer, District of New Mexico.

FORT CRAIG, NEW MEXICO, *November* 1, 1867.

GENERAL: In accordance with the requirement of Circular Order No. 3, War Department, Surgeon General's Office, dated April 20th, 1867, I have the honor to forward my special report of cases of epidemic cholera in the command with which I was on duty during the months of June, July, and August of the current year, and to state that it was impracticable for me to make this report at an earlier date, from the fact that, during the greater portion of the months named, the command was upon the march en route for this Territory.

Having been detached on special duty from the headquarters of the 38th Infantry, (which regiment I had been ordered to accompany on its march to New Mexico,) I arrived, on the 18th day of June, 1867, at Fort Riley, Kansas, to await the arrival of the command, then supposed to be upon the road from St. Louis, Mo., and was occupied until the 25th day of the same month in providing for the sick of such detachments of the regiment as preceded the arrival of headquarters. These detachments, three in number, each reported quite a large number of diarrhœa cases, painless in character, and but few requiring any considerable medical aid. On the 22d a detachment consisting of two companies left Fort Riley, accompanied by the late Brevet Lieutenant Colonel Geo. M. McGill, U. S. A., who informed me on my arrival at Fort Harker that quite a number of violent cases of acute diarrhœa had occurred in that command during its march to the last-named post. On the day that this detachment left Fort Riley (June 22d) an aggravated case of sporadic cholera occurred at that post in the person of a quartermaster's employé. This case, through the kindness of Brevet Lieutenant Colonel Irwin, U. S. A., I had an opportunity of viewing a few hours prior to its fatal termination.

On the 25th, the headquarters and one company of the 38th left Fort Riley; arrived at Fort Harker on the morning of the 26th, and though the men had been exposed to a violent rain storm on the preceding night, no sickness of any consequence was reported.

The regimental camp was made upon a small plateau or beach formed by the first rise of ground from a small creek, a tributary of the Smoky Hill fork, and about half a mile to the southwest of the post, and about the same distance from the creek. This plateau, although lower than the ground upon which the post was situated, presented so many natural advantages, that it was selected, after careful consideration, in preference to more elevated positions. The drainage was admirable; the natural slope of the plain was to the southwest; on the north and east large arrayos received the wash from the higher ground, while to the west the fall to the meadow bordering the creek was abrupt. The plain was covered with short prairie grass; the soil was loose and gravelly; the ground had never been occupied for camp purposes. The troops were well clothed, and provided with camp and garrison equipage; the tents were new, of the A pattern, and of a sufficient number to prevent any overcrowding. Great care was taken by the commanding officer to observe all sanitary precautions. There was no epidemic of any character at the post, and the tendency to diarrhœa, which I had observed prior to my arrival at Harker, seemed to have subsided.

On the 28th, a detachment of the 38th Infantry, consisting of Companies "D" and "F," under the command of Brevet Lieutenant Colonel H. C. Merriam, and under the medical charge of Brevet Lieutenant Colonel McGill, U. S. A., left the post en route to Fort Union, N. M. Owing to the extensive damage done to the Union Pacific Railway by the extraordinary June floods of this year, the medical supplies for this detachment, which were most liberal as to quantities and amounts, were detained at some point east of Harker, and Dr. McGill was obliged to commence the march but poorly provided with medical stores, his requisition being based upon the ability of the post hospital to fill it. A few hours prior to their departure, I had assisted Dr. McGill in his inspection of the men of this command, and no indication of latent disease was discovered, the sick report being of the simplest character. This command crossed the Smoky Hill about noon, and before any suspicion was excited as to the existence of epidemic cholera in the vicinity; but shortly after their departure, I was requested by Acting Assistant Surgeon Ira Perry, U. S. A., to see with him a citizen employed by the beef contractor of the subsistence department, whom he feared was seized with malignant cholera. The man was living in a "dug-out," the most miserable form of human habitation, in the immediate vicinity of a filthy slaughter-pen, and about one mile and a half southwest of the camp of the 38th. On our arrival the patient was found perfectly collapsed, exhibiting all the peculiar symptoms of the disease, and the case terminated fatally within a few hours. The clothing, articles of furniture, and ground around this patient were infected by the excreta, which had been thrown out in all directions, the patient having suffered from the disease and its premonitory symptoms many hours before calling in aid. Active disinfectant measures were instantly instituted by Dr. Perry. On the evening of the same day, Private Henry Groom, of Company "H," 38th Infantry, was taken with fully marked symptoms of the same disease, and was conveyed from camp to the post hospital, where he died early the next day.

These cases inaugurated the epidemic at Fort Harker; and I subsequently learned from a report which Hospital Steward D. D. Peabody, U. S. A., (who was on duty with Dr. McGill,) was kind enough to make for my information, that the first case in Colonel Merriam's command occurred at Plumb creek, their first camp, on the evening of the same day.

On the 29th of June, Private Tony Powell, also of Company "H," was attacked, and was sent to the post hospital, where the disease yielded to treatment. On the 30th, Private W. Jackson, of the same company, was seized with the disease; he was also sent to hospital, where he died the next day. The removal of these men to hospital was necessitated by the non-arrival of my medical supplies, from the same cause as was stated in Dr. McGill's case.

In the camp of the 38th Infantry the most rigid precautionary measures were at once adopted. The men were, as far as possible, debarred from communication with the post. The supply of water was obtained from a spring near the site of the abandoned Fort Ellsworth, distant nearly two miles from Harker; and new cedar water-casks were procured for this purpose. Great care was observed in disinfecting the sinks, for which purpose fresh earth and quicklime were used each day; the company tents were struck and removed to fresh ground every few days; company officers were required to inspect the food prepared for each meal; hospital tents were erected, and bunks were provided for the sick.

On July 1st, five enlisted men were attacked with cholera, although not aggravated in its type; and the same day six cases of painless but exhaustive diarrhœa were reported. On the 2d, three cases of cholera occurred, with four of prodromic diarrhœa. On the 3d there were four cases of cholera and two of diarrhœa; on the 4th, two cases of cholera and one of diarrhœa; on the 5th, one case of cholera and one of diarrhœa; and on the 7th, one case of cholera. At this date the disease, as far as Company "H" was concerned, seemed to be arrested, although the diarrhœa still continued.

In these cases the disease, although well marked, was not aggravated in its type, a very marked difference being observable between them and those which occurred in the immediate vicinity of the post, where, in spite of the most unremitting and devoted care of the medical attendants, many rapidly proved fatal. In my cases the characteristic symptoms were, without difficulty,

relieved, although in the majority convalescence was slow and tedious. The treatment consisted of pure chloroform for the relief of cramps and vomiting, and also as a stimulant; the employment of calomel in graduated doses, camphor, opium, the various alkaloids, brandy and food. Infected articles of clothing and bed furniture were destroyed by fire; deep but narrow pits were dug to receive excreta of all kinds, and were constantly kept disinfected by fresh earth and mineral acids, after the manner of Pettenkoffer; close-stools were constructed of small boxes, which were nearly filled with earth, and were exclusively used by diarrhœa patients. After each evacuation the dejection was inspected by an intelligent attendant, who recorded the character of the discharge, disinfected it with acids, placed it in the pits before described, and renewed the earth in the boxes. In the tents, carbolic acid and chlorine were employed as disinfectants; and in the drinking water the solution of permanganate of potash. Of the cases before enumerated, five proved fatal; in them the disease had been arrested, but the subsequent debility becoming typhoid, no impression by medication of any class could be obtained. In the management of these cases, great assistance was rendered me by the late Acting Assistant Surgeon Algernon M. Squier, U. S. A., who was unremitting in his care and attention to the sufferers from the disease to which he was so soon to fall a victim.

From the 7th of July no new cases of cholera occurred in the command, although it still continued epidemic in and around the post, where the disease seemed confined to two companies of the 38th Infantry and one company of the 10th Cavalry, who were doing garrison duty, to the quartermaster's employés, and to citizens. No officers or members of their families had been attacked; nor had it spread to a company of the 37th Infantry. After a slight subsidence, the disease was again suddenly developed with increased severity, the first victim being Mrs. Sternberg, a most lovely and accomplished lady, who died, after eleven hours of intense suffering, which defied medical aid. On the 16th, 17th, 18th, and 19th, the disease raged with unabated fury, but no new cases were developed in the camp of the 38th.

The precise manner in which the disease was imported to Fort Harker would be difficult to determine. The post had been but lately located upon high, well-drained, and unused ground. It was distant some two miles from the travelled route to the Arkansas and Santa Fé. The supply of water was good, and was obtained from a spring, which was guarded with every care, to prevent the introduction of excrementitious matter. The subsidence of the June floods had not produced any susceptible malarial influences. No obvious cause was to be found in the post for the development of the cholera poison. It might be presumed that the disease was directly imported from Fort Riley, on the following grounds: I. The progress of the disease had been arrested at that post in the preceding season, after fifty-nine cases of cholera and six hundred and thirty-five cases of acute diarrhœa had been treated in that garrison. II. As, on June 22d, a fatal case of sporadic cholera had occurred at that post while troops of the 38th Infantry were encamped in its vicinity. III. As three detachments of the same regiment, also en route for Harker, had been temporarily encamped near that post, and on ground which had been used for camp purposes. IV. As the disease appeared at Harker, among the men of this regiment, within seven days of the case at Fort Riley. V. As, about the same time, the quartermaster's department was removed from Riley to Harker, thus introducing a large number of employés, many of whom had been employed at the first-named post for a considerable period.

On the other hand, it has been shown that the disease was developed simultaneously in three distinct localities: I. In the person of the herder of the beef contractor, who lived nearly two miles from the post. II. Among the enlisted men in the camp of the 38th Infantry. III. In the command of Col. Merriam, at Plumb creek, some eighteen miles distant.

Again, the events of the days following its appearance at Harker determined the following facts: I. That the disease existed among the men of Mexican freight trains that had been loaded further east. II. That the quartermaster's employés who were first attacked, and who had the disease most severely, were not those brought from Fort Riley, but those who had been employed for some length of time at Harker. III. That, at the inception of the epidemic, the citizens living in the vicinity of the post were found to be most liable to the disease.

Prior to the outbreak of the disease, the stations of both the Santa Fé and Smoky Hill stage routes were removed to the vicinity of the post. The cholera poison may have been deposited through these channels, but the inhabitants of these stations were exempt from the disease; nor have I been able to learn of any cases having occurred on either of these routes until after the movement of the troops then at Harker. The working parties of the Union Pacific Railway had reached the post, but, as far as could be determined, no cases of sickness had occurred among them; and I have lately been informed by General W. W. Wright, chief engineer of that route, who, in making an extended survey, was accompanied by a large corps of engineers as far as this post, (Fort Craig, New Mexico,) that he had been constantly ahead of the cholera, no sickness occurring among his men.

Lastly, some facts concerning the organization of the 38th Infantry may point to the mode of distribution. The enlistments were commenced in October, 1866, and completed in June, 1867. The regiment was then 1,200 strong. The majority of the men (negroes) were enlisted in the southwest, and had served in volunteer organizations; the western and middle States furnished the remainder of the quota. The material of which the regiment was composed was good, but the localities in which the largest number of enlistments were made had, during the season preceding the regimental organization, been visited by epidemic cholera, viz: Chicago, Illinois; Cincinnati, Ohio; Louisville, Kentucky; Nashville and Memphis, Tennessee; Vicksburg and Jackson, Mississippi; Atlanta and Augusta, Georgia.

These facts have been stated in detail, as all having a bearing upon the question; but by far the most plausible theory can be drawn from the fact of the first case occurring near an old slaughter-pen, which contained masses of filth, and in a miserable foul "dug-out." The man had been sick two or more days before the attention of Dr. Perry had been called to his case, and his death ensued within a few hours of the first medical visit. Until the diarrhœa and vomiting had become profuse, the patient had gone into the bushes near at hand to empty his bowels; when they became more frequent and urgent, a bucket was used as the receptacle, and at the time of our visit it contained quite a considerable quantity of rice-water discharges. Time enough had therefore elapsed for fermentation to have occurred, and for the cholera matter to be widely disseminated prior to the departure of Colonel Merriam's command.

On the morning of July 20th the headquarters of the 38th took the road for New Mexico, the command consisting of Companies "A" and "K." These companies had, until this date, composed a portion of the garrison of Fort Harker, and had been

constantly exposed to the epidemic, although both had been comparatively free from the disease. Company "H," in which the disease had not reappeared, was retained at the post. Prior to starting, a most rigid inspection was made of the command, and in accordance with an arrangement which had previously been made with Assistant Surgeon Sternberg, U. S. A., all suspicious cases were placed in camp, for either observation or treatment, so that the command started with an absolutely clear sick report. The hospital arrangements consisted of a fully equipped Autenrieth medical wagon, an extra supply of disinfectants, stimulants and stores, and three ambulances. Dr. D. C. De Leon, formerly of the army, and who was en route to Albuquerque, New Mexico, accompanied the command as my personal guest, and subsequently rendered me valuable aid, although inclined to embrace all cases of intestinal disorder which occurred among those of pure cholera.

The command numbered as follows: Two hundred and twenty enlisted men, twelve officers, thirty-seven ladies, children and servants, forty-four quartermaster's employés, and was joined, after crossing the Smoky Hill, by Col. Brown, (the sutler at Fort Sumner, New Mexico,) with a family of ten persons; making a total of 324 persons.

The march of July 20th was a distance of 18 miles, over the usual Santa Fé road, to Plumb creek, on the west bank of which the camp was made, great care being taken to avoid ground which had been used for camp purposes, as all western bound trains, for several weeks past, had been affected with cholera. The water was good, and was procured from a spring one mile beyond the ford. No sickness of any character was developed during the day.

July 21st, the command left camp at 5.30 a. m., marched 10 miles to Cow creek, and went into camp on its west bank at 10.30 a. m. Old camp grounds were avoided; the water obtained from the stream was good. At 9 o'clock a. m., while on the march, Private John Hughes, Company "A," was suddenly seized with cramps of lower extremities and abdomen, accompanied with vomiting and purging, which rapidly assumed the rice-water character. This man, I subsequently learned, had been exposed to the disease as a nurse in the cholera tents at Fort Harker. The case proved amenable to treatment. Shortly after making camp, the disease, which we had hoped to escape, was suddenly developed among the enlisted men. Five well-marked cases of epidemic cholera, and four of cholerine, were admitted to hospital. The disease did not, however, assume a virulent type. By midnight the severity of the symptoms were relieved, none of the cases proving immediately fatal. Isolation of these cases was carried out as far as was practicable, and greater surveillance over the men was enforced.

July 22d, the command left camp at 5 a. m. The sick were well provided for in the hospital ambulances and wagons which had been turned over by the commanding officer for that purpose. The march of 13 miles to Walnut creek was made by 10 a. m., and the camp was formed on the east side of the creek, a mile from Fort Zarah, it being found unadvisable to cross the stream, from the fact that, Zarah being a rendezvous, the ground, for a very considerable distance on its west bank, had been used repeatedly for camp purposes. During the day two cases of epidemic cholera and one of cholerine were developed, but, as on the preceding day, without malignanant symptoms.

July 23d, at 3 o'clock, it was found impossible to ford the creek, as, since midnight, the stream had rapidly risen, and was then three feet higher than usual. The bridge below Zarah was examined, and pronounced unsafe to cross the train. The command remained, therefore, in camp during the day. Two new cases of cholera and five of cholerine were admitted for treatment, and many of those who were considered as having passed into convalescence exhibited symptoms of increased disorder. Two cases of those attacked on the 21st terminated fatally. The disease, which had previously existed at Fort Zarah to some extent, but had subsided, was this day again developed, the first victim being Brevet Captain I. Helm, of the 3d Infantry, who died a few hours after the inception of the disease.

July 24th, the command was still detained in camp by the impossibility of crossing the creek. Eight cases of cholera and five of cholerine were developed; two cases terminated fatally during the night, one of which had been taken with the disease on the same day and the other on the 22d.

July 25th, the ford being found practicable, the command crossed Walnut creek, and for the first time on the march it was practicable to adopt the rule so strongly recommended by Parkes and leave the line of march. It being found that the lower road, or that which follows closely the banks of the Arkansas, had been unused during the entire season, on account of the existing Indian troubles, the commanding officer determined upon taking it at all hazards. Before crossing the creek, a teamster of the quartermaster's department was seized with cholera, and was removed by the wagonmaster to the post hospital. I have been unable to learn the termination of the case. Immediately on making the crossing, Private William Mitchell, of Company "A," who left camp in apparent health, was seized with cholera, and it proved the only virulent or rapidly malignant case that occurred on the march, resisting all treatment; it proved fatal in four hours from its inception.

A march of about fourteen miles brought the command to the Arkansas river. As had been reported, the road was found unused—no trails or signs of camps to be perceived.

In addition to the cases reported, five cases of cholera and fourteen of cholerine occurred, and one case, attacked the previous day, died early in the evening.

July 26th: the effect of remaining in camp was evidently so pernicious to the morale of the command, that it was decided to move camp each day, if enabled to make only a few miles. Therefore, the command moved at 5.30 a. m., crossing the Pawnee fork, marched about 18 miles, and camped at 2 p. m. on the river opposite Fort Larned, but six miles distant. Three cases occurred during the day, and two deaths, one of whom was taken sick on the 25th, the other on the 21st. In addition to these, Mr. Brown, whose presence with the command was before noticed, was taken sick with cholera; his case proved an aggravated one. At this post an unsuccessful effort was made to leave in the post hospital the convalescent cases, in order to afford better accommodations to those seriously ill. I succeeded, however, in obtaining three large wagons, in addition to those already in use, and was then enabled to transport with comfort all the sick. During the past few weeks the days had been oppressively hot and close, but were followed by chilly nights and heavy dews. The damp heat of the earlier part of the day added greatly to the physical fatigue of the march; but during this night a violent rain storm with thunder and lightning came on, and lasted for several hours. The salutary effect of this was evident on the succeeding days.

July 27th, left camp at 5.10 a. m., two cases being in extremis, who died seven miles from camp, and were buried on the

road; one was the servant of Mr. Brown, the other a soldier who had been admitted to hospital on the 24th. Marched about 15 miles; made camp on river bank at 1.30 p. m. Two cases of cholera and five of cholerine occurred during the day, and before midnight two cases of those attacked on the 25th died.

July 28th, left camp at 5.50 a. m.; marched about 15 miles, and camped on river bank at 1.30 p. m. One case of cholera occurred, and proved fatal within twelve hours; five cases of cholerine also occurred.

July 29th, left camp at 4.50 a. m.; marched about 18 miles, and went into camp near the river at 12.30 p. m. No new cases of cholera occurred among the enlisted men, but a servant of Mr. Brown was attacked by the disease while on the march.

July 30th, left camp at 4.30 a. m.; marched about 13 miles, and made camp at 12 m., two and a half miles west of Fort Dodge. On approaching this post the column left the stage road, which passes through the works, and moved to the right, so that there should be no communication between the commands. No more cases occurred. The servant of Mr. Brown who was taken sick on the 29th died this day. From this date no cases of cholera occurred in the command; its subsidence was followed by the development of scurvy, and the diarrhœa, which still continued, lost its choleraic character. The general health of the command was much improved, and the daily march averaged 20 miles.

On Saturday, August 10th, soon after the arrival of the command at Fort Lyon, a sporadic case of cholera occurred in the person of Mrs. Sweet, the wife of an officer of Company "A." The attack was severe, but yielded readily to treatment, and on the 12th she was fully convalescent.

It is a matter of regret on my part that I am unable to forward a detailed report of individual cases. This is now impossible for me to do, from the fact that my case book was lost or disappeared after crossing the Arkansas. I am, therefore, compelled to form this report from such data as my private journal, the sick report, and prescription book afford.

As before stated, a very marked difference in type was apparent between these cases and those of cholera which came under my observation during the preceding season. This difference existed in the mitigation of all, or the absence of some, of the characteristic symptoms. In the cholerine cases, the attack commenced with profuse bilious discharges from both stomach and bowels, followed by cramps, generally confined to the abdomen, and but rarely extending to the muscles of the extremeties; a cold surface and depressed respiration. At this point of the disease the majority of cases yielded to treatment, which consisted in the exhibition of blue mass in full doses, and in emptying the contents of the bowels with castor oil; the exhibition of chloroform, the preparations of mercury, camphor, opium, and quinine. * * * * * *

In a few of these cases, the discharges could not be controlled, and, after the lapse of a few hours, lost the bilious tinge, became whitish, containing shreds of epithelium, and ultimately became pure rice-water, with the development of other cholera symptoms.

In the cases of epidemic cholera which occurred, the prodromic diarrhœa was invariably feculent and bilious in its earlier stages, and continued from ten to twelve hours prior to the occurrence of severer symptoms. In these cases, with the exception of those of which special mention will be made hereafter, the severity of the symptoms were mitigated, and yielded readily to treatment, and the majority of the deaths occurred when the cholera symptoms had been relieved, but the depression of the vital powers was so great that no lasting reaction could be induced. In all pure rice-water discharges were observed, with clonic spasms of the muscles of the abdomen and extremities, cold, clammy surface, depression of respiration and circulation, partial suppression of the secretions, and semi-collapse. In the cases that recovered, the profuse perspiration of the disease was wanting; the thirst, although present, was not intense; but one case, that of Colonel Brown, presented the peculiar huskiness of the voice; and in but one, that of Mrs. Sweet, did the spasmodic irritation extend to the heart. No case in which the symptoms were fully developed, or in which the collapse became complete, recovered. These cases, six in number, occurred between the 24th and 29th of July. In them the disease was virulently developed, defied all treatment, and terminated fatally within a few hours of its inception.

In the treatment of the disease, no special line could be adopted; therefore, no statistics of value could be obtained. Each case was treated, as its exingencies demanded, with the means at hand. The morale of the troops depended so greatly upon the daily march of the command, that the wants of the sick were, in a measure, disregarded in favor of the necessities of the well.

At the onset of the disease, purgatives (castor oil or seidlitz powders) were employed in some case with marked results. The internal administration of chloroform, strong frictions with rubefacients, and sinapisms, were employed for the relief of the muscular spasms. Chloroform, creasote, sulphuric and nitric acids, muriated tincture of iron, and soda powders were employed for the relief of vomiting. Cold water was allowed ad libitum. Calomel and quinine, in both large and small doses, were exhibited without success. The most favorable results were obtained from a modification of the saline treatment of Stevens, as follows: bicarbonate of soda, 20 grains, common salt and chlorate of potassa, of each ½ a drachm; administered dissolved in water, at one dose, and repeated every half hour, in conjunction with hot saline injections. In the case of Colonel Brown, the most decided advantages from saline enemeta, at 100° Fahrenheit, repeated every 30 minutes, were obtained by Dr. De Leon. In a few cases, it was thought that good resulted from small enemeta of hot beef tea and brandy, administered after each dejection. No advantage was derived from the employment of stimulants until reaction occurred, when vinous or alcoholic stimulants, combined with food, and both carefully administered, were of advantage. During convalescence, which was tedious in most cases, the occasional employment of mercurials and the active exhibition of quinine, or some other preparation of cinchona, was demanded. During the march the sanitary precautions which had been adopted at Harker were, as far as practicable, carried out. The hospital camp was pitched to the leeward, and at a distance from the command; the excreta were disinfected with carbolic acid and buried; the clothing of patients who died or became convalescent was burned; the ambulances and wagons used in the transportation of the sick were frequently cleaned and carefully disinfected. While on the daily march, the excreta of patients were disinfected before being thrown away; every effort was made to avoid disseminating the disease. To hospital attendants and drivers of ambulances and hospital wagons, regular issues of whiskey were made; these men, although constantly on duty, remained free from the disease. The disease was confined almost entirely to the family of Colonel Brown and the enlisted men of the command. But one case occurred among the teamsters. No officer was attacked, although all suffered more or less during the prevalence of the disease

from bilious disorders; and but one case occurred among the ladies and children accompanying the column. In the family of Colonel Brown, three cases of Asiatic cholera occurred, two proving rapidly fatal; while the remaining members, seven in number, were all taken with cholerine at different stages of the journey. These persons were remarkably imprudent in their diet, canned fruits, vegetables, and meats being used to great excess. The most persistent case of cholerine occurred in the person of the Rev. Mr. Vaux, post chaplain at Fort Sumner, N. M. In this case the discharges were frequent, small, bilious in character, attended with tenesmus, exhaustion, cold clammy and bluish surface. The disease, resisting all treatment, continued for several days, and finally yielded to full doses of blue mass, camphor, and quinine. The exhibition of opium invariably aggravated the disorder. It was a noticeable fact, that while daily marches were made, even in the unvarying scenery of the Arkansas valley, the morale of the entire command was unaffected; but, on the other hand, one day of rest, or even the prospect of remaining twenty-four hours in camp, developed cases of choleraphobia. In conclusion, I desire to acknowledge the great assistance rendered me by Hospital Steward Charles Bowmer, U. S. A., who reported to me for duty at Fort Harker, Kansas, the day prior to the departure of the command. The training of Steward Bowmer, during the epidemic in New York harbor, prepared him for rendering most valuable and reliable assistance in carrying out the treatment adopted in individual cases.

I am, very respectfully, your obedient servant,

E. McCLELLAN,

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

FORTS ZARAH AND LARNED.

Extract from Monthly Report of Sick and Wounded, Fort Larned, Kansas, July, 1867. *John J. Marston, Acting Assistant Surgeon, U. S. A.*

Epidemic cholera was brought to this post by two companies of the 38th U. S. Infantry, under command of Major Merriam, en route to New Mexico, which arrived at this post on the 2d instant, having several cases of epidemic cholera along. On my learning that there was cholera in that command, I immediately reported the facts to the commanding officer of this post, and requested him not to allow that command to camp within two miles of the post; but the request was not complied with, and the command went into camp within 500 yards of this post, and remained there for forty-eight hours. The first case occurred at this post on the evening of the 6th instant. The characteristic symptoms of cholera asiatica were prominent and very violent, and the case proved fatal after an illness of ten hours. Two more cases occurred on the 10th and 11th instants, one of which proved fatal in six hours; the other case recovered.

The above were the only cases that occurred amongst the troops of this post during the month. There were also some eight cases amongst the quartermaster's employés at this post, four of which proved fatal. The last case occurred on the 15th instant, and since that time no case has been reported either amongst the troops or employés of this post. There were also two fatal cases—one commissioned officer and one enlisted man—at Fort Zarah, which is a picket post thirty-five miles east of this point. Acting Assistant Surgeon Ira Perry is on duty with the picket at that post. All public trains and detachments of troops passing have more or less cases of this disease; but all cases from these infected commands, when brought to this post for treatment, are treated in a quarantine hospital two miles distant from the post. Numerous cases of diarrhœa have been prevailing at this post during the month, but all cases yield readily to prompt treatment. On the appearance of the disease at this post, every sanitary measure was adopted to prevent its further spreading. Sinks and all foul places were disinfected by unslaked lime and strong acids; lime was scattered abundantly about all the quarters, and a thorough police of the whole camp promptly and regularly enforced. Troops were instructed as to the importance of cleanliness, and the cooking closely watched; and all persons having diarrhœa were instructed to report promptly to the hospital for treatment. The treatment adopted during the attack was large doses of calomel, injections of starch, strong tea, brandy, and acetate of lead, sinapisms, and frictions. As a drink, strong tea was used, and the patient was allowed to suck ice. I may also report, as a sanitary measure, that the camp of the quartermaster's employés, which was in the post, was moved out half a mile distant.

Extract from Monthly Report of Sick and Wounded, Company "A," 10th U. S. Cavalry, Fort Larned, Kansas, August, 1867. *Acting Assistant Surgeon J. J. Marston, U. S. A.*

One case of epidemic cholera is reported at Fort Zarah on the 21st of this month.

Private George Evans, Company "H," 38th Infantry, a member of the escort party returning from this post to Fort Harker, Kansas, was taken sick with active symptoms of epidemic cholera on the road on the 20th of this month, and died at the picket post of Fort Zarah on the 21st of this month, after an illness of 36 hours.

Extract from Special Report on Cholera, Fort Zarah, Kansas, September 1, 1867. *Acting Assistant Surgeon Ira Perry, U. S. A.*

Treatment of the within cases: If the case was mild, as a general remedy, used the chloroform mixture. If the case was severe, used chloroform in drachm doses to control the active symptoms of the disease, particularly vomiting, purging, pain in abdomen, cramps, sinking pulse, and cold extremities. For convalescence, used the tonic and nourishment. Other remedies: ice, always, when it was to be had; morphia and calomel occasionally. External applications: mustard, heat, and friction. Drinks: cold water, linseed tea, crust coffee; coffee and farina gruel. Food: in convalescence, beef tea, crust coffee, and bland nourishment.

Remarks: The cholera mixture was useful in every stage of the disease, especially the first. The dose of chloroform was, usually, one drachm in half an ounce of cold water, agitated and quickly swallowed. When it operates kindly, the patient falls into a quiet sleep in ten minutes. Repeat the dose when the violent symptoms return, or at intervals of thirty to sixty minutes, so long as it operates favorably or is needed. If the stomach is full of anything, the chloroform usually acts as a speedy emetic. In that case it should be repeated as soon as the vomiting ceases. It is seldom ejected the second time. If the chloroform fails to empty the stomach, and an emetic is needed, I have found remarkable benefit from salt and capsicum, not only to produce emesis, but to hasten reaction. Personal vigilance was used in the care of these cases, especially in timing the medicine.

Mixtures above referred to: Cholera mixture: chloroform, tincture of opium, tincture of camphor, of each one fluid ounce; compound spirits of lavender, one fluid drachm; brandy, three fluid ounces—mix. Dose: one fluid drachm, repeated every hour to every six hours, as necessary. Diarrhœa mixture: the same as the above without the chloroform. Tonic: aromatic sulphuric acid, one fluid drachm; sulphate of magnesia, one drachm; water, four fluid ounces—mix. Dose: half a fluid ounce every three to eight hours. Emetic: chloride of sodium, six drachms; powdered capsicum, one drachm; tepid water, six ounces—mix. Give at one dose, and repeat in half an hour if it does not operate.

FORT DODGE, KANSAS.

FORT DODGE, KANSAS, *July* 31, 1867.

SIR: I have the honor to tender the following report upon epidemic cholera, as developed at this post during the past month. The report runs up to the end of the month, at which time the disease still exists, but in a greatly abated form:

On the afternoon of the 7th inst., a detachment of the 38th U. S. Colored Troops, en route to New Mexico, under Brevet Colonel Merriam, reached this post, and went into camp about a mile from the post. I visited the detachment immediately upon its arrival, and was informed by the medical officer accompanying the troops, Brevet Lieutenant Colonel McGill, Assistant Surgeon, U. S. A., that he had had quite a number of cases of cholera in the command; and that, at that time, there were a number of the men laboring under the disease. Not knowing of the existence of cholera anywhere in the west, I was much startled at the information, and at once returned to the garrison for the purpose of reporting the facts to the commanding officer. A line of sentinels was immediately established between the garrison and the camp, and every step possible taken to prevent communication between the two points. Dr. McGill informed me that the disease had been entirely confined to the negro soldiers; though there was a large number of whites with the command, no one of them had been attacked.

The detachment remained at its camping ground over the 8th, leaving early on the morning of the 9th. After its departure a large quantity of lime was sent down and scattered about the ground. Dr. McGill promised that, before leaving, the ground and the sinks should be disinfected.

About 10 o'clock p. m. of the 11th, I was called upon to go up and see a man, a government employé, living about three hundred yards from the garrison. Upon reaching the house and examining the man, I recognized a full case of cholera. I took great care in isolating this case, causing a mess for employés, kept in the house, to be at once broken up, and putting the house in a strict quarantine. The house and premises I found very dirty. This was, of course, attended to at once, and a plentiful use of lime ordered. This man recovered, and no other case occurred at the house; he was married, and had three children.

On the 14th, another case occurred among the government employés. This man also recovered. Diarrhœa began to be very frequent, both among soldiers and citizens, and proved difficult to treat. By far the greater number of cases existed among the citizens. I examined everything, particularly as to their habits of living, cooking, drinking, quarters, sinks, &c., giving positive instructions in regard to cleanliness, advising them as to drinking water, &c. Considering the two cases mentioned, and the increase of diarrhœic affections, as but the advance guard of the dread disease, I redoubled my watchfulness in regard to police of garrison, condition of wells, and everything that might influence the general health of the post. No trains were permitted to come into the post, a mounted man being stationed two or three miles from the post with instructions to stop trains till I examined them in person.

On the 14th, a train arrived; had had a case of cholera a day or two before, but no sickness at the time. It was ordered to go into camp three miles above the post.

On the 16th, a train was reported approaching the post; it proved to be a Mexican train en route to New Mexico. It was ordered to strike off from the main road, to make a detour of two miles around the post, and go into camp at least four miles from the post.

On the 18th, several trains were reported approaching loaded with supplies for this post; they were ordered into camp over a mile from the post. Upon inspecting the trains, I found one case of cholera. The trains were ordered to unload at that point, and the lumber and grain, with which they were loaded, to remain there (proper watchmen being put over it) until disinfected by exposure.

In spite of all precautions, the fearful scourge came upon us.

On the 21st, about 3 p. m., a man, Private Nolan, Company "A," 3d Infantry, one of the guard at the stone quarry 15 miles distant, was brought in in a state of collapse; he had had diarrhœa for two or three days previous, and had indulged largely in drinking water, which, as I learn, was full of impurities, and strongly impregnated with iron and sulphur. On the night of the 20th he was seized with cramps and vomiting; was better next morning, when he was put into an army wagon and driven in to the garrison, over a rough road, very rapidly, the driver believing they were chased by Indians. On the road his symptoms increased greatly, and on reaching the post he was in collapse. Chloroform was administered immediately, in one drachm doses, with stimulants; mustard was applied freely to all parts of the body; but he rapidly sank, and died in less than three hours.

On the 22d, a case made its appearance in Company "I," 37th U. S. Infantry—a weak, puny German boy, who had been on duty at one of the Santa Fé mail stations up the road. On the 23d, three cases: another in Company "I," one in Company "H," one in Company "A," 3d Infantry. The one in Company "A" died on the 24th; the one in Company "I" recovered; and the other is now in a typhoid condition, and will die. On the 24th, no cases among the soldiers; several among citizens. On the 25th, three cases reported: one of "B" troop, 7th Cavalry, recovered; one of "B" troop, 7th Cavalry, a patient in hospital at the time, died on the 26th; one in Company "I," 37th Infantry, died on the 26th.

On the 26th, eight cases are reported: Major Henry Douglass, 3d Infantry, commanding post, was attacked early in the morning; one of "B" troop, 7th Cavalry, prisoner in guard-house, convalescent; one of Company "A," 3d Infantry, prisoner in guard-house, returned to duty this morning; one of Company "H," 3d Infantry, recovered; one of Company "H," 3d Infantry, brought in from stone quarry guard, 15 miles distant, died in a few hours; this man had been eating large quantities of wild cherries and plumbs; one of Company "I," 37th Infantry, returned to duty on 28th; one of Company "I," 37th Infantry, died on the 27th.

On the 27th, two cases: one of Company "H," 3d Infantry, died same day; one of Company "I," 37th Infantry, brought in by escort from Cimaron crossing, Santa Fé mail station, 25 miles from post, died in collapse a few minutes after reaching post.

July 28th, one in "B" troop, 7th Cavalry, nearly recovered.

July 29th, one in Company "A," 3d Infantry, died same day.

July 30th, one in Company "A," 3d Infantry, died same day.

July 31st, no cases.

Among the citizen employés during this same time, (from 11th to 31st, inclusive,) twenty-six cases have occurred, with eleven deaths. Two other cases, both fatal, occurred among other citizens (not employés) about the post. To sum up, from the 11th July to the 31st, inclusive, number of cases, of soldiers and citizens, attacked with the disease, 49; recovered or convalescing, 24; died, 25.

The disease was at its height on the 26th, when there were eight soldiers attacked, and as many citizens. There were six deaths that day—three soldiers and three citizens.

At this time a panic seized upon the citizen employés, thereby increasing sickness among them. Every attempt was made by them, and by certain of the soldiers, to obtain whiskey. Several cases are directly traceable to a debauch at this time. As a general thing, the soldiers were cheerful, but the employés were completely demoralized, with a few exceptions. Some of them made a demonstration upon the stock, with a view of getting away from the post; a few shots, however, among them, wounding one of them slightly, quickly gave them to understand that they were closely watched, and no further attempts were made.

On the morning of the 26th Major Douglass, 3d Infantry, commanding post, was attacked. I am happy to be able to say that at present he seems in a fair way to recover. Mrs. Douglass was attacked on the morning of the 29th, in the midst of her devoted attention to her husband, and lies dangerously ill from the disease. Their infant of ten months is suffering from cholera infantum, but I believe it will recover.

In treatment of cases as they occur, I do not confine myself to any particular course, but cannot say that I derive any great degree of satisfaction from whatsoever I may try. In a majority of the threatening diarrhœas I have used a mixture of tincture of opium, tincture of capsicum, fluid extract of ginger, tincture of camphor, tincture of catechu, with brandy; sometimes adding enough chloroform to give five or ten drops at a dose. In many cases, judging by the tongue, I prescribed, with excellent effect, 2 grains of blue mass, with $\frac{1}{6}$ or $\frac{1}{4}$ of a grain of powdered opium every three hours. This had the effect of altering the character of the passages in a few hours; sometimes the diarrhœa ceased entirely; when it did not, astringents, which seemed of no effect before, now acted admirably. In the stage of cramps, purging, and vomiting, I have placed my main reliance upon chloroform, giving from 30 to 60 minims every half hour in ice water, sometimes in sherry wine; free and hard frictions to surface with turpentine; mustard plasters; injections of sugar of lead and tannin after each passage; ice swallowed in pellets, the patient to be kept from drinking. I have but little confidence—none, I might say—in opiates, in this or the after stages. In some cases calomel satisfied me, in others it did not. I gave it in small doses. In the stage of collapse I have used everything I could think of: general application of mustard; rubbing with turpentine; hot applications externally; internally, chloroform, in 60 minim doses; ice; now and then (not frequently) a teaspoonful of iced brandy. In one case (that of Egan, in special cholera report) strychnia was tried, in $\frac{1}{12}$ grain doses, every half hour, until three doses were taken. The man appeared at his last gasp, but rallied, and came out of his collapse. The medicine gave no indication of bad effects, but the man again sank into collapse and died. In the stage of reaction great watchfulness becomes necessary. The urinary organs demand special attention. In several of the cases reported there was entire suppression of urine for some hours—in one or two cases, for one, two, or more days—after reaction came on. To overcome this, I relied upon chlorate of potassa in large doses internally, sweet spirits of nitre, and other diuretics. Injections of chlorate of potassa, salt, bicarbonate of soda, one drachm each, to a pint of hot water, about

100°, acted most admirably in some of these cases. One or two wet cups over the lumbar region proved of benefit. In one patient, a citizen, who suffered greatly from suppression of urine, I found Rhine wine, in conjunction with diurētics, of benefit.

As to the origin of the epidemic at this post, during the spring we had several heavy rains, causing the Arkansas to rise, and, overflowing its banks, to fill the bottom near which the post is situated. Upon the subsidence of this overflow, and the coming of hot, close, sultry days early this month, I believe a miasma to have been generated, supplying fuel which only needed a spark to kindle into a flame of disease. This spark was, doubtless, emitted by the detachment spoken of in the beginning of this report—the 38th Infantry.

Immediately upon the outbreak of the disease I caused the camps of the citizen employés to be broken up and moved back some 800 yards to the hills fronting the river. Company "H," 3d Infantry, was removed from their dug-outs, which were within half a dozen yards of the bottom spoken of, and put in tents on the hills; the corrals were broken up and moved off a quarter of a mile; everything was cleaned up and whitewashed; lime thrown about plentifully; police strictly attended to. By the time this was all done the disease began to decline.

Two outside hospitals were instituted—one for citizens, one for soldiers. Sibley tents were used; a certain number set apart for diarrhœas, others for advanced cases. A corps of attendants was detailed at each. I will state, in passing, that not a single attendant has been attacked, though at work day and night. All articles with which dejections came in contact were destroyed.

The monthly report of sick and wounded shows thirty cases of acute diarrhœa. I suppose, in addition to these, between 150 and 200 cases were treated among the citizens. Every one at the post seemed to suffer more or less. In many cases the diarrhœa could be traced to errors in diet or in drinking. In some instances I traced it among teamsters to the use of corn meal, of which they received four days' rations; on exposure it would get somewhat musty. The issue was stopped, and diarrhœas decreased among this class.

The force of the garrison on the 20th was as follows: present for duty, officers, 6; present for duty, enlisted men, 194; citizens, government employés, 247; other citizens, about 30 or 40. A larger percentage of soldiers have, thus far, suffered from the epidemic than any other class of men at the post.

From the outbreak of this epidemic till the night of the 30th I was without an assistant, Acting Assistant Surgeon Crandall having been called away on business to Junction City, and unavoidably detained. In consequence, I am now suffering greatly from exhaustion. His return, on the night of the 30th, has given me wonderful relief. He at once entered upon work, taking into his own hands such cases as came up. His assistance is invaluable, and worthy of every praise. Hospital Steward O'Leary has been invaluable to me, showing such energy, faithfulness, and knowledge in the emergencies that arose, as to call for the highest commendation.

On the 24th, Hospital Steward Gunning arrived at the post en route to New Mexico, and was detained, by order, for temporary duty; many thanks are due him for much valuable service.

To the officers of the post my thanks are due for the support yielded me in every respect. Captain William Thompson, "B" troop, 7th Cavalry, has worked wonders in every way. In putting down the fear which had seized upon every one, I give him great credit. Still greater credit is due him for his close, kind, and considerate attention to those taken sick. To him more than one man owes his life. I render these thanks because I consider it but just that I should.

At the present writing the disease is on the decline, and the hope has sprung up that it will soon disappear. Another detachment of the 38th Infantry, en route to New Mexico, under General Grover, passed around (at a distance of about two miles from) the post yesterday, going into camp about three miles above the post. Brevet Major Ely McClellan, Assistant Surgeon, U. S. A., on duty with the detachment, informs me that there are a number of cases of cholera in the command. How this scourge is to be eradicated I know not, so long as troops and trains are sent over these roads and through these posts, scattering the seed broadcast.

In closing, I would state that, on the 26th of May, I made a requisition for hospital clothing and permanganate of potash. I was notified that these articles had been turned over for transportation to the quartermaster's department on the 3d of June. On the 31st of July these articles have not yet reached me. The delay is incomprehensible. I have especially needed the permanganate of potash.

The above is respectfully submitted.

C. S. DE GRAW,
Assistant Surgeon, and Brevet Major, U. S. A.

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

Extract from Monthly Report of Sick and Wounded, Cos. "A" and "H," 3d Infantry, Co. "I," 37th Infantry, and Co. "B," 7th Cavalry, Fort Dodge, Kansas, August, 1867. Acting Assistant Surgeon J. B. Crandall, U. S. A.

The two deaths from cholera noted were attacked with cholera at the mail station west of the post, while on escort duty, August 19th. Died before medical assistance could be obtained—the first in ten hours, the second in five hours after attack.

No case of cholera has occurred among the troops since August 19th. Two cases, citizens, were brought to the post August 26th. No case has occurred here since then.

WILSON'S CREEK, KANSAS.

Extract from Monthly Report of Sick and Wounded, Company "G," 10th U. S. Cavalry, Wilson's Creek, Kansas, July, 1867. *Acting Assistant Surgeon A. W. Wiggin, U. S. A.*

I was assigned to duty with this command July 25th, in accordance with Special Order No. 49, Headquarters District of the Upper Arkansas, dated July 25th, 1867. This report, therefore, covers only the last six days of the month.

I found nearly half of the command unfit for duty, including the two commissioned officers, six or eight of the cases being cholera, the remainder diarrhœa. Four of the deaths which are borne on this report occurred during the thirty-six hours immediately preceding my arrival. I have very carefully disinfected all excrements; have had water for drinking boiled, or disinfected with permanganate of potash; by holding sick calls three or four times daily, have attacked, so far as reported to me, every instance of looseness of bowels at the very start. At the date of this report the disease seems to have materially abated, no new cases having arisen for forty-eight hours.

I learn that this company left Fort Harker on the 16th instant, leaving behind three or four men in post hospital affected with choleraic diarrhœa. Since that time they have frequently changed camp, selecting dry, airy locations, in the vicinity of springs of water, not remaining more than three or four days in a place.

Occasional cases of diarrhœa had come to the notice of the company commander, and were treated by him, from the time of leaving Harker, but did not present alarming features till about the 20th. From that time the disease manifested itself with unusual violence.

Except so far as the disease is of purely epidemic origin, it seems to have been brought with the command from Fort Harker, where cholera had existed for weeks. Its violence was, no doubt, aggravated by the water used for drinking; by lack of variety and inferior quality of the ration issued; by the carelessness and ignorance of the men, new to the service, and naturally more prone to disease of an epidemic type than white men. The water is of the same character as that generally found in this part of the country; flowing from superficial springs, along the banks of creeks, considerably charged with organic impurities, and liable to produce diarrhœa in those who are unaccustomed to its use. The men have been supplied with a very poor meat ration—fat, rancid bacon—and no fresh vegetables.

CAMP GRIERSON, KANSAS.

Extract from the Monthly Report of Sick and Wounded, Company "C," 10th U. S. Cavalry, Little Arkansas, Kansas, July, 1867. *Acting Assistant Surgeon Wm. H. Buckmaster, U. S. A.*

The cholera first appeared in this camp on the 12th of July. It was supposed to be brought here by one of the messengers from Fort Harker, where it was prevailing. After a day or two it subsided, and again broke out. Two of the men that died only lived about four hours after being taken. No cases in camp at this date.

Extract from the Special Report of Cholera Patients at Camp Grierson, Kansas, for the month of July, 1867. *Acting Assistant Surgeon Wm. H. Buckmaster, U. S. A.*

The cholera first appeared in this camp on the 12th day of July, 1867, in the person of George Broomfield, a courier from this camp to Fort Harker, where the disease was prevailing very seriously. This patient was very low, and was at one time in collapse. His recovery was quite slow after convalescence was fully established. My treatment consisted in endeavoring to relieve the vomiting, purging, and cramps, which were very severe; in the collapse I used stimulants and friction freely. The next case was that of Thornton Hull, with whom I used similar treatment to the above. He seemed at one time to be convalescing, but had a relapse and died. The case of Charles Murray was somewhat milder than the two former cases; the disease yielded to the action of remedies employed, and made a good recovery. The case of Jeremiah Ansil was an unfavorable one; he was laboring under chronic rheumatism and pleurisy.

The cases of Columbus Schloss and William Patterson were very severe, the former dying within an hour after the disease showed itself; the latter was on guard and fell on his beat. Collapse immediately set in, and the patient died within two hours after the disease appeared. The case of David Dunn made a good recovery under the above treatment.

Extract from Special Report of Cholera Patients at Camp Grierson, Kansas, for the month of August, 1867, *by Acting Assistant Surgeon Wm. H. Buckmaster, U. S. A.*

There have been no cases of cholera in this camp since August 17th, 1867. Contrary to the experience of other epidemics, the disease continued very severe up to the last case, which was as severe as any of the cases during its prevalence in this camp. In some cases medicine seemed to have a very desirable effect; in other cases you could not see any effects from medicine. There is no danger of its breaking out in this camp again this year, as the cold weather is now approaching. I used all the sanitary means at my command to prevent its spread among the troops at this camp, burning the clothes of the dead and the bedding used by the sick. Some of my hospital stores were thus destroyed.

DOWNER'S STATION, KANSAS.

Extract from Monthly Report of Sick and Wounded, Downer's Station, Kansas, August, 1867. Leonard Y. Loring, Assistant Surgeon, U. S. A.

I would respectfully state that, notwithstanding the prevalence of cholera at Forts Harker and Hays during the past month, this post, and the stations connected with it, have been remarkably free from this terrible disease. Trains, accompanied by escorts and detachments of troops, have been continually passing and repassing between the above-named posts, encamping near this post, but seem to have had but little effect in spreading the contagion or peculiar poison which produces this disease. There have been cases, to which I have been called, occurring in these trains, which, in some respects, simulated cholera, but which could not be said to be cholera. They were characterized by somewhat profuse diarrhœa, and in a few instances by vomiting, which symptoms readily yielded to mild treatment.

On August 7th, a large supply train for Fort Wallace, accompanied by an escort of about forty men of Company "B," 38th U. S. Infantry, from Fort Harker, where the cholera was then prevalent, encamped here. During the night a case of diarrhœa occurred among them, which speedily recovered, by means of the usual remedies. On the evening of the 9th instant they arrived at Grinnell Springs, a station guarded by troops from this post. Soon after their arrival at Grinnell Springs one of the men there was attacked by a profuse diarrhœa and vomiting, which continued, at intervals, during the next day, when another similar case occurred. They were both sent to this post in the coach on the evening of the 10th, and arrived here about 10 o'clock. The one which was attacked the evening before was now in a collapsed state; the purging had nearly ceased; the vomiting would only ensue when medicine was administered; the skin was cold, and covered by a profuse, clammy sweat; the pulse was barely perceptible; the countenance bore an expression of anxiety and suffering; the lips were drawn and compressed over the teeth; the nose was pinched, and the eyes were sunken and expressionless; presenting, altogether, a most cadaverous expression, with death undeniably stamped on every feature. The treatment consisted at first in the administration of equal parts of tincture of camphor, tincture of opium, tincture of capsicum, and brandy, which it was impossible to retain on the stomach; when resort was had to doses, each containing calomel, 3 grains, subcarbonate of bismuth, 4 grains, and powdered opium, 1 grain, every half hour. These were retained, and seemed to act beneficially. At the same time, friction, by means of coarse towels, was applied to the extremities, and mustard, by means of sinapisms, to the abdomen. The patient complained of great thirst, and there was great restlessness and jactation. Death ensued at 5 o'clock on the morning of August 11th, seven hours after arriving here.

The other case was characterized by diarrhœa and vomiting, such as generally mark a case of cholera in its first stage. The vomiting was checked with bismuth, the diarrhœa yielded to the usual treatment, and the case recovered.

There is no doubt, in my mind, that the arrival of the supply train, with the escort above referred to, was in some way connected with the appearance of these two cases.

Extract from Special Report of Cholera Patients at Downer's Station, Kansas, August, 1867. Leonard Y. Loring, Assistant Surgeon, U. S. A.

I would respectfully state that, during the month of July, 1867, there were no cases of cholera at this place, notwithstanding the intense heat and the prevalence of cholera at Forts Harker and Hays, from which places trains were continually passing, attended by large escorts of troops.

During the month of August, notwithstanding the continued passing and repassing of large trains between Forts Harker and Hays and Fort Wallace, at which places the disease was prevailing to a fearful extent, this place enjoyed a remarkable immunity from the disease, no cases having made their appearance. On the 9th of August, a large supply train, going from Fort Harker to Fort Wallace, escorted by a detachment of Company "B," 38th U. S. Infantry, encamped at Grinnell Spring, a small stage station about twenty miles distant and guarded by troops from this place. Some of the men of the station mingled with those of the 38th U. S. Infantry forming the escort. On the same evening a man guarding the station was taken sick with all the symptoms of cholera. On the following day, August 10th, he was sent to this place, in company with another who had been taken sick that afternoon at the same station, for medical treatment. They arrived here on the evening of August 11th, when the man who had been taken sick the day before was found to be in a state of collapse. Active and energetic treatment was at once pursued in his case, but all of no avail; he died early on the morning of the 12th, a few hours after arriving here. The second case, when it arrived here, was in its incipient stage; the patient was having free discharges from his bowels at short intervals, and occasional vomiting. Powders, containing calomel, opium, and subnitrate of bismuth, were administered every half hour; in addition to this, a mixture containing tincture of opium, spirits of camphor, and fluid extract of ginger, was also administered; the vomiting now ceased, and the patient began to recover. The treatment was continued during the following day, and the patient gradually improved. During this month the sanitary condition of the post was good, and every effort was made to keep the post in a thoroughly clean condition. Passing trains were not allowed to encamp within a certain distance. The water for drinking was obtained from a spring near the post, and was comparatively pure, containing but a small amount of inorganic impurities. The men of this place did not mingle with those of passing trains, in which it would be reported at times that there were cases of cholera. At Grinnell Spring, where these two cases occurred, these precautions could not be enforced, as there was but a small detachment at that place, under the charge of a non-commissioned officer. From the facts and history of these two cases, there is no doubt, in my mind, that they were caused by infection derived from this detachment of troops from Fort Harker, where cholera was then prevailing. During subsequent months no cases of cholera arrived at this post, or at any of the stations attached to it.

DETACHMENT OF THE 7th CAVALRY, NEAR FORT WALLACE, KANSAS.

HEADQUARTERS 7TH U. S. CAVALRY, IN THE FIELD,
Near Fort Wallace, Kansas, July 22, 1867.

GENERAL: I have the honor to inform you that cholera has made its appearance in this command. I was called, about 11 o'clock this day, to see Private Bye, Company "H," 7th Cavalry, whom I found lying under a tree near camp suffering terribly from cramps in the abdomen and legs, attended with incessant vomiting and purging of rice-water fluid, excessive prostration, cold and clammy skin, nose icy cold, pulse entirely gone at the wrist, general cyanosis, pupils contracted, coma; could be roused, but would immediately fall away into deep sleep; urine suppressed, and features collapsed. I would respectfully add that cholera first presented itself near new Fort Hays, Kansas, about 4 p. m, July 11th, 1867, in the person of a citizen belonging to a citizen train which came from Salina, Kansas, with supplies for a trader near camp. The man was at least three-quarters of a mile from camp, and was not brought into or near it, although removed to a more suitable place than the one he occupied. A colored soldier was also taken with the disease the same night. They both (soldier and citizen) died next morning. Our detachment of cavalry was some distance from the colored troops, (for the camp was large,) and communication between them, after the disease broke out in camp, did not exist. We left new Fort Hays, Kansas, about 1 p. m., July 12th, up to which time no symptoms of cholera had appeared among the men of the detachment. The water at the first station west of Fort Hays is very bad, the drinking of which caused several cases of acute diarrhœa, but no symptoms of cholera were visible while on the march from Fort Hays to this camp, and the time occupied was seven days. That the disease was brought here, I am perfectly satisfied, for the men of the government and citizen trains at Fort Hays had constant intercourse with each other; besides, some of the same men, belonging to the government train at Fort Hays, came to this camp with property belonging to the 7th Cavalry at the same time that the detachment did. That the disease which has broken out at this camp is true Asiatic cholera, I have not the least doubt; and I am fully supported in my diagnosis by Dr. Coates, who is on duty with the regiment.

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

HENRY LIPPINCOTT,
Assistant Surgeon, U. S. A.

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

HEADQUARTERS 7TH U. S. Cavalry, IN THE FIELD,
Near Fort Wallace, Kansas, 10 *o'clock p. m., July* 25, 1867.

GENERAL: I have the honor to inform you that cholera is on the increase in this camp. I have just recorded (9 o'clock p. m.) the tenth case of the disease, and the fourth death. At surgeon's call this morning we had seven cases of diarrhœa; the latter not severe, however. Two quartermaster's employés and one Indian scout are included in the cases of cholera above mentioned. I would respectfully recall your attention to the fact that cholera did not present itself among the men of the detachment of the 7th U. S. Cavalry while on the march from Fort Hays, Kansas, to this camp, and the time occupied in coming from that post to this camp was seven days. As cholera had only broken out at new Fort Hays, Kansas, on the evening of July 11th, 1867, and as we left that post the next day about 1 o'clock p. m., and as we were on the road seven days without any signs of cholera arising, it was not considered necessary to go into quarantine after our arrival at this camp. Every effort is being made to arrest the progress of the disease, and I hope I shall be able to make a more favorable report very soon.

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

HENRY LIPPINCOTT,
Assistant Surgeon, U. S. A.

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

HEADQUARTERS 7TH U. S. CAVALRY, IN THE FIELD,
Near Fort Wallace, Kansas, 11 *o'clock a. m., July* 27, 1867.

GENERAL: I have the honor to report that cholera is decreasing in this camp, although we have had one new case and four deaths since my last report. All the fatal cases seemed to begin with death. Despite every effort to avert or prevent it, dissolution was inevitable, death supervening in from 6 to 15 hours. It will be seen, by referring to my former reports, that I believed the disease was brought here by human agency. I still adhere to the same opinion. But for the benefit of those who do not give credence to the importation of cholera from infected points, I would respectfully state that a part of the 7th Cavalry left Fort Hays, Kansas, June 1st, 1867, on an expedition to the Platte river, and after marching over seven hundred miles, subjected to great exposure, eating bad and insufficient food, drinking impure and often a too limited supply of water, arrived at this point July 13th, 1867. The detachment of 7th U. S. Cavalry and quartermaster's train from Fort Hays, Kansas, arrived here July 18th, 1867, and a citizen train came in next day with supplies for the post. Cholera broke out on the 22d, and was and still is confined to the soldiers and employés who were on the expedition to the Platte river. To Major Elliott, the present commanding officer, much credit is due in arresting the progress of the disease. His promptness in having wells dug, at my suggestion; making many daily inspections of the men; causing the grounds around the wells and quarters to be kept clean; sinks to be inspected and filled

up when required; prohibiting the drinking of water (as the men were accustomed to do in large quantities) without being boiled; promptness in procuring tents; and his vigilance in watching and correcting any lack of personal cleanliness in the men of the command, have produced favorable results. To Dr. Coates, Acting Assistant Surgeon, U. S. A., is due great praise; his excellent counsel and constant assistance in endeavoring to ward off and prevent the spreading of the disease, show his interest in humanity and the good of the service. I desire to make mention of the kindness of Dr. Turner, Assistant Surgeon, U. S. A., on duty at Fort Wallace, Kansas, in letting me have beds, bedding, &c., when requested. Finally, I beg to mention the names of Hospital Steward P. J. Clampett, U. S. A., and Acting Hospital Steward Alexander Macgregor, who have both performed their duties in a praiseworthy manner.

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

HENRY LIPPINCOTT,
Assistant Surgeon, U. S. A.

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

HEADQUARTERS 7TH U. S. CAVALRY, IN THE FIELD,
Near Fort Wallace, Kansas, July 31, 1867.

GENERAL: I have the honor to report that cholera is again on the increase. At 4 o'clock a. m. on the 29th instant, Private Rein was taken with the disease, since which time we have had five more cases and three deaths. I beg to assure you that we are doing everything in our power to arrest the progress of the disease.

I have the honor to be, very respectfully,

HENRY LIPPINCOTT,
Assistant Surgeon, U. S. A.

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

Extract from Monthly Report of Sick and Wounded of Companies "A," "D," "E," "H," "K," and "M," 7th U. S. Cavalry, Camp near Fort Wallace, Kansas, part of July, 1867. *Henry Lippincott, Assistant Surgeon, U. S. A.*

Cholera patients are treated in isolated tents. The disease first appeared at this camp at 11 a. m., July 22d, 1867. Besides the fourteen cases of the disease on the face of this report, there were two quartermaster's employés and one Indian scout taken with it, and all three died.

CAMP OF THE 7TH U. S. CAVALRY, IN THE FIELD,
Near Fort Wallace, August 12, 1867.

GENERAL: I have the honor to inform you that the progress of epidemic cholera has again been arrested in this camp. Two persons only have been attacked with the disease since my last report, (July 31, 1867,) and they were taken with it August 2d and 3d, respectively. One of the last cases died August 4th. I take much pleasure in informing you that the sanitary condition of the camp is, considering the epidemic, fast approaching that point which is so much desired.

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

HENRY LIPPINCOTT,
Assistant Surgeon, U. S. A.

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

CAMP OF THE 7TH U. S. CAVALRY, IN THE FIELD,
Near Fort Wallace, August 31, 1867.

GENERAL: I have the honor to inform you that epidemic cholera has been entirely arrested in this camp. The last case occurred August 17th, since which time we have been entirely free from the disease. I take much pleasure in stating that the health of the command is excellent; and as the weather is becoming daily cooler, I am almost sure we will have no more new cases of the disease.

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

HENRY LIPPINCOTT,
Assistant Surgeon, U. S. A.

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

Extract from Special Cholera Report, Detachment of the 7th U. S. Cavalry, in Camp near Fort Wallace, Kansas, July, 1867.
Assistant Surgeon H. Lippincott, U. S. A.

Left Fort Hays, Kansas, on the expedition to the Platte river, June 1st, 1867. Hard marches and bad food. Arrived at Fort Wallace, after marching over 700 miles, July 13th, 1867.

Prophylactic treatment: Great attention to personal cleanliness; drinking of water which has not undergone ebullition prohibited; alcoholic liquors forbidden; frequent inspections and disinfecting of sinks; daily inspections of quarters and food; liberal use of cold tea as a drink; burning of all infected articles; use of disinfectants in company quarters; isolation of patients and nurses.

Treatment: In the fatal cases we used almost every remedy recommended in the books, and found them nugatory. The solution of camphor and chloroform seemed to arrest the cramps and vomiting in some instances. A very strong solution of iodine in alcohol, applied to the chest, abdomen, legs, and feet, was also found beneficial in arresting cramps in some cases. In the cases of recovery, we think calomel and blue mass were useful agents. Acting Assistant Surgeon J. T. Coates, who is still with us, is, and has been, most indefatigable in his duties.

From Special Cholera Report of the same for August.

No cases of cholera have arisen since the 17th; and as the health of the command is excellent and sanitary surroundings good, I am almost confident that the disease is entirely arrested in camp.

FORT WALLACE, KANSAS.

POST HOSPITAL, FORT WALLACE, KANSAS,
September 1, 1867.

GENERAL: Enclosed I have the honor to forward a report of sick and wounded at this post for the month ending August 31st, together with a special report of cases of cholera which have come under my notice, none of which have occurred among the garrison proper of the post, which has consisted of Companies "F" and "I," 7th U. S. Cavalry, and "E," 3d U. S. Infantry, each of which had gone through the epidemic of cholera at Fort Riley last year, and Company "D," 37th U. S. Infantry, which had been exposed at Little Rock, Arkansas, during the prevalence of the disease at that post last fall; in all 339 officers and men. Besides the command, there were 120 citizens employed in the quartermaster's department at the post. With the exception of about seventy enlisted men who were quartered in the only barracks at the post, the whole command has occupied tents; of course in the absence of all shade.

During July several companies of the 7th U. S. Cavalry, having closed an arduous campaign, occupied several camps in this vicinity, none nearer than a mile from the post. Among them cholera prevailed and disappeared without infecting the post, intercourse being restricted, but by no means prevented. All sanitary precautions practicable have been enforced throughout the season, attention having been paid to diet, which has been good and well prepared, and drink, as well as police and disinfections. The sale of beer and alcoholic drinks, never promiscuous, was early prohibited. A part of the water used at the post has been obtained from the Smoky Hill river, which is a swift-running stream of small size, with gravel bottom and well-defined banks, and, at this point, is forty-five feet below the level of the bluff on which the post is erected, and three hundred yards distant. The balance of the water has been obtained from a well between the post and river, but is of little better quality than the river water, both having been subjected to purification during times particularly threatening. An extra issue of tea at one time afforded almost the exclusive drink of the command.

The occurrence of disordered bowels, which I noticed in my last monthly report, continued with increased frequency and severity, and the weather continued hot and dry, as the accompanying meteorological statement shows: The mean of the thermometer during the first fifteen days of the month was 83.78°; the mean of the hygrometer was 68.22°; no rain having fallen during this period. The average was deduced from observations made at 7 a. m., and at 2 and 9 p. m. The maximum was reached on the 6th, it being 106° in the shade at 2 p. m. Subsequent to the 15th a favorable change took place, which still continues. Latitude, 39°; longitude, 101°; altitude, 3,318 feet.

On the 8th inst., Companies "B," "E," "G," "H," and "I," of the 5th U. S. Infantry, arrived from New Mexico, and encamped about one mile west of this post on ground not previously occupied, and well calculated for the purpose, with an aggregate of 343 officers and men, Acting Assistant Surgeon Bradford, U. S. A., being on duty with them. The command is said to have been healthy on the road, though much diarrhœa seems to have existed unnoticed after its leaving the Arkansas.

Seven days' march from this post they passed, without halting, a camp of colored troops, among whom cholera was prevailing, and this is supposed to be the only contact, if contact that can be called, with the disease to which the command was subjected. On the 9th cholera was reported, and, visiting the camp, I saw a number of cases, and learned that the first case had occurred on the 8th, which had proved fatal. At this time the command was panic-stricken; considerable excitement had also arisen in my own camp, which required constant attention to allay. Everything required was placed at the disposal of the medical officer, including a quarantine hospital, of which I took charge on the morning of the 10th, and received all the cases then existing, as well as those which subsequently occurred. My records include nothing pertaining to the course of the disease to that time, excepting the deaths of the first five men that appear on this report, who died in the camp hospital under charge of Dr. Bradford. The sixth case upon the report was retained, without my knowledge and contrary to my wishes, with his family near the camp, which was moved on the 10th to a new locality, and frequently moved subsequently. Strict sanitary measures were from this time enforced in the regiment. Of the nine cases reported as having occurred on the 10th, five were brought to the quarantine hospital early on the morning of that day, having been attacked the night previous; the remaining four cases were attacked and brought to the hospital during the day. Of the first five, I have recorded three deaths, two of which occurred on the 11th, and one on the 12th. These were brought to me in a state of collapse; only one of them was attended with any symptoms of improvement, which were as temporary as deceptive; cramps in each were more persistent than either vomiting or purging, which almost ceased in each case, to be followed by involuntary discharges; in two cases, before death, suppression of urine persisted. Of the remaining two, neither was in complete collapse, though both were severely prostrated and presented the familiar symptoms of the disease. During recovery cramps ceased before discharges, the patients recovering with a rapidity only less surprising than satisfactory. Of the four cases which occurred during the 10th, there was one, apparently, not in an alarming state, though the diagnostic discharges which existed were promptly followed by more violent cramps in the extremities and a more complete collapse; death took place on the 12th. One case of the four, similar to this, recovered, the same treatment being adopted in each case. The remaining two were slightly, though characteristically, marked. Subsequent to the 10th, all the cases admitted, with one exception, assumed a comparatively slight form of the disease, though all were characteristic. From the 13th to the 17th, no cases occurred, when private Fralin was brought to the hospital vomiting and purging, and evidently drunk, which state passed into cholera, of which he died on the 20th, having passed through all the stages of the disease. Of his case I saw but little, as I was most of the time confined to my own bed by sickness. His wants were attended mostly by my steward, David B. Long, my only assistant, whose faithful performance of duties gives him much claim to my gratitude.

In connection with the treatment, I need hardly say that many remedies of reputed efficacy have been tried, but I have nothing to say in their favor. Mercurials are the only remedies from which I have learned to expect much, and to them I have resorted, early and late, in the disease. To give a purgative, with a mixture of chloroform and capsicum with brandy and opium, using subsequently calomel, lead and opium, in minute quantities, with injections of brandy, lead, and opium, as well as cold tea in connection with counter-irritants, was the general plan of treatment, in the less severe cases, followed by recovery. One of three fatal cases referred to on the 10th, which seemed to have reacted somewhat, did so after having been treated with violent counter-irritants and heat to the extremities and body. A solution of chloroform and camphor, with the injections above mentioned, was made use of, a full dose of calomel having been first retained.

But one serious case occurred among the officers of the 5th U. S. Infantry, or their families—the case of Mrs. Colonel Bankhead, whom I saw on the morning of the 12th, suffering from a painless and not frequent diarrhœa, which, though I was not so informed, had existed for several days. The course of her disease, to its fatal termination in forty hours, was painfully gradual and surprising. Her husband, under similar circumstances, had applied for treatment the day previous. Other similar cases came under my notice among the officers.

At the time of the arrival of the 5th Infantry at this post, the physique of the men was good; they had performed a long march, but had taken it quite leisurely, and were well supplied with equipage. There was no scurvy among them. The cause of the attack seems to have been an atmospheric one. It is probable that the violence with which the disease commenced was owing somewhat to the dissipation with which the men celebrated their arrival at the post; and that the panic which ensued was productive of cases, is, I think, as little to be doubted.

The good effects attending the establishment of the quarantine were evident, while I do not think that any patient was depressed by removal to the cholera hospital. The belief in the contagiousness of the disease was so universal among the men, that they were anxious to see their fallen comrades isolated. None of the nurses employed in the case of the cholera patients were attacked by the disease. Previous to the outbreak of the disease, I had been largely supplied with disinfectants, as well as all kinds of supplies, and throughout its prevalence I had on hand everything required at the post or in its vicinity.

Assistant Surgeon Lippincott, my patient and guest at the post, convalescent from disease brought on by excessive labors during the prevalence of cholera in his own command, (7th U. S. Cavalry,) kindly furnished assistance; but the little strength that had accrued to him was soon exhausted, and he was subjected to a relapse which prostrated him for two weeks. The 5th Infantry has since been distributed as follows: Two companies went east, one to Fort Hays, and one to Downer's Station, Kansas. The three remaining companies, having been assigned to this post, are now sharing the duties of the garrison.

In consideration of the continuance of the favorable change in the weather, and present sanitary condition of the command, I consider cholera to have passed for the season, and will be surprised if it again makes its appearance.

Acting Assistant Sugreon Bradford accompanied the first detachment of the 5th Infantry going east.

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

T. H. TURNER, *Assistant Surgeon, U. S. A.*

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

LITTLE ROCK, ARKANSAS.

Extract from Monthly Report of Sick and Wounded of Companies "G" and "H," 28th U. S. Infantry, Post Band and Battery "G," 5th U. S. Artillery, Little Rock, Arkansas, July, 1867. Acting Assistant Surgeon W. A. Cantrell, U. S. A.

Hospital Steward Gustave Schmidt, en route from Fayetteville, Arkansas, to Vicksburg, Mississippi, was brought to this hospital at 4 o'clock a m., and died at 9 o'clock on the 21st of July, having all the symptoms of cholera. For several days previous to his attack he was inebriated and exposed to the night air and hot sun, and probably imprudent in his diet. I learn that he had a little diarrhœa at 9 o'clock p. m. of the 20th, and at 11 o'clock was taken with vomiting, purging, and cramps, and died at 9 o'clock next morning. When I saw him he was pulseless, complexion livid, eyes sunken, and cold sweats. Vomiting had ceased, but the involuntary discharges continued.

Extract from an Endorsement by the same, dated September 10, 1867.

A case having all the symptoms of cholera was reported in July, but there being a doubt as to its being genuine cholera, no special report was made.

FORT SMITH, ARKANSAS.

POST HOSPITAL, FORT SMITH, ARKANSAS, *October* 11, 1867.

SIR: I have the honor to submit a special report of the cholera as it occurred among the troops at this post, and of its first appearance among the citizens of Fort Smith. The first well-authenticated case occurred on the 28th of August, in the person of Mrs. Baldwin, a widow lady, who was taken sick at 10 o'clock p. m., and died in ten hours, at 8 o'clock a. m. of the 29th, having manifested all the symptoms characteristic of Asiatic cholera. The next was the case of George Heckler, which occurred on the 29th, and was seen by a physician two hours after first characteristic discharge. Result, recovery. The third case was that of Mrs. Esterbrooke, who was taken sick on the afternoon of September 3d, and died after fifteen hours' sickness, having all the symptoms of cholera. So it continued up to the 25th of September, proving fatal in every case in which medical aid was not promptly rendered. During the visitation of cholera, malarial pernicious fever largely prevailed, with congestion of the stomach and bowels, attended almost invariably with effusion, causing copious watery evacuations, both vomited and purged. But these cases were unattended with cramps and other features characteristic of cholera. Among the troops at this post there were but two cases pronounced cholera; but not less than forty per cent. of the men were affected with diarrhœa or cholerine. The first case of cholera was that of Private Hiram Clarke, Company "F," 19th U. S. Infantry. He was taken with vomiting on the evening of the 16th of September while attending the funeral of a citizen who died of cholera. He returned to his quarters without having given information of his sickness. Vomiting and purging continued through the night, and at six o'clock in the morning he was in a state of collapse, in which condition he remained until death, which took place at 9 p. m. same day.

The second case was that of Private Blanc, Company "F," 19th U. S. Infantry. He was taken with diarrhœa some days previously to his admission, September 21st. The diarrhœa had been checked, but owing to imprudence of the patient in eating, a relapse took place, which rapidly passed into collapse, death taking place September 23d. In the cases recorded, the usual remedies were strenuously applied and careful nursing persisted in to the last. The greatest precautions were taken to prevent the spread of cholera among the troops. The men were ordered to report the first premonitory symptoms that might occur among them. The quarters were disinfected, the drinking water purified, and all food tending to produce diarrhœa was sedulously avoided. The bed clothing used by cholera patients was destroyed.

I am, very respectfully, your obedient servant,

CHARLES B. BYRNE,
Acting Assistant Surgeon, U. S. A.

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

FORT GIBSON, CHEROKEE NATION.

FORT GIBSON, C. N., INDIAN TERRITORY, *December* 1, 1867.

GENERAL: In compliance with a letter of instructions from the Medical Director's office of the Department of Missouri, dated Headquarters Department of Missouri, Medical Director's office, Fort Leavenworth, Kansas, July 18th, 1867, requiring a report of cholera at this post, I have the honor to submit the following:

It will be seen, by reference to my special report of cholera at this post, dated Fort Gibson, C. N., November 18th, 1866, on page 58 of Circular No. 5, War Department, Surgeon General's Office, ("Report on Epidemic Cholera,") that cholera prevailed, to a limited extent, at this post during the fall of 1866, imported directly in the persons of two soldiers from Fort Smith,

Arkansas, sixty-five miles distant in a southeasterly direction, but did not assume an epidemic form, in the most liberal acceptation of the term. Cholera had prevailed at the latter place during the month of September, 1866, and a portion of the month of October, to an alarming extent, considering the population, and yet did not make its appearance at this post, but sixty-five miles distant, as above stated, save in the instances mentioned, though communication by land and by the Arkansas river was constant and uninterrupted. This singular fact cannot be altogether explained by the lateness of the season, for frost had not yet set in, nor had the heat of summer been cooled to any appreciable extent by the advancing autumn. I can only solve the problem by supposing that the choleraic virus in its westward march had not yet reached this limit. It may have reached it, and been present all the while, but the atmospheric condition and telluric emanations may not have been such as to favor its evolution and develop its potency. Whatever may be our speculations on the subject, it did not prevail to any considerable extent, though it would be difficult to imagine more favorable circumstances for its prevalence, if we were to be visited at all by the disease, and the experience of the following summer (1867) showed that we were.

During the last week of June, 1867, several reports were brought to me by the natives of persons being seized suddenly with cramping, purging, and vomiting, followed by death in from twenty-four to forty-eight hours. It was not until July 1st that I had an opportunity of seeing one of these reported cases, in the person of a Cherokee Indian, which I unhesitatingly pronounced cholera. He was attacked at 10 a. m., and died at 4 p. m. of the same day. The rapid spread and great mortality of the disease among the Indians and negroes in the immediate vicinity of the post, many of whom I saw, convinced me of the correctness of my diagnosis in this case. The disease was confined almost exclusively to the native Indian and negro population, and civilians in the government employ, but chiefly to the former.

Deeming it superfluous, I will not enter into a detailed description of the symptoms in those cases which came under my care or observation, especially as but two enlisted men were attacked; but will merely state that the disease very speedily, after its first appearance, assumed an unquestionably epidemic form of the more violent type, the average duration of life in the fatal cases not exceeding forty-eight hours from the onset of undoubted symptoms of the disease. In many it was even less than twelve hours; and in two cases the patients died within six hours. It was impossible at the time, and has been since, to obtain accurate accounts of the number of cases of the disease, or the number of deaths, as Dr. D. D. Hitchcock, the only civil practitioner at the post, succumbed to the epidemic on the 17th day of July; and as many Indians and negroes, especially of the former, had no medical attendance, or treated each other with Indian remedies, which, so far as I could learn, consisted chiefly of oak bark and other indigenous vegetable astringents.

The post quartermaster was directed to furnish coffins to all who might apply for them, and he informs me that during the month of July, the period of the greatest prevalence of the epidemic, he supplied seventy-five coffins. This number, though it may be taken approximately, would not embrace all, though probably the majority, as it is the custom of some of the Indians in this vicinity to bury their dead in blankets, or at best in rude boxes of their own construction. An estimate, made from all reliable sources of information within my reach, of the number of deaths occurring from cholera at and in the immediate vicinity of this post, would probably reach seventy-five. Taking in the region of country that would be swept by a radius of fifteen miles from Fort Gibson as a centre, the number of deaths would probably be increased by fifty, making in all about one hundred and twenty-five deaths. The number of persons attacked by the disease I have no reliable means of estimating, and will not therefore venture an opinion. By far the larger proportion of those attacked were adults. In my limited experience in the treatment of children, I met with far greater success than in the treatment of adults. The attack is not apt to be so severe, for the reason that the former are not exposed to so many depressing influences, such as labor and exposure in the sun, and were not so completely under the dominion of fear.

During the month of July, Fort Gibson and vicinity were visited by an unusual number of rains of unusual severity. It is a noticeable fact that these storms were generally unattended by thunder and lightning. Each fall of rain was followed by a warm sun that seemed to light afresh the smoldering fires of the epidemic and give it a new impetus in its work of destruction.

The heat of July and of the preceding month was not unusual in point of intensity; in fact, it was far less intense than the heat of the corresponding months of the preceding year.

The extensive bottom lands in the immediate vicinity of the fort, which are subject to annual overflows in the month of June, were not so completely submerged in the month of June, 1867, as in June, 1866. It is a fact, perhaps not unworthy of mention in this connection, that the lands about Fort Gibson, as one of the fruits of the war, constitute one grand Golgotha. Thousands of bodies of men and beasts, chiefly the former, were deposited therein during the war, few, if any, of whom were buried more than three feet below the surface, and probably the majority even less than that; and during the prevalence of small-pox in the fall of 1863, sepulture was so imperfectly performed as scarcely to merit the name of burial. This fact, conjoined with that of the heavy falls of rain in the summer of 1867, and the unusual dryness of the summer of 1866, may serve, in a measure, to clear up the mystery of the unusual and unexpected severity of the epidemic in 1867. The telluric emanations and exhalations engendered by an unusually wet season, combined with favoring atmospheric conditions, may account for the dormancy of the choleraic virus in 1866, and for its activity in 1867.

The nidus of the disease was in a negro settlement less than one-fourth of a mile from the garrison. The settlement consisted of huts of an average dimension of ten by fifteen feet, each hut housing, on an average, six persons, with no sinks or outhouses, with a ventilation which amounted to stagnation, the huts in many cases adjoining, so as to constitute rows. Here the disease engendered and radiated until the last of July, when, on my recommendation, and by order of the commanding officer of the post, they were burned and their filthy occupants moved four miles from the garrison. From this date the disease began to abate, and ceased to prevail as an epidemic.

After August 1st, wherever cases occurred, they could be traced to some efficient cause, as errors in diet, prolonged exposure to the sun, or great physical exhaustion.

Among the negroes moved from the vicinity of the garrison, I did not learn of a single case of cholera after their removal. Their hygienic conditions were greatly improved, their camp on the prairie affording them an abundance of fresh air and pure

water. Having no means of subsistence, they were rationed from the government stores. The consequent regularity in their diet doubtless contributed largely to their subsequent exemption from the disease.

The following is a brief history of the only cases of cholera in the garrison, two in number: Private George Garriot, Company "E," 10th U. S. Cavalry, reported at sick call at 6.30 a. m. on the morning of July 18th, complaining of diarrhœa; was admitted to hospital at 9 a. m. of the same morning well advanced in the second stage of cholera. Active treatment was at once adopted. He remained in about the condition he was when admitted until the evening of July 20th. I find in my note-book the following entry of that date: "Visited Garriot at 5 p. m. and found him much better, with a fair prospect of recovery." He continued to improve on the 21st and 22d, and on the 23d was up and going about the ward, against my advice, all the symptoms of cholera having disappeared. On the evening of the 23d, on my visit to the hospital, he was again prostrated; and, upon examination, I found him suffering from pneumonia, which speedily assumed the typhoid type, from which he died, July 27th. This patient was very stubborn and uncontrollable, and I attribute his attack of pneumonia to exposure and exercise in the exhausted condition in which the cholera had left him. His attack of cholera was traceable to a hearty dinner he had eaten on the 17th, at one of the negro huts in the town, consisting of green corn, beets, beans, greens, &c.

The second case was Sergeant Caffrey, Company "D," 6th U. S. Infantry. It occurred during my temporary absence from the post on a tour of inspection, and was treated by Acting Assistant Surgeon J. H. Congdon, U. S. A., of which he left the following report: "Sergeant Edward Caffrey, Company "D," 6th U. S. Infantry, was attacked with diarrhœa on the morning of August 18th, which was soon followed by purging; remained on duty till 12 o'clock, when he went to his tent cramping severely; case reported at 12.30. Found him vomiting, purging, and cramping severely; no pulse perceptible at the wrist. Gave Squibb's mixture at once, but it was not retained till the second or third dose; applied mustard poultices to limbs and abdomen. The previous symptoms soon subsided, but he soon passed into a state of collapse, from which it was impossible to arouse him; every means at hand was tried, but without avail; he died August 19th, at 9 a. m., after twenty-one hours' sickness. He reports having eaten apples and watermelons the day previous; the melons were ripe, but the apples were green; they were the first he had eaten this season."

Of the government employés attacked, eight were treated by me; of these three died. * * * * The question very naturally arises here, why did the government employés suffer so much more severely from the disease than did the troops? For several reasons. The former were, for the most part, exposed to a hot sun during the whole day in the performance of their duties as mechanics or laborers; the latter did no duty, save the ordinary guard duty every third day, and when on guard were allowed to seek the shade. There could necessarily be but imperfect supervision of the diet of the former, while that of the latter was kept constantly under the most rigid scrutiny. The former were not so healthfully quartered as the latter. After work hours the former had greater license to roam about at night than the latter, who were obliged to answer roll-call at any hour of the day or night; and, generally, the hygienic conditions of the former were inferior to those of the latter. And this leads me to a description of the precautionary measures adopted and enforced to keep the disease out of the garrison.

The troops were encamped in wall tents, on a gentle slope, with a fair exposure to the wind, at an elevation of about thirty-five feet above the settlement in the vicinity of the garrison previously noticed as the focus of the disease. Their camp was kept scrupulously neat; the skirts of the tents were frequently raised to procure perfect ventilation; they were subjected to frequent rigid inspections. A very peremptory order was issued by the commanding officer, Brevet Major M. Bryant, Captain, 6th U. S. Infantry, enjoining and requiring the enforcement of every regulation that would serve to improve the hygienic condition of the troops. They were enjoined to abstain from the use of fruit; to remain in the shade when their military duties would permit; to avoid the night air, and to avoid exposure, fatigue, or exhaustion from any cause; to report at the hospital for treatment on the access of the slightest indisposition; disinfectants were used liberally; the bringing of fruit of any kind by anybody to the garrison or its vicinity was strictly prohibited; the cucumber vines in the post garden were destroyed; and, in short, nothing was left undone which, being done, would favor the health of the troops.

In reference to the treatment of cholera, I shall say but little, as I can say nothing new. For the premonitory diarrhœa, unless the tongue be heavily coated and other symptoms be present indicating torpidity of the liver, I know no better medicine or compound than Squibb's mixture. If the liver be torpid, calomel is the sine qua non, administered in large or small doses, according to the indications; its too violent cathartic effect, when given in large doses, being guarded against by its combination in suitable proportions with opium and ipecac. Later in the disease I thought excellent results followed the use, every hour or two, of the following prescription: calomel, 2 grains; opium and ipecac, of each, ½ grain. Injections of brandy and tea, brandy and mucilage, I abandoned after fully testing their virtues in two well-marked cases, being disappointed in my expectations. Mustard I found to be useful only when used unsparingly. In my opinion, before full collapse shall have set in, the patient should be swathed in mustard. When collapse shall have supervened, mustard, in the form of cataplasms, or used dry, with friction, hot bricks, and bottles filled with hot water, and, in short, every other means used with the view to promote the return of natural warmth, I found almost wholly abortive. In one case seventy-two dry cups were applied successively to different parts of the trunk while the patient was in collapse, and though he expressed himself as relieved measurably, I could find no external indication of relief.

No case, so far as I saw or could learn, which entered the stage and state of full collapse recovered. * * * *

Diarrhœa was almost universal, not only among the native Indian and negro population and government employés, but among the troops in the garrison, proving the presence of a strong epidemic tendency. My experience with the disease has led me to the following conclusions: If a person of a vigorous constitution be attacked and receive immediate treatment, the disease can, in a majority of cases, be easily controlled. If a person of a vigorous constitution suffered the disease to run on for twenty-four or forty-eight hours, which usually brought him into the advanced second stage, without treatment, medicines, at that late period, were of little or no avail. If the disease attacked a person of weak constitution, whether the weakness was the result of natural causes or produced by dissipation or excesses of any kind, medical interference was of little avail, however speedy and prompt.

With proper attention to diet, the avoidance of all depressing influences, as prolonged exposure to the direct rays of the

sun, exposure to the night air, extreme physical exhaustion, excesses of all kinds, the depressing passions, chief among which is fear—in short, the strict observance of, and adherence to, all approved hygienic regulations—I see no reason why cholera should excite such unwonted fear and dread as it usually does. With reference to the origin of the disease at this post, I think there can be but one opinion—that it sprang up here de novo; that it took up its line of march early in the summer of 1867 where it had left off in the fall of 1866. It was impossible to trace it to any source of contagion. Cholera was not prevalent at the time at any point with which we were in communication, so far as I could learn. The first case was a native negro woman who had not been away from the post. The period of prevalence of cholera here as an epidemic was from the 28th day of June to the 1st day of August, 1867. After the latter date but few cases occurred, and those were traceable directly to some exciting cause in the behavior of the person attacked.

Cholera prevailed to a considerable extent among the following tribes in this Territory: Cherokees, Creeks, Caddos, Comanches, Seminoles, Wichitas, Delawares, and Shawnees, but I could not obtain data to justify more than a simple mention of the fact.

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

V. B. HUBBARD,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General M. MILLS,
Medical Director Department of Missouri.

FORT ARBUCKLE, CHEROKEE NATION, INDIAN TERRITORY.

Extract from Monthly Report of Sick and Wounded, Fort Arbuckle, C. N., July, 1867. Acting Assistant Surgeon J. Reagles, jr.

I am of the opinion that cholera was brought to this post by a colored soldier of Co. "D," 10th U. S. Cavalry, who died at or near Cochran's station, forty miles east of here. From what I have been able to learn in relation to the case, he must have died of cholera, and was carried to this place for interment; this was on the 2d of the month. On the evening of the 3d, I was called to visit a government employé who lived at the corral, and found him suffering from a severe attack of sporadic cholera brought on by eating green peaches. The other cases reported were of a decided epidemic character, resulting in death in from six to twenty-four hours. I found the calomel and opium treatment the most satisfactory. Almost all cases of dysentery assumed the epidemic character, and resembled cholera to a very great degree—vomiting, cramping, etc.—with the exception of the rice-water discharges; these discharges are of a dark brown or greenish color, the patients having from thirty to sixty in twenty-four hours, when they sink into a comatose state or collapse, and death closes the scence.

I have found a pill composed of 2 grains each of calomel and opium, and 1 grain each of capsicum and camphor, to be of great service in checking the discharges.

DETACHMENT OF THE 6TH INFANTRY EN ROUTE TO FORT ARBUCKLE, CHEROKEE NATION.

CITADEL, CHARLESTON, S. C., *September*, 1867.

GENERAL: I have the honor to submit the following report relative to the epidemic of cholera which visited the battalion of the 6th U. S. Infantry, near Big Sandy creek, C. N., I. T., from the 14th to the 20th of July, 1867, and which resulted in the death of sixteen soldiers, four teamsters, one laundress, and one servant:

Companies "E" and "F," 6th U. S. Infantry, left—the first Columbia, the latter Charleston, S. C.—on the 11th of June, 1867, for the Indian Territory, and were ordered at Memphis, Tenn., to proceed, via Fort Smith, Ark., to Fort Arbuckle, Cherokee Nation.

From the 1st to the 14th of July, on its march through the Indian Territory, the command enjoyed perfect health; the soldiers were cheerful, not dreading or expecting any sickness. No cholera was known to have appeared as yet in any of the places they passed on the road. The marches were regulated by the supply of water, but never exceeded twenty-four miles, the average being fourteen miles a day. The troops were fed on the ordinary full ration, with one day's fresh beef in the first two weeks. On the 8th a messenger from Fort Arbuckle passed our camp, reporting that cholera had broken out almost simultaneously at Forts Gibson and Arbuckle. We prevented his intercourse with the troops for obvious reasons. On the 11th a heavy rain fell, and compelled us to remain in camp on the 12th, on account of the swelling of the streams. On the 13th we started under a drizzling rain, which, after a short time, increased in force, and continued for several days. At daybreak on the 14th I was called to attend Private Kallhoft, Company "F," who had been found lying on his back, drenched with rain, in an apparently collapsed state. I was informed that he had been vomiting and purging repeatedly, (probably all night,) but was discovered only a short time before my arrival. His comrades gave as the probable cause of his illness, the imprudence with which he ate, on the previous day, as soon as we arrived in camp, his whole day's ration (hard bread and bacon) raw. The history of his case, together with his cold extremities, leaden hue of skin, shrunken features, sunken eyes, with dark eyeholes—in short, his facies hippocratica—taught me at once that cholera had appeared in our camp. A tent was immediately ordered to be put up at a distance from the camp, (on the leeward side,) to which the patient was removed. Notwithstanding every effort used to bring on reaction, he died at 10 a. m.

Not many hours passed before the disease broke out among the troops in general; many were attacked suddenly by severe pains in the abdomen, with watery discharges from the bowels. The camp was at once moved to the crest of the hill, the shelter tents carefully ditched, and large fires built in the company streets. The men were cautioned against drinking water; but it was not long before the disease claimed its second victim. Private Kennedy, convalescing from a severe bilious fever, was seized with cramps and vomiting. He soon fell into collapse and died on the next day.

On the 15th the sickness became general among soldiers and teamsters. The third death was a hospital attendant, who, with particular attention, had nursed the first patient; without premonitory diarrhœa, he was taken with slight vomiting on the evening of the 15th, and died, collapsed, after a few hours. The sudden change in his features alone indicated clearly that he was to be a victim of the dread disease. On the same day eleven patients died, (eight soldiers, two teamsters, and one laundress,) with the ordinary symptoms of epidemic cholera, after a sickness of from twenty-four to forty-eight hours, all in a collapsed state.

Being short of medicines, and suffering myself with the premonitory diarrhœa, I caused a messenger to be sent to Fort Arbuckle (fifteen miles distant) for medicines and medical assistance. Neither could be obtained, nor could we get any hospital stores. Our only food was hard bread, bacon, and beans, which, in any mode of preparation, acted like poison on the whole command. Starvation or death were the only prospects. Eighty men were more or less afflicted with cholera, leaving barely a sufficient number for the attendance of the sick and the burial of the dead; three bodies had once to await their burial for hours. With a few exceptions of German soldiers, the men obeyed most unwillingly their detail for the nursing of the sick, and escaped to their camp as soon as unobserved. Under these trying circumstances, I was ably and devotedly assisted by Second Lieutenant John Carland, 6th U. S. Infantry, who, seeing my strength failing rapidly, offered to take charge of our temporary hospital, erecting new shelters, as soon as needed, preventing the escape of the nurses, and watching the observance of my directions. This enabled me to devote my time to purely medical assistance and preparation of medicines, no steward accompanying the command. Of great relief, and followed by rapid and good results, was the discovery of a bag of Indian meal, forming part of the teamsters' rations. A mush was prepared which saved many of our starving patients.

On the evening of the 17th I was taken with cramps and vomiting, and sank rapidly to a pulseless state. Four men died on that day; others improved. On the 18th our tents were moved half a mile, which was immediately followed by an improvement. On the afternoon of that day Hospital Steward J. H. Wilson, U. S. Army, reported from Fort Arbuckle, bringing also some medicines. Very few new cases occurred on the 18th; the disease seemed to have expended itself; many men were now recovering, but all suffering from the want of nourishment. My notes from the 17th to the time of my recovery are necessarily incomplete. On the 18th two men died; on the 19th one; on the 20th one. On the 19th, towards night, a panic seized the command; all the teamsters but one left, mounted on mules; sixteen soldiers deserted the camp, where certain death seemed to await them. At last, on the 20th, orders were given to move five miles, in the vicinity of some springs near the Washita river. A wagon train coming from Fort Arbuckle on its way to Gibson was seized to move the baggage to the new camp; there the wagons were unloaded and returned to take the sick to that place. Only one man died while undergoing this change. This change of camp seemed to act like a charm; not a single new case occurred, the patients rapidly recovered, and after a quarantine of ten days we reached Fort Arbuckle, where the cholera had also disappeared, moving further west, making great ravages among the nearest tribes.

As to the causes of this epidemic, they will remain in darkness as long as the exact nature of the disease is unknown, and by conjectures alone can we account for them. It might have originated in Memphis, where, as we learned afterwards, a few cases of cholera had made their appearance on the day of the departure of the troops. We have reason to doubt it, as we had in no way suffered up to the time of the outbreak of this epidemic. It is much more probable that it was the result of direct infection. Some colored cavalry had traveled over the same road, foolishly carrying with them the body of a comrade who had died, as is supposed, from cholera. They came from Fort Gibson, where the disease was epidemic among negroes and Indians. We were not then aware of the fact, and could not ascertain the location of their camps, where, in all probability, we caught the infection.

The atmospheric and telluric conditions were the following: winds from the southwest, bringing constant rain showers; sky heavily clouded; the soil of the camp was composed of a thick layer of humus on clay, with limestone bottom at the depth of four or five feet. The predisposing and exciting causes were the long march in the rain, resulting in exhaustion of the troops; the impossibility of changing wet clothes; and food insufficiently cooked, on account of the streaming rain.

The type of the disease was the same as in other localities, yielding to treatment as long as there was only an abdominal disturbance; almost invariably ending in death when assuming the form of cerebral disease. I refrain from giving a history of the individual cases, as they were of no peculiar nature. Four cases of death were the result of purely cerebral affection, almost without any symptom of abdominal disease. Several men having improved under treatment, tormented by thirst, took advantage of the absence of the nurses, drank large quantities of water, and died shortly afterwards. The treatment was necessarily more or less primitive, the supply of medicines being small and their variety limited. At the commencement of the epidemic, where an indigested meal was supposed to act as a source of irritation, an emetic was tried to remove the same, and to promote the arrested flow of bile. This practice, although in some cases successful, was abandoned when the number of patients prevented close watching. A large dose of calomel when constipation had preceded, small doses when it had not, acted very beneficially in many cases. Absolute rest and horizontal position on the back were particularly insisted upon. Mustard poultices were used as long as the supply lasted, under proper indications. Morphia, opium, camphor, quinine, and muriate of iron, were administered with more or less success. A mixture of tincture of opium, extract of ginger, and spirits of camphor, was issued to reliable men in the companies, to be given instantly to any man taken with diarrhœa. It had a very beneficial effect. In the second stage, rubefacients over the stomach; heated stones, wrapped in blankets, to the abdomen and extremities, relieved in many cases the painful spasms of the muscles. Internally, small doses of calomel, with antacids, camphor, ginger, capsicum, and quinine, were given according to indications; as a beverage, small quantities of tea, breadwater, and gumwater. In the third stage, little could be done, as medicines were no more assimilated. The distressing vomiting was sometimes allayed by small doses of

calomel and morphia. No experiments could be made with castor oil, astringents, turpentine, chloroform, hypodermic injections, and other modes of treatment which have acquired a reputation in the treatment of cholera; the reasons are already named. The supply of medicines was a large one for ordinary circumstances, but entirely inadequate for the overwhelming numbers to be treated. Our original orders carried us only to Fort Gibson, a railroad and steamboat trip of only nine days through a civilized country. When at that place I received orders to accompany the troops to Fort Arbuckle. I supplied myself as well as I could.

It may well be imagined with what difficulties the treatment had to contend, when we consider the want of proper food and drink, the inclemency of the weather, the insufficiency of shelter, and the depressing influence of the sudden and fatal outbreak in the midst of the prairies. If the scientific notes on this epidemic are incomplete, I beg leave to plead the unexpected appearance of the disease, involving, besides professional, so much manual labor, and my own sickness.

Finally, I take pleasure in commending Hospital Stewart Wilson for his untiring and successful efforts and devoted attendance, by which he contributed essentially to the recovery of many patients.

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

ALF. C. GIRARD,
Assistant Surgeon, U. S. A.

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

NEW YORK HARBOR.

FORT COLUMBUS, N. Y. H., *August* 21, 1867.

GENERAL: I have the honor to report that Recruit Lewis Vasser, Company "L," died to-day at 2.15 p. m. of cholera. He was admitted to hospital this morning at 7.20 in incipient collapse. He was given 20 grains of calomel, which was repeated at 8 and again at 9. He had three profuse watery evacuations after his admission to hospital, which, however, were not the pure characteristic rice-water discharges. He had no further passage from the bowels till one about 1 p. m., which was involuntary. No vomiting after the last dose of calomel. His cramps were not severe, and when I left him to attend the session of the medical board at 10 a. m., I thought that his case was not hopeless, though the collapse was quite profound, pulse extinct, and voice almost inaudible. He came with a detachment of 60 recruits, direct from St. Louis, which arrived at this post at 5 p. m. yesterday. He had lived for some time in Alton, Illinois, and for a short time before his enlistment in St. Louis. He had diarrhœa for two days preceding his arrival here. He left St. Louis on Sunday at 4 p. m. One man of the same detachment was taken sick on the cars en route, with cramps, vomiting, and diarrhœa, at 7 a. m. on Monday, and died at 12 m. the same day.

I have had the whole detachment carefully inspected, and find that only two of the whole number have diarrhœa; they were immediately taken into hospital and put under treatment, and the whole number isolated from the rest of the command. Recommendations have been made, through the commanding officer of the post, to the superintendent of the general recruiting service, to stop the importation for the present of recruits from that section. Should any further cases occur, the required reports will be promptly made.

Very respectfully, your obedient servant,

JOSEPH B. BROWN,
Surgeon, and Brevet Brigadier General, U. S. A.

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

DEPOT HOSPITAL, FORT COLUMBUS, N. Y. H., *September* 30, 1867.

GENERAL: I have the honor to transmit herewith a special report of cholera patients for the month of September:

I have been able to learn some additional particulars relative to the introduction of cholera here this season, as well as some facts confirmatory of the views expressed by me in previous reports in regard to its importation in all cases by recruits collected in our large cities. The first case occurred this summer on the 21st of August, as previously reported, in the person of Recruit Louis Vasser, who arrived at this post the evening previous with a detachment of recruits direct from St. Louis, Mo.

One man had died en route, after a short illness, with symptoms similar to cholera. I have since learned that Recruit Vasser, with another recruit, was in personal attendance upon the sick man. The other recruit went to Bedloe's island, and is regarded by Lieutenant Colonel Randolph, post Surgeon at Fort Wood, as the individual who introduced the disease at that post, he having been attacked by cholera shortly after his arrival there. No additional cases occurred at this post until the 31st of August, an interval of ten days, when, as previously reported, ten new cases were admitted to hospital, four of these cases occurring among men of a fresh detachment of recruits received here on the 28th of August, three days previous. One of these men came from Philadelphia, two from Jersey city, and one from New York city. Four others of the ten were rejected recruits who had been on this island respectively, one month, twelve days, two weeks and three weeks, but in daily and nightly contact with all newly arriving recruits in the castle. The remaining two cases of these ten were prisoners under confinement in the castle.

The facts relative to the cases occurring during the present month appear in the accompanying special report. It will be seen that six only of these cases have occurred in persons who were not recent arrivals at this depot. The treatment followed has been the same as that reported during the epidemic of last year, and our additional experience seems to confirm the superior

efficacy of the large doses of uncombined calomel over the reported results of the other modes of treatment recognized or recommended. There have been quite as many instances of recovery from collapse this year in proportion to the number of cases as the last, though the percentage of complete recovery is not so great as that reported last summer. I attribute the increased mortality this year, with perfect justice, I think, to the character of the patients attacked, a large proportion of them being recruits previously rejected for physical disability, and recently enlisted veteran reserve corps men, neither of which classes have sufficient vital force to recuperate from the terrible effects of such a disease, even after it has been completely checked. There have been two cases of death, apparently from uræmia, after complete reaction from the collapse of cholera; and one, as proved by an autopsy, from sudden invasion, after commencing convalescence from cholera, of capillary bronchitis. I can give no satisfactory explanation of the action of the large doses of calomel in relieving cholera. Perhaps as plausible a theory as any, is one which I have for some time entertained, that the calomel, from the absence of acid in the stomach in cholera, passes nearly unchanged into the intestinal canal and acts locally and mechanically as a remedial agent upon its mucus surfaces, denuded as they are known to be of epithelium. It is a well-known fact that dry calomel, applied to a chafed or abraded surface externally, will stop the exudation of serum and promote cicatrization more rapidly than any other known dressing. That the calomel passes through the stomach and intestines chemically unchanged seems to be also proven from the entire absence, in nearly all of these cases, of the constitutional effects, salivation, etc., known in ordinary cases to follow the use of mercurials. In all of the cases, both last year and this, salivation has only occurred in three or four instances, and in those in so slight a degree as to occasion no inconvenience and scarcely to require attention. A certain and invariable result of the exhibition of large doses of calomel in cholera is its immediate and powerful sedation. Vomiting is almost certainly stopped by one or two doses, and the patient remains in a state of immunity from suffering, except from thirst, as complete as could be effected by any safe hypodermic infection of morphia. My treatment of cholera and the preceding diarrhœa may be summed up briefly as follows:

For the diarrhœa, drachm doses, frequently repeated, of paregoric and aromatic spirits of ammonia, mixed in equal volumes, with rest in a horizontal position. Squibb's mixture we have found develops dysentery, though, for the moral effect in a frightened subject, nothing can be better than a single dose of Squibb's mixture, which the panic-stricken patient knows is taking hold of his complaint, for he can feel it. The paregoric and aromatic spirits of ammonia will suffice for nearly all cases of diarrhœa; but should the case progress to, or be admitted with, rice-water evacuations, vomiting, etc., the characteristic symptoms of cholera, thirty grains of calomel, dry, are placed upon the patient's tongue, which is always sufficiently moist to enable him to swallow it without difficulty. If one dose does not stop the vomiting, it is to be repeated within a few minutes. The next dose is exhibited in thirty or forty minutes, and within the succeeding two or three hours one or two similar doses should be given. No other remedies are used, except friction to the cramped limbs, or firm grasping by the nurse's hands of the contracted muscles. Mustard paste, as soon as the struggles of the patient will allow it to remain in place, is also locally applied. Under the sedative powers of the calomel the patient soon becomes quiet, complaining of nothing but thirst. Small pieces of ice relieve this thirst as well as pints of water, and I have also invariably found that free draughts of water renew the whole train of symptoms; in fact, occasion a complete relapse of vomiting and purging, even in a convalescent. After the patient is quiet, all remedies are suspended; he is occasionally supplied with a morsel of ice, cheering words are addressed to him, and sooner or later, in more than two-thirds of the cases treated here, reaction commences and progresses, if the patient were young and vigorous before the attack, to convalescence and recovery. The most intractable sequelæ we have had to contend with have been the effects of uræmic poisoning and dysentery. Autopsies have been made here, by Assistant Surgeon W. C. Minor, of several fatal cases of dysentery following recovery from cholera, the invariable lesion appearing to be active inflammation and swelling of the solitary and agminated glands of the ileum, with great injection of the points of the solitary glands. The autopsies were made soon after death.

Very respectfully, your obedient servant,

JOSEPH B. BROWN,
Surgeon, and Brevet Brig. Gen'l, U. S. A.

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

Proceedings of a board convened at Governor's island, New York harbor, by virtue of the following order:

SPECIAL ORDERS
No. 175.

HEADQUARTERS GENERAL RECRUITING SERVICE, U. S. A.,
New York City, September 5, 1867.

[EXTRACT.]

* * * * * * * * * * * * * * * * *

II. A board to consist of the following named officers will convene at Governor's island, New York harbor, this day at 3 p. m., viz: Brevet Brigadier General H. D. Wallen, U. S. A., commanding depot; Brevet Brigadier General Jos. B. Brown, Surgeon, U. S. A.; Brevet Lieutenant Colonel Edw. P. Vollum, Surgeon, U. S. A.; Brevet Lieutenant Colonel John F. Randolph, Surgeon, U. S. A.; Brevet Captain W. C. Minor, Assistant Surgeon, U. S. A.

The board will, after considering and informing themselves concerning the recent cases of cholera on Governor's island, and the present condition of the public health in New York, Brooklyn, and vicinity, also at the depot, report such regulations with regard to quarantine and other measures as they may consider necessary to prevent an increase of cholera at the depot, or its spread from thence elsewhere, or its importation to the island. They will also report whether, in their judgment, it is safe and

proper to renew recruiting in New York city and vicinity. The board will meet twice each week, or oftener at their discretion, until all danger of cholera has passed, and consider the state of health at the depots and in the vicinity, and make such recommendations from time to time as they may deem proper and necessary for the health of the general and sub-depots and recruiting stations in the city. The junior officer will act as recorder. The records of each meeting will be sent to this office.

By order of Brevet Major General BUTTERFIELD:

R. G. LAY,
Brevet Lieutenant Colonel, and A. A. Adjutant General.

FORT COLUMBUS, NEW YORK HARBOR,
3 *o'clock, p. m., September* 5, 1867.

First day: The board met pursuant to the above order. Present: Brevet Brigadier General H. D. Wallen, U. S. A.; Brevet Captain W. C. Minor, Assistant Surgeon, U. S. A.

In consequence of the absence of three of the members of the board detailed in the above order, the board adjourned to meet again to-morrow at 3 o'clock p. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR,
3 *o'clock p. m., September* 6, 1867.

Second day: The board met pursuant to the above order and to adjournment of yesterday. Present: Brevet Brigadier General H. D. Wallen, U. S. A., commanding depot; Brevet Brigadier General Jos. B. Brown, Surgeon, U. S. A.; Brevet Lieutenant Colonel E. P. Vollum, Surgeon, U. S. A.; Brevet Lieutenant Colonel John F. Randolph, Surgeon, U. S. A.; Brevet Captain W. C. Minor, Assistant Surgeon, U. S. A.

After a careful examination and inspection of the quarters occupied by the men at Castle Williams, South Battery, and of the hospital, kitchens, privies, sinks, drains, wells, and cisterns, and after informing themselves concerning the recent cases of cholera at this depot, the board are of opinion that at present a quarantine of Governor's island is not necessary. The board are unanimously of the opinion that it is not safe or proper to resume recruiting in New York and vicinity; furthermore, that recruiting should be suspended for the present in the surrounding States, and that no more recruits be sent to or from Governor's island for some time, and that no recruits should be sent from Bedloe's island, New York harbor, who have not been there at least fifteen days from the date of those last received at that island.

The board then adjourned to meet again at 11 o'clock a. m. Tuesday next, 10th instant.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *September* 10, 1867.

Third day: The board met pursuant to adjournment. Present: Brevet Brigadier General H. D. Wallen, U. S. A.; Brevet Brigadier General J. B. Brown, Surgeon, U. S. A.; Brevet Lieutenant Colonel E. P. Vollum, Surgeon, U. S. A.; Brevet Lieutenant Colonel J. F. Randolph, Surgeon, U. S. A.; Brevet Captain W. C. Minor, Assistant Surgeon, U. S. A.

The communication presented from the New York Board of Health of August 31, 1867, was regarded as confirming the previous opinion of this board, since the city is therein reported as sufficiently infected, in the opinion of the board, to forbid the renewal of recruiting. The board are still of opinion that recruiting at all stations from which recruits have been sent to New York harbor should be suspended until all danger of cholera is past. The board recommend that all bedding and clothing soiled by patients, or that may in any way be infected by them, be destroyed by fire. The board recommended that Special Orders No. 177, of September 9th, from Headquarters General Recruiting Station, be extended to Bedloe's and David's islands.

The board then adjourned till Friday at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *September* 13, 1867.

Fourth day: The board met pursuant to adjournment. Present: All the members.

No cases of cholera have occurred at Bedloe's or Governor's island since the last meeting of the board.

A communication, referred by General Butterfield, from the New York Board of Health of September 10th, was read, declaring the continuance of Asiatic cholera in New York city, and the board advise the continuance of their previous recommendation in regard to the suspension of recruiting.

The board then adjourned till Tuesday next at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *September* 17, 1867.

Fifth day: The board met pursuant to adjournment. Present: All the members.

The health of Governor's island is reported as on the gain, no cases of cholera having occurred since the last session, and the number of diarrhœa cases having decreased. The health of Bedloe's island is not so good, two or three suspicious cases having occurred there, though none as yet fatal.

A communication from General Butterfield was received, requesting this board to put itself in communication with Dr. Harris, and enclosing a letter of Dr. Harris, of date September 13th, relative to the appearance of cholera in the west and in the city. The board acknowledges the receipt of this paper, and will be happy to receive any communications from Dr. Harris that General Butterfield may see fit to communicate.

It was officially brought to the notice of this board, in an endorsement from General Butterfield's office, of date September 13th, that recruiting officers are ordered to continue recruiting for bands in the city, and that these recruits are sent to David's island. The board consider that there is the same danger from their enlistment as from that of any other class of recruits, and recommend that it be stopped.

The board recommend that the previous recommendations of this board relative to enlistments be continued in force for fifteen days from this date.

The board then adjourned till Friday at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *September* 20, 1867.

Sixth day: The board met pursuant to adjournment. Present: All the members.

Governor's Island is reported as still free from cholera. No new cases have occurred at Bedloe's island since the last meeting of the board.

In view of remonstrances from the Engineer Department, officially laid before the board, relative to the burning of offal accumulated by the tides on Governor's island, the board urgently recommend the completion of the sea wall, to prevent its lodgment on the shore, and strongly recommend its destruction by fire, in the meantime, as the only complete and thorough method of preventing infection, which might otherwise arise from it.

It is also strongly recommended by the board that Castle Williams be discontinued as a barracks for recruits and men, and that permanent barracks, sufficient to accommodate from 300 to 500 men, be erected without delay. It is the opinion of the medical officers that the castle is not suitable for barracks, being damp and cold, giving rise to rheumatism and dysentery; and the records of the post show that, for a succession of years, infectious diseases have commenced among the recruits occupying Castle Williams.

The board then adjourned till Tuesday next at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *September* 24, 1867.

Seventh day: The board met pursuant to adjournment. Present: All the members.

No cases of cholera have occurred since the last meeting of the board, at either Governor's or Bedloe's island.

In reply to an inquiry from the Superintendent General Recruiting Service, of date September 17th, relative to the removal of the veteran reserve corps, it is the opinion of the board that they may be removed from Governor's island to posts on the northern lakes without any danger of spreading the cholera. As only seven days have elapsed since the last case of cholera at Bedloe's island, it is not considered safe to send recruits from that point as yet.

The board then adjourned till Friday next at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *September* 27, 1867.

Eighth day: The board met pursuant to adjournment. Present: Brevet Brigadier General H. D. Wallen, U. S. A.; Brevet Lieutenant Colonel E. P. Vollum, Surgeon, U. S. A.; Brevet Lieutenant Colonel J. F. Randolph, Surgeon, U. S. A.; Brevet Captain W. C. Minor, Assistant Surgeon, U. S. A.

No cases of cholera have occurred at Governor's island since the last meeting. One case only has occurred at Bedloe's island, but not fatal.

Special Orders No. 190, from Headquarters General Recruiting Service, U. S. A., of date September 26th, was laid before the board, relative to transfer of prisoners from Newport barracks to Governor's island.

In the opinion of this board, it is not safe to send any men here till it is safe to begin recruiting.

The board then adjourned till Tuesday at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *October* 1, 1867.

Ninth day: The board met pursuant to adjournment. Present: Brevet Brigadier General H. D. Wallen, U. S. A.; Brevet Brigadier General J. B. Brown, Surgeon, U. S. A.; Brevet Lieutenant Colonel J. F. Randolph, Surgeon, U. S. A.; Brevet Captain W. C. Minor, Assistant Surgeon, U. S. A. Absent: Brevet Lieutenant Colonel E. P. Vollum, Surgeon, U. S. A.

There being a quorum present, the board proceeded to business.

No cases of cholera have occurred at either Governor's or Bedloe's island since the last session of the board. The last case of cholera at Bedloe's island occurred seven days ago.

A communication from the General Superintendent Recruiting Service, of date September 30th, was laid before the board, inquiring whether recruits cannot be received at the general service depot.

The board is of the opinion that they should not be received here for at least ten days.

The records of the hospital show that cholera was reintroduced at Governor's island with the premature renewal of recruiting last year. Three deaths from cholera occurred as late as the 6th of October, 1866, among recruits received at the depot the last of September.

The board then adjourned till Friday next at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *October* 4, 1867.

Tenth day: The board met pursuant to adjournment. Present: All the members.

No cases of cholera have occurred at Governor's or Bedloe's island since the last session of the board.

In reply to an inquiry from the General Superintendent of the General Recruiting Service, in regard to sending troops away from Governor's and David's islands, the board are of opinion that they may be sent without any danger of spreading cholera from these points. The board recommend that intercourse with the city from Governor's island be allowed to enlisted men, at the discretion of the commanding officer.

No further business being before the board, it was adjourned till Tuesday next at 11 a. m.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *October* 6, 1867.

Eleventh day: The board met pursuant to special instructions from Headquarters General Recruiting Service, of date October 4th, for the purpose of considering certain orders and circulars submitted to the board. Present: All the members.

The health of Governor's and Bedloe's islands remains as at last session.

Relative to the removal of quarantine from Governor's island, the board are still of the opinion expressed in their session of October 4th, unrestricted intercourse with the city being still undesirable.

In regard to the renewal of recruiting on October 9th, the board are of opinion that, inasmuch as three deaths from cholera occurred here as late as the 6th of October, 1866, and as deaths from cholera have occurred in New York city as late as Saturday, October 5th, of the last week, the board are of opinion that recruiting should not be renewed till the 15th of this month.

The board are further of the opinion that neither recruits nor prisoners should be sent to Governor's island till after the 15th of this month.

No further business being before the board, it was adjourned to Friday next at 11 a. m., unless sooner convened.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT COLUMBUS, NEW YORK HARBOR, *October* 11, 1867.

Twelfth day: The board met pursuant to adjournment. Present: All the members.

The health of Governor's and Bedloe's islands remains as at last session.

In response to the inquiry from Headquarters General Recruiting Station, New York city, of date October 9th, 1867, the board are of opinion that recruits may be sent away at once from Bedloe's island, and that it will be safe to send others there after the 15th of October.

The board also recommend that unrestricted intercourse be permitted between the city and Governor's island, and after the 15th with Bedloe's island.

The danger from cholera having passed, in the opinion of the board, and there being no further business before them, the board adjourned *sine die*.

H. D. WALLEN,
Brevet Brigadier General, U. S. A., President.

W. C. MINOR, *Brevet Captain and Assistant Surgeon, U. S. A., Recorder.*

FORT WOOD, N. Y. H., *October* 1, 1867.

GENERAL: I have the honor herewith to forward a monthly report of sick and wounded at this post for September, and a special report of cholera cases for the same period:

On the 12th of September I reported the first fatal case of cholera through the chief medical officer, New York city, but failed to mention three cases which previously occurred bearing every resemblance to cholera, as will be observed in the special report of cases.

The first—William Harden—was admitted August 25th. He arrived at Governor's island on the 22d from St. Louis, Missouri. On his way east, assisted by another recruit, he waited upon a man who died with cholera and was buried on the way. The assistant, the day after their arrival at Governor's island, was taken with symptoms of cholera and died in a few hours. This was the first case of cholera reported on that island. The place was at once quarantined. On the 24th, however, quarantine restrictions were removed, and one hundred and forty-four recruits were sent over to this post for distribution, recruit Harden among them. Two days afterwards all of the detachment, except ten or fifteen men, were sent to posts in New England, and the officer who accompanied them informs me that a St. Louis recruit, destined for Portsmouth, I think, was taken violently ill at Boston with symptoms resembling cholera.

The fact shown by the history of Harden makes it very clearly appear that cholera, this season, was first introduced at Governor's island, and here through that post, by St. Louis recruits; and it is unfortunate that more time did not elapse after the occurrence of the first case before recruits were allowed to depart. The infection had evidently taken root, as shown by the cases here and in Boston; and if their destination had been to a less favorable latitude, the consequences might have been different.

There was no cholera on this island last summer, and since early spring a constant "quarantine of observation" has been kept—the whole island thoroughly policed daily, and disinfectants abundantly used; no possible local cause of disease has existed.

A large number of diarrhœa cases are reported, but many were of but little consequence. As soon, however, as cholera infection was suspected, the mildest cases were observed closely; and I found that when a man was put to bed in time and absolute rest required, the disease succumbed to simple remedies.

In the more serious cases the subcarbonate of bismuth seemed to act better than anything else tried in checking vomiting, and chlorodyne mixture relieved cramps very promptly in some instances. The majority of cases of diarrhœa were controlled by simple chalk mixture, combined, in the more urgent cases, with laudanum and tincture of catechu.

In treating cholera, I should not hesitate to use large doses of calomel, from twenty to thirty grains, placed dry on the tongue, to be washed down by the saliva, and repeated in the course of an hour or so, if necessary. It seems to relieve cramps and vomiting sooner and more effectually than anything else tried, and no unpleasant effects were observed from the peculiar action of the drug. This treatment I was induced to try from the experience of Surgeon Brown, post Surgeon, Governor's island, who has obtained better results from it than any other during several epidemics he has witnessed and in a large number of cases.

To restore the action of the kidneys, which seem to lose their functions so completely in this disease, I found excellent results from a combination of acetate of potash and sweet spirits of nitre—10 grains of the former to ½ a fluid drachm of the latter, given every hour. From the fifth to the seventh dose generally produced free diuresis.

During the month Acting Assistant Surgeon H. C. Yarrow, U. S. A., has been on the island—his duties in Brooklyn having been suspended by the discontinuance of recruiting—and he has rendered me valuable assistance in looking after the general sanitary condition of the post, visiting the sick at all hours, and constantly exhibiting a most commendable zeal.

Very respectfully, your obedient servant,

J. F. RANDOLPH,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

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

PLATTSBURGH BARRACKS, N. Y., *September* 30, 1867.

GENERAL: I have the honor to make the following report concerning the case of cholera which appeared at this post on the 1st of the present month: I would state that the patient had just returned, on the day preceding the attack, from Governor's island, New York harbor, where he had been sent for trial by general court martial for desertion. He was necessarily detained there for several days awaiting trial, and it is reported by his comrades that while there he had partaken freely of fruit, and that he had also eaten a quantity of preserved peaches after his return to this post on the day previous to the attack. During the night of August 31st he was suddenly seized with cramps, vomiting, and purging, but owing to the neglect of the guard in charge of the room, the case was not reported for treatment until four hours after the attack, when he was brought to this hospital, and the case then presented all the characteristics of well-marked cholera. The patient quickly sunk into a state of collapse. The treatment consisted principally of the administration of small and frequent doses of calomel in connection with stimulants, and externally warm applications to the limbs, mustard plaster to the abdomen, and continued frictions to the body. The vomiting and purging subsided twelve hours before his death, and there was apparently some approach towards reaction, but soon afterwards followed by relapse, and the disease ran the usual course, and terminated fatally at one o'clock on the morning of September 2d, twenty hours after his admission. Prompt measures were immediately adopted to prevent the progress of the disease at this post, by a free use of disinfectants and burning of all clothing, &c., used by the patient, and no further indication of the presence of cholera has been manifested in this command.

I do not entertain any doubt that the disease was brought to this post from Governor's island, New York harbor, by the deceased.

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

J. PLATT FOOT,
Acting Assistant Surgeon, U. S. A.

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

RECRUITS FROM NEW YORK TO TEXAS VIA NEW ORLEANS.

ADJUTANT GENERAL'S OFFICE, WASHINGTON, *April* 16, 1868.

SIR: In reply to the inquiry contained in your communication of this date, you are respectfully informed that recruits were forwarded to Texas, from the general depots in New York harbor, during the month of November, 1867, as follows:

From Bedloe's island, November 23d, 1867, a detachment of 398 recruits, viz: 73 for Battery "I," 1st U. S. Artillery, Brownsville, Texas, and 325 for the 17th U. S. Infantry, Galveston, Texas.

From David's island, November 30th, 1867, a detachment of 509 recruits, viz: 295 for the 26th U. S. Infantry, Austin, Texas, and 214 for the 35th U. S. Infantry, San Antonio, Texas.

Very respectfully, your obedient servant,

R. WILLIAMS,
Assistant Adjutant General.

Brevet Lieutenant Colonel J. J. WOODWARD, *Assistant Surgeon, U. S. Army.*

FORT COLUMBUS, N. Y. H., *January* 7, 1868.

GENERAL: I have the honor to submit the following report:

In obedience to Special Orders No. 309, from these Headquarters, dated November 23d, 1867, detailing me to accompany a detachment of recruits to sail that day for Galveston, Texas, I reported to Captain W. A. Crafts, commanding detachment, on board the A. C. M. S. S. Co.'s steamer Raleigh, pier 32, North river. The detachment consisted of five hundred and thirty recruits and a band of eighteen musicians, and was quartered between decks, bunks being provided for five hundred and thirty. Ventilation was secured by means of open hatches, fore and aft, and numerous portholes; the cooking was done by steam.

After a voyage of nine days of good weather, during which, with the exception of sea-sickness, the health of the men was excellent, we arrived at New Orleans on the evening of December 2d, without a man unfit for duty on account of sickness. During this voyage a daily inspection was made between decks, the place kept thoroughly policed, and disinfectants freely used. On arriving at New Orleans, one hundred and ten men were disembarked, and there being no steamer ready to take the detachment on board for Galveston, they were kept twenty-four hours on the Raleigh. Hearing, for the first time, of the prevalence of cholera in the city, (fifteen deaths having been reported on that day from this cause,) every precaution was taken to prevent infection. The steamer was anchored a short distance out from the wharf, nothing allowed to be sold or given to the men, and as far as possible they were prevented from drinking the river water. On the evening of December 3d, the detachment was transferred from the Raleigh to the hurricane deck of the steamer W. G. Hewes, of the Morgan line, for Galveston, and at once started down the river. Ten miles below the city we were obliged to anchor for the night, on account of the fog.

During the 4th of December, I prescribed for a number of cases of diarrhœa of a character to alarm me, on account of the nature of the discharges, (being of the rice-water variety and exceedingly copious,) the absence of pain, and the great exhaustion consequent upon it. These were, however, generally amenable to treatment, and kept in check by the usual remedies.

In the case of one man, however, Fisher, who had neglected to report himself early, the diarrhœa was unaffected by treatment; vomiting and cramps supervened, and it assumed all the characteristics of a case of real cholera ending in collapse. By means of artificial heat and friction with dry mustard he reacted slowly without a return of the vomiting and purging. Two others, White and Ormsby, were similarly affected, but did not arrive at the state of collapse. We arrived off Galveston on the morning of December 6th, but on account of low water were detained eight hours on the bar. By an officer going ashore I informed the medical director, Dr. Bacon, of the state of affairs, who, with Assistant Surgeon Cronkhite, came on board at once, and confirmed my opinion of the nature of the disease. On arriving at the wharf, everything was found in readiness; the sick men were at once removed to a hospital, and the troops quartered in tents outside the town. At the time of my leaving Galveston, December 8th, no deaths had occurred, though six new cases of choleraic diarrhœa had been received in hospital. They were all under the care of Assistant Surgeon Cronkhite. The few days that these men were under my care would make any remarks on their treatment of little weight, though I will venture to remark, that in the diarrhœa I had to combat, I found the combination of a mercurial with the usual remedies employed to be not only beneficial, but almost, it seemed to me, indispensable in arresting the discharges and changing their nature. In the case of Fisher, whilst in a state of collapse, the purging and vomiting having ceased, and the thirst being excessive, I found the administration of ice and ice water in small quantities, frequently repeated, to have a surprisingly reviving effect without renewing the vomiting. It may be in place to remark, that the supply of coffee was exhausted about the time of leaving New Orleans, and that a chest of tea which was to serve for the rest of the voyage failed to be transferred; so that the men were without tea or coffee for several days, with the exception of one meal, when tea was furnished from the ship's stores at the request of the commanding officer. I have only left to say, that in everything necessary to be done for preserving the health of the detachment, I had the earnest co-operation of the commanding officer, and to acknowledge the kindness of Captain Tripp Hewes, who proffered the resources of his ship without reserve for the use of the sick men.

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

J. K. CORSON,
Assistant Surgeon, U. S. A.

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

GALVESTON, TEXAS, *January* 1, 1868.

COLONEL: I have the honor to submit the following statement concerning an epidemic of cholera which prevailed at this post during a part of the month of December, 1867. On the 6th of that month a vessel, transporting four hundred and twenty-five U. S. soldiers from New York city to Texas, arrived at Galveston, having cholera to a limited extent among the troops on board. They were disembarked and quartered in tents for three days. At the expiration of that time, on account of the inclemency of the weather, they were put in barracks with the detachment of the 17th U. S. Infantry on duty here. On the 11th of December another vessel, bringing from New York city to Texas five hundred and ten U. S. soldiers, among whom also cholera had appeared, reached this place. The second transport remained one day and sailed for Indianola, Texas, with all of its detachment on board, except the sick who had been left for treatment in this post hospital. The troops on both the ships, while en route from New York to Texas, stopped a day at New Orleans, La., and the malady appeared among them soon after leaving the latter city. Cholera was epidemic in New Orleans at the time. One death from that disease occurred on the second transport before it reached Galveston. Altogether twenty-five cases of cholera and eighteen of choleraic diarrhœa were admitted into Galveston post hospital. Four cases of cholera terminated fatally. Twenty-one cases of cholera and all the cases of choleraic diarrhœa resulted favorably. Three privates of the 17th U. S. Infantry previously on duty here were attacked with cholera. They all recovered. The remedy mainly relied upon was tannin, in doses varying from half a drachm to two drachms, in fresh solution, after each discharge by vomiting or per anum. After commencing its administration to the extent mentioned, none were lost who came under treatment before the stage of collapse had set in. The first effect of the tannin was to cause the stomach to discharge its contents; but in every case it finally completely arrested the discharges and relieved the cramps attending them. The men who were received in a pulseless condition died. I witnessed no good effects from acoholic stimulants. They were usually very offensive to the stomach, and did not appear capable of influencing the circulation in the stage of collapse. The epidemic has intirely disappeared from this post.

Very respectfully, your obedient servant,

H. McL. CRONKHITE,
Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel W. WEBSTER, *Surgeon, U. S. A.*,
Chief Medical Officer District of Texas.

Extract from Weekly Report of Sick and Wounded, Indianola, Texas, week ending December 14, 1867. *Acting Assistant Surgeon S. Santoire, U. S. A.*

Thirteen cases of cholera were admitted from a detachment of recruits from Galveston, Texas. The disease has not yet spread in this place.

POST HOSPITAL, INDIANOLA, TEXAS, *December* 31, 1867.

COLONEL: In reply to your communication of December 23d, 1867, I have the honor to inform you that cases of cholera admitted from a detachment of recruits passing through en route for San Antonio, Texas, referred to in one of my letters to your office, are cases of what is called, by recent European writers, common or sporadic, also European cholera. Although in all of these cases rice-water discharges were observed, the disease progressed slowly, and not one of the cases showed that stage of collapse found in Asiatic cholera. Two cases terminated fatally, on the 6th day of the disease, in a typhoid condition; none existed in this command nor among the citizens at this place.

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

SAMUEL SANTOIRE,
Acting Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel W. WEBSTER, *Surgeon, U. S. A.*,
Chief Medical Officer District of Texas.

HEMPSTEAD, TEXAS, *January* 3, 1868.

SIR: I have the honor to transmit a special report of cholera patients for the month of December, 1867.

Besides the accompanying list, I am satisfied that there was considerable choleraic diarrhœa which failed of full development on account of the prompt measures taken to stop it.

Not only was cleanliness and disinfection attended to, but opium and camphor pills were placed in the hands of the sergeants of companies, with instructions to watch the sinks, and all men frequenting them too often had a dose administered after each evacuation, and every case proving obstinate was at once reported to the hospital.

Respectfully, your obedient servant,

F. A. WILMANS,
Acting Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel WARREN WEBSTER, *Surgeon, U. S. A.*,
Chief Medical Officer District of Texas.

HEMPSTEAD, TEXAS, *February* 4, 1868.

SIR: In compliance with yours of the 15th of January, 1868, I have the honor to report that cholera first appeared among the troops here immediately after the arrival of recruits from Galveston, Texas, December 13th, 1867.

The commanding officer here informs me that one of their number left in hospital at Galveston died of cholera on the 12th of December, 1867, showing that it existed among them previous to their arrival here, so that when, where, or how it originated, I have no authentic means of ascertaining.

Respectfully, your obedient servant,

F. A. WILMANS,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. MCPARLIN, *Medical Director.*

QUARANTINE CHOLERA CAMP, HEADQUARTERS DET. RECTS. 26TH U. S. I.,
Onion Creek, near Austin, Texas, December 31, 1867.

SIR: In compliance with Circular Order No. 3, War Department, Surgeon General's Office, Washington, D. C., April 20th, 1867, I have the honor herewith to transmit a special report of cholera patients in this detachment for the present month. I beg, also, to add for your information, that in conformity with instructions received from Headquarters 26th U. S. Infantry, post of Austin, Texas, I met the detachment on its arrival at this place on the afternoon of the 24th instant, and finding cholera prevailing among the recruits, had the command quarantined, and established a hospital and other conveniences for the treatment of the sick. There was no medical officer with the command, the sick being in charge of an acting hospital steward. The disease was, with few exceptions, easily controlled when seen early and the patient well nursed. The treatment found most successful was calomel, in large doses, placed on the tongue; brandy when the irritability of the stomach subsided; occasional injections of chloroform and laudanum, with applications of mustard. Squibb's mixture was found useful only in the early stage of diarrhœa.

The officer who accompanied the detachment from New York informs me that diarrhœa prevailed largely on board the vessel from New York to New Orleans, but that after their departure from the latter post for Indianola, Texas, the disease assumed a more malignant character.

I am, very respectfully, your obedient servant,

T. O'R. SHERIDAN,
Acting Assistant Surgeon, U. S. A.

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

HEADQUARTERS DETACH. 26TH U. S. I., EN ROUTE TO BROWNSVILLE, TEXAS,
Indianola, Texas, January 31, 1868.

SIR: I have the honor to transmit herewith the special report of cholera patients in this command for the month of January, 1868. In regard to the case of Private John Bream, reported for this month, I am unable to obtain any particulars which would enable me to give an opinion as to the probable origin of the disease in his case, further than that he belonged to the detachment of recruits among whom cholera had been recently prevailing.

I am, very respectfully, your obedient servant,

T. O'R. SHERIDAN,
Acting Assistant Surgeon, U. S. A.

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

APPENDIX II.—YELLOW FEVER.

A. STATISTICAL TABLES.

1. INDIANOLA, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	52		151†		141†		72		72*		78		50	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	21*	10	4	3	.....	.....	4	1	.....	.....	.....	.....	29	14
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Intermittent fever	.....	.....	.....	.....	.....	.....	6	.....	5	.....	4	.....	15	.....
Diarrhœa and dysentery	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
All other diseases	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	3	2	3
Total	.....	.....	2	.....	.....	.....	7	.....	5	.....	4	4	18	4
Aggregate	21	10	6	3	.....	.....	11	1	5	.....	4	4	47	18

* There were, besides, two cases in June.
† The remainder of the command absent at Green Lake.

2. GALVESTON, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	174		170		138		95		111		222		151	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	10	2	68	15	106	53	15	8	.....	1	.....	.....	199	79
Typhoid fever	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	13	.....	1	.....	1	.....	2	.....	5	.....	.....	.....	22	.....
Intermittent fever	6	.....	15	.....	5	.....	10	.....	5	.....	2	.....	43	.....
Diarrhœa and dysentery	10	.....	10	.....	5	2	7	.....	1	.....	30	.....	63	2
All other diseases	24	.....	22	.....	2	2	11	.....	5	.....	61	4	125	6
Total	54	.....	48	.....	13	4	30	.....	16	.....	93	4	254	8
Aggregate	64	2	116	15	119	57	45	8	16	1	93	4	453	87

3. VICTORIA, TEXAS.

Month	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength					77		71							
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever					8		10	4					18	4
Typhoid fever														
Typho-malarial fever														
Remittent fever					20		4						24	
Intermittent fever					35		24						59	
Diarrhœa and dysentery														
All other diseases					47		1	1					48	1
Total					102		29	1					131	1
Aggregate					110		39	5					149	5

4. GOLIAD, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	47		47		43		43		44		43		45	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever							5						5	
Typhoid fever														
Typho-malarial fever	1		1				1						3	
Remittent fever	6		5		3		1		3				18	
Intermittent fever	8		13		13		13		8		8		63	
Diarrhœa and dysentery	5		4		5		2		6		2		24	
All other diseases	9		3	1	3		2		1		5		23	1
Total	29		26	1	24		19		18		15		131	1
Aggregate	29		26	1	24		24		18		15		136	1

5. HOUSTON, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	75		82		82		59		49		87		72	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever					15	5	54	20	2				71	25
Typhoid fever							1	1					1	1
Typho-malarial fever	1												1	
Remittent fever	6		10		7		1						24	
Intermittent fever	23		42		14		3		17		10		109	
Diarrhœa and dysentery	10		6		16		2	1	4	1	18		56	2
All other diseases	12		24		12		12	3	8		22	1	90	4
Total	52		82		49		19	5	29	1	50	1	281	7
Aggregate	52		82		64	5	73	25	31	1	50	1	352	32

6. HEMPSTEAD, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	104		117		106		99		79		156		110	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	11	8	39	16	3	5	2	.....	55	29
Typhoid fever	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....
Intermittent fever	3	.....	4	.....	6	.....	1	.....	2	.....	7	.....	23	.....
Diarrhœa and dysentery	1	.....	.....	.....	4	.....	.....	.....	3	.....	11	.....	19	.....
All other diseases	1	.....	12	.....	7	1	.....	.....	9	.....	21	1	50	2
Total	5	.....	20	.....	18	1	1	.....	14	.....	39	1	97	2
Aggregate	5	.....	20	.....	29	9	40	16	17	5	41	1	152	31

7. BRENHAM, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	67		50		70		50		50		69		59	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	2	2	.....	.....	.....	.....	.....	.....	2	2
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	3	.....
Remittent fever	14	.....	25	.....	3	.....	15	.....	26	.....	13	.....	96	.....
Intermittent fever	8	.....	10	.....	3	.....	7	.....	13	.....	16	.....	57	.....
Diarrhœa and dysentery	12	.....	7	.....	1	.....	3	.....	1	.....	10	.....	34	.....
All other diseases	2	.....	15	.....	5	.....	11	.....	7	1	15	.....	55	1
Total	36	.....	57	.....	15	.....	36	.....	47	1	54	.....	245	1
Aggregate	36	.....	57	.....	17	2	36	.....	47	1	54	.....	247	3

8. BROWNSVILLE, TEXAS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	83		80		45		72		72		104		76	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	.....	.....	3	.....	1	.....	.....	.....	4	.....
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	.....	.....	14	.....	17	.....	12	.....	8	.....	5	.....	56	.....
Intermittent fever	6	.....	10	1	7	.....	10	.....	12	.....	18	.....	63	1
Diarrhœa and dysentery	15	.....	6	.....	7	.....	13	.....	6	.....	8	.....	55	.....
All other diseases	51	.....	25	.....	11	.....	10	1	4	.....	3	.....	104	1
Total	72	.....	55	1	42	.....	45	1	30	.....	34	.....	278	2
Aggregate	72	.....	55	1	42	.....	48	1	31	.....	34	.....	282	2

9. BROWNSVILLE, TEXAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	738		331		257		402		302		337		395	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever														
Typhoid fever														
Typho-malarial fever	3	1	2										5	1
Remittent fever	6		17		16		20		6		9		74	
Intermittent fever	31		16		37		26		21		19		150	
Diarrhœa and dysentery	22		14		28		12		13		9		98	
All other diseases	110		37		48		41		18		19	1	273	1
Total	172	1	86		129		99		58		56	1	600	2
Aggregate	172	1	86		129		99		58		56	1	600	2

10. RINGGOLD BARRACKS, TEXAS.

(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	308		230		228		196		199		173		222	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever														
Typhoid fever	3	1											3	1
Typho-malarial fever														
Remittent fever	12		7		1		4		1		4		29	
Intermittent fever	21		5		16		2		6		8		58	
Diarrhœa and dysentery	7		5		5		1		11		13		42	
All other diseases	6		24		41		13		22	1	23		129	1
Total	49	1	41		63		20		40	1	48		261	2
Aggregate	49	1	41		63		20		40	1	48		261	2

11. NEW ORLEANS, LA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	793		625		740		723		728		954		761	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	4*	3	108	31	448	113	87	43	11	4	1	1	659	195
Typhoid fever	1	1	2										3	1
Typho-malarial fever														
Remittent fever	14		45		18		3						80	
Intermittent fever	27		43		64		58		46		50		288	
Diarrhœa and dysentery	78	1	37		17	1	16		49		58		255	2
All other diseases	184		124	3	159	3	121		151	3	146	2	885	11
Total	304	2	251	3	258	4	198		246	3	254	2	1,511	14
Aggregate	308	5	359	34	706	117	285	43	257	7	255	3	2,170	209

* There was, besides, one fatal case in June.

12. NEW ORLEANS, LOUISIANA.
(Colored Troops.)

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	193		239		342		377		366		361		313	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	13	2	97	10	53	10	.....	1	.....	.....	163	23
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	5	.....	7	1	22	.....	4	.....	4	.....	.....	.....	42	1
Intermittent fever	34	.....	19	.....	35	.....	11	.....	8	.....	6	.....	113	.....
Diarrhœa and dysentery	35	.....	12	.....	15	.....	8	.....	8	.....	8	1	86	1
All other diseases	210	.....	52	.....	76	.....	61	.....	8	3	30	1	437	4
Total	284	.....	90	1	148	.....	84	.....	28	3	44	2	678	6
Aggregate	284	.....	103	3	245	10	137	10	28	4	44	2	841	29

13. BATON ROUGE, LOUISIANA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	193		219		219		270		270		159		222	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	1	.....	.....	.....	1	1	.....	.....	1	1	.....	.....	3	2
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	2	1	1	1	.....	.....	3	2
Remittent fever	57	1	66	.....	20	.....	6	.....	19	1	5	.....	173	2
Intermittent fever	31	.....	71	1	62	.....	91	.....	124	.....	50	.....	429	1
Diarrhœa and dysentery	5	.....	16	1	33	2	19	.....	9	2	13	.....	95	5
All other diseases	12	.....	13	.....	11	.....	9	.....	9	.....	11	.....	65	.....
Total	105	1	166	2	126	2	127	1	162	4	79	.....	765	10
Aggregate	106	1	166	2	127	3	127	1	163	5	79	.....	768	12

14. VIDALIA, LOUISIANA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	47		64		64		61		.....		.....		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	3	.....	.....	.....	1	1	.....	.....	.....	.....	4	1
Typhoid fever	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....
Typho-malarial fever	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Remittent fever	6	.....	7	.....	7	.....	.....	.....	.....	.....	.....	.....	20	.....
Intermittent fever	19	.....	31	.....	27	.....	11	.....	.....	.....	.....	.....	88	.....
Diarrhœa and dysentery	20	1	10	1	11	.....	.....	.....	.....	.....	.....	.....	41	2
All other diseases	11	.....	10	.....	9	.....	14	4	.....	.....	.....	.....	44	4
Total	56	1	62	2	54	.....	25	4	.....	.....	.....	.....	197	7
Aggregate	56	1	65	2	54	.....	26	5	.....	.....	.....	.....	201	8

15. NATCHEZ, MISSISSIPPI.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	70		85		85		85		100		134		93	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	2	.....
Typhoid fever	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Typho-malarial fever	.....	.....	1	.....	2	.....	1	.....	.....	.....	.....	.....	4	.....
Remittent fever	.....	.....	3	.....	1	.....	1	.....	.....	.....	1	.....	6	.....
Intermittent fever	7	.....	12	.....	8	.....	5	.....	13	.....	16	.....	61	.....
Diarrhœa and dysentery	4	.....	6	.....	5	.....	3	.....	5	.....	6	.....	29	.....
All other diseases	5	.....	12	1	13	.....	5	.....	4	.....	7	.....	46	1
Total	16	.....	35	1	29	.....	15	.....	22	.....	30	.....	147	1
Aggregate	16	.....	35	1	31	.....	15	.....	22	.....	30	.....	149	1

16. VICKSBURG, MISSISSIPPI.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	171		196		198		282		377		379		267	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	.....	.....	8	1	4	2	1	1	13	4
Typhoid fever	1	.....	1	.....	2	.....	1	.....	.....	.....	.....	.....	5	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	3	.....
Remittent fever	12	.....	30	.....	32	.....	71	.....	50	.....	16	.....	211	.....
Intermittent fever	6	1	23	.....	27	.....	55	.....	48	.....	39	.....	198	1
Diarrhœa and dysentery	23	.....	30	.....	22	.....	21	.....	22	1	5	.....	123	1
All other diseases	29	2	9	.....	9	1	19	1	35	2	13	.....	114	6
Total	71	3	93	.....	92	1	170	1	155	3	73	.....	654	8
Aggregate	71	3	93	.....	92	1	178	2	159	5	74	1	667	12

17. JACKSON, MISSISSIPPI.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.*		DECEMBER.		TOTAL.	
Mean strength	164		163		163		278		.....		359		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	1	1
Typhoid fever	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	4	.....	12	.....	15	.....	20	.....	.....	.....	19	.....	70	.....
Intermittent fever	59	.....	50	.....	20	.....	24	.....	.....	.....	53	.....	206	.....
Diarrhœa and dysentery	19	.....	20	.....	20	.....	13	.....	.....	.....	9	.....	81	.....
All other diseases	29	.....	29	.....	44	.....	30	2	.....	.....	27	.....	159	2
Total	111	.....	111	.....	100	.....	87	2	.....	.....	108	.....	517	2
Aggregate	111	.....	111	.....	100	.....	88	3	.....	.....	108	.....	518	3

* No report.

18. MEMPHIS, TENNESSEE.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	184		161		160		201		199		213		186	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....	.....	2	1
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Remittent fever	3	.....	.....	.....	.....	.....	6	.....	4	.....	1	.....	14	.....
Intermittent fever	39	.....	40	.....	38	.....	45	1	16	.....	35	.....	213	1
Diarrhœa and dysentery	19	.....	6	.....	12	1	14	.....	8	.....	26	1	85	2
All other diseases	12	.....	17	1	19	.....	32	.....	46	.....	63	.....	189	1
Total	74	.....	63	1	69	1	97	1	74	.....	125	1	502	4
Aggregate	74	.....	63	1	69	1	97	1	76	1	125	1	504	5

19. FORT MORGAN, ALABAMA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	71		54		51		53		51		51		55	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	14	7	9	4	.....	.....	1	1	.....	.....	24	12
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	25	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	.....
Intermittent fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Diarrhœa and dysentery	.....	.....	2	.....	.....	.....	1	.....	.....	.....	.....	.....	3	.....
All other diseases	9	.....	13	.....	8	1	5	.....	12	.....	12	.....	59	1
Total	34	.....	25	.....	8	1	6	.....	12	.....	12	.....	97	1
Aggregate	34	.....	39	7	17	5	6	.....	13	1	12	.....	121	13

20. MOBILE, ALABAMA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	356		334		328		307		247		261		306	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	3	.....	18	5	.....	1	1	1	22	7
Typhoid fever	2	1	1	1	1	.....	3	3	1	1	.....	.....	8	6
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	27	.....	28	1	16	1	.....	.....	8	.....	6	.....	85	2
Intermittent fever	24	.....	20	.....	11	.....	.....	.....	110	.....	16	.....	181	.....
Diarrhœa and dysentery	11	1	2	.....	.....	.....	1	1	21	1	34	.....	69	3
All other diseases	14	.....	3	2	5	.....	.....	.....	7	2	27	.....	56	4
Total	78	2	54	4	33	1	4	4	147	4	83	.....	399	15
Aggregate	78	2	54	4	36	1	22	9	147	5	84	1	421	22

21. FORT GAINES, ALABAMA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	77		83		82		85		75		69		79	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever											1	1	1	1
Typhoid fever														
Typho-malarial fever														
Remittent fever	4		6		1		1						12	
Intermittent fever	30		25		22		20		18		18		133	
Diarrhœa and dysentery	1				5		5		4		1		16	
All other diseases	6		11		9		5		3		15		49	
Total	41		42		37		31		25		34		210	
Aggregate	41		42		37		31		25		35	1	211	1

22. BARRANCAS, FLORIDA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	87		88		88		88		89		90		88	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever			1	1									1	1
Typhoid fever														
Typho-malarial fever			1										1	
Remittent fever														
Intermittent fever	9		10		11		8		2		1		41	
Diarrhœa and dysentery	15		22		8		10		1		2		58	
All other diseases	11		34		19		5		2		4		75	
Total	35		67		38		23		5		7		175	
Aggregate	35		68	1	38		23		5		7		176	1

23. KEY WEST, FLORIDA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	67		58		57		57		100		116		76	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever			1		8	1	8	1					17	2
Typhoid fever														
Typho-malarial fever														
Remittent fever							1		4				5	
Intermittent fever	4		1						6				11	
Diarrhœa and dysentery	3		2						6		4		15	
All other diseases	4		2						5		9		20	
Total	11		5				1		21		13		51	
Aggregate	11		6		8	1	9	1	21		13		68	2

24. FORT JEFFERSON, FLORIDA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	326		291		288		267		201		205		263	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	12	2	161	27	13	3	.....	.....	.....	.....	186	32
Typhoid fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	3	.....
Intermittent fever	7	.....	.....	.....	.....	.....	3	.....	8	.....	4	.....	22	.....
Diarrhœa and dysentery	34	.....	6	.....	6	.....	10	.....	13	.....	8	.....	77	.....
All other diseases	85	1	28	.....	14	.....	20	.....	32	.....	25	.....	204	1
Total	126	1	34	.....	23	.....	33	.....	53	.....	37	.....	306	1
Aggregate	126	1	46	2	184	27	46	3	53	.....	37	.....	492	33

25. TALLAHASSEE, FLORIDA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	176		191		113		92		87		146		134	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Yellow fever	.....	.....	.....	.....	.....	.....	2	1	.....	.....	.....	.....	2	1
Typhoid fever	6	2	.....	.....	1	1	.....	.....	.....	.....	.....	.....	7	3
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Remittent fever	1	.....	11	4	.....	.....	10	.....	10	.....	.....	.....	32	4
Intermittent fever	261	.....	297	.....	255	1	148	.....	124	.....	120	.....	1,205	1
Diarrhœa and dysentery	16	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	18	.....
All other diseases	15	2	2	.....	2	.....	5	.....	6	.....	19	.....	49	2
Total	299	4	310	4	258	2	164	.....	140	.....	140	.....	1,311	10
Aggregate	299	4	310	4	258	2	166	1	140	.....	140	.....	1,313	11

26. CASES OF YELLOW FEVER DURING THE LAST SIX MONTHS OF 1867, 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.
WHITE TROOPS.														
Austin, Texas	.....	.....	.....	.....	1	1	.....	.....	1	.....	.....	.....	2	1
Ship Island, Miss.	.....	.....	.....	.....	1	1	2	2	.....	.....	.....	.....	3	3
Ringgold Barracks, Tex.	.....	.....	.....	.....	1	.....	.....	.....	1	1	.....	.....	2	1
Pass Christian and Winchester, Miss.	.....	.....	.....	.....	.....	.....	14	5	.....	.....	.....	.....	14	5
Opelousas, La.	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	1	1
Alexandria, La.	.....	.....	.....	.....	.....	.....	2	1	1	1	.....	.....	3	2
Jefferson, Texas	.....	.....	.....	.....	.....	.....	2	1	.....	.....	.....	.....	2	1
Total white troops	.....	.....	.....	.....	3	2	21	10	3	2	.....	.....	27	14
COLORED TROOPS.														
Galveston, Texas	.....	.....	2	1	2	1	1	.....	.....	.....	.....	.....	5	2
Ship Island, Miss.	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	3	.....
Total white and colored.	.....	.....	2	1	8	3	22	10	3	2	.....	.....	35	16

27. TOTAL NUMBER OF CASES OF YELLOW FEVER.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
White troops *	36	15	211	59	777	216	289	115	28	18	6	4	1347	427
Colored troops	.....	.....	15	3	102	11	54	10	.....	1	.....	.....	171	25
Total white and colored.	36	15	226	62	879	227	343	125	28	19	6	4	1518	452

* There were, besides, 2 cases in June.

APPENDIX II.—YELLOW FEVER.

B. EXTRACTS FROM OFFICIAL REPORTS.

INDIANOLA, TEXAS.

INDIANOLA, TEXAS, *June* 30, 1867.

GENERAL: I have the honor to report that an epidemic of bilious remittent fever has, within the last ten days, made its appearance among the citizens of Indianola. The fever, in a great many cases, assumes a pernicious and continued type on the third day, and, in fatal cases, generally terminates on the fourth or fifth day in a typhoid condition. One hundred and ten cases are reported, and twelve deaths. The location of the troops southwest of the town seems as yet free from these miasmatic influences. Only two cases occurred among the soldiers; one has perfectly recovered, the other is in a hopeful state.

Very respectfully, your obedient servant,

SAMUEL SANTOIRE,
Acting Assistant Surgeon, U. S. A.

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

INDIANOLA, TEXAS, *July* 31, 1867.

GENERAL: I have the honor to report that the health of the troops at this post is, at the present time, as good as can be expected. At the commencement of the month, yellow fever threatened to be very severe among the men. Up to the 20th, eighteen cases had occurred, with ten deaths. Upon my suggestion, the troops were removed to Green Lake, Texas, twenty miles from Indianola. The locality is healthy and well suited for a camp, having good water, good bathing places, and a high ground. Since their arrival at that place, yellow fever has entirely ceased its ravages.

Very respectfully, your obedient servant,

SAMUEL SANTOIRE,
Acting Assistant Surgeon, U. S. A.

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

INDIANOLA, TEXAS, *August* 31, 1867.

GENERAL: I have the honor to report that, during the present month, the health of the troops stationed at this post has been as good as can be expected. Yellow fever seems to have subsided; but, in my opinion, for the want of proper material to work upon. Strangers coming to this place, if not acclimated, soon take the fever. Only two cases occurred among the troops during this month; both terminated in death. All the men now here have passed through it except one.

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

SAMUEL SANTOIRE,
Acting Assistant Surgeon, U. S. A.

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

Extract from Monthly Report of Sick and Wounded, Detachment 35th Infantry, Indianola, Texas, October, 1867. Samuel Santoire, Acting Assistant Surgeon, U. S. A.

A detachment of sixty-four men of the 35th U. S. Infantry arrived at this post during the past week, having abandoned their post at Victoria, Texas, on account of the yellow fever raging among them. Not a single case has manifested itself since their arrival.

Extract from Monthly Report of Sick and Wounded, Post Hospital, Indianola, Texas, October, 1867. Acting Assistant Surgeon Samuel Santoire, U. S. A.

YELLOW FEVER*: This disease, which had apparently subsided, reappeared during the past week. Four cases occurred among the soldiers, immediately following two days of a cold north wind. Three of these cases proved to be of a milder form than during the hot season, with less tendency to congestion of the digestive organs. After the opening of the bowels by blue mass, the fever was combated by draughts of the effervescing citrate of potash, taken ad libitum. This preparation has proved very beneficial in the hands of all practitioners who have used it at this place during the epidemic. To the refrigerant diaphoretic action of this preparation, which has the good effect of relieving the burning thirst suffered in the first stage of the fever, may be added that it maintains the secretion of the kidneys and mildly operates on the bowels. Quinine was given during the convalescence in tonic doses. One case, which ended fatally, was brought from Victoria, Texas, during a cold day. Death took place twenty-four hours after admission. He had black vomit when admitted, and during the two days previous had suffered from severe epistaxis.

INDIANOLA, TEXAS, *November* 30, 1867.

MAJOR: I have the honor to submit the following observations relative to the introduction of yellow fever at this post, and the history of its progress:

The disease is proved to have been imported from Mexico, in the latter part of May, upon a schooner from which some articles of bedding, etc., were landed. Two workmen who handled the said effects were taken sick four days after, and died of what their physician then called pernicious fever. The deputy collector of customs who boarded the vessel labored under the same disease. In five or six days it seemed to have spread rapidly, having swept through every house around the wharf, and pursued its course along Main street, from one side to another, with rare exceptions. It was of a mild form, and, for ten days, mistaken for bilious remittent fever by the physicians of this place, all of whom have passed through several epidemics. I had never before met with yellow fever, and felt very uncertain in my diagnosis. It was not until the 16th of June that the first cases occurred among the troops, and I convinced myself of the nature of the disease; more than fifty citizens were then down with the fever, and ten deaths had occurred. These fatal cases terminated by cerebral congestions; only in two instances was the black vomit observed. Our camp was located on elevated ground, to the windward, and about a mile from the town. The first cases observed were men guarding quartermaster's property in town, and through them it was propagated in the camp. On the 15th of July it became severely epidemic and assumed a more violent form. I then advised the post commander to remove his camp to Green Lake, Texas, twenty-two miles from Indianola, where good water could be had. They abandoned this post on the 28th of July, leaving 17 men; all these men had had the fever except two, who took it shortly after and died. The same day of the arrival of the troops at Green Lake, two of the men were taken with the fever; both cases terminated fatally; no other case occurred at that place. No very successful method of treatment has fallen under my observation at this place. All my colleagues seemed united in considering good nursing as the most important part of the treatment, of which hot pediluvia, diaphoretic decoctions, and castor oil was the basis. The method of treatment which I have found to procure the greatest relief to the patients, also the most successful, is the following, introduced by Acting Assistant Surgeon E. C. Fox, U. S A., which I have adopted, with slight deviations, according to symptoms and different constitutions: At the first visit, fifteen grains of blue mass, or ten of calomel, were given, followed by a cathartic and effervescing draughts of citrate of potassa, taken ad libitum. To the refrigerant diaphoretic properties of that preparation, which has the beneficial effects of relieving the burning thirst so distressing to the patient, may be added that it maintains the secretion of the kidneys and mildly operates on the bowels, which are the main points to be obtained to give the fever a favorable course. The fever having abated, five grains of sulphate of quinine are to be given three times a day, to prevent recurrence. In my opinion, the characteristic symptoms of this disease seem to call for the use of mercury; but if not administered at the outset, its effects cannot be obtained. One instance was communicated to me by a practitioner of this place, who gave two doses of calomel, thirty grains each, three hours apart, on the third day of the fever; it remained in the stomach eighteen hours, and was then rejected in the form of a paste, without having produced the slightest effect. In two instances I myself administered mercurials, on the third day of the fever, in small repeated doses, combined with opiates, without marked effect. No instance of recovery after the setting in of black vomit is recorded. Two cases checked by acetate of lead and turpentine ended fatally, with hemorrhage from the urethra and the bowels.

The above is a true statement of the introduction of yellow fever at this place, and of the methods of treatment adopted.

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

SAMUEL SANTOIRE,
Acting Assistant Surgeon, U. S. A.

Brevet Major C. BACON, *Assistant Surgeon, U. S. A.,*
Chief Medical Officer District of Texas.

GALVESTON, TEXAS.

HEADQUARTERS, DISTRICT OF TEXAS,
OFFICE CHIEF MEDICAL OFFICER, GALVESTON, *August* 13, 1867.

GENERAL: I have the honor to inform you of the condition of our city and the progress of the epidemic now prevailing among us. The first case of yellow fever was brought here about the 26th of June from Indianola, and the patient died with black vomit two days afterwards, at one of the boarding-houses in the lower part of the city. The entrance of the disease was entirely the result of gross negligence on the part of the city authorities in failing to take any measures to establish a quarantine for the protection of the city. No efficient quarantine was thought of until a case had already arrived here and had died with black vomit. The first case among the troops came into the post hospital on the first of July, and one had been carried to the city hospital from among the quartermaster's employés on the 27th of June; since then the disease has been slowly and steadily on the increase, and became epidemic about the 25th of July. Within the past week it has increased rapidly and spread over the entire city, sparing neither natives nor strangers in its march. Sections of the city in which, heretofore, no cases had ever occurred, are now as full as the more unhealthy localities; but still the foci of infection are along the business streets in the lower part of the city, and there the disease manifests its greatest malignancy. Every day the number of cases increases, and there are now over five hundred cases in the city, including those in the city and charity hospitals. On Friday there were 15 deaths; on Saturday, 23; on yesterday, 18; the total for the week ending August 10th was 81. I shall write you weekly, keeping you informed of the progress of the disease, and forwarding you the mortuary record for the week.

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

SAMUEL ADAMS,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General THOS. A. MCPARLIN,
Medical Director Fifth Military District, New Orleans, La.

HEADQUARTERS, DISTRICT OF TEXAS,
OFFICE CHIEF MEDICAL OFFICER, GALVESTON, *August* 17, 1867.

GENERAL: I have the honor to report the state of the epidemic and the mortuary record of the city sexton for the week ending to-day:

During the week the disease has increased terribly; the type has become much more severe and unmanageable, and it has invaded all classes of society. Yesterday there were three cases which proved fatal in from two to ten hours from the commencement of the attack. The following is the report of the burials daily, by the city sexton, for the week: Saturday, 18; Monday, 20; Tuesday, 28; Wednesday, 27; Thursday, 20; Friday, 27; Saturday, not complete; supposed to be about as Friday. Making a total of 166 deaths during the week.

The cases at the post hospital are doing most favorably; we need more ice and more delicacies, as the hospital fund is small. I forward, to-day, a letter from Dr. Rowe relative to this subject; please give us as speedy a decision as convenient, as the case is urgent.

We are all worked to the fullest capability night and day, but all things move on evenly and quietly, and we do not need any help. I shall write you (God willing) as often as is necessary to keep you fully informed of our condition and needs.

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

SAMUEL ADAMS,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General THOS. A. MCPARLIN,
Medical Director Fifth Military District, New Orleans, La.

GALVESTON, TEXAS, *April* 15, 1868.

GENERAL: My location at this city during a period including a considerable part of the recent epidemic of yellow fever renders requisite a statement of my service, at the station, during the prevalence of the disease. I respectfully transmit the following statement especially relating to the course of the epidemic in this city:

On the 11th of September, being on duty at the Austin station, I received a telegraphic order from Brevet Major General Griffin, commanding the district, to report at once at Galveston for duty as chief medical officer. Leaving Austin the day succeeding this order, I arrived at Galveston on the 17th of the month, the second day after the death and burial of General Griffin of yellow fever. General Griffin was the fourth officer of his staff who had fallen in the place of his duty during the epidemic. At this time there existed, not only along the gulf coast, but extending a long distance interior to localities hitherto deemed safe from the yellow fever, an epidemic condition, aggravated directly, so far as my knowledge extends, by localizing circumstances. The epidemic was the most extended and disastrous that has occurred in the history of the State; the entire region of its occurrence within the State included a direct coast range of some 370 miles, the line commencing at Brownsville, passing through

Corpus Christi, and terminating on the east at Liberty, within an interior range at its greatest extent of 150 miles from the gulf line, and including the counties of Cameron, Nueces, Calhoun, Goliad, Victoria, Jackson, Colorado, Fayette, Fort Bend, Washington, Brazos, Grimes, Galveston, Harris, Montgomery, Walker, and Liberty.

Galveston is situated in latitude 29° 18′ 26″ north, longitude 94° 46′ 38″ west, and is built at nearly the eastern extremity of Galveston island, on a bay four miles in width and bearing the same name with the island. The city is placed fronting the bay, and is but a small elevation above the line of the water; the ground upon which the city is built is but slightly undulatory—indeed, so nearly a level plain that the drainage of much of the city is exceedingly defective, the rains remaining only to be removed by evaporation and absorption. The island is composed of shingle, with the contributions of the rivers entering the bay. In conjunction, to some extent, with the Brazos river below, these contributions from the sea and land, in the process of the emergence of the island, have left much of the formation loose and readily permeable by the waters falling upon the surface, and in this exists one of the exceedingly objectionable sanitary features of the city's location, as the putrifiable matters accumulating within the limits of the city are held in suspension by the rains so as to enter the soil and become an accumulation of filth just beneath the surface, while the water disappears in the sea line below. Cistern water, however, is relied upon for household use in the entire city. An unguarded water line lies along most of the city front, a part of this being an unimproved flat, exposing at low tide much objectionable matter. The streets immediately receding from the water front were laid out at an early period in the growth of the city, and bear the usual character of imperfect drainage, being built over a tract of low ground, a portion of which was a marsh and subject to tidal overflow, and include much of the present business portion of the city. The improvements in this section of the city are exceedingly objectionable in a sanitary point of view; while near the central portion of the city is a considerable extent of unimproved flat, difficult of crossing in wet weather; this connects by an offensive drain with a pond of water also within the city, the receptacle of much filth, being the commencement of what is known as Hitchcock's bayou, along which lies, within the city, much low, unhealthy ground; this, to some considerable extent, has been filled in and improved. It will thus be seen that the location and sanitary condition of the city is such as to intensify epidemic causes.

I have transmitted, direct, meteorological registers for the year 1867, which were furnished me by Dr. Greensville Dowell, of the city hospital. It will therein be seen that the months of May, June, and the early part of July, included a very considerable fall of rain; the monthly mean of the thermometer for June was 81.91°, with a wind force amounting in the total (three daily observations) for the month to but 69; the rain during the month was 4.30 inches.

The monthly mean of the thermometer for July was 85.77°, with a wind force of 93; the rain fall was the same as during June, 4.30 inches. No interruption appears to have occurred to the continuously hot weather during either of the months, and there was an almost equally continuous absence of any perceptible amount of wind force. I find the following remarks accompanying these observations, under date of June 25th: "Great deal of congestion of the brain; yellow fever all around." I judge these remarks in reference to yellow fever purely unwarranted as to the prevalence of the disease. The introduction of yellow fever, as far as can be ascertained, occurred in the latter part of June. According to the census of the city assessor, taken about the 1st of June, the population numbered 23,982; of these 2,434 were colored; of the first class many had had the disease, but the larger proportion had been introduced since the war, and were unacclimated. The first case I find noted, of the character of which I am satisfied, occurred at the city hospital: Nathan Elliott, admitted from the city June 22d, had arrived at the city by a sailing vessel from New Orleans, where he had stopped two or three nights en route, (from Jackson, Mississippi,) and where yellow fever was reported to have been. Recovered. This case is said by Dr. Dowell, whom I regard as excellent authority, to have been a well-marked, undoubted case of yellow fever. According to his own statement, this man was admitted to hospital fourteen days from the time he was in New Orleans.

The second case reported at the city hospital, Benjamin Sproul, a deck hand on the steamer Whitelaw, of the Houston (interior) line, entered the hospital June 17th with syphilis; on the 30th, thirteen days subsequent to admission, and on the 9th day succeeding Elliott's admission, he was prostrated with yellow fever; he had occupied a bed adjoining Elliott. Recovered.

The third case, admitted to city hospital July 1st, was from the bark Crothers, from New York. Date of arrival of the vessel, June 4th; cleared for Liverpool June 28th; therefore, the case must have been admitted directly from the city. Recovered.

By this time the epidemic influence seems fairly at work, but, as yet, in a mild form. Two more cases appear on the register of the city hospital as admissions of yellow fever, July 5th. In the meantime a case had occurred on the 29th of June in the heart of the city, which had been seen by several physicians, in the person of a young German who had arrived by the steamship Harlan from Indianola, a town on the lower gulf line of the State, and but eighteen hours' distant from this city by steam communication. At Indianola the disease was at the time prevailing. Dr. Randall, of this city, had, on the 13th day of July, the fourteenth day succeeding the occurrence of this case, two additional cases—one a servant, the other a young lady at the house occupied by the young German, and who had been a good deal in the room with him. Here seems to have been one of the chief points of infection. Dr. Welch, of this city, says, referring to a period including the second week of July, "a few days after this, rumor was busy at work, and cases were reported in distant parts of the city having no apparent connection with each other."

The first case of yellow fever among the troops at the station appears to have occurred July 1st, in the case of Private Charles H. Cunningham, Company "F," 17th U. S. Infantry, on duty at District Headquarters, admitted to hospital July 3d, but taken ill, he states, two days previous to admission. Recovered. The second case reported was Private Robert Burton, Company "I," 17th U. S. Infantry, on duty at hospital; first ill, as I can best learn, July 2d; no date of admission appears, but he is reported first in the list of cases of yellow fever for the month. Recovered, but subsequently died; death reported of yellow fever; probably a relapsed case. Neither of the cases here mentioned could have been absent from the city prior to the date of attack, while the soldier first mentioned can give no account of any direct exposure through which he may have contracted the disease. The third case was Private Eli Haven, Company "E," 17th U. S. Infantry, admitted to hospital July 5th; died July 9th. The fourth case was Albert Husbaum, Company "E," 17th U. S. Infantry, admitted to hospital July 8th; died July 14th. The next case occured, after an interval of five days, July 13th. Twelve cases appear among the troops during the month, and one citizen employé of the government; total for the month, 13.

Brevet Lieutenant Colonel George Taylor, Surgeon, U. S. A., chief medical officer of the district, was taken with yellow fever on the 31st of the month.

Assistant Surgeon Charles H. Rowe, U. S. A., remarks, in a report of sick and wounded of the post hospital for the month, that the disease is without doubt epidemic in the city, but has not as yet invaded the camp to any extent. The treatment of these cases was extremely mild for the most part. It will thus be seen that sporadic cases occurred early in the year, being nearly a month earlier than I find mentioned for any previous year, including and succeeding the epidemic year of 1853. The type of the disease, early in the epidemic under observation, was mild, not assuming a marked virulent character until toward the close of July, or the first of the ensuing month; toward the close of the month of July the spread of the disease had become quite alarming, while the history of the ensuing month shows the whole city stricken with the scourge.

The entire number of troops in the city July 31st was, including those belonging to the post, Companies "E," "F," and "K," 17th U. S. Infantry, 134; 38th U. S. Infantry, colored, 1; prisoners, 18; and those belonging to District Headquarters, which I estimate approximately at 38; making a total of troops present of 191. On the 19th of August 35 recruits of the 41st U. S. Infantry, colored, were assigned to the post, and quartered, at first, in barrack accommodation; afterward in small tents, in an excellent location, out from and near the line of the barracks, and close upon the water line of the gulf. The regular troops of the post had excellent barrack accommodations. While the surface of the ground occupied by the barracks is low, and, with much of the surrounding locality, objectionable from this cause, yet the immediate vicinity of the open gulf, and the prevalence of the winds from off the sea line the year through, renders the location a comparatively healthy one. The water used is condensed, and also from cisterns.

The number of cases reported among the troops for the month of August was a very large increase over the number reported for July. Brevet Lieutenant Colonel George Taylor, Surgeon, U. S. A., chief medical officer of the district, died on the 5th of the month. "With deep regret the Brevet Major General Commanding announces the death" of Colonel Taylor, since, in the preceding year, he had been a member of his staff. Succeeding Colonel Taylor's death, able medical assistance from the city was employed for the care of the troops. The second death among the troops occurred on the 10th; the third on the 16th. William S. Abert, Captain, 7th U. S. Cavalry, and Brevet Lieutenant Colonel, U. S. A., of the staff of the commanding general, died August 25th, of yellow fever, having, almost immediately preceding his final sickness, placed the remains of his wife in the cemetery ground. Mrs. Abert had died of the prevalent fever. Mrs. J. T. Kirkman, wife of Lieutenant Kirkman, of the staff of the commanding general, died of the fever August 22d. Assistant Surgeon Charles H. Rowe, U. S. A., Surgeon in charge of the post, was taken with yellow fever August 24th. The city sexton's report of interments, which, I think, is not wholly reliable, but sufficiently so to be used as a general statement of deaths from yellow fever, for each third of the month, was, 1st third, 92; 2d third, 146; close of month, 262; additional to the deaths here mentioned are eight deaths marked "unknown;" the larger number of these probably died of the prevalent fever; total interments for the month, 508. This with a population which may be estimated to have decreased 9,000, all who could well do so, and who were unacclimated, having left the city. There remained a population of 15,000; of these, one-fourth may be estimated to have previously had the disease. Again, further deduction should properly be made of the colored portion of the population, who, as a class, were exempt from attack, or, occurring, as it did, in a small proportion of cases, was almost invariably of a mild character.

The month of September records among the troops a large increase of the disease. The city sexton's report of interments for the month was, 1st third, 244; 2d third, 122; close of month, 63; unknown, 11. By the middle of the second part of the month the epidemic seems to have been very perceptibly declining, though the daily report of deaths was still large.

Assistant Surgeon Charles H. Rowe, U. S. A., died on the 4th of the month. "His untiring fidelity during the present epidemic has won for him the esteem and praise of all his fellow-officers." These were the words of the general order announcing his death. To Assistant Surgeon Rowe's untiringly faithful service in the epidemic every one who knew the facts attests, while his success in the treatment of the disease is spoken of in the highest terms.

Brevet Major and Assistant Surgeon Samuel Adams, U. S. A., attending Surgeon, died of the epidemic September 9th. The announcement of his death in general orders bears earnest testimony to his service, in "the decease of another of those heroes who have died at their posts manfully doing their duty. * * * * He leaves behind him a bright example of a christian gentleman and a faithful soldier." Succeeding Colonel Taylor's death, Dr. Adams had added to his duties those of the office of the chief medical officer of the district.

Mrs. Potter, wife of Brevet Brigadier General Potter, of the staff of the commanding general, died on the 11th of the prevalent fever.

Brevet Major General Charles Griffin, commanding district, died on Sunday, the 15th, of yellow fever, having been confined to his house but three days. General Griffin had declined removal to New Orleans, preferring to remain at his present place of duty.

On the 6th of the month, Assistant Surgeon H. M Cronkhite, U. S. A., arrived at the station from New Orleans. Twelve days subsequently my own arrival at the station dates, as above mentioned. The fever existing, at the date of my arrival, in Assistant Surgeon Cronkhite's family, and his own subsequent prostration by the disease, required my presence at the military hospital for the epidemic.

The month of October evidences among the troops the almost entire consumption of the material present.

The following is the city sexton's report of interments for the month: 1st third, 28; 2d third, 16; close of the month, 13; unknown, 8.

On the 3d of October a violent gale and rain storm occurred, inundating by water the entire lower portion of the city, and to a depth of from two to three feet along the strand and immediately receding streets, where, from the filth, the virus of the fever had found its choicest section. It was feared that the result of the storm would, in the presence of the epidemic, be disastrous; yet with this storm the fearful ordeal through which the city had been passing seems to have been well nigh stayed, the subsequent death reports were early lessened, and by the close of the month the history of the fever had been mostly written.

Brevet Major Henry A. Swartwout, U. S. A., Captain, 17th Infantry, and Acting Assistant Adjutant General, died of yellow fever on the 8th of the month, after an illness of little more than three days.

On the almost entire subsidence of the epidemic among us, and on the convalescence of Assistant Surgeon Cronkhite, we, on the 19th of the month, discontinued the hospital as a ward for patients, discontinuing my own hospital work, and removing my office from the building. Subsequently, the hospital at the barracks (which had been used chiefly as a convalescent ward, and for the admission of cases other than of yellow fever) only was occupied.

Succeeding the discontinuance of the military hospital in the city but three additional cases occurred; of these Hospital Steward Henry J. Levy, U. S. A., on duty in my office, was admitted to hospital October 20th, and died on the 31st of the month.

No additional cases occurred among the troops in November; but there was one death, (white,) and this was a continued case.

In the city the fever during November presented but few additional cases; and in December the infection may be said to have entirely run its course.

In this month the city again became occupied by returned unacclimated residents, without any spread of the disease, notwithstanding no ice or frost appeared until in January of the present year.

Before proceeding to the summary of the prevalence of the fever, I should speak of the hospital service, during nearly the entire epidemic season, of Hospital Steward Ernest Cauzler, U. S. A., who, unacclimated, had been placed on duty at the military hospital for the epidemic, having arrived at the station on the 22d of July. On the 5th of September he was prostrated, but early resumed his duty. For a time, when all the medical officers of the army were ill, he was the only one of the department on duty.

I should do injustice to pass over the name of Charles H. Weeks, Sergeant, Company "F," 17th U. S. Infantry, who, unacclimated, voluntarily assumed, at an early period, the immediate duty of an acting hospital steward in the convalescent ward of the hospital and barracks in the city, only ending his faithful service with his life, dying of yellow fever at nearly the close of the epidemic.

I enclose a summary of cases among the troops during the epidemic. The deaths given I find reported in the following order of date, including the date of admission: on the second day, 10; on the third day, 11; on the fourth day, 13; on the fifth day, 15; on the sixth day, 11; on the seventh day, 6; on the eighth day, 3; on the ninth day, 7; on the tenth day, 3; on the eleventh day, 1; on the 12th day, 2; on the 13th day, 2; additional continued cases, 2; unknown, 5. Some of the dates given, occurring in quarters and through the city, are not entirely exact.

The U. S. steam revenue cutter Delaware (on duty in the harbor, but lying well off from the city, in excellent sanitary condition) lost 50 per cent. of the commissioned officers who had the disease; but of a crew of forty-two enlisted men lost but one; and this death, I am informed, was consequent upon a relapse. All belonging to the ship, with one exception, had the fever.

The first interment among the Hebrews of the city was made July 30th. The percentage of deaths among them was about 21.33. As a class, they were very largely unacclimated; more died of those direct from Europe, in proportion, than of those from the northern states whose first season south it was; of the deaths twenty-nine were males and three females; no children.

I enclose, for the information of the department, a statement of cases of yellow fever in the hospitals of the city during the epidemic. First, Island City Hospital, under the charge of Dr. Greensville Dowell. I have taken this from the published report of the hospital. Second, Charity Hospital, under the supervision of the Sisters of Charity, the report of which is furnished me by Dr. James Nagle, managing Surgeon. Of the three Sisters first engaged in the organization of this hospital, all had arrived in the year from Europe; all took the fever; one, the Sister Superior, died.

Two thousand and twenty-six cases were relieved by the Howard Association during the epidemic, including all applications, supposed to have been yellow fever cases. A small proportion of these, however, no doubt, were cases passing through the city, and who were sufferers from the epidemic.

The estimate of the number of cases of yellow fever for the entire city during the epidemic (troops and civilians) approximates nine thousand. This, making a deduction of the colored portion of the population, and of the whites remaining in the city who had previously had the disease, would leave a small margin, including persons entirely escaping attack. Of the total of cases here given, the mortality may be estimated at 14 per cent. The army suffered severely in proportion to its number of cases. The infection chiefly spread at the barracks in the months of August and September, a period including the most malignant portion of the epidemic. Again, it is to be remembered that those of the army were men almost wholly unacclimated. In the mental depression that witnessed so many falling around them is evidenced another fact tending to increase the mortality.

I may here speak of the work of the Howard Association, who, while the terrible scourge was prostrating the heart of the city and decimating its population, laboriously, zealously extended help and comfort in the want and sorrow of the almost pulseless city. To us of the army they extended warm sympathy, and at all times gave their assistance promptly when it was asked. On our own account, I can hardly say too much in their behalf. Mr. Yard, president of the association, has given me much aid in procuring material relating to the course of the epidemic.

The epidemic was one of the most sweeping that has occurred in the history of the city, becoming especially virulent, as has been seen, toward the close of the month of July; at this date, and until toward the latter month of the epidemic, the tendency of the fatal cases was to death by congestion of the brain. In the last month, however, the disease assumed its more ordinary characteristics, expending its force usually upon the digestive organs, and the tendency was to death, attended with black vomit. Thirty or thirty-three per cent. of the fatal cases of the first part of the epidemic may be estimated to have been attended with cerebral congestion, death usually occurring within twelve hours after the supervention of the cerebral symptoms; in many instances death succeeded the appearance of such symptoms much more speedily.

In the fatal cases attended with black vomit, death was apt to occur within 12 or 24 hours after this condition presented; not unfrequently a lesser period intervened; this was not, however, considered necessarily a fatal symptom. All ages and sexes appear to have been equally susceptible of attack, though among children, to the age of twelve years, the disease was almost invariably less virulent. I doubt that the average of deaths among these would exceed five per cent. The comparative mortality

of the sexes was very greatly in favor of the females. The cases of these were, as a rule, more tractable, and greatly modified in severity A peculiar manifestation of the epidemic was that those of this class who were in parturition were among the most tractable cases.

To have had yellow fever in a previous epidemic, I am quite well satisfied, proved a most reliable guarantee against infection in this. I recall no secondary case, in my acquaintance with physicians of the city, of which there was undoubted proof of its character; on the contrary, two of these gentlemen of high standing in their profession, and who individually possessed a very large city practice in the epidemic, saw no secondary case of yellow fever which they knew to be such. One of these gentlemen has been engaged in a general practice in the city much of the period since the epidemic of 1853, and assures me that he has not known a recurrence of the disease. Entire immunity did not belong to persons who had supposed themselves to have been well acclimated by long residence in the city.

In approaching the ground of the communicability of the disease, as evidenced by the epidemic, I do so with the more hesitation, because my observations include but a portion of the time under observation. On the 9th of September, while at the Austin station, 250 miles interior, a healthy limestone section with an altitude of 800 feet, Prisoner Higgings was admitted to the hospital under my charge. While waiting proper accommodation, he had, at one of the hospital tents occupied by other patients, the characteristic vomiting of yellow fever, and was quite yellow after death. No additional case resulted from this; the proper local condition for the dissemination of the disease was not present. In proceeding to this city, in my change of station, I was obliged to pass through infected dis ricts in which the disease was very fatal; and, again, in my subsequent hospital service here and continuous residence in the city, I remained exempt from infection. I am also informed of other and similar cases. Of the Hebrews in the city, some twelve, I learn, escaped the disease. It is true that yellow fever is one of the most searching of epidemics, yet, while cases of exemption were few, no fact was more apparent than that weeks of almost daily exposure to the disease might transpire before the culmination of the exposure in attack. Again, the person who passed freely among cases of the disease was, perhaps, the one to be entirely or longest exempted. I must, therefore, regard the disease as communicable rather by atmospheric condition; by infection, in contradistinction to direct contagion. I am cognizant of no fact of interest occurring during the epidemic relating to the transportability of the disease. I may refer to one fact: the U. S. steam revenue cutter Delaware coaled at the city August 2d; further communication with the city was endeavored to be cut off, as the ship lay some three miles out in the inner roads,) other than to receive the marketing and mail by the cutter of the ship at a point well out from the city; the water used was condensed on shipboard. However, on or about the 24th of August, yellow fever appeared on the ship, a period of twenty-two days after arriving at the city. I think, however, the fact is an imperfect one, as it appears quite probable, allowing infection to have been escaped by other means, that the disease was introduced by the material taken up with the coal in the first part of the month.

It is worthy of note that in the counties of Refugio, Matagorda, Brazoria, and Wharton, lying within the coast range of the infection, the disease did not occur. Neither of these counties includes any very frequented route of travel at any period, and they are especially unfrequented during the epidemic season. At the town of Matagorda, the seaport and entrance of the county of Matagorda, strict quarantine was enforced, entirely excluding the disease. Quarantine was also enforced at Brazoria and Columbia, in Brazoria county, the inhabitants of the towns escaping infection. At Columbus, lying on one of the interior routes of travel from this city and directly within the line of the epidemic, an imperfect quarantine was established. The disease occurred in the town, but, I am informed, at so late a date as not to be alarming. On the other hand, at Bastrop, a healthy elevated interior town of considerable importance, the fever did not prevail as an epidemic, although cases occurred; yet it may be said that continuous communication was kept up with the contiguous town of La Grange, where the epidemic prevailed in an exceedingly malignant form. Again, I quote from an article on the epidemic by Dr. Welch, of this city: "It is worthy of mention, that among our large population resident in the open prairie beyond the limits of the city from two to eight miles, although there were a number of cases, not less than 15 or 20, contracted by persons visiting the city, not a single instance occurred in which the disease was communicated from the sick to the well." In neither of the last-mentioned instances were the proper local conditions for the dissemination of the disease present.

I have noted above cases referring to the period preceding the development of the fever after entering the range of infection, and here give other instances: Sergeant James McArdle, Company "F," 17th Infantry, in charge of a detachment on duty with the Bureau of Refugees, Freedmen, and Abandoned Lands at Matagorda, a place, as I have above stated, free from infection, returned to his company at Galveston on the morning of the 23d of September, having, off Saluria, boarded one of the Morgan line of steamers (plying between Indianola and this city) at noon on the preceding day; on the afternoon of the 1st of October he was prostrated with yellow fever. Private John Collins, of the same detachment, who returned at the same time with McArdle, was taken on the morning of the 27th of September; both were in good health at the time of their arrival in this city. Here was an interval preceding the development of the fever in the first case of nine days, in the second case of five days; or even allowing the first exposure to have been on board the steamer, it could only increase the length of time eighteen hours. Another case, which I have from Mr Briggs, one of the directors of the Howard Association, had been absent from the city on Chocolate bayou, (where, Mr. Briggs says, there certainly was no fever,) returned to the city, and in four days was prostrated with yellow fever.

I think the period of incubation varies much in proportion to the surrounding sanitary condition and healthy habits of life of the person exposed, and serious violations of hygienic principles are very likely to be visited by an early attack; indeed, the history of the epidemic in this city shows that the infection first displayed its force in those sections of the city where, from the filthy condition of the tenements, their foul location, and the presence of a high degree of heat, such a triple combination existed as would be expected, under any circumstances, to depress and destroy healthy action.

The department is informed of the sanitary precautions and protective course pursued among the troops at Brenham, Texas, where the disease was very virulent. I may mention a somewhat similar protective course pursued successfully by some unacclimated persons in this city, which I have from the president of the Howard Association. These persons were in the city

during the entire season, taking a small quantity, frequently, of an acidulated (acid sulphuric) solution of quinine, with an additional slight quantity of spirits of nitric ether. Of eleven persons who used this, all escaped infection. In both instances above mentioned the course must have been promotive of a healthy condition of the system. So these facts go far to establish the principle that a healthy system is, in a large measure, a guarantee against infection.

Among my cases occurring among the troops, I find the paroxysm of fever preceded by the premonitory symptoms of a day or two in duration, the patient complaining of feeling unwell, but endeavoring to continue his duty; or, again, being well until about the time of being taken with the chill with which the paroxysm of fever usually made its appearance; the chill was accompanied with or succeeded almost invariably by pain in the head, neck, and back; pulse 120; tongue furred at the centre, moist, and with scarlet edges, or, perhaps, somewhat pale; again, near the point and edges, the papillæ projected through the light coating; the eyes frequently injected; thirst extreme. Early in the disease the stomach and bowels were, as a rule, not affected to any extent. I have, however, seen the stomach excessively irritable from the first.

In severe cases the nervous anxiety and the restlessness early in the paroxysm of fever was excessive; this, in the progress of the case, was succeeded by a want of mental restraint, resembling a mild form of mania, the patient not realizing his danger, thinking himself capable of much exertion, and impatient of restraint, yet committing the most preposterous acts.

I have witnessed, at an early period of the disease, livid, dark, crimson edges of the tongue, exhibiting imperfect aeration of the blood, and, in severe cases, indicating the approach of dissolution. This I recall in the case of Brevet Major Swartwout, whose death was one of the most remarkable I witnessed, from the gradual approach of dissolution, retaining his mental faculties until toward the close of his sickness. The paroxysm of fever in the cases under my observation continued, as a rule, from 48 to 72 hours. Comparatively few of my cases had suppression of urine. I ascribe this more especially, however, to the use of chlorate of potash in my treatment. I do not recall a case, in which the use of this was continuous, that this symptom presented. With convalescence almost invariably commenced (at the period of the patient's first going into the open air) a desquamation of the entire cuticle, making the course of recovery to the patient quite uncomfortable by the attending pruritus.

At the military hospital for the epidemic, the ward occupied was large, could be well ventilated, and obtain in its entire extent the prevalent breeze directly from off the open gulf. The ward was with much care disinfected with diluted carbolic acid. I found, in trying to obtain proper ventilation, much direction of the nurses was required in order to secure fresh air without draft directly upon the patients. During much of the period of the epidemic the department had employed acclimated civilian nurses, at a large rate of compensation. Some of the men employed were excellent nurses in individual capacity; but had I again a similar hospital charge, I should prefer, in the care of a large ward, acclimated—could these be obtained—reliable enlisted men of the army, under the direction of capable, faithful wardmasters; and I think I should find in such a corps better discipline and attention than civilians would give, who are necessarily men employed for but a limited period. During the earlier part of the epidemic several men of the command voluntarily entered the hospital for the epidemic as attendants; these men were unacclimated; such devotion to duty is worthy of highest praise. The course of treatment pursued was, in general terms, intended to modify and control the disease in its course. In any complication the treatment which clinical experience has indicated was modified by a knowledge of the characteristics of this epidemic. Could the patient live over seven days subsequent to the attack, his recovery was, as a rule, established. The general course of treatment pursued at the hospital differed somewhat with the physician. The course of Dr. Moran, of the city, was directed to making the covering of the patient comfortable, and yet using, during the active fever of the first paroxysm, sufficient covering to keep up the action of the skin. At first the mustard foot-bath and the efficient use of castor oil, restricting the use of the foot-bath to the period of the chill, or the early period. Subsequently the following: sulphate of magnesia, one ounce and a half; tartrate of antimony and potassa, one grain; diluted sulphuric acid, half a drachm; distilled water, ten fluid ounces—mix. Take one fluid ounce at a dose. Given in the first paroxysm to moderate febrile action—more or less a purgative, according to use—preferring, if the patients were of a full system, to reduce them freely and actively, in order to avoid tendency to local congestion. After the bowels had been moved, the following was given: infusion of linseed, one pint; tincture of hyoscyamus and chloric ether, of each, two fluid drachms—mix. Dose: a tablespoonful frequently repeated, almost as frequently as the patient desired to use it.

After the severity of the first part of the attack had passed, the above-mentioned magnesia mixture was used as an occasional laxative, or as required by the condition of patients, combined, if there was costiveness and torpid secretions, with mercury and chalk and a sufficient purgative. During the earlier stages of the attack the mildest diet should be adhered to, with a little cool water, without ice.

Dr. Dowell's general course of treatment was somewhat at variance with the above. In the earlier part of the attack, if the bowels had been moved, he used the mild chloride of mercury in combination with sulphate of quinine and Dover's powder, nine grains of each, divided into three powders; one to be taken every three hours. If the fever was high, skin dry, tincture of aconite with spirits of nitric ether was in favorite use. Small quantities of ice, ice water, and iced lemonade were frequently given (each time a small amount.) Nourishment, from an early period in the febrile paroxysm, was given, as a rule, first in the form of mucilaginous drinks, to be quite early followed by a much more liberal use of food.

My own preference was for the early use of the mild chloride of mercury, succeeded, when the stomach was sufficiently retentive, by the free purgative use of castor oil; subsequently the action of the mercury, and almost invariably the chlorate of potash in small amounts, when the condition of the stomach would permit.

I cannot speak very favorably of the use of quinine. In my own course I early discontinued the use of quinine in combination with blue mass, and think the nourishment of the patient may well be extremely light until the system has passed through the earlier part of the attack, and then it requires to be guarded. Yet I have seen injurious results in allowing the patient to become exhausted from the continued want of requisite nourishment. Had I to decide as to the use of ice or ice water to relieve thirst, I should use only the latter, as a rule, pleasantly cool, and only in a small amount at a time. If there was determination to the head or stomach, Dr. Dowell preferred cups and the use of blisters. Dr. Moran judged the use of injections most efficacious. Blisters, to any considerable extent, I think injudicious, through the consequent irritation. Everything tending

to produce nervous excitement of the patient in this disease is to be carefully guarded against. If vomiting was present after the febrile paroxysm passed, both of the following prescriptions were efficacious. Of the first, used in the practice of Dr. Dowell, I must speak in especial commendation: Brandy and distilled water, of each, two fluid ounces; creasote, twenty drops; sulphate of morphia, ½ a grain—mix. Dose: a tablespoonful every two hours, or after each attack of vomiting, if not too frequently repeated. In the service of Dr. Moran the second was used, which I think worthy of trial: acetate of lead, six grains; acetic acid, one fluid drachm; distilled water, one fluid ounce—dissolve. Dose: tablespoonful every fifteen or twenty minutes if the vomiting was excessive; otherwise at a longer interval, or only after vomiting. In addition, camphor and ice were applied over the larynx, to relieve hiccup, which almost invariably preceded the characteristic vomiting of the disease. Ice with turpentine, used in the same manner, proved valuable.

Dr. Dowell, in his practice, speaks well of the use of five to ten grains of oxalate of cerium; and also favorably of the valerianate of bismuth in order to produce sleep and allay restlessness. Where the patient tolerated the use, I have used the subnitrate of bismuth in sedative doses to allay vomiting after the paroxysm of fever, but not with sufficient satisfaction to speak favorably of it. I am able in my practice to speak of the very prompt and beneficial action of the spirits of nitric ether used by the rectum in suppression of urine when the stomach would not tolerate the use. To allay restlessness after the febrile paroxysm had passed, I have used as an injection, and I think with good result, extract of valerian, one fluid drachm, and oil of turpentine, ½ a fluid drachm, combined and given in starch water. In extreme nervous excitement the extract of hyoscyamus, with pulverized camphor and extract of valerian, is an excellent combination for an injection. In convalescence I used, to quite an extent, the infusion of cinchona; if the patient was much reduced, brandy or porter was in favorite use at the hospital. I had but one patient whom I bled, (a man of full system,) which I did to remove commencing convulsions; the case, however, resulted fatally. I am cognizant of the advantageous use of the lancet, and with the most happy effect in the commencement of the attack where the nervous excitement was greatly exalted, attended with much irritability of the stomach. Negroes, in the fever wards, progressed most favorably under abundant nourishment, with morphine to stimulate them and obtund sensation.

A prominent endeavor, on the part of the physician in this disease, should be to obtain control of the mind of his patient. It is true that while a calm, hopeful mind will do much in the way of recovery, its opposite may be one of the most alarming conditions, preventing and thwarting every labor and hope of the physician.

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

C. BACON, JR.,
Assistant Surgeon, and Brevet Major, U. S. A.

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

Tables appended to the Report of Brevet Major C. Bacon, jr.

1. SUMMARY OF CASES OF YELLOW FEVER AT THE POST OF GALVESTON, TEXAS, DURING 1867.

1867.	Commis'ned Officers.			Enlisted Men, White Troops.									Enlisted Men, Colored Troops.									Government Employés.									Grand Total.		
				Taken sick.			Recovered.			Died.			Taken sick.			Recovered.			Died.			Taken sick.			Recovered.			Died.					
	Taken sick.	Recovered.	Died.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	In hospital.	In quarters.	Total.	No. of all cases taken sick.	No. of all deaths.	No. of all recoveries.
July	1	....	....	11	....	11	7	....	7	2	....	2	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	13	2	7
August	3	2	2	62	8	70	10	1	11	15	....	15	2	....	2	1	....	1	1	....	1	4	....	4	3	....	3	....	....	....	79	18	17
September	6	2	3	98	11	109	59	3	62	48	7	55	2	....	2	1	....	1	1	....	1	7	....	7	4	....	4	4	....	4	124	63	69
October	3	2	1	11	1	12	26	3	29	7	....	7	1	....	1	1	....	1	....	....	....	....	....	....	1	....	1	....	....	....	16	8	33
November	....	1	....	.....	....	.....	7	6	13	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	1	14
Total	13	7	6	182	20	202	109	13	122	73	7	80	5	....	5	3	....	3	2	....	2	12	....	12	8	....	8	4	....	4	232	92	140

Ratio of deaths per 100 = 39.65.

NOTE.—The above table contains 3 cases and 1 death of white troops more than table 2, page 71, which latter is believed to be correct, being compiled from the actual list of names given by Assistant Surgeon Cronkhite.

2. SUMMARY OF YELLOW FEVER CASES IN GALVESTON CITY, AND CHARITY HOSPITALS, DURING 1867.

Epidemic 1867.	Admitted.							Recovered.			Died.			Grand Total.			Ratio of deaths per 100.	Remarks.
	Whites.	Colored.	Total.	Males.	Females.	Unknown.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	No. of all cases admitted.	No. of all recoveries.	No. of all deaths.		
Island City hospital	495	31	526	496	30	.....	526	350	25	375	146	5	151	526	375	151	28.51	Five cases of colored
Charity hospital	241	.....	241	199	34	8	241	142	26	168	65	8	73	241	168	73	30.29	died out of 31 cases.
Total	736	31	767	695	64	8	767	492	51	543	211	13	224	767	543	224		

U. S. A. Post Hospital, Galveston, Texas, *April* 17, 1868.

General: In response to your communication of the 11th instant, inquiring as to the number of citizens who died of yellow fever in this city in the epidemic of 1867, I have the honor to enclose the city sexton's report of interments from July 27th to November 11th, inclusive, a period including most of the epidemic. The summary of the records I enclose estimates the 1,134 interments to have been of yellow fever. For the period reported, it is impossible to obtain an entirely accurate estimate. Yellow fever is known to have been in the city since the preceding month of June. The sexton furnishes me with a list of 14 interments of yellow fever, and one of jaundice, for July, not including enlisted men of the army. This increases the number for the period reported to 1,149; to this, I judge, may be added in July and in the latter portion of the epidemic—say 50 to 70 deaths from yellow fever, incorrectly reported as due to congestion of the brain, inflammation of bowels, and miasmatic and typho-malarial fevers. Not only was cerebral congestion one of the prominent characteristics of the epidemic, but also the tendency to other local determinations is well known to be, in this disease, influenced by the peculiar health and habits of the system of the person attacked. And, again, in the presence of a sweeping epidemic, almost all sickness more or less partakes of the type of the prevalent disease. If we estimate 15 deaths from yellow fever for the close of the epidemic not given in report, we obtain a total of 1,234, which, less 5 officers and 49 soldiers, leaves 1,180 deaths of civilians.

I yesterday mailed to Colonel Webster my report of the epidemic, in which I had collected considerable material of interest relating to the rise and course of the fever in the city.

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

C. BACON, Jr.,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General T. A. McParlin, U. S. A.,
Medical Director 5th Military District, New Orleans, La.

VICTORIA, TEXAS.

Victoria, Texas, *September* 24, 1867.

General: I have the honor to report, in compliance with circular order, the first case of yellow fever at this post of which, personally, I have any knowledge. The patient was T H. Leeds, quartermaster's agent at this place. He is now under treatment by me, progressing favorably.

Health of troops, under existing circumstances, most favorable. Every precaution has been adopted to enforce a strict sanitary police. No communication allowed between the troops and the citizens of the town.

I am hopeful in believing that I will not have any yellow fever cases in military hospital.

I have the honor to be, with great respect, your obedient servant,

JOHN RIDGELY,
Acting Assistant Surgeon, U. S. A.

Brevet Major General Joseph K. Barnes, *Surgeon General.*

Extract from Monthly Report of Sick and Wounded, Victoria, Texas, September, 1867. *Acting Assistant Surgeon J. Ridgely, Companies "B," "D," and "H," 35th Infantry.*

Yellow fever is now epidemic, combined with a favorable endemic condition. Two-thirds of the citizens are down, or have been sick with the disease. The mortality with them, so far as I can learn, is very heavy. With the troops, no deaths as yet.

New Orleans, Louisiana, *November* 26, 1867.

Major: I have the honor herewith to transmit special reports of yellow fever at Victoria, Texas, for September and October, 1867.

The names and military history of the men I am unable to give. Having only a detachment hospital, no record is kept except the morning report and prescription book. I have applied to headquarters of the regiment at San Antonio, Texas, for the information; but as so much time has elapsed since the report was overdue, I send without it.

I would respectfully state that I reported for duty at Victoria August 27th, at which time most conflicting reports were prevailing as to the existence of yellow fever in the town. Necessarily much occupied with my official duties, having a large

sick call of endemic diseases, I had neither time to make a diligent inquiry, nor did I wish to subject myself to the personal discourtesy which, as a federal officer, I would have received, even when laboring in such a service. Finding that my views of the advent of that deadly scourge, yellow fever, conflicted widely with the opinions of those high in rank and power, and not having either health or mental ability now to urge them, I would respectfully say, in conclusion, that I know of no specific treatment for yellow fever. On the other hand, I would be understood to say that, to my own knowledge, too much medication has been resorted to, and that quinine has been used to such an extent as to become a poisonous agent. In no other way can I account for the mortality in Victoria. There, I am told, persons ranged before the counter of the apothecary ranks deep, the prescription being the same—30 grains quinine, 10 pills. * * * * * * * * *

I placed the sick man in a hot bath enveloped in blankets; had him supported therein till he became faint, and then removed to bed; gave him 30 to 60 grains of quinia, with 10 grains of bismuth; in two hours a mercurial purge; allaying irritability of the stomach by mustard sinapisms, (mustard that would act,) with 8-grain doses of bismuth, lime-water and milk together, and, strange to say, beef essence, which I found to be the most effective agent. I have used the bisulphite of soda with marked success. Mrs. Lathrop was treated with it by me.

In conclusion, I would, with all due deference, say that there are cases in which all human interference avails nothing. Such was the case of the late Brevet Major S. H. Lathrop.

With every consideration, I have the honor to be your obedient servant,

JOHN RIDGELY,
Acting Assistant Surgeon, U. S. A.

Brevet Major C. BACON, Jr., *Chief Medical Officer District of Texas.*

SEDGWICK HOSPITAL, GREENVILLE, LA., *January* 10, 1868.

GENERAL: I have the honor to present the following statement, in lieu of the report forwarded to the chief medical officer District of Texas.

When I reported for duty at the temporary post of Victoria, Texas, (August 23d, 1867,) I found a great state of excitement, consequent upon a report which the physicians of the town had made, that yellow fever was prevailing as an epidemic. Conflicting statements prevailed, both as to the truth of the report and the origin of the disease. As for myself, knowing none of the physicians of the place, and not wishing to subject myself to discourtesy by asking questions of strangers, I have no definite knowledge as to the prevailing opinion of its origin in Victoria, but believe that the disease was introduced from Indianola, Texas.

Being occupied in consolidating the men, getting them out of the weather, (as it was raining continually,) and establishing a detachment hospital, and not having any assistance, no soldier in the command being qualified to act as hospital steward, every moment of my time was taken up from the time I reported until I was taken sick; therefore, I know nothing but from hearsay testimony, and that of a conflicting character, as to the history of the first cases of yellow fever in the town of Victoria.

As to my own men who were taken sick with the disease, the first, second, and fourth on the list had been treated by me for remittent fever for a considerable time; they were convalescent from that disease when attacked with yellow fever, but still inmates of the hospital. Meyers was on detail duty at the commanding officer's quarters, sleeping over a stable in a log-house in the rear of the quarters—a most unhealthy locality. I had broken up this place, but, as the discipline was lax, several of the men would resort there. Crighton was detached as baker, employed in the town, and was taken sick there. Paradise, being a Hebrew, had permission to attend the Jewish New Year festival, and was taken sick while absent. Nelson was detached as clerk at Major Lathrop's quarters, and was taken sick in town. Moore and Colter were hospital attendants. Colter was taken sick in my quarters while acting as nurse to me. Good had just returned from Halletsville. Downing had been sleeping, contrary to my order, in the aforementioned log-house. The two last cases were of a highly malignant character.

It appeared to me that the epidemical influences were greater with the citizens of Victoria than with the troops, and that, among the latter, the influences were endemic. Beyond a doubt, yellow fever prevailed in the town of Victoria as an epidemic, and so affected the citizens; but with the troops the disease was modified or changed by endemic influences, those soldiers who had been treated for remittent and intermittent fevers escaping, or having the disease of a mild type; whereas two of the fatal cases had never been to sick call until taken with yellow fever.

I would respectfully state that I know of no specific treatment for yellow fever. On the other hand, I would be understood to say that, to my knowledge, too much medication has been resorted to, and that quinia has been used to such an extent as to become a poisonous agent. In no other way can I account for the great mortality among the citizens of Victoria.

Unless one takes into consideration the different characters the disease assumes in different localities, and even in each separate case, and does not allow himself to be misled by resorting to medication for every vagrant symptom that may present itself, he had better leave the sick man to nature and the disease, for by so doing the struggle will be more equable.

In most of my cases abortive treatment was used; whether the result was from that treatment or otherwise, I cannot say.

I have the honor to be, with great respect, your obedient servant,

JOHN RIDGELY,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. MCPARLIN,
Medical Director Fifth Military District, New Orleans, La.

GOLIAD, TEXAS.

LAKE TRINIDAD, TEXAS, *April* 28, 1868.

SIR: I have the honor to acknowledge the receipt of your communication of March 24th, 1868, relative to the yellow fever at Goliad, Texas. The presence of the fever at Goliad was, in my opinion, consequent upon intercourse with the neighboring town of Victoria, 28 miles distant, where the disease prevailed some time previous to any cases occurring in Goliad. Heretofore, when the disease has existed on the coast, and in some of the interior towns, Goliad has been exempt. No local cause, I think, produced the yellow fever in Goliad. It is a place noted for health, and situated on high ground, with no swamps or stagnant water for several miles around. Communication between Goliad and Victoria was uninterrupted during the prevalence of the epidemic at the latter place, and many refugees resorted to Goliad to escape the disease. The disease existed in Goliad about three weeks before the troops were attacked. In consequence of the fever making its appearance in the town, a quarantine was established, allowing no soldiers to leave camp or citizens to visit there. The camp was situated about a quarter of a mile from the town. About one-ninth of the entire population were attacked, and there were about twenty-five deaths among the citizens. The comparatively few cases among the troops was, I think, in consequence of the rigid quarantine enforced.

Very respectfully, your obedient servant,

COLUMBUS J. WHITE,
Acting Assistant Surgeon, U. S. A.

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

HOUSTON, TEXAS.

HOUSTON, TEXAS, *November* 30, 1867.

The following statement in regard to the first appearance and subsequent progress of yellow fever, as it occurred at this post during the months of September, October, and November, 1867, is respectfully submitted:

The first cases of yellow fever in the city of Houston were brought from Galveston in the second week of August, where the disease was at that time prevailing epidemically. The number of new cases gradually increased from this time forth till about the 20th of August, when the fever was declared epidemic. The first case of yellow fever among the troops at this post occurred on September 7th, terminating fatally on the 11th by the supervention of a violent congestive chill. This was the case of Private Matthew Hale, Company "D," 17th U. S. Infantry, who had for some weeks been employed as teamster, and was consequently compelled to visit the city daily for drinking water and other purposes. Brevet Colonel J. D. O'Connell, U. S. A., Major 17th U. S. Infantry, commanding this post, who was at that time residing with his family at the Hutchins House, in this city, was attacked by the fever September 12th, and died September 16th. Mrs. O'Connell took the fever on September 13th, and died on the morning of the 19th. * * * Captain Lyman H. Warren, U. S. A., commanding Company "C," 17th U. S. Infantry, was taken with the fever on September 15th, * * * * and died at an early hour on the morning of the 18th, having ejected during the night large quantities of black vomit.

During the month of September the fever made but slow progress among the troops, 15 cases occurring in all, of which number 5 died. On the 30th of September there remained under treatment 4 cases, all of whom died during the first week of October. In October, however, the fever made rapid progress, 54 cases occurring, 20 of whom died. On the 31st of October there remained under treatment 7 cases; 2 new cases occurred on November 1st and 3d, respectively, all of whom recovered. There occurred in all 71 cases, 25 of whom died.

The extreme virulence of the prevailing epidemic influence—the fact that all our men were entirely unacclimated—the impossibility of effectually establishing complete non-intercourse of the men with the inhabitants of the city—the prevalence of the violent north winds during the greater part of September and October, to which our camp, otherwise very favorably situated, was exposed—and the unfortunate circumstance that so many of our convalescents, in spite of all our endeavors to prevent it, clandestinely managed to procure for themselves improper articles of diet, in which they imprudently and voraciously indulged, thereby causing relapse, which proved to be much more severe and fatal than the original attacks—all these causes combined go far to account for the heavy mortality among this command during the past epidemic. * * * * * * *

The general sanitary condition of the troops composing this command before yellow fever became epidemic in the city was very satisfactory, no death having occurred during the year; and, with the exception of the months of July and August, when an increase of intermittent and bilious remittent fever cases was observed, there was but very little sickness at any time in the command. As soon as yellow fever was known to exist in Galveston, we had every reason to infer that it would also soon make its appearance here; and as our old camp was at that time on the north side of the Buffalo bayou, exposed to the generally prevailing south winds, sweeping over the entire extent of the city, and as it had been proved by the experience of previous epidemics that the mortality had invariably been much heavier in the northern portion of the city than elsewhere, I advised Colonel O'Connell, commanding the post, to move the camp, for obvious hygienic reasons, to the extreme eastern portion of the city limits. Colonel O'Connell coinciding with me, our camp was accordingly moved during the latter part of July, particular attention being paid in selecting favorably situated grounds, where we also had the advantage of being able to obtain readily a suitable building for the purpose of establishing a hospital therein, in case it should be necessary to do so.

Having stated that the generally prevailing winds were from south to north, I would here observe, that during September and October, contrary to the general rule, the prevailing winds were from the reverse direction. In order to attain the highest possible hygienic standard in the command, all due attention was paid to the rigid enforcement of every sanitary measure known and attainable. The entire extent of our camp ground was thoroughly policed daily; large fires of pine wood and tar were made nightly at various points around and inside of the camp; the different disinfectants were freely used about the sinks, kitchens, &c., and doses of quinine and whiskey dealt out to every man in the command regularly every morning and evening as a prophylactic against general miasmatic infection.

Colonel O'Connell, anticipating the outbreak of the epidemic, sought and got permission from Headquarters District of Texas to employ, in that event, more medical help; and as no medical officers could be obtained from the department in order to render such temporary aid at this post, he authorized me to make arrangements with an acclimated citizen physician, well acquainted with the pathology and treatment of yellow fever, to act as my assistant during the prevalence of the epidemic among our troops, with the understanding that he should consent to be in constant attendance with our sick in camp, day and night, until the epidemic had entirely subsided. Such an agreement I accordingly made with Dr. J. W. Daniel, of Houston, who entered on the discharge of his duties September 19th, and continued to attend our sick, in conjunction with me, and under my special supervision, until November 20th, when, nearly all our men being able to return to duty, his services were no longer needed.

The yellow fever, as it prevailed among the troops stationed here, was essentially the same as I observed it among the citizen population of Houston, in its prevailing tendency to assume the intermittent and congestive type, complicated frequently during its course by hæmorrhages from the nose, stomach, and anus. Among the citizens of Houston the same well-marked peculiarity in the manifestation of the past epidemic was observed that was noticed in Galveston and New Orleans, distinguishing the epidemic of this year most essentially from previous ones by its most sweeping and universal character, no class of the population being able to claim the least immunity from its ravages. Heretofore the majority of the most experienced members of the medical profession practising in yellow fever districts firmly believed that the fever rarely, if ever, would a second time attack the person that undoubtedly had it before; that people residing for a long time in yellow fever districts were much less liable to its attacks than newcomers from places where it was never known to have occurred; and that small children, born and raised in fever districts, as well as colored people, were nearly exempt from its ravages, or, in case they did take it, experienced generally but very light attacks.

The experience of the last epidemic has most incontrovertibly proved the utter fallacy of these tenets, as a great many instances are known of persons having the fever this year a second time; and of others, claiming to be perfectly acclimated, taking it quite severely and dying of it; and of numbers of children and colored people suffering severe attacks of it with fatal results.

Considering the great virulence of the prevailing epidemic this year, it is no matter of surprise that all of our soldiers, being entirely unacclimated, should have taken it, with the exception of eleven. During the first five months of this year very little sickness prevailed in Houston and vicinity; in June and July, however, a great number of bilious remittent and intermittent fever cases occurred, with a well-marked tendency to assume a pernicious and congestive character.

That the first cases of yellow fever observed in Houston occurred in persons that contracted the disease in Galveston is proved beyond doubt; but it is quite as certain that on account of the excessively muddy and filthy condition of the city and all its streets, caused by the long-continued rainy season during May and June, and the utter negligence on the part of the city authorities to attend to proper drainage and the removal of the accumulated filth from the streets, gutters, and yards, together with the unusually high range of the thermometer during July, August, and September, there was cause enough for the epidemic influence, once brought here, to take root and spread.

As soon as the fever became epidemic in the city, the post quartermaster of this station, Lieutenant Wm. M. Van Horne, upon my recommendation, rented a building close to our camp, which I immediately fitted up as a hospital for yellow fever patients, and had my three hospital tents pitched in the rear of it for the accommodation of the convalescents. Having, by necessity, to meet the approach of the grim visitor, every precautionary measure that hygienic knowledge and experience could suggest was, if possible, more rigidly than ever enforced throughout the command, in order to be thoroughly prepared to battle with the insidious enemy; for, situated as we were, and unable to maintain complete non-intercourse of our men with the citizen population, we could hardly expect to escape more or less speedy attacks.

All of our men being unacclimated and liable to contract the fever at the slightest exposure, it became necessary, as soon as the disease was among us, to employ acclimated citizen nurses conversant with the nursing and general management of yellow fever cases.

As regards treatment, according to the difference in type and character of the fever in individual cases, different indications arose and various methods of treatment were resorted to; generally speaking, however, the principal aim was to interfere as little as possible with nature's own resources and recuperative endeavors whenever powerful and energetic enough to bring about a cure. * * *

the surface of the body became either hot and dry, or cold and clammy, the application of hot bricks, enveloped in woolen rags saturated with vinegar, to the soles of the feet and knees, almost always sufficed to bring about very speedily the desired moist state of the skin. In order to counteract the septic influence of the fever poison on the composition of the blood and mucus membranes of the stomach and bowels, a tablespoonful of solution of two drachms of either the sulphate of magnesia or hyposulphite of soda, in six ounces of water, or a teaspoonful of chlorine mixture, (prepared by mixing together two ounces of hydrochloric acid, two ounces of water, and two drachms of chlorate of potassa, and taking from this mixture one fluid drachm, to be added to eight ounces of mint water,) was, in some cases, ordered to be given every three or four hours. If, on the fourth day, the fever had nearly abated and no untoward symptoms of any kind were observable, the patients were generally allowed small quantities of some bland, mucilaginous, and slightly nourishing drink, such as barley slime, oat or cornmeal gruel, &c.; the day after, perhaps a little weak beef tea and brandy toddy were added; and on every succeeding day the quantities and variety of nutriment were very carefully and gradually increased till full convalescence was established. In those cases where excessive dryness of the skin was, from the beginning, a noticeable feature, and where the repeated applications of hot mustard pediluvia, hot moist bricks, and rubbing the body and extremities with either dry mustard powder or hot stimulating lotions seemed to be of little or no avail, nothing has succeeded better in my hands, in order to bring about reaction and establish free diaphoresis, than resort to the cold wet-pack; that is, enveloping the patient in a cold wet linen sheet, and rolling him up very closely in three or four woolen blankets. If, in such conditions, the resort to this wet-pack is not too long deferred, it generally acts like a charm in soon producing very profuse perspiration and abating the excessive heat and often insupportable cephalalgia. Care must be taken not to let the patient remain too long in the pack—two or three hours are generally sufficient; when he should be quickly taken out and the surface of his body thoroughly rubbed off with rough towels and well covered up afterwards. Another admirable method of treating such cases consists in applying several smaller wet sheets, under a good cover, over the entire surface of the body, and changing them as often as the sheets become hot and steaming. In cases early showing an irritable state of the stomach, with a sensation of heat and oppression about the precordia, the frequent administration of a half tablespoonful dose of the chlorine mixture above mentioned had the happiest effect in allaying these untoward symptoms. In others, however, where this remedy seemed to do no good, and where nausea and vomiting supervened, I often succeeded in effecting a change for the better by giving, every two or three hours, a tablespoonful of a mixture of subnitrate of bismuth in creasote water, and chloroform, in conjunction with applying a blister to the region of the stomach.

In cases where patients were of very robust, plethoric habits, and seemed to be threatened, soon after taking the fever, with symptoms of general congestion, I promptly bled them from the arm to the amount of from twelve to twenty-four ounces, following it up in some instances by free cupping, after a lapse of eight or ten hours, and I am satisfied that by doing so I saved their lives. In others I applied counter-irritation in the form of small blisters to the extremities, and feel convinced that it did good service as a derivative in a good many instances. In cases where the patients were taken with a severe chill, during the the first intermission of the fever a powerful dose of quinine was ordered, and sometimes with the best effect, as chills hardly ever recurred again, and the subsequent fever was very light and easily subdued.

Before closing this report, I will take this occasion to attest to Dr. J. W. Daniel's very faithful performance of his arduous duties; to the untiring labor and energy displayed by him on all occasions; for to his intelligent and valuable services are due the saving of many lives and the alleviation of the suffering of all our patients. Much praise is likewise due to Lieutenant Wm. M. Van Horne, commander of this post since the death of Colonel O'Connell and Captain Warren, for the prompt and efficient manner in which he supplied me with everything needful for the comfort of our sick during the trying time of the late epidemic. Our supply of various articles of diet, stimulants, bedsteads, mattresses, sheets, &c., becoming exhausted, and not being able to obtain these articles in time from the medical purveyor at New Orleans, I was obliged, several times, to make requisition on him as post quartermaster in order to supply our immediate wants.

All of which is respectfully submitted.

F. HASENBURG, M. D.,
Acting Assistant Surgeon, U. S. A.

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

HEMPSTEAD, TEXAS.

HEMPSTEAD, TEXAS, *April* 6, 1868.

SIR: In compliance with your request, I have the honor to inform you that yellow fever was introduced here from Galveston' It first apppeared amongst the citizens, one Vorhees, from Galveston, who died here in August, 1867, being the first well authenticated case, so far as I can learn. Several citizens were attacked soon afterwards, and on the 6th of September one of the officers of this post was taken with it. None of the privates were attacked until near the middle of the month.

Very respectfully, your obedient servant,

F. A. WILMANS,
Acting Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel WARREN WEBSTER, *Surgeon-in-Chief.*

BRENHAM, TEXAS.

BRENHAM, TEXAS, *December* 2, 1867.

SIR: In accordance with your instructions, I have the honor to submit the following report relative to the prevalence of yellow fever in this town, and the remarkable fact that the troops stationed here have escaped entirely:

On the 8th of August, James A. Devine, late Captain, U. S. Volunteers, and at that time on duty in the Bureau of Refugees, Freedmen, and Abandoned Lands, came to this post en route for the interior. He left Galveston the day before, the yellow fever prevailing there at the time. The next evening, at 4 o'clock p. m., while in camp, he complained of feeling unwell, and went to his hotel; in a short time he sent for me. I saw at once symptoms of yellow fever, but he insisted that he had had the disease, and I was not certain as to his case until the day following, when yellow fever was plainly developed. On the 13th instant he died with black vomit. This was the first case that occurred in Brenham. No apprehensions were then felt that the disease would assume an epidemic form, as there had never been but two cases of the fever in Brenham, and those were persons who had come from an infected district a few hours before they were attacked by the disease. I think there were one or two cases reported by resident physicians during the two weeks subsequent to Devine's death, when the disease became epidemic, and its ravages were most fearful; whole families were swept away, every family suffered, and the inhabitants became terror and panic stricken. About this time I chanced to hear that mustard seed (sinapis alba) had been used successfully as a prophylactic against yellow fever, and remembering to have seen it used on the Isthmus of Panama as a preventive against intermittent fever, I thought that if I adopted the use of something of this kind, and could lead the men of this command to believe that they were safe from the disease, it might, perhaps, have a good moral effect upon them. Through your kind assistance I procured a large supply of mustard seed, and gave a tablespoonful, with an ounce of whiskey, to all in the command, including servants and laundresses; this was given daily, at 11 o'clock a. m., up to this date. We have had a heavy frost, and I now believe the fever to have left us entirely.

Our camp is located in the town, about one-fourth of a mile from the centre. During the epidemic there has been more than one hundred and fifty fatal cases among the whites, and half that number among the blacks. Almost the entire population who remained in town have had the fever; every house in the vicinity of our camp, and at every point of the compass around it, has had fatal cases of the disease—one house, in close proximity, lost six members of the family. Our men were exposed to the disease as much as any others living in town, they being compelled to go through town for wood and to the depot for supplies. Two of these men nursed a case of the fever. What conclusion, if any, can we draw from these facts? Here is a camp in which are sixty souls, located in a town where yellow fever is epidemic, and of a most malignant type—where, in every occupied house, from one to ten cases of the disease may be found—where, at one time, scarcely people enough could be found to bury the dead—these sixty souls breathing the same atmosphere, and exposed, in every way, as much as any of the inhabitants—not scattered, but living together—escaping without one case. Troops ordinarily suffer as much from any prevailing disease, perhaps more, than any other class. At Hempstead, but twenty-two miles from this place, the troops have, as you know, suffered terribly. I might remark here that our camp has been a very clean one. As early as June 1st I gave my careful personal attention to disinfectants; the camp was disinfected twice daily with sulphate of iron, and all wood-work frequently whitewashed; the tents were raised eighteen inches from the ground and lime thrown under them; the ends of the tents fronting north and south were made of lattice-work, giving a free circulation of air. I am not prepared to say that white mustard seed will prevent an attack of yellow fever; but this body of people have entirely escaped, and I can safely say that they are the only ones in the town who have escaped, and they have been exposed equally with all. Not one of these men was acclimated. A clerk from Galveston en route to Austin was taken with the fever in one of the tents of the command; he had slept with one of the men the night previous. Not a person who has taken the mustard and whiskey has taken the fever. We know that the mustard promotes the action of the kidneys, stimulates the digestive organs, and creates a moisture upon the surface of the skin. While the troops have, in this State, suffered terribly, we have escaped; whether it be mustard seed, or whatever the preventive may have been that has kept us preserved from the disease, we can but feel thankful that we have escaped.

Very respectfully, your obedient servant,

CHAS. E. WARREN,
Acting Assistant Surgeon, U. S. A.

Brevet Major C. BACON, *Assistant Surgeon, U. S. A.*

BRENHAM, TEXAS, *April* 6, 1868.

SIR: First Lieutenant L. J. Lambert came to this post from Houston; he had been on duty at that place for a considerable length of time, during which time, and at the period of his leaving, yellow fever was an epidemic at Houston. He was taken with the fever about thirty-six hours after his arrival at this post, and did not use mustard seed. During his sickness I was ordered to Fort Stockton, and relieved by Dr. Jackson. Dr. Jackson put Private J. Thompson on duty as a nurse, he being then a patient in the hospital. He had been under my treatment for some time previous for gastritis. A day or two after Private Thompson was put on duty as a nurse with Lieutenant Lambert, Dr. Jackson was taken sick with remittent fever, and I took charge. I found Thompson lying beside Lieutenant Lambert's bed exhausted. I removed him to the hospital, where he died from exhaustion. Dr. Jackson did not see him for some days before his death, but was on duty at the end of the month, and made the report for the month of September to which the letter from the Surgeon General's Office refers. Dr. Jackson recovered. Private J. Thompson had not the yellow fever, nor a single symptom of the same.

Very respectfully, your obedient servant,

CHAS. E. WARREN,
Acting Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel WARREN WEBSTER,
Surgeon-in-Chief District of Texas, Austin, Texas.

AUSTIN, TEXAS.

Extract from Special Report on Yellow Fever, Austin, Texas, September, 1867. *Acting Assistant Surgeon R. M. Kirk, U. S. A.*

Higgins, a prisoner, supposed to be a member of the 4th U. S. Cavalry, was attacked September 9th, and died same day. He arrived, some days previous to the attack, from New Orleans, La.; was unconscious when received in hospital, and remained so till death.

Extract from Special Report on Yellow Fever, Austin, Texas, November, 1867. *Acting Assistant Surgeon R. M. Kirk, U. S. A.*

Private J. B. Shearer, attacked November 6th; recovered November 12th. Was clerk at District Headquarters. Arrived at the post, from Galveston, October 23d.

SUB-DISTRICT OF THE RIO GRANDE—BROWNSVILLE AND RINGGOLD BARRACKS, TEXAS.

HEADQUARTERS SUB-DISTRICT OF THE RIO GRANDE,
OFFICE OF CHIEF MEDICAL OFFICER, BROWNSVILLE, TEXAS, *January* 28, 1868.

GENERAL: In compliance with the instructions of Circular No. 3, S. G. O., April 20th, 1867, I have the honor to forward the accompanying special reports of yellow fever patients for the months of October, November, and December, 1867, in the sub-district of the Rio Grande, at the posts of Ringgold Barracks and Brownsville, at which posts alone cases of the disease have occurred.

The special and full instructions relative to the sanitary condition of troops issued from the Office of the Surgeon General U. S. A., and by the medical director of the Fifth Military District, and the chief medical officer of the District of Texas, during the earlier part of the past season, were carefully followed and strictly enforced by commanding officers at all posts in the command. The health of the troops continued remarkably good during the whole season, with the exception of the few cases of yellow fever reported.

On the 28th of June last application was made to the chief medical officer of the District of Texas for instructions relative to the establishment of a quarantine station at Brazos Santiago, and, in accordance with the orders received, a rigid quarantine was established July 8th at that port, and so effectually enforced that none of the cases of yellow fever that have occurred during the season in the vicinity of the Rio Grande can be traced to that port as the source of infection. There were three deaths in quarantine during the season, but none were reported by the health officer of the port as yellow fever; and only one case was regarded as suspicious—on board a schooner from Pensacola, Florida—which resulted in death early in September. Much apprehension was felt during the months of August and September regarding the port of Bagdad, Mexico, at the mouth of the Rio Grande, where, notwithstanding the satisfactory assurances of the Mexican authorities at Matamoras and the port of Bagdad, and the great vigilance and very commendable efficiency of Acting Assistant Surgeon Wm. E. Savage, U. S. A., the health officer at the port of Brazos Santiago, Texas, there was some laxity in the enforcement of quarantine regulations in regard to some vessels from Mexican ports, and to the steamer Pisano, from New Orleans, some passengers from which arrived in Matamoras about September 16th. None of these people were allowed to come to Brownsville, although their passage from New Orleans had been a long one, and there was no sickness among them. In regard to the port of Bagdad, however, it is considered certain that no elements of infection or contagion were admitted there from which the epidemic that appeared a month later could have been developed.

As soon as it was announced that yellow fever was epidemic at Corpus Christi early in August, quarantine stations were established, on the 12th of the month, at the crossings of the Arroyo Colorado and the Corpus Christi roads, between that place and Brownsville, and, it is believed, with the most satisfactory results. Almost all travel on this route was prevented or turned in other directions by these obstructions, but few people arrived at Brownsville from Corpus Christi during the months of August and September, and no cases of the fever occurred among them or can be traced to them.

At about the same date, August 12th, directions were given from this office, to Acting Assistant Surgeon C. C. Furley, U. S. A., post Surgeon at Ringgold Barracks, to exercise all possible vigilance in quarantining the road to that point on the Rio Grande from Corpus Christi. Soon after very stringent orders were issued by Brevet Brigadier General McKenzie, commanding that post, prohibiting all travel upon that much frequented route. That these orders were most vigilantly enforced is indicated by the accompanying special report of Dr. Furley. It is believed that a number of deaths from yellow fever occurred on that route among persons attached to wagon trains, and others at points outside of the quarantine stations, during the months of August and September, while the disease was prevailing at Corpus Christi.

In the latter part of July and in August the usual summer freshet of the Rio Grande occurred, and the river continued very high during all the month of September. From the 19th of August, for ten days, it rained almost incessantly, and during this period the whole country along the lower Rio Grande, from Rio Grande City down, was almost literally flooded, rendering all the roads quite impassable. Upon the cessation of the rains and the subsidence of the waters, about September 1st, malarial fevers of a congestive type began to prevail among the Mexican people in the vicinity of Rio Grande City, Texas, and Camargo, Mexico. The same thing occurred in the vicinity of Brownsville, but the sickness was confined to the ranches near the river,

above and below, and did not appear in Brownsville. It is believed to be beyond doubt that there was nothing like yellow fever in these cases. With the exception of these cases, the sanitary condition of the post of Ringgold Barracks and vicinity continued quite good until some time in September.

About the 1st of September began a series of interesting events, of which an account is given in the accompanying report of Acting Assistant Surgeon C. C. Furley, U. S. A. In forwarding this report, however, it becomes my duty to correct some of the statements made therein, and to present the results of my own investigations relative to the disease which has recently prevailed at Rio Grande City and vicinity. This report was received at this office from Dr. Furley about the 6th of November. I afterwards received from Dr. Cunynghame, post Surgeon at Ringgold Barracks, the accompanying letter, dated October 30th.* Further inquiry was rendered necessary by that letter and by other contradictory statements received; also by the fact that Dr. Furley was entirely inexperienced in regard to yellow fever, and had not seen any of the cases that occurred outside of the post subsequent to the date of September 20th, from which time till November 1st (when his contract was annulled for official misconduct) he was in arrest, and, excepting to see the case of Dr. Reilly, did not leave the post of Ringgold Barracks. In the latter part of November, copies of all official papers relating to the subject of Dr. Furley's report were obtained from Ringgold Barracks, and are enclosed with the report; also copies of letters received from medical and other officers at that post.†

There are three or four doctors in practice at Rio Grande City, Texas, and Camargo, Mexico, (which places are about four miles apart,) but of these it is understood that the only physician by education is Dr. Headley, of Camargo, who is repeatedly referred to in the accompanying report and letters, and his opinion regarding the recent epidemic in that vicinity is the only professional one to be obtained. * * * Since December 1st I have had several conversations with Dr. Headley, and substantially the same account is given by him as by Dr. Furley in the accompanying report of the events which occurred early in September.

An ambulance arrived at Rio Grande City from Corpus Christi, on the evening of September 2d, in which was a man sick with yellow fever, who was immediately sent out of town, and who died the next morning. Very energetic action was at once taken by the military commander at Ringgold Barracks to prevent the further development of the disease. These cases were all seen by Dr. Headley of Camargo, and those of the persons who crossed the Rio Grande and died of the fever at a house three miles from Camargo were under his care. The Doctor believes that these cases (of the ambulance party) were yellow fever, but that subsequently to these there have been no cases of the disease in the vicinity of Camargo or Rio Grande City. His grounds for this belief are, that the vigorous and thorough action taken with regard to the ambulance and its contents, (all of which were burned and entirely destroyed, including all blankets, silks, &c., &c., and even the pistols of the sick man, so great was the fear of contagion among the Mexican people,) and the similar course pursued with regard to those of the ambulance party who crossed into Mexico, rendered propagation of the disease by contagion improbable, if not impossible; that the disease which became more prevalent in September was entirely malarial, of a decidedly intermittent character and congestive type, and was such as usually prevailed in the region at that season; that all the cases properly treated recovered, the plan of treatment being a mercurial cathartic followed by large doses of quinine and stimulants; and that few deaths occurred among the better class of the people who had medical attendance, but many among the poor Mexicans, who could not employ physicians, but treated themselves with herb teas, sweating, &c., &c. This Mexican plan of treatment, Dr. Headley argues, should have cured a fair proportion of the patients if their disease had been yellow fever; and, on the other hand, that the actual results were what might have been expected from such treatment (without quinine) for malarial fevers of a congestive type, viz: a mortality in two months of about one hundred and fifty or two hundred persons in a population estimated at from 500 to 750 people. Returning now to Dr. Furley's report, it is evident from his letters, dated September 11th, 18th, 24th, and 25th, that matters went on very quietly at Ringgold Barracks and vicinity subsequent to the ambulance burning, September 3d, and that the existence of yellow fever was not suspected, or, at least, that the idea of its existence was not entertained, until the 24th of the month, when a citizen named Forbes was admitted to the post hospital at Ringgold Barracks. During all this period, however, there had been some sickness and a few deaths in Rio Grande City, particularly among children, and at various ranches above and below that place along the river.

It is stated as an interesting fact, that during the whole time of the prevalence of the epidemic there was no sickness beyond a ranch about twelve miles above Rio Grande City, and that at the larger town of Roma, only three miles further up than the point where the epidemic appeared to stop, or fifteen miles from Rio Grande City, there were no cases of the prevailing disease, and but a few deaths in September and October.

At the Garcia ranch, where the ambulance was burned, half a mile from Rio Grande City, there are several houses or huts in which Mexican families are living. It is stated by credible persons that, immediately subsequent to September 3d, there was no more sickness at this ranch than at many other neighboring ones at the same time, and that it was not of a peculiar character. Had there been any evidences of yellow fever at this suspicious locality they should have been recognized earlier than September 24th by the military and civil authorities who were looking for the appearance of the disease. The three cases (it should be stated as two) mentioned in Dr. Furley's report as having been pronounced yellow fever by Dr. Reilly, who had never before seen cases of the disease, were two women, seen but once by him, and that after dark, in a Mexican hut, and the only examination made was by the light of a coal of fire held over their faces. The women died shortly after, and were buried before morning by direction of the doctor, who afterwards repeatedly declared that they were not cases of yellow fever.

The first declared case of yellow fever, after those of the ambulance party, was that of Mr. Forbes, before mentioned as having died at the post hospital at Ringgold Barracks, September 24th. Dr. Furley had previously been placed in arrest, but

* In this letter the writer reviews the alleged cases of yellow fever reported by Acting Assistant Surgeon Furley, and denies that they were really such, or that true yellow fever had existed up to that date in Rio Grande City or its vicinity.

† These letters are not here published for want of space; their substance is embraced in this document.

on this day was allowed to visit Dr. Reilly, whose case will be noticed hereafter, and who had been taken sick in town on the 22d, two days before.

Upon Dr. Furley's return to the post hospital he found Forbes there sick. * * * Forbes was a notorious drunkard, and for more than two weeks before his death had been drinking excessively. A few days before his death he started to go to San Antonio, but was taken sick and lay by the roadside (it is stated) nearly 24 hours before he was taken back to Rio Grande City, and from thence to the post hospital. That he vomited black matter, as stated, before his death, may be admitted, but there is most reasonable ground for doubt as to the character of the disease. It is quite certain that no one at the post of Ringgold Barracks contracted yellow fever from him by contagion.

At about this date—September 24th—communication between the post and Rio Grande City was stopped; and as Dr. Furley did not again leave the post till about November 1st, none of his statements regarding the events of this period in Rio Grande City are made from personal knowledge.

The second case reported as yellow fever in Rio Grande City was that of Dr. B. S. Reilly, late Acting Assistant Surgeon, U. S. A., who was taken sick Sunday, September 22d, and died Saturday, September 28th. This case has at all times been declared by Dr. Headly to be one of congestion of the brain. The history of this case, as nearly as can be ascertained, is as follows, viz: Dr. Reilly was taken sick on Sunday evening with a slight chill, followed by a moderate fever, which continued without increase or abatement till Wednesday. He had pains in the head and back, and flushed face, when attacked, but no redness of the eyes was noticed. He did not appear to be very ill, but believed from the beginning that he would die, and on Wednesday sent for a priest. On this day increased feverishness was noticed in the morning, which abated at night, and he begun to have irritability of the stomach. The Doctor had been taking cathartic medicines, but they did not operate well, and believing now that his disease was intermittent fever, he began to take quinine. He was very thirsty, and during the day—Wednesday—drank freely of a very acid solution of citric acid in water. On Thursday morning another and more severe exacerbation of the fever occurred, with increased irritability of the stomach, and occasional vomiting of a clear liquid; Dr. Reilly became much excited, and at times irrational, and feared that he had yellow fever. More quinine was taken, but, as with everything else taken during the day, was vomited as soon as swallowed. On Friday morning the fever was again greatly increased; he became delirious, was quite violent during the night, and continued delirious until death on the following day. The irritability of the stomach continued, and an increasing amount of dark-colored sediment was observed in the matter vomited during the succeeding 24 hours. Dr. Headley, of Comargo, first saw the case on the evening of this day—Friday—and said it was one of congestion of the brain; had Dr. Reilly's hair cut short, cooling lotions applied to his head, and gave medicines which were rejected. Dr. Reilly grew worse rapidly, and on Saturday morning was placed in a hot bath containing a pound of Colman's mustard, (so says Dr. Headley,) and after being taken from the bath, was given black coffee to drink. Dr. Reilly became quiet and slept (comatose?) shortly after the bath, and remained so until death at 3 o'clock p. m. He vomited very black matter two or three times during the last three hours, which made stains on the bed linen that could not be washed out with soap and cold water; experienced nurses then present declared this case to be one of yellow fever, which Dr. Headley does not believe.

In Dr. Furley's report it is made to appear that Dr. Headley contracted the fever by contagion from Dr. Reilly, and that Mrs. Headley was sick afterwards with the same disease. The fact is, that Mrs. Headley was ill early in September with a disease which Dr. Headley thinks was more like yellow fever than any other case he saw, and that Dr. Headley was not sick with yellow fever, which he had already had long before, but with some other disease. Colonel Gautierez, who is reported to have died October 5th with yellow fever, did not see his friend, Dr. Reilly, during his illness, as stated, and was treated by Dr. Headley for congestive intermittent fever. Colonel Gautierez survived two severe paroxysms of the fever, and was in a fair way for recovery, when, Dr. Headley being taken ill, the case came under the treatment of a doctor by whom castor oil was given to the patient, producing severe catharsis and vomiting, followed by a third paroxysm resulting in death.

Mr. Dallas, whose case is mentioned in Dr. Furley's report, was a very intimate friend of Dr. Reilly; was with him night and day during his illness, and was greatly fatigued, as well as much depressed, by the death of his friend. Mr. Dallas was taken ill on the day of Dr. Reilly's burial—Sunday, September 29th—with a very high fever, but was on the street again in three days. He has since suffered much from intermittent fever.

In regard to Dr. Furley's own case, it must be said that there is much ground for doubting the correctness of his statements. On the afternoon of the 30th of September I was at Ringgold Barracks for two hours while the steamer from Brownsville, by which I visited the post, was stopping there. Dr. Furley was evidently very nervous and apprehensive; said that he was not feeling well; that he had been twice exposed to yellow fever, in the cases of Dr. Reilly and Mr. Forbes, during the preceding week, and that he expected he would be sick. He was much jaundiced, with decided yellowness of the eyes, and had been talking much to other officers of his having the fever. Dr. Furley was taken sick on the evening of this day—Monday, September 30th—and became greatly alarmed. Dr. Headley, of Camargo, was sent for, and visited and prescribed for him during the night, or on the following morning, a fact not mentioned in Dr. Furley's report. Dr. Furley was given some blue mass and quinine, and on the following day was considered out of danger. Dr. Headley declares that Dr. Furley did not have yellow fever, and his nurse now says the same thing. It is altogether probable that his disease was simply bilious fever, as stated by his physician. It is quite certain that no cases of yellow fever followed Dr. Furley's illness at the post. Lieutenant Colonel Shafter, who is reported as the third case on the tabular report of Dr. Furley, arrived at the post on the afternoon of September 30th from Brownsville; was taken sick only 48 hours afterwards; his illness was not severe, and, undoubtedly, was not yellow fever. The fourth case on Dr. Furley's tabular report is of so doubtful a character as hardly to require notice.

In addition to the papers already referred to, relating to the recent epidemic at Rio Grande City and vicinity, it seems not improper to forward an official report of the case of Acting Assistant Surgeon William E. Savage, U. S. A. Dr. Savage left Brownsville, where yellow fever was prevailing, on the 8th of November, arrived at Ringgold Barracks on the 10th, was taken

ill on the 18th, and died on the 21st of the same month.* There is so much in this case that is like yellow fever that it is still a matter of doubt in my mind whether it was not one of that disease.

The prevalence of yellow fever at Indianola, Galveston, Corpus Christi, and afterwards at New Orleans, Louisiana, from all which places there is direct communication to the valley of the Rio Grande, was a sufficient warning during the months of June, July, August, and September, that the epidemic might be expected to appear in this sub-district. With the comparatively few avenues of approach, viz: via the ports of Brazos Santiago, Texas, and Bagdad, Mexico, and the roads from Corpus Christi to Brownsville and to Rio Grande City, it was hoped that either the advent of the disease could be prevented by rigid quarantines, or that, by vigilant observation, the first cases of the disease could be noticed, and important and interesting facts ascertained as to the manner of its introduction from infected localities. To this end, very explicit instructions were given to the medical officer at Ringgold Barracks, from whom, as a result, the accompanying report has been received. It is to be regretted that the report is entitled to so little confidence, that such contradictory opinions regarding the epidemic in that vicinity are entertained by professional men, and that the statements of the only physician (Dr. Headley, of Camargo) personally cognizant of all the facts, are not quite credible. Under these circumstances, it is thought best to forward the accompanying papers† as an appendix to Dr. Furley's report, to review them at length as I have done, and to give the results of a careful investigation of information received from all credible sources.

The history of the recent epidemic in the vicinity of Ringgold Barracks may be summed up briefly in the following statements, which, I believe, contain all that can be relied upon as facts, and that can be accepted as quite well established by the evidence furnished:

1st. The prevalence of yellow fever, during the month of August, at Corpus Christi, the nearest infected locality, and the existence of rigid quarantine by land and sea, rendered it most likely that the disease, if introduced at all in the valley of the Rio Grande, would be so by the route from Corpus Christi to Rio Grande City, a distance of about 150 miles; the roads between those places being the most travelled and most difficult to be effectually guarded, as they are quite widely separated and pass through an open country.

2d. The quarantines established upon these roads, and other measures adopted, were so far effectual as to delay the introduction of the disease for at least a month after it might have been expected to make its appearance, if it did so, by importation from Corpus Christi, had the roads from that place been unobstructed.

3d. Fevers of a malarial character were somewhat prevalent in all of the lower regions of the Rio Grande during the month of August, and became more general in September and October.

4th. Yellow fever was introduced by importation to the vicinity of Rio Grande City as early as the beginning of September; but while development of the disease by contagion cannot be traced and proven by such evidence as is furnished, still, at the same time, it cannot be denied that the disease may have been so developed. It also appears that it was not until the latter part of September that the diseases prevalent in the vicinity of Rio Grande City began generally to assume the type of yellow fever.

5th. Many of the cases commonly believed to have been yellow fever were not of that disease, but were purely pernicious or malarial fever; many more were of a mixed character, complicating both types of the disease; and not a few were well-marked, uncomplicated cases of yellow fever.

6th. The mortality from these diseases during the months of September, October, and November, among a population of about seven hundred people residing at Rio Grande City and the adjacent ranches within ten miles of that place, in the Rio Grande valley, was over one hundred deaths of persons whose burials were registered, and nearly or quite that number of those not registered, and who were buried at different places.

Respectfully submitting the above-mentioned reports, together with my accompanying report for the post of Brownsville,

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

EDWARD COWLES,
Assistant Surgeon, and Brevet Captain, U. S. A.

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

FORT BROWN, BROWNSVILLE, TEXAS, *January* 20, 1868.

GENERAL: I have the honor to forward herewith special reports of yellow fever patients at this post during the months of October, November, and December, 1867. It will appear from these reports that in the military force at the post there have been but four cases of yellow fever, all officers, and that all happily resulted in recovery. During the months named the fever prevailed quite generally in Brownsville, and the history of the epidemic presents some points of considerable interest.

Soon after the appearance of yellow fever at Indianola, quarantine stations were established—on the 8th of July—at the ports of Brazos Santiago and Brownsville, Texas; and at Bagdad, Mexico, by the co-operation of the Mexican authorities.

The regions of the lower valley of the Rio Grande being, comparatively, so much isolated, by wide tracts of nearly uninhabited country, from all localities where yellow fever could be expected to prevail, and communication with such localities being held by sea via the above-named ports, and by land via the long roads from Corpus Christi to Brownsville and Rio Grande City, the distance in either case being about 160 miles, it was hoped that strict quarantine upon these routes of travel would prevent the introduction of the disease. At the same time all sanitary measures possible were adopted to improve the hygienic condition of the city of Brownsville, and in compliance with instructions from the Headquarters of the District of Texas, a health officer was appointed for the city, and frequent and thorough inspections were made by him and myself.

* Dr. Cunynghame's letter of November 23d, forwarded with this report, denies that Dr. Savage had yellow fever.

† These papers are not published for want of space; their substance is embraced in this report.

The recommendations made were ordered to be carried out and enforced by the military commander of the post of Brownsville with very beneficial results, as far as the cleanliness and appearance of the city was concerned. The sanitary regulations in force in the garrison were continued with unabated care and vigilance by all the commanding officers of the troops and the camps at the post.

As soon as it was known that yellow fever had appeared at Corpus Christi, quarantine guards were, on the 12th of August, placed upon the Corpus Christi roads where they cross, by several ferries, the Arroyo Colorado, which is a salt-water inlet extending many miles inland. These crossings are distant from Brownsville about 30 miles. At about the same date quarantine guards were also stationed upon the roads from Corpus Christi to Rio Grande City. All these quarantine stations were continued, and their regulations rigidly enforced, until after yellow fever had declared its presence in Brownsville in October.

In regard to the quarantine at the ports of Brazos Santiago and Bagdad, they were so effectual, through the most commendable efficiency and vigilance of the health officer at Brazos Santiago, Acting Assistant Surgeon Wm. E. Savage, U. S. A., now deceased, that it is believed that no elements of infectious or contagious diseases were introduced through those ports. In regard to the land quarantine, it did not so effectually obstruct travel by the land routes. During the months of August and September three or four persons arrived in Brownsville from Corpus Christi, but such was the apprehension of the people here, and the vigilance of the health officers and other city authorities, that every such person is believed to have been reported and kept under observation. These persons were residents of the country, who, finding themselves unable to return here by sea, and having already had yellow fever and not being afraid of it, did not fear to return by almost the only available route—by way of Galveston, Indianola, and Corpus Christi—by land. They were, in every case, a long time on the way, and it is believed that all were kept under observation at the quarantine stations until the period of incubation was over. No suspicion has been attached to these persons as carriers of the contagion from which the recent epidemic was propagated; nor has it been possible to trace to them, as sources of contagion, any of the first cases of fever that occurred in Brownsville in September and October last.

During the month of August everything seemed promising for the continued good health of this community; the weather was pleasant and agreeable during the first eighteen or twenty days of the month, and the healthful southeast breezes prevailed. In this month occurred the usual summer freshet of the Rio Grande, and the river continued very high till the latter part of September. In the month of August there was also a great deal of rain, which fell continuously from the 19th for ten days, or till the 29th. All the lower valley of the Rio Grande and adjacent country was almost literally flooded, and all the roads leading to Brownsville and Matamoras were, for many weeks, so bad that the amount of travel upon them was trifling, and they were at times quite impassable. The August rains ceasing about the 29th of the month, the water began to subside from the flooded country, but it was again very rainy for many days from the 10th of September.

Nearly all commercial intercourse between Brownsville and places up the river was stopped during the months of August and September, in consequence of the importation of merchandise being obstructed by the quarantine. The only communication by steamer during these months, with the towns above, was one trip to Rio Grande City about August 16th, and one about September 16th, and one to Ringgold Barracks, which is below Rio Grande City, September 30th. After a careful investigation of the circumstances relating to this apparently possible means of importation of contagion, it must be admitted that no suspicion can be entertained of the introduction of any elements of disease by the river steamer from any infected locality.

When the steamer was at Rio Grande City in August there was then, certainly, no yellow fever there. Again, in the middle of September it was not believed by any one at Rio Grande City that there had been any cases of the fever in that vicinity, except of some persons who came by ambulance from Corpus Christi and were disposed of on the 3d or 4th of September, of whom an account is given in the accompanying report from Ringgold Barracks. Furthermore, it is found impossible to trace any connection between these circumstances and the appearance of yellow fever in Brownsville. Upon the last-mentioned trip of the steamer it became known, just as she was leaving Brownsville on the 27th of September, that there had been some cases of the fever reported at Rio Grande City.

The steamer touched only at Ringgold Barracks, and there remained about two hours on the afternoon of September 30th. Being present at the time, I am personally cognizant of all the circumstances, and can state as my firm belief, that the only possible means by which yellow fever could have been contracted by contagion by any one, was by personal contact with Acting Assistant Surgeon C. C. Furley, U. S. A., the post Surgeon, who was taken sick on the evening of the same day, after the steamer's departure. But it is my opinion, for which reasons are given in an accompanying report on this subject, that Dr. Furley did not have yellow fever at all. I also believe that there was no disease, nor were there any elements of contagion, existing at Ringgold Barracks on the afternoon of September 30th, to be communicated in any way to persons on board the steamer. Nothing can be found in subsequent events to indicate that yellow fever was conveyed to Brownsville by this steamer.

In regard to the communication between Rio Grande City and Brownsville by land, a distance of about 130 miles, it was unobstructed during the month of September, no reason being known for placing any restriction thereon, except by the very bad and almost impassable condition of the roads, on account of which there was but little travel between the two places. But upon the recognition of the existence of yellow fever in Rio Grande City, an efficient quarantine guard was placed on the roads at a point 12 miles from Brownsville, and all communication between the two towns was prohibited on the 2d of October.

At the town of Edinburgh, on the Rio Grande, about 75 miles from Brownsville, on the road to Rio Grande City, there began to be some sickness from malarial disorders in the latter part of September, upon the subsidence of the waters after the August and September rains. The first death at this period occurred about October 12th; and subsequently there was much sickness and a few deaths, the number of inhabitants being small, and most of the sickness being among children. There is no physician in that vicinity, and it is reported to me that it was not thought by the people, who are, with the exception of two families, all Mexicans, that there were any cases of yellow fever among them during the past season. Similar facts have been elicited with regard to the sickness at other points along the Rio Grande, between Brownsville and Edingburgh, and it appears that malarial disorders were very general among the people during the months of September, October, November, and December, but with little mortality.

Taking into consideration all the circumstances detailed above, and those connected with the first cases of yellow fever in Brownsville, as far as they can be known, the results of all investigations made by well-informed medical men in this vicinity, and by myself, do not discover any facts, or even well-grounded suspicions, to indicate that the disease was imported to Brownsville from any infected locality.

During the month of August there was some sickness at the ranches along the river above and below Brownsville, and it seemed to increase somewhat in the latter part of September, upon the subsidence of the waters after the August and September rains. During this period the appearance of yellow fever was several times rumored, as was to be expected from the apprehension that prevailed among the people of this vicinity; but in all cases, upon investigation, the sickness was found to be of a malarial character and with little or no mortality.

In the city of Brownsville, however, and also in Matamoras, Mexico, a remarkable state of health existed during the months of July, August, and September. In Matamoras, with a population estimated at 12,000, it is reported that there were only five interments in the city cemetery in the month of August, and the mortality in September was also very small.

On the 15th of September, the health officer of Brownsville reported that, from the 1st of July to that date, there had been only 23 deaths in a population of 5,000. Of these deaths, 13 were children, and in none of the cases was the disease of a suspicious character. There was an equally small rate of mortality from September 15th to October 7th, and none from yellow fever; and at the latter date it was officially reported and generally believed that there had been no cases of yellow fever in Brownsville.

On the 7th of October the lower valley of the Rio Grande was visited by a terrible and destructive hurricane. The storm came from the Gulf of Mexico and moved in a direction from about southeast to the northwest. Its path was about 80 miles in width; its vortex passed over the cities of Brownsville and Matamoras, and it was about 20 hours in passing those places. On the morning of the 7th the wind began blowing from the northeast, and gradually increased in violence until midnight. There was then a calm for nearly an hour, when the wind began blowing from the southwest with appalling fury, and continued until morning, when it gradually ceased.

The cities of Brownsville and Matamoras appeared almost entirely destroyed, and in fact there were very few houses left standing without being seriously damaged. There was no little loss of life, and many persons received severe injuries. All were more or less exposed, and in many cases the exposures of the night induced serious illness. The rapid increase of sickness after the night of October 7th was attributed to the effects of the exposure during the storm, but on the 12th of the month it was announced that a German had died in Brownsville of yellow fever, and with the black vomit, and that there were several persons sick with the disease in different parts of the city. The number of cases increased, and in a few days the fever became decidedly prevalent. From the 9th to the 18th of October there were 20 deaths from yellow fever, and by the 20th the deaths were from 3 to 6 daily for several days. The mortality continued at about the same rate and became somewhat increased in the latter part of November.

About the 1st of December there were in one day seventeen interments of persons who had died of the fever.

It is estimated that at the end of 60 days after the appearance of the fever, or on the 9th of December, there had been at least 240 deaths; and on the 9th of January there had been at least 300 deaths. On the latter date frost appeared, and the disease was suddenly checked, there being five interments on the 9th, four on the 10th, and none for many days after the 10th of January.

Of those who had yellow fever, many were Germans, with whom it was especially fatal; and a large proportion of the sick were unacclimated persons. The disease prevailed quite extensively among the Mexicans, who compose a large part of the population of the city of Brownsville, and who suffered much from exposure, insufficient shelter, and want of the necessaries of life, consequent upon their losses in the storm of the 7th of October. A marked peculiarity of the epidemic was the exemption of females from the disease. Of 67 recorded deaths, that occurred in the practice of one physician, before the 20th December, 5 were females, and 10 were children; and among females there was an equally small proportion of sickness. During the last 30 days of the epidemic, before the 9th of January, a very large proportion of the sickness and the deaths was among children.

The epidemic is considered as having been mild in its character, and with all persons in a good physical and hygienic condition the rate of mortality was very small. Persons addicted to the use of alcoholic stimulants were, other things being equal, apparently most liable to the disease, and were earliest attacked, and it was most fatal to them. In all fatal cases there was a decided tendency to gastric irritability, and in an unusually large number of these cases there was black vomit.

The plan of treatment quite generally followed during the epidemic was, to give the patient, upon the onset of the disease, a mercurial cathartic, to be followed in a few hours by a full dose of castor oil. Immediately upon being attacked the patient was well covered in bed after having a hot mustard foot-bath. Cooling applications were made to the head, when agreeable to the patient, and indicated by a tendency to cerebral congestion, and orange leaf tea was administered freely during the continuance of the fever. Sponging the body under the bed clothes was employed to allay the heat and dryness of the skin. Little nourishment was allowed, except rice water or barley water at the approach of the second stage, and afterwards fresh milk, chicken broth, or beef tea, as convalescence advanced. Nourishing enemata were administered in cases of gastric irritability. Small pieces of ice, lime water, with or without milk, and sometimes creasote, &c., were employed to allay irritability of the stomach, together with sinapisms externally.

In pursuance of this plan of eliminating the disease by the perspiration, urine, &c., nitrate of potash was also given for its action upon the kidneys, and to meet the perplexing symptom of suppression of the urine. Quinine was not given unless there were marked periodic exacerbations of the fever. Opiates in any form were avoided as dangerous, and no stimulants were allowed until convalescence was well advanced. The most absolute rest was enjoined during the progress of the fever, and little physical exertion was permitted until recovery was well assured. This plan of treatment was varied somewhat in many cases to conform to the theory of elimination of the disease by the lungs, and, to my mind, the results appeared to be quite as satisfactory as by the other method of treatment. Mercurial carthartics were not given, unless especially indicated by constipa-

tion or irregularity of the bowels, and castor oil was also avoided as generally inducing nausea; but instead of these a saline draught was given, (as sulphate of magnesia, half an ounce, and carbonate of magnesia, 15 grains—in solution.) The patient was well, but not heavily, covered to the neck in bed with a sheet and single light blanket, the object being to promote gentle diaphoresis, and to keep the body as cool as possible without danger of chilliness after perspiration. An abundance of fresh air was provided by placing the bed in the centre of the room, with doors and windows open to allow sufficient but not too much draught; and the patient was also fanned if there was too little movement of air. Diuretics were regarded as of little avail in restoring the arrested renal functions, and were not given. This constituted nearly the whole treatment, and, in other respects, nearly the plan detailed above was pursued.

On the 13th of October orders were issued stopping all communication between the garrison and the city, except by permission to certain officers and orderlies to visit the headquarters of the post then in the city. This order was very strictly enforced until the epidemic had decidedly abated in the city; and no cases of the fever occurred among the troops, except those of the four officers reported, who all resided in Brownsville, excepting myself. On account of the total destruction, by the hurricane, of the post hospital under my charge, and the increased sickness among the trooops, consequent upon their exposure in the storm, extraordinary demands were made upon my time and strength, and I was greatly fatigued during all of the week after the 7th of October. I saw the sick man in the city on the 12th, who died the same evening with yellow fever and black vomit, and two or three cases of the fever among the quartermaster's employés came under my care on the 13th and 14th. I was attacked on the 15th instant, and did not resume my duties until nearly the middle of November. Brevet Colonel A. M. Randol, of the 1st U. S. Artillery, who was taken sick on the 27th of October, and Lieutenant John Gotshall, of the 26th U. S. Infantry, who was taken sick on the same day, were under the care of a physician at Brownsville. Brevet Lieutenant Colonel S. K. Schwenk, of the 41st U. S. Infantry, who was taken sick on the 20th of November, was under my own care, and though he was somewhat enfeebled by previous attacks of intermittent fever, and was in a very critical condition in the second stage of the fever, he fortunately recovered. These cases were all well marked, and in each there was like previous exposure. In each of them equally valid arguments can be adduced to support the theory of contagion or of infection in regard to the manner in which the disease was contracted. In other words, in each of these four cases, the disease may be believed to have been contracted by receiving contagion from persons sick with yellow fever, or, equally well, by visiting or residing in infected localities.

In returning now to the consideration of the circumstances connected with the origin of the disease, I am obliged to depend greatly for information upon the statements of physicians practicing in Brownsville, who have given me the results of their observations, viz: Dr. A. F. Watson, of Brownsville, and Dr. C. Macmanus, of Matamoras. These gentlemen have resided in this country for more than twenty years, and both served, at different times, as post Surgeons at Fort Brown.

The first suspicious cases of illness in Brownsville were two Mexicans, (males,) and occurred between the 10th and 15th of September, terminating in recovery. These two persons were natives of the place, and had not been away from Brownsville for two years. These cases are now stated by Dr. Watson to have been quite well marked, and I am unable to obtain any evidence to indicate that the disease was contracted by contagion.

There was some sickness of a malarial character among Mexicans and others during the remainder of September, but the first case of fever, of a suspicious character, that came to notice after the two before mentioned, was a young man, an American, named Fisher. This man had but a short time before been discharged from Battery "L," 1st U. S. Artillery, and was employed as a clerk in the quartermaster's department at the time of his illness. Mr. Fisher was taken sick on the 23d of September and recovered on the 11th of October, and was also under the care of Dr. Watson, who regarded the case as undoubtedly one of yellow fever. The man had not been away from Brownsville for a long time before his illness, and it cannot be ascertained that he was in any way exposed to the disease, either by contact with persons sick with the disease, or by visiting infected places. These three cases, occurring in September, were not reported, and it was not until some time after the epidemic became pronounced that the case of Mr. Fisher was spoken of publicly by his attending physician as being one very much like yellow fever. It is now asserted by him that the case was an undoubted one. Until recently I have entertained the belief that there had been no cases of yellow fever previous to the hurricane of October 7th, but it is plainly evident from the statements above, that its existence in Brownsville previous to that event cannot be positively denied. At the same time, the assertion that there may have been a few unrecognized cases among poor Mexican people, who did not employ physicians, also cannot be denied. In whatever state or form the elements of the disease may have existed previous to the hurricane, it is certain that this untoward atmospheric tumult exercised a profound influence in developing the epidemic, and, as it were, expressed the disease from some epidemic infecting elements already in action. Yellow fever declared itself immediately after the storm, and, as before stated, its epidemic character was very rapidly developed.

The first case recognized and reported as yellow fever resulted in death, on the 12th of October, as has been before stated; but the first death from the fever is now believed to have occurred on the 9th, at a place known as Mechanics' Boarding-house. This is a low wooden building, in which a few small, close, badly ventilated rooms, used as dormitories, were crowded with boarders, most of whom were Germans or Austrians. There were many of these Austrians about Brownsville at that time, who formerly belonged to the Mexican Imperial army, and who were especially obnoxious to the diseases of this climate, with whom and the German residents yellow fever was very fatal. There was some sickness at the boarding-house during the two weeks before the 7th of October, of a trifling character, and which came under my immediate notice in attending several quartermaster's employés boarding there. The man that died on the 9th of October was an Austrian, who was ill a day or two before the hurricane, and is declared to have died of yellow fever by his medical attendant, a German doctor, who professes to have seen much of the disease at Vera Cruz and elsewhere. The second death from yellow fever occurred on the 10th, also of an Austrian, who died at the same boarding-house, and was under the care of the same doctor; his illness supervened upon exposure during the storm. A third death, with black vomit, also of an Austrian, occurred at the same house on the 12th, and is the one before mentioned as that first recognized and reported as yellow fever, and was unmistakable in its character. From this time this boarding-house was evidently an infected locality, and many deaths occurred there during the ensuing ninety days.

The first recognized case of yellow fever occurring elsewhere in Brownsville, and in a distant part of the city, after the hurricane, was that of a young man (an American) employed by the U. S. revenue collector, who had an ordinary attack of intermittent fever on the 6th of October. He was greatly exposed to the rain and cold during the night of the storm. He became intoxicated on the following morning, and on the same day was attacked with a chill, followed by a fever, which terminated in death from black vomit on the 13th of October.

One other case (of a German) occurred, beginning before the hurricane with intermittent fever, from which the patient was apparently convalescent; but it assumed the type of yellow fever after exposure in the storm, and resulted in recovery.

There was another death from black vomit on the 13th, that of a house carpenter, (German,) who had not been away from Brownsville for two months, and who was perfectly well before his exposure during the storm.

The cases of yellow fever previous to the date of the 13th were of persons living in different parts of the city, and the disease did not appear to affect any particular locality, excepting, perhaps, the mechanics' boarding-house mentioned above.

It is impossible to state with accuracy the number of persons attacked with yellow fever during the first seven days after the hurricane. It can only be said that before that event the amount of sickness in Brownsville was trifling, with only the few suspicious cases before mentioned, but immediately afterwards the sickness was suddenly and largely increased; and that there were at least five recognized cases of yellow fever on the 13th, eight on the 14th, and as many on the 15th. In fact, the arrangements made for securing thoroughness of investigation and accuracy and completeness of reports of cases of yellow fever were overthrown in the confusion consequent upon the hurricane, and little reliance can be placed upon the imperfect city records of sickness and mortality during the period of the epidemic.

In the neighboring city of Matamoras, two miles distant from Brownsville, yellow fever prevailed to some extent, but there was much less sickness there than on this side of the Rio Grande. The disease did not make its appearance in Matamoras until after it had declared itself in Brownsville. It is stated, on good authority, that very many of the cases of yellow fever occurring there were of persons who had left Brownsville to escape the disease, and that in the houses in which they were sick or died no second cases occurred. It cannot be shown, however, that yellow fever was developed in Matamoras from elements of the disease conveyed there from Brownsville; and similar phenomena were observed in Matamoras to those in the neighboring city in regard to the non-existence of the disease before the hurricane, and its subsequent apparently spontaneous origin there.

In considering the events of the past season, in regard to their bearing upon the question of the introduction of yellow fever to this vicinity by importation from some infected locality, or of its apparently spontaneous origin here, I have to refer to the foregoing statements and details in this report as all the facts relating to the subject that I am able to obtain. I cannot find any evidence that the disease was imported here and developed by contagion. It can be said that the disease may have been thus introduced in some unknown manner; but, granting this, no satisfactory evidence can be adduced from the facts observed to account for its development from such imported contagion. It is, probably, hardly to be doubted that several cases of disease manifesting the type of yellow fever occurred before October 7th, but I cannot believe that the sudden and wide-spread development of the disease after the hurricane can be accounted for on the theory of contagion. The facts as observed rather indicate that there may have existed an atmospheric epidemic influence, affecting especially the crowded and unhealthy localities in the city. This infecting element may have made its advent with the hurricane, or, if existing before, was then greatly augmented in virulence; while, at the same time, the people were made more susceptible by being generally subjected to great physical exhaustion and the reaction from fear and mental excitement.

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

EDWARD COWLES,
Assistant Surgeon, and Brevet Captain, U. S. A.

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

RINGGOLD BARRACKS, TEXAS, *October* 20, 1867.

GENERAL: In my letter of September 4th, you will recollect I reported that upon my arrival here in the early part of August, I recommended the commanding officer at this post to stop all communication with Corpus Christi and other infected neighborhoods by putting guards upon the most frequented roads between those places and Rio Grande City. In accordance with these suggestions, this was done in time to prevent the entrance of an infected merchandise train, from which two persons subsequently died of yellow fever, near our quarantine station. The mail rider, who arrived from Corpus Christi about the same time, and was ordered back without his mail being opened, died of that disorder during his trip.

I have the honor, also, to recall to your memory the fact, then mentioned, of the arrival of an ambulance containing three passengers from Corpus Christi, which, by making a detour of fifteen miles north, had avoided our quarantine guards. Two of these passengers, all of whom were ill of yellow fever, were left at a point above, and crossed into Mexico, where one of them is known to have died. The third, and owner of the carriage, passing down to his residence at Rio Grande City, was seen and sent half a mile from town, where he died during the succeeding night from that disease. The citizen (Merrick) who warned him off, and, no doubt, came in contact with him, an old resident, habituated to yellow fever, and thoroughly acclimated, was, on the eighth day afterward, taken ill, and this was probably the first case of yellow fever in town, though, from fear of isolation by the military quarantine, and in part from the pecuniary interests of the few American inhabitants of the place, it was kept strictly secret. The family of the deceased person who had been with him during his illness, consisting of four adults and two children, after taking some blankets from the carriage and remaining a part of the night with some friends (named Garcia) at a ranch near the spot, fearing a rigid quarantine for themselves, crossed the Rio Grande into Mexico, having first sold the blankets which had been used by the deceased during his illness to the friends with whom they stopped during the remainder of the night. All this family, with the exception of one child, died of yellow fever. One other person, who, though not a clergyman, officiated as confessor to the

dying man, fearing isolation, went to a ranch about four miles down the river, on the American side, where, some days afterwards, he was taken ill and died, it is supposed from the effects of the same disease. This one, and those of the Garcia family, six or seven persons, mentioned above, were the first deaths from yellow fever, but not known to be that disorder, because the connection between the Corpus Christi cases which occurred in the ambulance was not established, and, being poor Mexicans, no physician was consulted. These parties, with the exception of the two left up the river, were all Mexicans, and the evidence, thus far, of direct infection, is reliable. The ambulance, a private conveyance which had conveyed the disease to this locality, was burned during the day, after the death of its owner, on my recommendation, by order of Brigadier General Mackenzie; and it was supposed that the entire contents of the carriage were at the same time destroyed, and it was not for some time subsequently that the sale of the two blankets mentioned above was ascertained from the surviving member of the Garcia family.

About the third week of September the mortality in Rio Grande City, which is about the third of a mile from these barracks, and said, according to good authority, to contain about seven hundred and fifty inhabitants of all ages, began to assume an alarming increase, but was entirely confined to the Mexican portion of the population. About the same period Dr. B. S. Reilly, late an Acting Assistant Surgeon, stationed at this post, informed me that he had seen and treated three cases of yellow fever in one jacal, (hut,) but on an inquiry being made of him a short time afterward by the commanding officer, he denied its being yellow fever. Inquiry made of citizens at the same period brought out the statement that it was not yellow fever, but a bilious remittent fever, usual every fall. No more attention was paid to the subject until September 23d, when a citizen was sent to the post hospital by Brevet Brigadier General Mackenzie, commanding the post, without my knowledge. The patient, F. H. Forbes, a former employé of the quartermaster's department, being sick in town, was sent into the hospital as stated. On hearing of his admission about four or five hours afterwards, I visited him, and, suspicious of his appearance, cautioned the hospital steward; and when the disease developed itself, I had the greater portion of the bedding removed from the ward. A short time afterward, the unmistakable black vomit appearing, the hospital was at once vacated, and the patients put into tents. The patient died during the night, and was buried two hours afterward. The hospital was then closed and thoroughly fumigated with sulphurous acid, and no person permitted to enter the building. Some of the clothing of the three soldiers (blacks) acting as his attendants, together with all the bedding contained on the patient's bed and the two adjacent ones, was burned, and it was expected that these prompt steps would prevent its further development at these barracks.

The second case known as yellow fever, occurring in the neighborhood, was that of Dr. Reilly, at Rio Grande City, who was taken ill on Sunday or Monday, September 21st or 22d, and died September 27th. Dr. Headley, of Camargo, Mexico, who attended him throughout the night of September 26th, and until he died, pronounced this a case of yellow fever, as did a number of citizens who had before seen and nursed the disease. The following Saturday, October 4th, Dr. Headley was taken ill at his home in Camargo, and on the 9th day succeeding his attack, October 13th, his wife, Mrs. Headley, who attended him through the first night of his illness, was taken sick with the prevalent disease.

Another case may be mentioned of an American named Garner, who was the sleeping companion of Forbes for about ten days previous to his illness. This person was taken during the middle of the week and died on Saturday, September 27th, the same day as Dr. Reilly. Mr. Dallas, on Tuesday, September 23d, brought my patient Forbes to the hospital in a buggy and was taken ill on the following Monday night. On the same day, September 29th, I was taken ill, it being the seventh day after the admission of Forbes to the hospital. There being no physicians of easy access, I had recourse to a merchant who had spent the summer in Corpus Christi, where, having recovered from the disease, he acted as a volunteer nurse and saw a large number of cases. His idea of my appearance was that the disorder which manifested itself was yellow fever. The skin, though not presenting a marked appearance, was, I have been told since by officers, very slightly tinged; and the eyes, according to my nurse, the merchant spoken of, presented a peculiar appearance. Pain over the inner canthus of the eye, which seemed to reach to the back of my head, where it was most intense, was the most noticeable symptom to me. Tenderness over the stomach and liver were reserved until the third or fourth day, and not very marked. The icteroid hue of the skin became very plain, and the eyes somewhat more highly colored about the same period.

I have followed the origin of this disorder here more closely, and have taken pains to ascertain the facts more particularly, because many seemed at first to question if this was yellow fever. Some of the citizens insisted that it was not; but a remittent fever, with a jaundiced condition of the skin and eyes, and, in fatal cases, a vomiting of blackish matter, but not the real black vomit of yellow fever. Others, quite as intelligent, as strenuously asserted that it was yellow fever, of which they were competent judges, having seen and nursed it through repeated epidemics. The first case recognized as yellow fever in this vicinity was that of the citizen Forbes, which occurred in this hospital, and whatever the citizens in town may determine their epidemic to have been, it is none the less certain that it was an infectious disorder presenting many of the characteristics of yellow fever. Never since the last epidemic of yellow fever in 1858 has the mortality at this place been one-tenth as severe as during this fall.

The little graveyard of Rio Grande City, for the thirty days ending the middle of October, showed over eighty new-made mounds, speaking louder of the mortality for that month than any statistics that could be arrived at in such a community. The first nights of October were ushered in with quite chilling weather, and, either from want of more material, which some assert, or the effects of a few nights at a temperature about forty-five degrees, the disease seems to have abated, and we hear of scarcely any new cases, though I am told six or seven deaths have occurred during the past week.

The commanding officer of the post, as soon as the first case was discovered, was recommended to prohibit communication between the garrison and the citizens, and isolation of all suspected cases; a cordon of sentinels completely around the garrison accomplished this object, making ingress and egress impossible. My own case being the only one that subsequently occurred, I received the full benefit of my own suggestion, by having sentinels placed a short distance off entirely around the building which I occupied during my illness.

Two other cases were reported during my illness: the first was that of Colonel Shafter, who was taken ill on the second day after his arrival at the post, but, according to my mind, with none of the symptoms of the yellow fever. The other was that of

Private Alexander, (a negro,) a nurse, who had been exposed, and may, perhaps, have had a slight attack; but I think his case was called yellow fever on too slight grounds.

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

CHARLES C. FURLEY,
Acting Assistant Surgeon, U. S. A.

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

JEFFERSON, TEXAS.

JEFFERSON, TEXAS, *November* 30, 1867.

GENERAL: I have the honor, respectfully, to report as follows upon the appearance of yellow fever at this post:

Sergeant Joseph Hogan, Company "D," 20th U. S. Infantry, arrived here on the evening of the 22d ultimo direct from Baton Rouge, La., by steamboat direct from New Orleans, (where he had gone about one month previous as witness at a court martial,) with no apparent symptoms of disease but those of the character to which unacclimated persons are so subject in this climate, and similar to attacks he had had during the season. Several days previous to his departure he was seized with a violent attack of vomiting and retching, which recurred, while en route, several times during the day, but less violently. It is my opinion that what he had here was a relapse, the disease having been contracted at Baton Rouge, La., and that he had gone through the first and a portion of the second stage before arriving here—in a very mild form, however; three prominent resident physicians whom I had in consultation fully concur with me in this. It is my opinion, further, that his was a sporadic case, as he was not directly exposed to any contagious influence, it not having been epidemic at Baton Rouge, La., nor was there even a case there so far as I can learn; neither were there a case on board the boat which brought him here. Though the season was far advanced and our camp distant four miles from the city, upon a high and open site, yet every precaution was taken to prevent its spreading, by isolating those who had been directly exposed upon sites to leeward of the camp, keeping large fires burning continually to windward of it, and administering quinine and whiskey as a prophylactic to the well portion of the command three times per day for the period of two weeks. Out of five who were directly exposed, but one took it; this case was of a very mild form, recovery was rapid and without one untoward symptom, having used no other treatment than that known here as the domestic.

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

A. L. BUFFINGTON,
Acting Assistant Surgeon, U. S. A.

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

NEW IBERIA, LOUISIANA.*

[EXTRACT.]

NEW IBERIA, LA., *October* 1, 1867.

GENERAL: I have the honor to acknowledge the receipt of Circular No. 5 on epidemic cholera, it being the fourth circular that has reached me since I have been here.

Having been sent here by the Surgeon-in-Chief of Bureau R., F. and A. L. to assist in the relief of the sick and destitute freedmen during the terrible epidemic of yellow fever, there being no acting Surgeon besides, I have taken them from the post office.

The command at present is removed, for safety, some fifteen miles from this place, their acting Surgeon having died lately.

* * * *

Most respectfully,

WM. M. MILLER,
Acting Assistant Surgeon, U. S. A

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

* With regard to the origin of the epidemic at New Iberia, see also the New Orleans report of Brevet Major H. E. Brown, Assistant Surgeon, U. S. A.

NEW ORLEANS, LOUISIANA.

HEADQUARTERS FIFTH MILITARY DISTRICT,
NEW ORLEANS, LA., *May* 29, 1867.

GENERAL: I have learned from a reliable source that yellow fever is prevailing in the harbor of Havana, island of Cuba, and call your attention to this fact, so that you may put the troops of your command in the best sanitary condition, as the epidemic may reach here at any time, owing to neglect of the proper authorities to establish quarantine regulations.

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

P. H. SHERIDAN,
Major General, U. S. Army.

Brevet Major General J. A. MOWER, *Commanding District of Louisiana, New Orleans, La.*

Circular Letter addressed to the Medical Officers serving in the Fifth Military District.

HEADQUARTERS FIFTH MILITARY DISTRICT,
MEDICAL DIRECTOR'S OFFICE, NEW ORLEANS, LA., *June* 17, 1867.

SIR: Your attention is invited to Circular No. 3, Surgeon General's Office, April 20th, 1867, with the suggestion that the attention of the post commander be drawn to the propriety of selecting, in advance, proper sites for "quarantine of observation" alluded to therein; and for a temporary separate encampment of his own command in addition, should the outbreak of cholera or yellow fever necessitate its removal. Care should be taken to insure these places being kept in a fit state for occupation by troops, and with a sufficient supply of wholesome water available on each. Camp equipage should be at hand if no buildings are available.

Where it is possible to choose, the highest places should be selected, and the dryest and hardest ground, such as the ridge of a watershed, and never excavated or moist ground, for encampment of troops or site for hospitals.

The recession of surface water, and the consequent drying of impregnated porous soil that has been thoroughly soaked for some time, appear to be of the greatest weight in determining the time of outbreak of a cholera epidemic. In river channels, in valleys, and at the feet of steep declivities, the above three factors are often in combined action, since these conditions of surface promote the formation, collection, stagnation and variation of surface water.*

Against peculiarities of soil, surface water, and poisonous impregnation, scarcely anything can be attempted at short notice; when the introduction of cholera germs coincides with the presence of these three factors in an unfavorable sense, there is nothing to be done—save disinfection—but to avoid or desert the locality. A judicious preference of high levels with compact subsoil is the more important when it is impossible to insure perfect disinfection of all excreta. The use of lime, chloride of lime, and alkalies for disinfection of excrementitious fluid or other such matter should be discontinued, and copperas, carbolic acid, or other agents, used instead to produce an acid reaction. As it is probable that the alkaline condition is essential to development of the germ or poison of cholera, the retardation of this reaction, or its complete neutralization, if the alkaline condition has been already produced, is to be secured by systematic daily use of sulphate of iron and carbolic acid, articles which are cheap and easily procured.

The most complete possible removal of all exposed organic remains and foul substances from the vicinity of human dwellings, and the destruction of all worthless and suspicious refuse, should be strictly enforced, but always with a preceding thorough disinfection.

The excreta, urine, and vomited matters should be received in vessels already disinfected; all buckets, utensils, water-closets, cesspools, sewers, pipes, &c., that may have at any time contained them, as well as soiled linen, clothing, or wooden floors on which excreta have been spilt, should be thoroughly disinfected and purified.

The intestinal contents of cholera corpses and everything soiled by them must be similarly disinfected.

Copperas and chloride of manganese (containing iron) would injure clothing and floors by rust stains. Solutions of carbolic acid in water or the salts of zinc have not this disadvantage. Carbolic acid leaves a very persistent odor, so that for linen and such matters watery solutions of sulphurous acid or of sulphate or chloride of zinc may be preferred. Whatever articles of bedding or clothing have received infected matters from patients, and cannot be readily disinfected, should be destroyed by fire.

Places where cholera or yellow fever prevail should generally be avoided by troops on the march, and they should encamp in the neighboring open country rather than go into quarters in an infected town. If quartered in the healthy section of a large city, all traffic with the infected districts therein should be prohibited.

Cases of diarrhœa should, if circumstances allow, be treated in an isolated premonitory ward, the dejections being disinfected. A special hospital at some little distance, or, still better, tents or huts, should receive cases of suspected epidemic disease, especially of cholera or yellow fever.

Prompt isolation and disinfection may prove to be protective of the command and no dispersion become necessary. The greatest care and attention should be given, therefore, to these objects, as the inconveniences and difficulties inseparable from a removal are great, although the contingency may have been anticipated, and under the best circumstances.

* NOTE.—See rules for the guidance of sanitary authorities, practitioners, and the public during the prevalence of epidemic cholera, by the Professors Dr. W. Griesinger, Dr. Max Von Pettenkofer, and Dr. C. A. Wunderlich—Appendix to Half-yearly Abstract Medical Sciences, Vol. XLIV, July—Dec., 1866, quoted here and elsewhere in this paper.

If a decided outbreak, however, occur in the barracks, especially of cholera or yellow fever, (indicating an epidemic tendency in an unmistakable manner,) it will be proper to evacuate the premises, and then no delay should attend the movement; the sick with ordinary diseases being also taken away, to share the benefit of removal from the infected atmosphere.

The command should not return until the epidemic has ceased. The barracks should not be reoccupied until they have been thoroughly fumigated, disinfected, ventilated and purified.

Should cholera or yellow fever follow the troops, they should be moved short distances every second or third day without fatigue to the men, at right angles, if possible, to the prevalent wind and track of the disease.

Wood fires, if necessary, can be maintained to the windward of camp.

A camp once left should not be returned to again if another can be selected.

Separate the sick and place the hospital tents to leeward. The excreta should be buried deeply and covered with earth by a special party with a non-commissioned officer in charge. Take care in moving to cover effectually everything liable to make the place a focus of disease for others. During the removal the men should not sleep on the ground or in damp places; cots should be carried, if possible. The prevision of the commander for this contingency will diminish the amount of exposure and consequent sickness among the men. The daily use of disinfectants should be continued throughout the season, and will assuredly tend to lessen the tendency to grave types of disease and promote the general health and efficiency.

At all times let the best water be secured, and see that the supply is daily as pure as possible.

When cholera approaches every person should carefully avoid all influences which his experience tells him are likely to produce diarrhœa, and if attacked should immediately seek medical aid. Frequent daily visitations of the healthy, so as to detect all illness at its commencement, has, in all epidemics, been of the greatest benefit to the people. Tainted provisions should be avoided, diet should be moderate, clothing should afford sufficient protection from cold without checking transpiration. Being chilled will often drive the circulation from the surface of the body and occasion congestion of internal organs, or catarrh of the mucus membrane. The abdomen should be warmly clothed, which can be suitably done by a flannel bandage. Good beds and clean linen are important aids to uninterrupted transpiration.

Long continuance in a confined air (as in a dwelling) which withdraws too little water and carbonic acid increases the disposition to cholera.

The absence of fresh air, bad ventilation (as in ships) in crowded barracks, prisons, or rooms too small for the number of inhabitants, have been shown by much experience to be a frequent cause of violent choleraic outbreaks.

The perils frequently, but erroneously, ascribed to too great a current of air ("draught," as it is termed) may be obviated much better by clothing, bedding, heating, &c., than by shutting up the doors and windows.

Ventilation improves foul air and dilutes all foreign matter it contains. The use of chloride of lime in rooms containing tainted air has long been customary, but there is no proof of the smallest benefit from it. The evaporation of vinegar or acetic acid may be supposed to exert some little power as a disinfectant, and at the same time diffuses an odor agreeable to the sick.

When the introduction of cholera is feared, we ought not to wait with our disinfectants until the epidemic character of the outbreak has been shown in several houses and cases. The acid reaction produced in the excreta should be maintained until they can be moved away from the vicinity of human dwellings: they should be deeply buried.

The concealment or neglect of the first case of cholera is one of the greatest errors, and usually occasions more injury than can be retrieved by the greatest efforts and sacrifices.

The vigilant enforcement of sanitary measures is particularly necessary in a southern climate, and if yellow fever, like cholera, may be considered to be a fœcal disease, we may presume that successful efforts directed to the prevention of one disease are prophylactic with regard to the other.

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

T. A. McPARLIN,

Surgeon, and Brevet Brigadier General, U. S. A., Medical Director Fifth Military District.

Report of the Epidemic of Yellow Fever in New Orleans, La., during 1867, *by Brevet Brigadier General* T. A. McPARLIN, *Surgeon, U. S. A., Medical Director Fifth Military District.*

MEDICAL DIRECTOR'S OFFICE, FIFTH MILITARY DISTRICT,
NEW ORLEANS, LA., *May* 15, 1868.

GENERAL: I have forwarded to your office, at different times, all reports received from the medical officers upon the diseases prevalent at their stations. The reappearance of yellow fever and cholera in this district in 1867 gives the subject unusual interest, especially in regard to yellow fever, which commenced early, spread widely, and proved fatal to many thousands.

In 1866, Asiatic cholera, newly imported, rapidly spread after June, and was the prominent and most fatal disease. Yellow fever did not appear until late in August, 1866, and though the individual cases were severe, its greatest mortality did not exceed seven per day. The lateness of the season, the advent of cold weather, (which was earlier in 1866 than in 1867,) and the presence of cholera, may have contributed to prevent it becoming epidemic in 1866.

Cholera reappeared here June, 1867. It assumed, in July, an alarming character in one precinct, and called for very energetic action on the part of the civil authorities. It then declined and almost passed out of consideration until autumn, when, as yellow fever declined, cholera again increased to sixteen deaths per day. Five hundred and eighty-one citizens died of the disease in 1867 compared with 1,180 in 1866. Five soldiers died in 1867, (average mean strength of the command 1,140,) as compared with 173 in 1866 among United States troops in this vicinity.

In anticipation of an epidemic, disinfectants were distributed to the stations in the spring, and recommendations made in April to establish quarantine stations in Texan ports, and maintain quarantines of observation after May 1st, 1867. In Louisiana, civil quarantine stations, regulations, and officers were already in existence under State laws.

The public press had reported yellow fever at the Isthmus of Panama in March, and also in May at Nassau, St. Thomas, Jamaica, Guayaquil, Buena Ventura, Havana and Vera Cruz.

There were 68 cases and 18 deaths reported on the steamer Resaca en route from Panama to San Francisco in July.

At Havana, and especially in Vera Cruz, which had been some time a besieged city, the disease prevailed severely. From both places there were arrivals at this port as well as from Indianola, where yellow fever had been introduced by arrivals on the schooner Santa Margarita, which left Vera Cruz the 11th of May and arrived May 21st.

There was no quarantine attempted anywhere in Texas until July, and in Louisiana, although it may have been enforced generally by quarantine physicians with especial vigor, it is true that passengers from several infected localities passed up to this city, without being detained as suspected, until July.

The fever broke out in Indianola in May, 1867, and though many were dying in June of the disease, the fact was not known elsewhere until late in June, perhaps July, when passengers from Indianola had sickened and died at Galveston, South West Pass, mouth of the Mississippi river, and New Orleans.

The fever appeared at the Mississippi river, the principal quarantine station, July 1st, viz: 4 cases on the brig Virginius from Havana. It did not, however, visit the colored troops and white officers at the forts a few miles below quarantine, viz: Fort Jackson and Fort St. Philip. Neither did it appear at Fort Pike at the Rigolettes. If the disease be propagated by an atmospheric wave, it might be expected to have affected some one of these localities.

The only stations in the State of Louisiana where the troops were affected to any extent were those at and adjoining New Orleans. The troops here, when yellow fever appeared, were quartered as follows: Commercial Hotel building, corner Tchoupitoulas and Girod streets, 1st district, Companies "C," "G," and "H," 1st U. S. Infantry; Sailors' Home building, corner Tchoupitoulas and Erato streets, 1st district, Companies "A," and "B," 1st U. S. Infantry; Cotton Press building, corner Cotton Press and Love streets, 3d district, Company "G," 6th U. S. Cavalry; Jackson Barracks, six miles from the central portion of the city but adjoining the city limits, Companies "E," "F," and "K," 1st U. S. Infantry, and Battery "K," 1st U. S. Artillery. Three Companies ("C," "G," and "H") 1st Infantry were moved from Commercial Hotel to Jackson Barracks August 28th, 1867. Companies "A" and "B," 1st U. S. Infantry, quartered in the Sailors' Home since March 29th, 1867, and the post band, were moved, August 17th and 18th, 1867, to Greenville Barracks, being the late General Hospital pavilions connected with the post hospital at Greenville, distant six miles from the central portion of the city. Greenville Barracks, headquarters band, and "H" and "I" Companies of the 39th U. S. Infantry, colored regiment, numbering 225 men, occupied the pavilions not in use as hospital wards. At Greenville, 79 colored recruits of the 9th U. S. Cavalry, and 16 recruits of the 41st U. S. Infantry, were encamped several hundred yards from the hospital.

In consideration of the previous use of the building, and the unhealthfulness of the locality, the troops in the Sailors' Home were observed closely in the expectation that disease might appear there early, and as soon as there was reason to believe a local cause might be operating, the building was vacated.

Dr. Brown, in his report, states that the Sailors' Home was occupied in 1865 and 1866 as a yellow fever hospital for the naval vessels stationed at New Orleans. Dr. Heber Smith details the history of the occupation and use of the building. His letter is enclosed. It would appear that it was during the summer and fall of 1864 that there was so much fever in the squadron, and that yellow fever patients were received from the ships until late in the winter. Fatal cases occurred there as late as February, 1865. He thinks there were no cases of yellow fever admitted in the summer of 1865, and that no new patients were received for several weeks before it was finally broken up, patients being transferred to Pensacola at different times, as they were able to travel, before the hospital was broken up, October 1st, 1865, and the appurtenances removed. It was feared that yellow fever would again prevail in 1865 if this course was not pursued.

The Sailors' Home was vacant in 1866, I believe. It was first occupied by U. S. troops March 29th, 1867; July 20th, August 3d, 4th, 7th, 8th, and 9th, single cases of fever occurred at the Home. On the 10th, two cases; on the 12th, four cases; after which it was determined to evacuate the building. The troops were transferred thence to Greenville, a few miles above the city.

The troops at the Commercial Hotel were moved, not because there was necessity for vacating the building, but as the disease was extending in the city, and likely to invade these quarters, they were moved while still considered a healthy command to the barracks, in order to be out of the city, and at the same time to be near to hospital accommodations for prompt treatment. After August 30th the troops, except Company "G," 6th Cavalry, which, being in the 3d district, was not far from Jackson Barracks, were out of the city, and convenient to the principal hospitals. The necessary duty to be done in the city, however, brought the men back and forth to the city, and in the hot sun. The admissions to post hospital Greenville of cases of yellow fever early in the season were of soldiers serving in New Orleans, and did not originate at Greenville. The period of extreme severity among the troops, when the number of daily admissions of new cases and deaths were largest, continued from the 15th to 30th of September. As the epidemic advanced additional medical attendance became necessary. Assistant Surgeon Cronkhite, and Acting Assistant Surgeons Mauran and Tonner, were sent to Galveston; Assistant Surgeon C. B. White, September 5th, and Acting Assistant Surgeons J. D. Johnson, September 14th, Z. P. Doehnler, September 20th, J. T. Payne, September 26th, and Charles Lodge, October 2d, were sent to Jackson Barracks for duty. The following Acting Assistant Surgeons were sent to Greenville for duty in and near the New Orleans post hospital: Dr. J. J. Auerbach, August 12th; J. T. Scott, September 16th; Heber Smith and Charles Pelaez, September 23d; F. A. Wilmans, September 26th; and J. O. Taylor, October 22d.

The greatest virulence of the disease seems to have been manifested in the following commands: Indianola, where, out of 29 cases, 14 died; Hempstead, 55 cases, 29 died; Galveston, 207 cases, 82 died; Houston, 71 cases, 25 died; New Orleans and

vicinity, 822 cases, 218 died; Victoria, Texas, 18 cases, 4 died. It is proper to remark that only 18 cases and 9 deaths occurred in the whole of the commands serving in the District of Louisiana outside of New Orleans. The number of citizens who died in Galveston of yellow fever was 1,170, and in New Orleans, 3,107. The disproportion in the population between the two cities evidences the excessive fatality of the disease at the former place. I am of opinion, however, that many died in New Orleans of the prevailing disease who were erroneously reported as dying of other diseases. The mortality by fevers in New Orleans during the year was 4,076, and from all causes, 10,096. The aggregate number of yellow fever cases belonging to the army, serving in the States of Louisiana and Texas, and in Ship Island, Mississippi, during the season, was 1,237, and the deaths 384. During the year the total mortality from all causes in the army serving in the Fifth Military District was 592.

John Cowarts, the first fatal case reported in New Orleans, died June 10th, with black vomit, in the Charity hospital, a day after admission; he came from No. 261 Circus street. Three weeks before his death he had shipped as sailor on the Italian bark Bessie, loading with staves in the 4th district for Barcelona. The vessel came from Havana March 25th, 1867, loaded with sugar; arrived in New Orleans April 22d, and went into dry-dock at Algiers for repairs before loading with staves, having been damaged while coming up the river. Second case, John Roddis, Dr. Brickell reports as taken sick on St. Charles street, near Julia street, on the 13th of June; he recovered. Third case, H. A. Gelston, reported, by Dr. Folwell, sick on Julia street, between Camp and St. Charles streets; he died June 23d. Fourth case, John Bonanan, arrived from Galveston on steamer Hewes; sick in Galveston on the 19th with chill; arrived at New Orleans stock-landing 21st of June, and went to the Texas Hotel, at the head of Napoleon avenue; he died June 26th with black vomit. Fifth, John Dougherty, died at Charity hospital 29th of June—brought from No. 61 Girod street; he was employed near the shipping on coal barges at Algiers. Lieutenant Orville Dewey, U. S. A., died of yellow fever, June 30th, at the St. Charles Hotel; he had arrived from Indianola on a steamer a few days previous. June 30th, Mrs. Hooper, wife of the captain of the bark Florence Peters, died of yellow fever; arrived at Algiers from Havana and quarantine about June 22d. The bark left Havana June 3d loaded with sugar. Mrs. Hooper was sick on arrival at Algiers, opposite New Orleans. Dr. Barnes, who visited Mrs. Hooper, reports the following cases of the disease connected with the bark Peters: Mrs. Hooper's sister, taken sick June 25th, recovered; Mrs. Hooper's babe, taken sick June 26th, recovered; Mrs. Hooper's son, taken sick during the same week, recovered; 1st mate of the Peters, taken sick about June 30th, recovered; 2d mate of the Peters, sent to Charity hospital, and died July 9th; Captain Hooper, of the Peters, taken sick July 7th, died July 13th; Seth Yorke, who had visited the Peters frequently, died at Charity hospital of yellow fever July 25th. The remainder of the crew, six sailors, disappeared, and no trace has been found of them. Captain J. D. Bell, Texan stock-trader, who came passenger on the same steamer with Lieutenant O. Dewey, was visited by Dr. Wood, June 30th, at the Stock-landing Hotel, being then in the third day of his attack of yellow fever. In the same house, Bonanan, Dr. Greenleaf's patient, died the day previous to Captain Bell being taken sick. Captain Bell recovered. Captain Pennington died July 19th of yellow fever; I believe he was Captain of the bark Frank Marion, which arrived in New Orleans from Cardiff about the 22d of June. He was a patient of Dr. Wood. July 1st, four cases of yellow fever were brought to the quarantine station, arriving on the brig Virginius, from Havana, after eight days' passage. During their detention two other cases occurred. Private Benjamin Miller, 1st Artillery, taken sick at Jackson Barracks July 1st, died July 8th, of yellow fever. Private Charles H. Wurtz, taken sick July 11th with yellow fever at Jackson Barracks, recovered. Private John O'Neil, Company "G," 6th U. S. Cavalry, was taken sick July 5th, in New Orleans, and died July 13th of yellow fever, at post hospital, Greenville. Private Francis Zimmer, Company "H," 1st U. S. Infantry, reported July 22d, and died July 25th of yellow fever, at Greenville. Thomas Kelly, age 30, born in Newfoundland, longshoreman, last at sailor's boarding-house, No. 373 Victory street, near Pontchartrain railroad depot, came from New York, had been twelve months in the city, was admitted to Charity hospital July 22d, and died the same day of yellow fever. Peter Ferrell, age 21, came sick from Galveston, Texas, July 24th, died July 27th; he came to New Orleans on steamer Fire Queen, from Dublin, Ireland, May 24th, 1867, and came from Galveston on steamer Hewes; he was born in the city of Dublin, had been attended by Dr. Bell, and died with yellow fever at his brother's residence, No. 621 Moreau street, near Montague. Ludwig Antonell, age 32, from Denmark, arrived about February, 1867; he was taken sick July 30th, 1867, and died August 4th, 1867; he was a glazier, and died at his boarding-house, No. 365 Victory street. The wife of Antonell, age 31, from Denmark, came with her husband, was taken sick July 30th, and died August 2d, of black vomit, at No. 365 Victory street. Mrs. Lawson, age 44, from Copenhagen, Denmark, came from Mobile, July 5th, 1867, was taken sick August 9th, and died August 12th, of black vomit, at No. 365 Victory street. James Hannigan arrived from Galveston, Texas, on the steamer Harlan; took board at No. 339 Old Levee street, July 22d; died on the 25th with yellow fever.

The preceding cases suffice to show the origin of such as are known to me. The archives of the board of health may give more, and in regular succession. I question whether there is any source from which a complete record could be prepared, on account of the neglect of practitioners to report all their cases. The very diverse estimates made of the number of cases and rate of mortality evidences the difficulty of obtaining reliable data. Whatever may be deduced from some of the cases, importation is shown from Havana, Indianola, Galveston, and New Iberia. The disease was introduced into Indianola from Vera Cruz, as before stated, in May. The fever was epidemic in Indianola June 15th; at Galveston late in July. It very soon appeared in the adjacent interior towns, viz: at Houston, Lavacca, and Corpus Christi, Texas.

Quarantine was enforced in New Orleans in July against Texan ports, and passengers from Texas made their way into the adjoining counties of Louisiana. Very soon yellow fever broke out with violence in New Iberia, in western Louisiana, and became epidemic the first week in August. The Howard Association of New Orleans sent assistance, nurses, and physicians there August 10th. On that day Dr. Shields, Acting Assistant Surgeon, U. S. A., recently arrived from New Iberia, upon summons as a witness, died in this city, of balck vomit. Other places in the interior of Louisiana and Texas then became affected.

The yellow fever of 1867 may be stated to have become epidemic generally wherever it appeared within its usual limits, and it would seem that the type of the disease was such as tended naturally to extend rapidly over populations. In New Orleans sanitary efforts were made for prevention and mitigation of its spread. Although they were employed at a late period, to a limited extent, and not employed generally with confidence by the health authorities, it is fair to say, that such as were properly employed were beneficial. The trial of disinfection has not yet been complete, fair, and conclusive as to

its value in yellow fever, etc. The report of Dr. Lewis (copy appended) deserves the attentive consideration of practitioners in this section. It may be claimed by the health authorities, that the disease was held in check, and restrained from becoming epidemic as soon as it otherwise would have done, by the vigorous measures taken to combat it in the localities where it appeared.

In this connection it is proper to remark, that the earlier and important cases were sick in widely distant sections of the city, viz: Bull's Head, Circus street, St. Charles street near Julia street, Charity hospital, Julia street near Camp street, Girod street, Texas Hotel, the St. Charles Hotel, at Algiers, at Jackson Barracks, "G" Co., Cavalry quarters, 3d district, and at Greenville.

It is difficult for a health officer to ascertain promptly when sanitary measures and disinfectants are needed, as the report of any case of suspicious or infectious disease to the Board of Health is liable to be neglected.

The fever was epidemic in New Orleans about September 1st. It was reported there, also, as of milder type and less fatal than elsewhere. Why did it thus differ, and why was it slow in attaining, in New Orleans, the epidemic character, (the maximum mortality was reached on the 25th of September,) are questions of interest. In certain localities in the 2d and 3d districts the cases were grouped together, in July and August, chiefly in or around sailor boarding-houses and fever nests which received passengers from Texas, Mexico and the West Indies. The levee, market, and restaurants in this section were favorable resorts for newly arrived passengers.

There was an arrival there during the season of several hundred discharged soldiers of the Imperial Maximilian Legion, from Mexico, and in the same district was the field of cholera, where so many died in July, details of which will appear in the accompanying papers.*

The municipal and health officers of the 2d and 3d districts put in force vigorous sanitary measures as soon as they believed that genuine yellow fever cases were under treatment and a tendency to outbreak was noticed, and, as I believe, accomplished very beneficial results in their districts. I regret that similar efforts were not made sooner by the authorities in the 1st and 4th districts.

The fever finally spread gradually in every direction, advancing upward to Lafayette, (4th district,) Jefferson City, and Carrollton, and backward in the direction of the swamp and Lake Pontchartrain. On the 3d day of September, quarantine was raised by the local authorities as being, in their opinion, useless and no longer necessary. The pestilence increased day by day, and extended to many who, as creoles or long residents in the south, had deemed themselves and their families secure, and not a few who had the disease in former years were again attacked.

The experience of this season established the fact, that the number of persons liable to be exempt, as a rule, is limited to the class who have unquestionably had the disease during an epidemic season. Here, as well as at other places, it was noticed that many young children, born in the city, were attacked, and a number of them died. It is reported that cases already in hospital at the time when patients with yellow fever were admitted and brought beside them, contracted the disease in some instances. This was observed at the City hospital, Galveston, by Dr. Dowell, and at Charity hospital, New Orleans, by Dr. Heber Smith.

The propriety of isolating the first cases of the disease is clear; and when it cannot be perfectly accomplished, the cases should be spread out far apart in hospital, and the companies in barracks and tents dispersed or removed from the locality and isolated from infected precincts.

It is probable that here upon the border of the yellow fever zone two kinds of yellow fever may be confounded by observers, and laws deduced from observation of one type in any season erroneously applied to the other. The febris icterodes remittens (malarious yellow fever) may occur sporadically in New Orleans every season. The febris icterodes, true specific yellow fever of continuous type, and communicable as stated by Aitken, would seem to be more virulent and essentially epidemic in its tendency. While the necessity of excluding such a disease by quarantine (and it is generally imported) is imperative, the difficulty of doing so is great, for the virus conveyed by fomites may pass the ordeal of quarantine undestroyed.

I know of no special advance in the etiology of the disease this season. Some tolerance has been gained for efforts towards prevention, and to stay or extinguish it. An honest endeavor to do something in that direction is laudable, and preferable to indifference and inaction.

An exhausted treasury, the depression of the times, and the disturbed political situation, will prevent this city from speedily improving its sanitary condition. A step has been gained recently in the purchase and control of the water-works by the city, with the possibility of improved drainage and cleanliness.

Cases of the fever conveyed to some localities, (e. g., to Austin, Texas,) though fatal, did not spread to others and infect the community.

In concluding this paper, I desire to acknowledge the valued services rendered by medical officers of the army serving in this district, specially exposed for two years past to the incursion of epidemic diseases. Their intelligence, zeal, and vigilance have greatly contributed to preserve the general health of the command.

Doctors George Taylor, Samuel Adams, and Charles H. Rowe, of the medical staff, died in the performance of their duty, all within 30 days, at one station. Doctors Bacon and Cronkhite promptly repaired to the post of danger, at Galveston, where the latter soon after became ill with the fever. Surgeon B. A. Clements and Assistant Surgeon C. B. White, at Jackson Barracks, Assistant Surgeons H. E. Brown, in New Orleans, E. A. Kœrper, at Greenville, La., and E. Cowles, on the Rio Grande, were themselves stricken down while administering to others. As one fell, charge was taken by another. Acting Assistant Surgeons Orsamus Smith, Heber Smith, and Mathew Stovell, took charge in this way of their respective hospitals. Acting Assistant Surgeons Wm. Deal, F. A. Wilmans, J. J. Auerbach, and Henry Smith, also contracted the disease while on duty with troops.

The commands with which Assistant Surgeon W. D. Wolverton, and Acting Assistant Surgeons Charles E. Warren, C. W. Kœchling, and J. F. M. Forwood, were serving, were shielded from the shock of the epidemic. As they were liable to receive it, the gratifying result is creditable to these gentlemen and the commanding officers.

In the period of greatest need, many physicians of the army being prostrated by illness, a very generous tender of professional assistance was made to me by the President of the Board of Health, Dr. S. A. Smith, and the Professor of Practice of

* The greater part of these papers are omitted in this report for want of space.—*Ed.*

Medicine in the University of Louisiana, Prof. S. M. Bemiss. This contemplated, unavoidably, very great sacrifice on their part, their time being occupied by pressing and important professional engagements.

The timely permission accorded to employ experienced nurses prevented many embarrassments in administration and suffering to the sick. Assistant Surgeon H. E. Brown gave me his assistance in procuring them by contract at times when increase of duties at the height of the epidemic, and the necessity of visiting the hospitals, prevented my being present in my office.

I am, General, with much respect, your obedient servant,

T. A. McPARLIN,

Surgeon, and Brevet Brigadier General, U. S. A., Medical Director.

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

NEW ORLEANS, LOUISIANA, *December* 2, 1867.

SIR: Your note of November 1st, requesting a general report of the work accomplished at my office from May to November, was not received until the 25th, otherwise the report would have been made out earlier. During the month of May, and until about the latter part of June, my district was exempt from epidemic diseases, and consequently neither fumigants nor disinfectants were employed. From that time until August, true cholera appeared in the district; the first case, originating at the corner of Mandeville and Prosper streets, terminated fatally at the Charity hospital. This place was not immediately disinfected, and soon the whole neighborhood, from Elysian Fields to Mandeville, on Prosper, Josephine, Soliette, Morales, and Urquehart streets, was thoroughly infected with cholera, about twenty-five cases occurring in a week. Requisitions for disinfectants were made and forwarded to the street commissioner, and about the tenth of July over thirty houses in the locality mentioned were thoroughly fumigated and disinfected. From that time not more than two or three cases originated in that part of that district. Other cases were afterwards reported in various portions of the district—on Greatmen, Congress, Casacalvo, and Front Levee streets—but the infected houses were promptly attended to, and the cholera was effectually checked. I have no hesitation in stating that it was checked, for I observed that wherever the work of purifying infected houses was delayed, whether from want of promptness on the part of physicians in reporting these cases, or from other cases occurring in the same places, that the adjoining houses suffered, which did not prove the case when nothing interfered with or obstructed me in my duty. Though I cannot assert so positively the beneficial effects of disinfectants during the prevalence of yellow fever, I firmly believe that yellow fever can be checked; but for that purpose, a removal of the sick would be necessary, especially the first cases, and a better knowledge of the disease on the part of practitioners of medicine, so that the early cases would not escape notice.

The number of houses disinfected of yellow fever from the middle of August to November 1st was about three hundred. The first case died at the hospital, but was taken there from Antonio Baptistella's, on Victory street near Elysian Fields street. Four days after there were upwards of forty cases on Victory street, from Frenchmen to Elysian Fields streets. Every house is a boarding-house, and many were filled to overflowing with strangers. These houses were not only fumigated with sulphur and disinfected with sulphate of iron in solution, but were pumped from top to bottom with carbolic acid, which impregnated the atmosphere for some distance off. This was repeated as often as new cases occurred.

From the 1st of September to the present time, there has not been a more healthy neighborhood; and notwithstanding new sets of boarders, also equally unacclimated, have taken the places of those who have gone away, but very few, to my knowledge, have been sick with yellow fever.

For the removal of various nuisances since the first of May, four hundred and sixty-seven written orders have been issued by me. This is independent of the orders given by police officers, acting under me, in their inspections of privies.

From November 24th to the present day, 22 places, infected with cholera, have been fumigated and disinfected: No. 32 Elmira street, corner of Moreau and Frenchmen; 432 Casacalvo; brig Harvest Home; ship Zimi; bark Estin; house corner of Spain and Casacalvo streets; 160 Clonett street; Congress between Moreau and Casacalvo; No. 8 Port street; Piets near Cove; 115 Frenchmen street; 36 Annetto street; Casacalvo near Frenchmen; Levee between Mazant and Liseps; ship Zimi, a second time fumigated; ship City of Limerick; corner of Enghien and Morales streets; Independence street; 595 Casacalvo; corner of Port and Good Children; corner of Elmira and Greatmen.

Respectfully,

E. S. LEWIS,

Health Officer, Third District.

Dr. S. A. SMITH, *President of the Board of Health.*

NEW ORLEANS, OFFICE OF THE HEALTH OFFICER,
Second District, December 3, 1867.

SIR: In compliance with your letter, I make the following report of the operations of this office during the months of July, August, September, October, and November: Up to the 4th of August, the small amount of disinfection required was performed by Police Officer H. Tricou, detailed from the police force of this district. The number of cases of yellow fever increasing, I made application to the deputy street commissioner, second and third districts, Mr. Louis C. d'Homergue, who supplied me with men, who have been employed in disinfecting, inspecting, and serving notices. I have always found this officer ready to furnish any assistance in the execution of sanitary measures, and an ample supply of disinfectants was always kept on hand by

the department. During the existence of yellow fever here, about 334 cases were reported to me as having died in this district. Out of this number, (all of which premises were disinfected,) 293 houses had 1 death in each; 12 had 2 deaths; 4 had 3 deaths; and 1 had 5 deaths. The mode of disinfecting was by closing the room or chamber in which the death took place, tightly stopping up the fireplace, and burning two to four pounds of sulphur in the apartment, which, also, was generally sprinkled with carbolic acid. Sulphate of iron was put in the privies and mixed with the excreta, and all bed clothes boiled or destroyed.

During the period embraced by this report, forty-six deaths of cholera took place in forty-five houses, only one house having had a second case after being disinfected in the first instance. * * * * * * * *

I have studiously avoided in this report giving any opinion or theory as to the causation or mode of propagation of cholera or yellow fever, or of the efficiency of disinfection therein. I simply report the means adopted by me, and the results obtained, from which, of course, you can make the proper deductions. * * * * * * *

Yours, respectfully,

ALFRED. W. PERRY,
Health Officer, Second District.

Dr. S. A. SMITH, *President of Board of Health.*

HEADQUARTERS FIFTH MILITARY DISTRICT,
Medical Director's Office, New Orleans, La., May 15, 1868.

GENERAL: * * * * * * * * * * * * *

In my opinion it would be judicious to institute, every year after the 1st of May, along the gulf coast, quarantines of observation, to prevent the introduction of epidemic diseases from suspected ports. It will be proper, also, whenever a few cases of yellow fever appear at any gulf station in the spring or summer season, to abandon the locality, and institute quarantine against suspected persons and places; also, to isolate early every suspicious case, and spread out those already in hospital with other diseases. At the same time, the type of the disease should continue to be studied and observed. The exemption of the troops at several stations, viz: Baton Rouge, Shreveport, and Alexandria, may be attributed to the prompt removal of the troops to other healthful localities. At New Orleans, circumstances were such as to make it desirable to keep the troops within reach. The type of the disease continued for a long time to be mild, and its extension gradual, without exciting particular apprehension until a late period. * * * * * * * * * * * *

I am, General, with much respect, your obedient servant,

T. A. McPARLIN,
Surgeon, and Brevet Brigadier General, U. S. A., Medical Director.

Brevet Brigadier General T. H. NEIL, *A. A. A. G.,*
Fifth Military District, New Orleans, La.

NEW ORLEANS, LA., *March* 7, 1868.

GENERAL: In accordance with your request, I have the honor to present, herewith, an additional report upon the late epidemic of yellow fever in this city, with some points in regard to the cause, origin, symptomatology, and treatment of the disease that may prove of interest. I witnessed, in Charity hospital, on the 10th of June, the termination of the case that was then, and is still supposed to be, the first that occurred in the city, viz: that of John Cowarts, from the bark Bessie, which I reported to you in full on the following day. It has been claimed, from the evidence presented in this case, that the epidemic last season was of endemic origin; but a careful examination of all the facts will certainly cast doubts upon this conclusion that cannot easily be settled. A brief synopsis of this case will read as follows:

John Cowarts, seaman, 29 years of age, had been in and about New Orleans for fourteen months previous to his death, suffering now and then with intermittent fever. Four weeks before his last sickness, he shipped on board a vessel lying before the city, loading with staves, and worked in the hold of this ship until the Wednesday, June 5th, preceding his death, when he went on shore to the house of an acquaintance on Circus street, where, two days afterwards, June 7th, he became suddenly much worse, and was conveyed to the hospital, where he died with black vomit on Monday, the 10th. If we stop here in the investigation of the subject, the evidence is certainly all in favor of an endemic origin; but when we come to inquire into the previous history of the ship in which Cowarts had worked, we find that she had recently arrived from an infected port, Havana, loaded with sugar and molasses, a cargo notoriously favorable for the propagation of yellow fever, and that the length of time that elapsed from the first exposure of the patient to the manifestation of the disease, corresponds with the views of a late writer upon the subject, who says that the period of incubation in yellow fever is "longer than is usually supposed, being probably often fourteen or sixteen days."—Parkes' Hygiene, p. 447. This, then, renders the local origin of the disease last year extremely doubtful.

There is one symptom of the disease that is not mentioned by writers as of much importance, but to which great weight is attached by physicians in this region, by some considered almost diagnostic of the disease, viz: a congested and spongy condition of the gums, bleeding freely with slight pressure of the finger nail. This condition of the gums was certainly found in a very large proportion of cases last summer, but I had the opportunity of showing you and Dr. ———, of Charity hospital, who is a firm believer in the infallibility of this symptom, one interesting deviation from the rule in the case of Mr. Price, on Baronne street, whose gums were perfectly natural; but the mucous membrane of his nose was very much congested. Several well-marked cases of yellow fever came under my observation in which there was no congestive appearance whatever.

There were few physicians in this city who did not use quinine in some form during the epidemic. Many used it in the manner recommended by Professor Stone—a full dose early in the paroxysm, with a view to both hastening and prolonging the sweating stage; and many believe that quinine also exerts a powerful influence in sustaining the nervous system or vital powers through the terrible depression which remains after the paroxysm. During the latter portion of the epidemic, quinine was given in another way, and for another object, by many of the private practitioners of the city, with marked success, viz: in large and repeated doses with Battley's sedative, in the proportion of one drop to each grain, commencing early in the paroxysm, with a view of getting a head of, and, as it were, controlling it by the remedies. One eminent practitioner and professor gave to a member of his own family a drachm of quinine with nearly as much Battley's sedative in the course of a few hours with the desired effect. All who tried this treatment speak of it as being more satisfactory in its results than any other. Many of the famous do-nothing men adopted it at last. The fact of this method of treatment coming in use late in the season may explain its success. Early in the epidemic it might not have been at all applicable; other seasons must test its merits. The mortality of last year's sickness was remarkably low, and this is attributed to the mild type of the disease. There is no doubt that epidemics differ from each other in severity as individual cases differ; but would it not be well to attribute some of the improvement in this respect to a more enlightened and rational mode of treatment? Advancement certainly has been made since the good old parboiling times, when blankets, close rooms, and starvation made up the course patients were put through. We heard of but few physicians who subjected their patients to the torture and murderous tendency of a seven days' starvation, as was formerly done. On the contrary, as soon as patients could take the least nourishment, it was allowed them; often, or I may say generally, with malt liquor of some kind, for which there was a remarkable craving. The tendency of the disease to spread over the city seemed to be much stronger this year than in other seasons. In 1864, for example, although the disease prevailed in a virulent form at the United States naval hospital, situated in the heart of the city, it was confined almost exclusively to that institution. Notwithstanding the thorough disinfection and fumigation of the house of Natallie Swago, on Circus street, where the man Cowarts remained a few hours, that neighborhood was, as it always has been in yellow fever years, a stronghold of the disease. Whether the infection came from Cowarts or not is more than any one could assume to say.

In the month of July I saw cases of yellow fever in Charity hospital among patients who had been a long time under treatment in the institution, and at this time cases were reported in widely separated sections of the city. It did not seem to me to spread by an atmospheric wave. May not the virus have been carried by persons in their intercourse with the sick? In exceptional instances some unacclimated member of a family escaped the disease, although freely exposed in nursing those sick. No undoubted case of the disease occurring twice in the same person in different years came to my knowledge. Numbers of such cases were reported, but it would be found on inquiry that they claimed to have had the disease in a year when it was not epidemic, or else they would refer in evidence to the exorbitant bill of some physician for services rendered in yellow fever. The propriety of quarantine seems to depend upon the origin, or non-origin, here of the disease. If yellow fever originates in this city, a quarantine after the disease has commenced would seem to be useless. But if the disease does not originate here, it is reasonable to suppose that a rigid quarantine would preserve us from its ravages. Half-way measures are worse than useless; for while they do not protect the city, they do serve to throw ridicule not only upon the subject itself, but upon every member of the community who advocates it. The opponents of quarantine laughed at the puny efforts of the authorities to keep cholera out of the city in 1866, and yellow fever last year, by quarantine, and it did seem ridiculous to impose a rigid quarantine upon all vessels coming from northern ports, as was done in the former year, when cholera was raging in the north and west, while the river and railroads were left free to pour as much of the disease into our midst as they could transport. Last year, we all know to our sorrow, the intercourse with the West Indies and with Texas was but partially checked. It is doubtful if this community would submit to the isolation necessary to render quarantine effectual in preventing epidemics of yellow fever.

This imperfect report should have been sent with the special report of yellow fever cases which I forwarded to you and to the Surgeon General last December. Not expecting to be required to contribute anything more than that, I was unprepared for your letter of the 7th ultimo requesting further details.

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

HEBER SMITH,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. McPARLIN, *Medical Director Fifth Military District.*

ATTENDING SURGEON'S OFFICE, NEW ORLEANS, LA., *November* 8, 1867.

GENERAL: I have the honor herewith to present my report as attending Surgeon at these headquarters during the recent epidemic of yellow fever. The officers and troops under my charge were as follows:

1. Officers and soldiers on duty at headquarters. 2. Detached officers on duty in the city. 3. Military prisoners confined in the parish jail. 4. Company "G," 6th U. S. Cavalry. 5. Detachments of other commands.

Of these, the first two and the last were under my immediate charge. The military prison was at first attended by Acting Assistant Surgeon Heber Smith, and on his being transferred to Sedgwick Barracks, by Acting Assistant Surgeon Henry Smith. Company "G," 6th U. S. Cavalry was at different times during the epidemic under charge of Acting Assistant Surgeons Charles Pelaez, J. T. Payne, Francis Barnes, and Henry Smith. As special reports will be made of these commands by the medical officers in immediate charge, I shall, in this communication, confine myself more particularly to the sickness at the Headquarters Fifth Military District and among the detached officers on duty in New Orleans; and inasmuch as the officers and clerks comprised in the above were living in private residences scattered throughout the city, any report in reference to them, to give a faithful view of the causes and history of their sickness, must involve the description of the whole epidemic in the city. Were any other course followed the report would be partial, disconnected, and imperfect.

Very early in the season, before the appearance of any cases of yellow fever, the city of New Orleans was in an extremely filthy condition. More especially in the third district, (the French quarter,) and in those portions of the first and fourth districts bordering on the river, and inhabited chiefly by the poorer classes of foreigners and blacks, the sanitary condition was bad. There was a rigid health ordinance, but the want of either a sufficient number of sanitary inspectors, or of sufficient vigilance in those already appointed, made it a dead letter, and no attempts were made to require the street commissioner to do his duty. The gutters and drains were choked with mud; garbage was constantly thrown into the streets to decompose in the hot sun, and frequently not removed once a week; while the back-yards and privies of most of the houses—never being disinfected, and but seldom cleaned—were so many foci for the dissemination of morbific elements. The physicians of New Orleans, who should have been foremost in the work of reform in these respects, were either disbelievers in the propriety of hygienic measures in reference to yellow fever, or else apathetic on the subject. Under your orders, the medical officers of the army made inspections of various quarters of the city and suggested improvements.

In accordance with your instructions, frequent inspections were made by me of the different buildings occupied for government purposes, and particular directions given to have the sinks and privies disinfected once every day with sulphate of iron and carbolic acid. McDougall's disinfecting powder (a compound of hydrate and sulphate of lime, with a small quantity of impure carbolic acid) was also freely used around the buildings, and in the stables of the cavalry command and the quartermaster's department, with the best results. In every building where any case of yellow fever occurred, or where there was any reason to suppose that the germs of disease existed from a previous season, a thorough disinfection and fumigation of the premises was undertaken, in the following manner: The rooms, being closed and every crevice and aperture sealed up, were first fumigated with nitrous acid, (prepared, by adding sulphuric acid to nitrate of potash, in a retort, and boiling the mixture;) they were then opened and ventilated for an hour, and next submitted to a similar fumigation with sulphurous acid. Where it was desirable to hasten with the fumigation, both nitrous and sulphurous acid fumes were combined by adding a quantity of nitrate of potash to a pan of burning sulphur. Finally, carbolic acid was sprinkled around the corners and poured into any crevices that could be found, and mingled with the whitewash for the walls, and then the building ventilated for several days before being reoccupied. An attempt was made to carry out the same system in the city at large through the medium of the Board of Health, and at the commencement of the season many houses were fumigated, and no doubt much benefit was derived therefrom; but as the disease became widely spread, it became a matter of impossibility to continue special fumigation in every infected house, and it was abandoned.

The first case of yellow fever in the city of which I have any record was that of Lieutenant Dewey, U. S. A., who died in the latter part of June, at the St. Charles Hotel, of black vomit. This officer was under the charge of Brevet Major Morris J. Asch, U. S. A., at that time attending Surgeon. I have not the exact dates in his case, but he came to New Orleans from Indianola, Texas, where, as was subsequently ascertained, malignant yellow fever was at the time prevailing, and was sick on his arrival.

The next cases positively ascertained to be yellow fever occurred on the bark Florence Peters*—cases full of interest in establishing the period of incubation of the disease and the importance of rigid quarantine laws. This vessel left Havana on the 3d of June with a clean bill of health, yellow fever at that time prevailing in that city. On the 13th she was visited by the health officer at the Southwest Pass, and on the 23d she arrived at Algiers, opposite the city of New Orleans. The same day a physician was called to see the captain's wife, and, finding her very ill, consulted with Dr. Francis Barnes, who pronounced it a case of yellow fever. She had no black vomit, but died of uræmia, on the 30th of June. On the 25th, two days after the bark arrived, a young lady, aged 17, the sister of the last patient, was taken ill, and the case presented well-marked symptoms of yellow fever. She eventually recovered. On the 26th the child of the captain, a baby of a few months old, was taken sick. This case also recovered, as did also the first mate, who was taken three days later, and treated on board. The second mate was about the same time removed to the Charity hospital, where he died of black vomit on the 8th of July. At this time the President of the Board of Health ordered the vessel to be cleaned and fumigated—nine days after it had been reported to the board by Dr. Barnes that there was yellow fever on board. In these nine days the vessel had twiced changed her position from Algiers to two different points in New Orleans, probably making each of her temporary resting-places a nidus for the pestilence so soon to devastate the city. On the 12th of July the captain died of black vomit, and on the 25th a man by the name of Yorke, a resident of New Orleans, who had been frequently on the vessel in search of employment. This completes the list of cases directly traceable to the vessel, but enough has been shown to prove conclusively that the disease was brought on the vessel from Havana, that it made its appearance more than ten days after her departure from that port, and that in this manner the disease was introduced into the city of New Orleans; for it can hardly be doubted that the above does not comprise the whole of the cases that occurred from connection with the vessel, but that others were sick on shore, and, recovering, no special attention was attracted to their cases. It becomes a matter of interesting inquiry whether the outbreak of fever could not have been choked in its infancy had the Board of Health showed a little more promptness in disinfecting the vessel, and had ordered her to the quarantine.

About the time that the first of these cases happened a man was taken ill with yellow fever at 495 Magazine street, and another on the corner of Magazine and Calliope streets. No connection could be traced between these cases and any extra mural sources of infection; but both houses had been crowded with yellow fever cases the year before, and (from points to be brought forward in writing of the disease as it existed in the Sailors' Home building at a subsequent day) there seems little doubt that these two persons contracted the disease from the infected walls of the houses where they resided.

In the meantime, yellow fever of a malignant type had made its appearance at both Galveston, Texas, and New Iberia, Louisiana, the course of the disease being directly traceable from Indianola to Galveston by means of infected bedding, and thence to New Iberia, through persons who had fled from Galveston to escape the pestilence, some of whom, it was conclusively

* For the facts in relation to the bark Florence Peters I am indebted to Acting Assistant Surgeon Francis Barnes, U. S. A.

proved, had arrived in that village. Dr. George W. Shields, an Acting Assistant Surgeon, U. S. A., arrived in New Orleans from New Iberia, was taken sick a few days after his arrival, and died of black vomit. Other cases shortly after occurred in the house where he died, 212 Common street.

I have thus briefly indicated four sources of infection which may throw some light on the etiology of the disease:

1st. The unclean condition of the city and the entire neglect of proper hygienic measures.

2d. Importation from Havana, as in the case of the bark Florence Peters.

3d. Importation from New Iberia, Galveston, and Indianola, as in the cases of Lieutenant Dewey and Dr. Shields.

4th. The spread of the disease from houses infected the previous year which had not been fumigated at the time.

That the last is not exaggerated as a means of propagating the fever, the history of the outbreak among the troops at the Sailors' Home will show. This building, a large four-story edifice, originally constructed for an asylum for disabled sailors, was occupied in 1865 and 1866* as a yellow fever hospital for naval vessels stationed at New Orleans. Only the two lower stories were so occupied, the upper part of the building being vacant. This year it was used as barracks by two companies of the 1st U. S. Infantry and the New Orleans post band. Yellow fever made its appearance among these troops, especially in the band, and there were some twenty-eight or thirty cases in the command before it was removed to Sedgwick Barracks. The band occupied the rear room on the second floor, and suffered most; this room was used last year for yellow fever patients. The company quartered in the upper story suffered but little; thus almost forcing one to the conclusion (there being no other special reason why one portion of the command should suffer more than the other) that the virus of the disease had penetrated the wood-work and walls of the room, had slumbered there through the winter, and, with the approaching heat of summer, had been developed into action when appropriate food was offered it. I think if there is one lesson more than another to be learned from the history of this epidemic, it is that there is nothing in the climate or tropical position of New Orleans which originates yellow fever; that with a complete system of disinfection and fumigation of every infected house, a proper attention to street cleaning and drainage, the removal of abattoirs, soap factories, cemeteries, and other nuisances beyond the city limits, and an absolute quarantine, (at least fifteen days for all vessels coming from infected ports,) yellow fever can be kept out of the city. I am aware that this is not the opinion of some of the most prominent New Orleans physicians, but I have not seen any valid arguments to prove that yellow fever is endemic in this city, and I have observed much that goes to prove the contrary. It will be observed, in looking at the chart of the epidemic which accompanies this report,† that during the whole month of July (*i. e.*, the period in which the fumigations were most efficiently carried out) the number of deaths did not at any time exceed five per day; and that although the fever was pronounced epidemic by the Board of Health on the 12th of August, yet it was not until the latter part of that month that it became at all formidable. After this time, both fumigations and quarantine were abandoned as useless; the virus of the disease became concentrated in certain houses and localities, and the more malignant types from Vera Cruz, Galveston, New Iberia, and other places, were constantly introduced into the city, undoubtedly aggravating the very mild character of the original disease.

From the middle until the latter part of July, the fever prevailed quite extensively in a filthy locality in the third district. Several hundred cases occurred in the vicinity of Victory, Marigny, and other streets in this vicinity. It subsequently died out here entirely, and about August 1st made its appearance in the first district along Tchoupitoulas, New Levee, Magazine, St. Mary, and other streets, extending thence into the fourth district, and being especially malignant in the vicinity of the stock-landing, near the foot of Washington avenue. By the 12th of August it was so generally prevalent as to warrant its being pronounced epidemic by the Board of Health. From this time the number of deaths increased in a steady ratio until the 24th of September, when the mortuary report was 82 from yellow fever, and 133 from all causes. It then commenced to decline, rather irregularly at first, but by the 10th of October very decidedly, and on the 5th of November the fever was no longer pronounced epidemic. During the last few weeks it, to a great measure, abandoned the central portion of the city, and most of the cases were to be found along Claiborne, Union, and the streets on the outskirts of the city towards Lake Pontchartrain. Nearly all the officers and men under the charge of the attending Surgeon had the disease. The following table shows the number of cases:

COMMAND: Headquarters Fifth Military District.	July.	August.	September.	October.	November.	Total.
Clerks and orderlies	1	7	17	8	.....	33
Detached officers	2	3	4	1	1	11
Detachments	.....	2	5	5	.....	12
Company "G," 6th Cavalry	.....	1	40	14	.....	55
Total	3	13	66	28	1	111

The enlisted men embraced in the above table were sent to Sedgwick hospital, Greenville, Louisiana, as soon as taken sick, and the result, in their respective cases, reported by the Surgeon in charge of that institution. Consequently, I am unable to give

* Dates erroneous. See p. 109.

† It is regretted that it was not practicable to publish this chart.

the ratio of deaths among them. The following officers died in the city during the epidemic: Brevet Lieutenant Colonel George Lee, First Lieutenant, 21st U. S. Infantry; Major George B. Simpson, Pay Department, U. S. A.; Captain John W. Spangler, 6th Cavalry, U. S. A.; Lieutenant O. Dewey, 4th Cavalry, U. S. A.; Lieutenant Rossander, 9th Cavalry, U. S. A.; Lieutenant Wing, 9th Cavalry, U. S. A.; Acting Assistant Surgeon George W. Shields, U. S. A.

The following table presents the total number of deaths in the city of New Orleans as reported weekly by the Board of Health:

Date.	No.	Remarks.	Date.	No.	Remarks.
For month of July	11		Week ending Sept. 22d	418	
Week ending August 4th	9		" " " 29th	489	For month of September, 1,510.
" " " 11th	14		" " October 6th	431	
" " " 18th	26		" " " 13th	355	
" " " 25th	77	For month of August, 255.	" " " 20th	235	
" " Sept. 1st	129		" " " 27th	120	
" " " 8th	245		" " Nov. 5th	86	To end of epidemic, 1,227.
" " " 15th	358		Total	3,003	

To this number should be added 226 deaths registered as from pernicious fever, that term being commonly used by the Creole physicians as synonymous with malignant yellow fever. This would make the total number of deaths from yellow fever 3,229. The number of deaths from fevers other than yellow and pernicious, from July 1st to November 5th, was as follows:

Bilious fever	39	Remittent fever	93
Congestive fever	222	Scarlet fever	7
Intermittent fever	39	Typhoid fever	74
Brain fever	25	Gastric fever	1
Nervous fever	9	Malignant fever	11
Total			520

Adding these to the cases of pernicious fever gives 746 deaths from fevers other than yellow.

Many of these were either cases of true yellow fever, or else the fatal result was due to the modification of the original disease by the epidemic influence pervading the city, instances of which were not uncommon.

The following statistics of the epidemic, showing the ages, sexes, and nativities of those who died, will, I am in hopes, be considered as adding somewhat to our knowledge of the classes of persons most liable to this disease. The first table gives the result in 2,563 cases, where the ages could be ascertained:

Age.	No.	Remarks.	Age.	No.	Remarks.
Under ten years	340		From sixty to seventy	27	
From ten to twenty	297		" seventy to eighty	16	
" twenty to thirty	1,036		" eighty to ninety	3	
" thirty to forty	519		Over ninety	1	Woman aged 94.
" forty to fifty	228				
" fifty to sixty	96		Total	2,563	

Of 2,865 cases noted, 2,140 were males, and but 725 females, a result due most probably to the much greater exposure of males and their more careless habits of life; but, more than all, to the fact that the chief pabulum of the disease was the great number of discharged soldiers, and other unacclimated persons, who made the city their residence at the close of the war, with a view to business, thus greatly increasing the ordinary number of males in the city. It was estimated that last winter there

were fifty thousand persons in the city belonging to these classes. In the next table the nativities of those who died are given in 2,215 cases:

Natives of the United States:		Foreigners:		
Maine	15	GERMANY:		
New Hampshire	4	Austria	24	
Vermont	5	Prussia	103	
Massachusetts	26	Province not stated	496	
Rhode Island	2			623
Connecticut	3	GREAT BRITAIN:		
New York	80	Scotland	31	
New Jersey	5	England	97	
Pennsylvania	43	Ireland	436	
Maryland	23			564
Delaware	1	Italy	59	
District of Columbia	5	Sicily	16	
Ohio	29			75
Indiana	15	Russia		15
Illinois	6	Spain		10
Michigan	7	Sweden		10
Virginia	33	Denmark		8
North Carolina	3	Poland		12
South Carolina	8	Finland		6
Florida	2	Greece		1
Georgia	10	West Indies		3
Alabama	22	Canada		36
Mississippi	31	Mexico		2
Tennessee	13	Sandwich Islands		1
Kentucky	39	Australia		1
Louisiana	360			
Arkansas	3	Total foreigners		1,367
Texas	7			
Wisconsin	8			
Missouri	28	RECAPITULATION.		
Minnesota	1			
Oregon	1	Natives of the United States		848
Not stated	10	Foreigners		1,367
Total natives	848	Total deceased		2,215

It will be seen that the number of natives of Louisiana in the above list (335 of whom were natives of New Orleans) corresponds very closely to the number of deaths of children under ten years of age, and, in fact, the two lists were nearly identical. Very few adult natives of the city died, although many of them had the fever. This epidemic differed from all others that have visited New Orleans, in the large number of children taken sick. It had been considered, from the experience of previous epidemics, that children under ten years of age were comparatively exempt, but this year they were especially liable. It is nearly a matter of impossibility to arrive at anything like a correct estimate of the total number of cases in the city, but from the records of both the Board of Health and the Howard Association, both of whom had excellent opportunities for ascertaining the facts, the proportion of deaths was placed at not over 5 per cent., which would give rather over sixty thousand as the total number of cases, which is by no means an extravagant estimate.

From the above table of nativities some idea may be obtained of the comparative liability of different classes of the population. Beginning with those most liable, the population may be divided into the following classes: 1st, unacclimated foreigners; 2d, unacclimated northern whites; 3d, unacclimated northern negroes; 4th, children born in New Orleans; 5th, unacclimated southerners; 6th, adult natives of New Orleans; 7th, southern negroes. In regard to the 3d class, it may be remarked, that during the epidemic a detachment of recruits for the 9th U. S. Cavalry (colored) arrived at New Orleans en route to Texas, and were quartered temporarily at Sedgwick Barracks, Greenville, where there was a yellow fever hospital. The disease quickly made its appearance among them, and they suffered greatly. The same was also true of the negro sailors of the navy. There was no exemption whatever for blacks of northern birth. Among southern negroes the disease prevailed to a certain extent, towards the last of the epidemic, but chiefly among those who had come to the city from the country since the emancipation, and it was not generally fatal. There were no statistics to be obtained showing the ratio of mortality among the blacks, but it was small.

The clinical history of the disease did not differ materially from that noted in previous epidemics. Prodromic symptoms were not constant, the attack commencing with a supraorbital headache, followed soon after by slight rigors and severe pains about the back of the neck, the lumbar region, and the calves of the legs, the rigors being succeeded within an hour by fever. Towards the close of the epidemic, very many case assimilated closely to malarial fever, the rigors being more pronounced, the fever higher, and decided remissions taking plac The pulse, in favorable cases, was seldom over 110, and the fever did not

last beyond the 72d hour. The appearance of the eye was very characteristic, being wild, ferretty, and somewhat injected, and, later in the attack, deeply tinged with yellow. There was also a peculiar odor about the patient, hard to be described. But little yellowness of the skin was to be noticed, except in fatal cases. Black vomit was comparatively a rare symptom, and almost uniformly fatal, although not necessarily so. It occurred the most frequently in the strongest and most vigorous patients, the weaker or anæmic cases showing rather a tendency to pass into a typhoid condition and die of asthenia. The urine was generally albuminous after the third day, and more so in proportion to the gravity of the case, the albumen disappearing rapidly when convalescence was speedy. Suppression of urine was very common, and in many cases followed by uræmic poisoning and death by coma. In cases evincing a tendency to black vomit, there was a general disposition to hæmorrhages from the gums, nostrils, &c., or any abrasion of the skin. This hæmorrhagic disposition was always to be looked upon as a grave symptom, as indicating such a disorder of the blood as would readily terminate in black vomit. When black vomit did occur, it was generally a few hours after cessation of the fever, during the stage of calm.

Delirium was not by any means a constant symptom. In all the milder cases it was entirely absent, but invariably happened whenever there was suppression. In some of the typhoid cases it persisted for weeks, and in these cases was intermittent in its character, the patient being rational in the daytime and delirious at night. In some cases there was hebetude of mind from the beginning; these were severe cases, and recovery, if it took place at all, was tedious.

Among the most annoying complications of disease were the crops of boils which appeared after convalescence was established. They were most frequent about the back and lower extremity, and were very numerous, sometimes as many as a hundred breaking out on one person, of course causing great irritation and retarding convalescence. Relapses were very frequent, especially among the soldiers, who indulged freely in eating and drinking before their stomachs had recovered their natural tone. They were very often due to very slight causes.

On the 22d of September a heavy thunder storm passed over the city. There were several very severe claps of thunder, and a great deal of electricity in the atmosphere. Nearly all those who were sick did badly in consequence, and the mortuary report was largely increased during the next two days. A physician in high standing in the city had a relapse, fifteen days after he was pronounced well, from overexertion in attending to his patients. One of my patients relapsed, twelve days after he had been returned to duty, from imprudence in eating pie. Many other similar cases could be cited. Good nursing was the great secret of success in the treatment. Beyond a dose of oil at the outset, and mustard baths repeated sufficiently often to produce free diaphoresis, no medication was advisable. Many recommended quinine during the febrile stage, but they did not have as good success as those who adopted the view that nothing whatever should go into the stomach before the fourth day. If it was necessary to stimulate or nourish before that, it was best done by enemata, or sponging with hot whiskey. Enemata of beef tea could be given at any time, and were invaluable. When the immediate danger of black vomit was passed, bland and unirritating nutriment could be administered by the mouth in very small quantities, and stimulation commenced. It was generally thought well to consult the tastes of the patient as regards the kind of stimulant used, although I found malt liquor of the stronger kinds preferable to anything. When black vomit occurred, a blister was immediately placed over the epigastrium, and willow charcoal, suspended in champagne, administered in small doses frequently repeated. If this was rejected, or the black vomit recurred, our last resort was then to injections of brandy and beef essence, conjoined with absolute rest and the avoidance of either food or drink by the mouth.

Raspail's eau sédatif was very generally found a most grateful external application. As used by the New Orleans physicians the prescription was as follows: Saturated solution of chlorinated soda, 13 fluid ounces; strong aqua ammonia, 1 fluid ounce; tincture of camphor, 2 fluid ounces—mix. When suppression of urine was threatened, I found immediate relief in the use of large poultices of flaxseed, completely enveloping the person, in the region of the kidneys, and frequently changed until micturition took place. The practice of frequent catheterization was to be condemned. In closing this report, I beg leave to state that the medical officers subject to my command discharged their duty faithfully and zealously. Acting Assistant Surgeons Heber Smith and Henry Smith, U. S. A., both had severe attacks of the fever, the result of their devotion to their duty. On the 28th of October I was taken sick myself, and relieved in my duties as attending Surgeon by Brevet Major Morris J. Asch, U. S. A., whose duties I had been performing during his absence from the city on detached service.

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

HARVEY E. BROWN,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General T. A. McPARLIN,
Medical Director Fifth Military District, New Orleans, La.

NEW ORLEANS, LA., *April* 20, 1868.

SIR: The epidemic of yellow fever this year has manifested some interesting peculiarities in its origin, its progress, its form, and its fatality. First, in regard to its origin: there were none of those coincidences, thermometric, hygrometric, or meteorologic, which are said to foreshadow its outbreak or accompany its acme. It was not by any means a hot summer, for the mortuary statistics of the whole city show but six cases of sunstroke for the year—two in June, three in August, and one in September. There were an unusual number of showers during the summer, which have always been regarded as beneficial to the general health of the city, both by cooling the atmosphere and cleansing the streets, and, according to the Picayune, almost certainly preventive of an epidemic of yellow fever. Neither was there an unusual prevalence of the northeast wind, which, in old times, was regarded as coming from the region of death. On the contrary, the winds from the south and west, if my recollection does not deceive me, were of most frequent occurrence. The river was very full, submerging districts in the lower portion of its valley, and reached its low-water point late in the season. The sanitary condition was better this year than the last, the

water from the river running through the city, and the quantity of rain which fell necessarily kept the streets cleaner than in the year before. Besides, a greater activity of the health authorities was used in this direction, under the influence, no doubt, of a feeling of responsibility to military government, which always exacts stricter account of officials than can be obtained by any municipal government. The coincidences which show importation as the cause of the fever becoming epidemic are much greater in number than usual, and would prove its foreign origin, it seems to me, to any mind that admits yellow fever to be, in its nature, infectious and importable.

The Florence Peters' history illustrates the viciousness of the system of quarantine in operation here, which does not deserve the name, being a sham, a delusion, a make-believe, in place of one which would be efficacious if properly carried out. The yellow fever prevailed last year in its true infectious form in the West India islands and in Vera Cruz. It invaded successively all the cities and towns on the Mexican as well as on the Texas coast, before, as I may term it, the wave rolled over us, appearing at Galveston and Indianola before reaching New Iberia and this city. The Florence Peters arrived almost at the same time as the ship from Indianola which brought the young Lieutenant of the 4th U. S. Cavalry who died at the St. Charles. There was no quarantine enforced in regard to Texas vessels for a month or six weeks after the arrival from Indianola referred to, and, as will be seen in the case of the Peters, the quarantine was merely nominal in regard to vessels from the West Indies, and the usual number of arrivals during the summer from those ports would increase the number of foci of infection. It is notorious that 500 of Maximilian's disbanded army reached this city near the 1st of June, and yellow fever broke out among them on their voyage to New York subsequently. If the yellow fever infection can be imported or transported from place to place in the holds of ships, in fomites, or in the living bodies of human beings, it must be confessed that there were abundance of such opportunities occurring all of last summer—158 from the 1st of May till the first of November, (see list of arrivals during May, June, July, August, and September, annexed.) Now, to explain what I have remarked in relation to the system of quarantine which is trusted to prevent infectious diseases being imported into New Orleans, first, ships from infected ports are only detained ten days; then cargoes are not discharged, and, consequently, the vessel's hold cannot be scrubbed or washed out; wind sails cannot conduct air to replace that fouled in the hold, fumigations being made from utensils placed on the top of the cargo in the hold. It is a physical impossibility that their gases can be disengaged in such quantities as to replace the foul air in the hold, especially that which is held imprisoned in the cellular cavities of the wood with which the ship is built. The quarantine here is notoriously a failure in rendering any protection to the city, while that of New York is a success, if that be the means by which that city has enjoyed an exemption for so many years. The New York quarantine exacts 30 days' detention of vessels and passengers at the quarantine station; it exacts that the cargo be discharged from the ship and be disinfected, that the bilge water be pumped out, the hold thoroughly washed out and fumigated, and wind sails must play into the empty hold of the ship for a period of at least twenty days, while the cargo is not reshipped, but is sent up to the city on lighters. It exacts most rigorous non-intercourse with the suspected ship, its crew and passengers, or contact with them and its cargo, from all outside persons. I have ascertained, from facts not to be disputed, that the period of incubation, or that during which yellow fever may be dormant in the systems of individuals before manifesting itself by the prostration of the person by the disease, is twenty-four days. In 1854 the yellow fever appeared in the town of St. Joseph, in Tensas parish, Louisiana, in three different houses not connected with each other, and only affecting the residents of those houses; houses that were between them escaped. Each one of these houses had its own focus of infection nearly simultaneously with each other, and the disease appeared epidemic in them all twenty-four days afterwards. Let me mention, also, that during the year 1863, when the fever appeared in so many towns in Louisiana, St. Joseph escaped, for the reason, undoubtedly, that the rigid isolation from the world outside, which the people exacted of themselves, protected them from infection; while a disregard of former precautions on the part of some of them rendered them liable in the following year.

The first cases which I saw were those from the ship Florence Peters, a vessel of 347 tons. She cleared from Havana on the 3d of June, 1867; at the time she left, yellow fever was very prevalent in the shipping of the port. She was boarded at the South West Pass on the 13th. She arrived and tied up at the wharf in Algiers on Sunday morning, the 23d. She had on board, as ship's company, the captain, captain's wife, son, and baby, and the wife's sister, a young lady about seventeen years of age. It seems that all were well up to the day of the ship's leaving the quarantine station, on which day Mrs. Hooper, the captain's wife, was taken sick, and, by the time the vessel reached Algiers, became so alarmingly ill, that the vessel was no sooner tied to the wharf than Doctor Riley was sent for in the greatest haste. On the following Tuesday Mrs. Hooper's fever passed off, and she was removed to a boarding-house in Algiers. On this day her sister was seized, and the following day the baby. The captain's son had been sent over to New Orleans—where, I did not learn—and was also taken sick some time that week. Mrs. Hooper's remission lasted eighteen hours, when she had an accession of fever, which proved to be a secondary continued fever, of which she died the following Sunday, having been ill for a period of nine days. I was called in consultation in her case the day she died; the Doctor had no suspicion of yellow fever, he had never seen a case, and thought that this family was down with ship or typhoid fever. I did not hear where the ship was from until I had seen the patient. I found Mrs. Hooper, her sister, and the baby, all in one room, the two ladies in the same bed. A very brief examination of the cases satisfied me that they were yellow fever. The baby had a bronchitis, which rendered the diagnosis complicated, but I think it fair to presume that it was laboring under the epidemic infection, and the progress of its disease coincided with what should have happened had the child been suffering with yellow fever complicated with bronchitis. Mrs. Hooper died the day I saw her, June 30th from uræmia; the rest recovered. At this time the first mate was sick on board the ship, was treated by the captain, and recovered: the captain also treated the second mate on board till he threw up black vomit, when he was removed to the Charity hospital, where he died on the 9th of July; he had been taken sick on the 4th and was admitted into hospital on the 8th. The ship, at this time, had been removed to pier 22, second district.

The next death from this ship was that of the captain, who was taken sick on the 7th of July and died on the 13th. The last death was that of Seth Yorke, who went on board frequently in expectation of taking the place of the deceased mate; he died on the 25th of July. The six seamen on board disappeared, for I find no trace of what became of them. The vessel was

fumigated by pots, placed over all the hold, while she lay at quarantine; she was also, when empty, cleansed and fumigated, if the order from the Board of Health was complied with, about the 10th or 11th, and it was after this date that Seth Yorke was attacked. A large number of sea captains, mates, &c., attended the funerals of Captain Hooper and his wife; and many cases among seafaring men, which occurred shortly after their funerals, were believed by this class of men to have originated from that circumstance. Captain Hooper's brother came here to take command of the ship, but became so alarmed from circumstances which seemed to prove the persistence of infection in this ship, that he declined to go out in her, but preferred joining her in the Mediterranean by the mail steamer.

The records of the Board of Health show three deaths from yellow fever in June. The first occurred on the 23d, in the thirteen buildings, Julia street, and was reported by Dr. Folwell; the next on the 26th, at the hotel near the stock-landing, the resort of stock merchants from Texas, reported by Dr. Greenleaf. The third case was that of a man named Dougherty, employed at headquarters coal barges, Algiers, who was taken sick on the 25th and died in Charity hospital on the 29th.

Dr. Wood's two first cases terminated favorably. His first was Captain J. D. Bell, Texan stock-trader, who came over in the same vessel with Lieutenant Dewey. He paid him the first visit on the 30th of June, at the Stock-landing Hotel, a place where Texan travellers by the Morgan line usually stop on arriving in the city if they be engaged in the stock business. Dr. Wood found him, as he was informed, in the third day of his attack. Dr. Greenleaf's case died on the 26th, in the same house; so that Bell must have been taken down the day after the death of Dr. Greenleaf's case, (Bonanan.)

Dr. Wood saw his second case on the 9th of July—a man named Pratt, aged 40 years, on Washington between Camp and Magazine streets. His third case was Captain Pennington, who died on the 19th of July, and who had dined several times on board the Texan steamers.

July shows a mortality on the public records of 11; August has 255; September, 1,637; October, 1,072; November, 103; December, 26: grand total, 3,107.

The above is, of course, but a feeble contribution to the etiology of the disease for the last summer. It is given in the hope that a portion may fill a hiatus in your records. Of course, in a city like New Orleans, where neighbors are often ignorant of the names of those residing even next door to them, it would almost be a matter of impossibility to trace the progress of an epidemic with only one focus; but where the foci are multiplied indefinitely, we are only able to reach an approximation to the truth by conjecture. * * * * * * * * * * * * *

Annexed are memoranda of results of cases treated by me last summer in private practice, the city workhouse, the boys' and girls' house of refuge, and the army, by which it will be seen that in the workhouse there were 64 cases treated and 3 deaths; in the girls' house of refuge, 13 cases and no deaths; in the boys' house of refuge, 5 cases and 2 deaths; in city general practice, 76 cases and 10 deaths; in the army, 1 case and no death: total, 159 cases and 15 deaths.

My treatment of yellow fever consisted in the observance of the following general outlines: that, as yellow fever is a disease which, like the exanthemata, (to which class, in my opinion, it belongs,) has a definite course to run, which cannot be abbreviated and hardly modified by drugs, I gave but little medicine; that, as typhoid symptoms indicated putrescent secretions, and that the patient, by breathing the effluvia from his own body, might increase the virulence of the poisoning process which was evidently going on in his system, I took pains to secure as full and free a supply of fresh air in his apartment as circumstances could afford, always mindful not to place him in a draught. Rest of body, mind, and alimentary canal I considered essential, never allowing the patient to rise in the bed or get out of it for any purpose, and urging him to turn over slowly in changing position, so that a quick, sudden movement should not accelerate the circulation. Free perspiration seems to be the mode by which nature relieves the effects of the excessive animal heat generated in this disease; accordingly, it was encouraged in moderation, avoiding covering the patient too warmly. Two blankets at first, afterwards reduced to one, were all I directed to be used. Warm or acid drinks seemed to have equally good results in this way, and I gave the patient his choice.

The fatal results of suppression of the urine, its acid reaction and its irritant properties, required close attention from the first, and I used alkalies—the carbonate of soda or potassa, flaxseed tea, and spirits of nitre—for this purpose; in addition, in some cases, to a liniment applied over the region of the kidneys, composed of equal parts of turpentine and spirits of nitre.

The neuralgic pains of the head and back or limbs were controlled by using mustard plasters, foot-baths as well, with small doses of morphine. The eau sédatif de Raspail, ice-cold, I found an excellent application to the head. In view of the condition of the mucus membranes in regard to softening, as well as the arrest of the function of secreting pepsin, I starved my patients, except so far as any food which could enter the system by endosmose was concerned, for at least six days, and, for a reason which I shall give hereafter, preferred administering thin broth by enemata, to sustain his strength, to giving by the mouth any food requiring digestion.

In a few cases of great apparent congestion of the brain or viscera I used cupping and the abstraction of blood, never more than eight or ten ounces. I also used blisters over the stomach or to the temples and back of the ears to relieve the brain or the stomach later in the disease. Stimulants were not used by me indiscriminately, but only as occasion required, rather avoiding than using them too hastily, and carefully watching their effects. Brandy was selected for the remission, and porter for the convalescence. The carbonic acid water was a grateful drink, and acted like a charm in most cases in controlling vomiting and relieving nausea. The per chloride of iron I used, much diluted with water, to arrest hæmorrhages, (both as drink and mouth-wash,) and in some instances by enemata with brandy, using about twenty-five drops to a tumblerful of water. To go over the ground again: the mutation of the tissues, secretions, and excretions are influenced in this disease in a remarkable manner by the condition of the blood. There is a period of variable duration in which this fluid is preserved in a normal or nearly normal condition. During this period remedies may be used and certain therapeutical effects ordinarily observed, as their action may be expected to follow. During the first period of the disease, blood-letting freely, tartar emetic, calomel, quinine, sulphuric ether, &c., have been used, and, their advocates assert, with great benefit. But in the calm stage, or when the hæmorrhagic phase is reached, it is difficult to foretell what will occur from the administration of any remedy.

I knew a physician who, in Vera Cruz, in 1849, gave a great number of patients sulphuric ether to relieve hiccough. So

many died that he became afraid to administer that usually harmless remedy. I have known a dose of eight grains of blue mass, given in one case on the fifth day, and in another on the eleventh day, to cause death by profuse hæmorrhagic stools; consequently, being in doubt as to the propriety of medication in the middle and last stage of yellow fever, we should be cautious how we use any, confining active interference with the disease to the first stage, and should apply depletion and antiphlogistic measures to such cases as call for them only with a view of preparing them for the second and last.

Now, in regard to the diet question, and the propriety of a preference for nutritious enemata, any one who studies the disease closely will be led to infer, from observation, that in all bad cases, during a certain number of days, say from five to seven, after the febrile paroxysm has reached its height, the stomach, although acid, does not secrete true gastric juice, and pepsin is almost entirely absent. Now, when it is remembered how close a sympathy there is between the brain and the stomach, we can understand how, in the peculiar condition of the nervous system in yellow fever, a patient can be thrown into a delirium or coma by a small error in diet. The Duke of Wellington died of apoplexy by overloading his stomach with venison which he could not digest; and how many cases can nearly every physician number where apoplexy has followed an imprudent meal! In cholera infantum we know the infant's stomach loses its power of digestion from irritation of the dental nerves, and how commonly, in this condition, convulsions and coma occur, doubtless the result, in most cases, of indigestion.

During last summer I lost two patients who had reacted thoroughly from cholera and were passing through the typhoidal fever, which frequently follows the collapsed condition; one died on the sixth day of her disease—first delirious, then comatose—from taking a small quantity of milk, the casein of which she could not digest As long as she was kept on beef-tea injections, with a little brandy, and allowed only mucilages and iced drinks by the stomach, she did well. The other case had been in collapse fifty-six hours before she reacted; during the fever which followed she vomited great quantities of bile. On the night before her death she slept soundly for the first time all night, awoke much refreshed in the morning, and said she was hungry; called for a soft-boiled egg with some tea and toast, which she ate with great relish; in three hours after that meal she became delirious, and in six hours died in profound coma, the whole surface of her body livid from congestion and stagnation of the capillary circulation. Death occurred on the eleventh day of her disease.

The lesson to be drawn from the observation of these facts is, to put on the stomach of yellow fever patients during the doubtful period, when the absence of pepsin is to be inferred, no aliment which requires any assistance in entering the circulation besides the force of endosmosis, but to give broths, with or without brandy, by the rectum. * * * * * *

Since writing the above I have obtained from records from the custom-house a list of all the vessels arriving from ports south of this, and the habitat of yellow fever from the first of May till the 31st of November, by which it appears there were 45 arrivals in May; June, 25; July, 19; August, 21; September, 29; October, 19: total, 158. I have also obtained from Dr. Delery's pamphlet a register of the course of the winds and condition of the weather, both of which documents I append, together with names and memoranda of cases treated by me this summer.*

Very respectfully, your obedient servant,

FRANCIS BARNES, *M. D.*,
City Physician, and late Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. McPARLIN, *Medical Director Fifth Military District.*

* These documents are excluded for want of space, with the exception of a part of the list of vessels, and the register of the winds and weather.

LIST OF ARRIVALS FROM PORTS SOUTH OF NEW ORLEANS DURING THE SUMMER OF 1867.*

May 1st, British schooner Harkoua, Ruatan, ballast.
May 2d, American schooner Lottie Weims, Tampico, fruit.
May 2d, American schooner Electric, Balize, ballast.
May 3d, American brig Joseph Ledger, Matanzas, molasses.
May 3d, Spanish brig Amabah Teresa, Havana, ballast.
May 6th, American schooner Haonta, Cardinas, sugar and molasses.
May 6th, American schooner Prince of Wales, Matanzas, ballast.
May 9th, American schooner John Crocker, San Marino, molasses.
May 9th, American schooner Fanny Elder, Cardinas, molasses.
May 9th, American schooner Elizabeth, St. Thomas, ballast.
May 9th, British brig La. Robt. Pub., Havana, molasses.
May 9th, Spanish brig Javien Jaquin, Matanzas, molasses.
May 11th, French steamship Darien, Havana, gin.
May 11th, Lux. bark Grief, Rio, coffee.
May 12th, British brig Sarah Harris, Sagua La Grande, molasses.
May 12th, British brig Mary A. Reed, Havana, molasses.
May 12th, British schooner Salvador, Havana, molasses.
May 13th, American steamship Star of the Union, *via* Havana, gin.
May 13th, American schooner John G. Whipple, Havana, fruit.
May 13th, British schooner Fancy, Utilla.
May 14th, American schooner Emma D. Finnay, Maraqueza, molasses.
May 14th, American schooner A. B. Barden, Ruatan, sugar and molasses.
May 14th, American schooner Louisa Crocker, Cienfuegos, sugar and molasses.
May 16th, Spanish brig Amanda, Rio, coffee.
May 16th, British schooner Eliza, Tampico, specie.
May 19th, British schooner Flying Sand, Matanzas, guano.
May 19th, American steamship Cuba, *via* Havana, guano.
May 19th, French bark Novelle Helvetia, Vera Cruz.
May 20th, British brig Robert M. Spearing, Havana, sugar and molasses.
May 20th, Mexican schooner Neptune, Havana, molasses.
May 20th British schooner Angeline, Ruatan, fruit.
May 21st, American steamship Trade Wind, Balize, fruit.
May 21st, American bark Shilton, Cardinas, molasses.
May 21st, American brig Prairie Bird, Cardinas, molasses.
May 21st, British schooner Mary Travis, Utilla.
May 21st, Spanish brig Romantic, Havana, ballast.
May 21st, Spanish steamship Pisano, Matanzas, ballast.
May 24th, American brig E. M. Tucker, Cardinas, molasses.
May 25th, American schooner Independence, Vera Cruz, gin.
May 27th, American schooner Christopher Pendleton, Sagua La Grande, molasses.
May 27th, American steamship General Sherman, Ruatan, fruit.
May 29th, Spanish bark Bozanir, Matanzas, ballast.
May 29th, British schooner Challenge, Utilla, fruit.
May 29th, Spanish brig Chronometer, Havana, ballast.
May 31st, British schooner Village Belle, Utilla, fruit.
June 2d, American steamship Liberty, Havana, sugar and molasses.
June 3d, British schooner Andromala, Havana, sugar and molasses.
June 2d, American brig Mary Rosewell, Tarewell, Cabaria, sugar and molasses.
June 3d, American bark Luc A. Nickels, Fosil Los Lanos, sugar and molasses.
June 11th, Spanish bark Victoria Hebellos, Matanzas, ballast.
June 11th, Spanish brig Chauik Gulfizunes, Havana, sugar.
June 11th, American brig Ocean Belle, Havana, sugar.
June 13th, American steamship Grant Wind, Balize Horn, fruit.
June 13th, American schooner Electric, Ruatan, fruit.
June 13th, Spanish brig Edmonds, Havana, fruit.
June 11th, American schooner Sunbeam, Ruatan, fruit.
June 15th, American schooner H. B. Borden, Ruatan, fruit.
June 17th, American steamship Darien, Havana, general.
June 21st, Mexican schooner Lucy, Tuxpan, general.
June 22d, American schooner Aurul Mourinne, Vera Cruz, sugar and molasses.
June 23d, British schooner Oriental, Havana, sugar and molasses.
June 23d, British brig ——, Cienfuegos, sugar and molasses.
June 23d, American schooner T. G. Frazer, Cardinas, sugar and molasses.
June 23d, Spanish bark Antonita, Matanzas, sugar.
June 23d, American bark Florence Peters, Havana, fruit.
June 26th, American steamship General Sherman, Ruatan, ballast.
June 28th, American schooner United States, St. Thomas, ballast.
June 28th, Spanish bark Mucia Sabina, Havana, ballast.
June 29th, American brig Brothers, Havana, sugar.
June 29th, Spanish bark Puebla, Havana, ballast.
July 1st, British schooner H. Travis, Utilla, fruit.
July 5th, British schooner Brazos, Utilla, fruit.
July 7th, British schooner Auschua, Ruatan, fruit.
July 7th, Mexican schooner Atlas, Campeche, ballast.
July 8th, British schooner Salvador, Havana, sugar and molasses.
July 8th, British schooner Village Belle, Utilla, fruit.
July 10th, British steamship Pisano, Matamoras, spices.
July 14th, American schooner Ætna, Ruatan, fruit.
July 18th, British schooner Eliren, Tampico, Hds. Sp., fruit.
July 19th, American steamship General Sherman, Balize, fruit.
July 19th, American steamship Darien, Havana, general.
July 20th, British brig Sid. R. Pirel, Havana, m. c.
July 21st, Spanish brig Virginas, Havana, ballast.
July 22d, British schooner Helena, Havana, molasses.
July 22d, American brig Winona, Havana, sugar.
July 24th, British brig O'Spiney, Havana, sugar.
July 25th, British schooner Three Sisters, Ruatan, fruit.
July 27th, Spanish steamship Muria, Havana, ballast.
July 28th, British schooner Morris, Ruatan, fruit.

*The arrivals during August, September, and October are excluded for want of space.—*Ed.*

Meteorological Memorandum appended to the Report of Dr. F. Barnes.

MAY.			JUNE.			JULY.			AUGUST.			SEPTEMBER.			OCTOBER.		
Date.	Wind.	Weather.	Date.	Wind.	Weather.	Date.	Wind.	Weather.	Date.	Wind.	Weather.	Date.	Wind.	Weather.	Date.	Wind.	Weather.
1	N. W.	Fair	1	S. E.	Rain	1	S. W.	Rain	1	N. N. E.		1	S. W.	Fair	1	N. E.	
2	N. W.	Fair	2	S. W.	Cloudy	2	S. W.	Cloudy	2	N. E.		2	N. E.	Rain	2	N. E.	Rain
3	N. W.	Fair	3	N. E.	Variable	3	S. W.	Rain	3	N. E.		3	N. E.	Rain	3	S. E.	Cloudy
4	S. E.	Fair	4	S. W.	Variable	4	S. W.	Rain	4	N. E.	Rain	4	S. E.	Rain	4	S. E.	Rain
5	S. E.	Rain	5	S. W.	Variable	5	N. N. E.	Rain	5	S. W.		5	S. E.	Rain	5	N. N. E.	Cloudy
6	N. E.	Rain	6	S. E.	Variable	6	S. E.	Fair	6	S. W.	Rain	6	S. W.	Rain	6	N. N. E.	Cloudy
7	N. N. E.	Fair	7	N. E.	Variable	7	E.	Rain	7	S. W.	Variable	7	S. W.	Cloudy	7	E. S. E.	Fair
8	S. W.	Fair	8	S. E.	Variable	8	N. E.	Rain	8	S. E.		8	N. W.		8	E. S. E.	
9	S. W.	Fair	9	S. E.	Variable	9	S. W.	Rain	9	N. E.	Rain	9	N. E.		9	S. E.	
10	S. W.	Fair	10	S. W.	Variable	10	S. W.	Rain	10	N. E.	Rain	10	N. E.		10	N.	
11	S. W.	Fair	11	S. W.	Cloudy	11	S. E.	Cloudy	11	N. E.		11	N. E.	Rain	11	N. E.	
12	S. W.	Foggy	12	S. E.	Rain	12	S. W.	Rain	12	N. E.		12	N. W.	Rain	12	N. W.	
13	S. W.	Fair	13	S. W.	Cloudy	13	S. E.	Rain	13	N. E.		13	S. W.	Cloudy	13	N. W.	
14	N. W.	Fair	14	S. W.	Cloudy	14	N. E.	Rain	14	S. W.		14	N. E.		14	N. E.	
15	N. W.	Variable	15	S. W.	Rain	15	N. E.	Rain	15	S. W.		15	S. E.		15	N. E.	
16	S. W.	Rain	16	S. E.	Rain	16	N. E.	Fair	16	S. W.		16	S. E.		16	N. E.	
17	S. W.	Cloudy	17	S. E.	Cloudy	17	N. E.	Fair	17	N. E.		17	S. E.	Rain	17	N. E.	
18	S. E.	Cloudy	18	N. E.	Rain	18	S. W.	Rain	18	N. E.		18	S. E.	Fair	18	N. E.	
19	S. E.	Cloudy	19	N. E.	Cloudy	19	S. W.	Fair	19	S. W.		19	N. E.	Rain	19	N. E.	
20	S. E.	Rain	20	N. E.	Cloudy	20	S. W.	Fair	20	S. E.		20	S. E.	Cloudy	20	N.N.W.	
21	N. W.	Rain	21	N. E.	Cloudy	21	S. W.	Fair	21	S. W.	Rain	21	S. E.	Cloudy	21	N. E.	Variable
22	N. W.	Fair	22	N. E.	Cloudy	22	S. W.	Rain	22	S. W.	Rain	22	N. N. E.	Cloudy	22	S. E.	Variable
23	S. E.	Fair	23	S. W.	Rain	23	S. E.	Rain	23	S. E.	Clear	23	N. N. W.	Rain	23	S. E.	Variable
24	S. E.	Rain	14	S. W.	Clear	24	S. E.	Rain	24	S. W.	Clear	24	N. E.	Rain	24	N. E.	Variable
25	N.	Rain	25	S. W.	Clear	25	S. E.	Cloudy	25	S. E.	Rain	25	N. E.	Cloudy	25	N.N.W.	Cloudy
26	S. E.	Rain	26	N. E.	Rain	26	S. E.	Cloudy	26	N. E.	Cloudy	26	N. E.	Cloudy	26	N.N.W.	Rain
27	S. E.	Cloudy	27	S. W.	Clear	27	S. W.	Rain	27	N. E.		27	N. E.	Cloudy	27	N.N.W.	Rain
28	N.	Rain	28	S. W.	Rain	28	S. W.	Rain	28	S. E.	Rain	28	N. E.	Cloudy	28	N.N.W.	Fair
29	N.	Rain	29	S. W.	Rain	29	S. E.	Cloudy	29	S. W.	Cloudy	29	N. E.		29	N.N.W.	
30	S. E.	Var'ble and cloudy.	30	S. W.	Rain	30	S. E.	Cloudy	30	N. E.		30	N. E.		30	N.N.W.	
31	S. E.	Var'ble and cloudy.				31	S. E.	Cloudy	31	N. E.							

JACKSON BARRACKS, NEW ORLEANS, LA., *December* 12, 1867.

GENERAL: In compliance with instructions, I have the honor to forward, herewith, tabular statements, on the prescribed form, of all cases of yellow fever which have occurred at this post during the recent epidemic. Appended are several tables showing the number of cases, ratio of mortality, duration of the disease, &c.; also, a record of temperature, weather, &c., extracted from a public journal. I have the honor to submit, as required, the following special report of the epidemic, endeavoring to present only the more salient facts as they manifested themselves to my observation. The first case of yellow fever at this post occurred on July 1st, the second on July 11th; thereafter, no other case occurred until August 2d, when they gradually became more frequent, and, by August 31st, the disease might be considered to have become epidemic. The last case was seized on the 22d of November, but none had occurred before since the 4th of November, and the epidemic, which reached its height about September 28th, may be considered to have lost its epidemic character about the 10th of October, when there was little material left for it.

During the extremes of this period 374 cases occurred, of which 111 died, including 4 officers. For the five months commencing with July, the mean of the average strength of the command was 380 officers and enlisted men; but it will be observed (table 1) that in September the strength was 477. Perhaps less than 50 men of the whole command, consisting, in September, of six companies of the 1st Infantry, and Battery "K," 1st Artillery, escaped the disease while here. It will be seen that the ratio of deaths to cases was 29.67 per cent., a result which, compared with the average mortality, (quoted from La Roche as 43.18 per cent.,) is favorable.

In June, when I assumed the duties of post Surgeon, the post was in a very thorough state of police. Later in the summer, some of the drains in the vicinity of the hospital building were not kept in the best condition, though the fact was represented; but on the whole the post was exceedingly clean; the discipline seemed excellent; though grog-shops abounded in the vicinity, but little drunkenness was usually witnessed, and the duties of the command were not arduous. A very thorough disinfection of the sinks and privies of the garrison was in daily operation, according to the plan recommended by the best authorities; this was kept up constantly, and the drains were repeatedly sprinkled with carbolated lime. In the hospital, an invariable rule was rigorously observed, to cause every stool of any patient to be disinfected, and I believe it was scarcely ever, even at the height of the epidemic, disregarded. It was recognized that these measures would tend to limit the liability to the disease and to moderate its severity; but during the whole epidemic I observed no fact which lent support to the suggestion that, like cholera, it might be considered a fœcal disease; but it will be observed that the measures adopted and just referred to would present a sufficient testing of this point. Though scarcely any one escaped the disease, it can hardly be doubted that these measures were of great value.

When, towards the end of August, it was seen that an epidemic was imminent, hospital accommodations were prepared for 100 men, a number nearly equal to one-third of the command at that time, and which it was hoped would be ample. But on August 30th three companies of the First United States Infantry, stationed in the city of New Orleans, were, unexpectedly to me, transferred to this post, and, for a few days subsequent, they furnished the greater number of new cases. On the 12th of September ten new cases were taken, and the number daily increased, until, from the 13th to the 16th, inclusive, (four days,) eighty-two new cases of the disease occurred, and from the 17th to the 28th September, inclusive, (12 days,) one hundred and sixty-five new cases occurred. The epidemic reached its height on September 28th, there being on that day 283 men on sick report, and but 4 officers and 112 men for duty. So sudden and great an invasion of the disease was not expected. It was necessary to provide further accommodation for the sick. Brevet Major C. B. White, Assistant Surgeon, U. S. A., who, on the 15th September, assumed the duty of post Surgeon, (I being prostrated with the disease the previous night,) applied himself with great energy to this work. For two or three days there was some embarrassment, but the wise liberality and prompt action of the Medical Director in affording Dr. White every means which the resources of the department afforded, enabled him, by the 17th of September, to have sufficient hospital accommodations, though for a short time the wards were much crowded. Brevet Major White, after six days of incessant duty, during which time his services were of great value, was himself seized with the disease on the 20th, and Acting Assistant Surgeon M. Stovell, U. S. A., performed the duties of post Sugeon until October 3d, when I resumed charge. During this period the condition of affairs was depressing; the permanent commander of the post, seized with the disease, left his command and went to a civil hospital in New Orleans. This example was fortunately followed by but few officers, most of them remaining with their men, evincing a soldierly desire to share equally with them the perils of the epidemic. Something of a panic prevailed for a while; many men indulged in intoxication, to which cause the deaths of several have been clearly traced. They were unwilling to act as nurses, and there were barely enough well men to do indispensable guard duty, to nurse the sick, and bury the dead. On September 25th there were ten deaths, and in one day thirteen bodies were carried to the cemetery of Chalmette. Among the deaths were Lieutenants Arnold, Hubbell, and Ingraham, young officers, whose sudden deaths added to the gloom which pervaded the command.

Before the epidemic assumed such large proportions, many men attacked with the disease delayed to report themselves sick, either supposing the insidious symptoms to be trivial, or actuated by the soldierly motive of not avoiding duty; but it was urged upon the company officers not to permit this course. Some officers visited their companies very frequently during the day and night, and ordered to the hospital any man found complaining, and they may justly have the satisfaction of knowing that their timely care, in all probability, saved the lives of several of their men; and it was noticed by the medical officers that the men of those companies whose officers showed this interest in their welfare were more contented, and, in so far, less liable to death.

During the whole epidemic the Medical Director of the Fifth Military District afforded myself, and the officers in charge during my illness, in his almost daily visits, the benefit of his advice and opinion in all matters of administration and treatment of cases. With a wise liberality, which was indeed a just economy, he authorized the purchase and issue of any articles which, in the opinion of the medical officers, were actually required for the proper care and treatment of the sick. The medical purveyor filled, with marked promptness, every requisition made upon him. The expenditures for proper diet and ice were neces-

sarily large, and in excess of the savings of the hospital ration. A considerable number of citizen nurses were employed, male and female, and it was found that the latter were by far the most efficient, and, indeed, indispensable.

In concluding this brief and general account of the principal circumstances attending the epidemic at this post, omitting many particulars which might add weight to the statements made, it may be proper to suggest for consideration that some practical lessons may be drawn from them:

1. When an epidemic is imminent, hospital accommodations for at least one-half the whole command should be at once provided, if at all practicable.

2. It may be regarded as certain that in an epidemic of this pestilence the hospital fund will never suffice to furnish proper diet for those ill of the disease.

3. The usual allowance of nurses is wholly insufficient; there should be at least one nurse to five average cases, to allow for day and night service, and half, when practicable, as it is in this place, should be women.

Brevet Major White, U. S. A., in his report to the Medical Director of his service here, (a copy of which he has kindly furnished me,) refers to the want of screens in the wards, a want which was very marked, and which could be easily supplied at small cost.

4. There should be an allowance of one medical officer to every forty patients, if possible. Epidemics of yellow fever are temporary; the disease requires more careful watching than any with which I am acquainted, and no preparation that can be made to meet the emergencies it entails should be omitted. It is economy in the end, even in point of expenditure, human life is saved thereby, and the profession is enabled to prove its character of usefulness.

I might adduce much evidence of an unrecorded kind in support of these suggestions, but will let them pass without it.

In regard to the medical aspects of the disease as presented during this epidemic, I wish to express myself with reserve. Previously unacquainted practically with the disease, and, I think, unbiased by preconceived ideas of it, I have endeavored to form no opinion that is not founded on observed facts and the valuable unwritten experience of the epidemic.

The epidemic began insidiously. In July and August a number of cases of disease occurred which gave rise to much doubt as to its real character. The patients would generally have a not strongly pronounced chill, of short duration, followed speedily by great heat of surface, especially of the head, suffusion of the eyes, flushed face, and rapid pulse, with great pain in the head and in the limbs—in fact, with the usual phenomena of a febrile paroxysm; but generally the pains in the limbs were complained of as excessive, lasting thus from twenty-four hours to three days, but rarely more than sixty hours, when there was a marked remission and, in some cases, a pronounced intermission, followed in most instances by speedy convalescence, but in a few by a debility out of all proportion to the severity and duration of the paroxysm. A papular eruption, appearing principally on the chest and limbs, was noticed in a number of cases; in all the six cases in which the fact is recorded, the eruption appeared on the fourth day. Not satisfied that these were cases of yellow fever, they were recorded, with quite as little confidence, as remittent fever, or as dengue. The difficulty of exact diagnosis was increased, when it was soon after found that some cases, seized with the symptoms just briefly described, would die in six or eight days with unequivocal symptoms of yellow fever, and which, in their inception, their symptoms and course, for the first two or three days, could not be distinguished from the cases which recovered in from two to six days, or, in other words, from the mildest cases. The uncertainty of prognosis was strongly impressed upon me.

But, further, it was observed that in September a number of these men who recovered from the disease so inadequately described were seized with epidemic yellow fever. A record of fifteen of these cases is embodied in table No. 5, herewith appended, of whom six died. The brief description given of these cases makes it proper for me to say, that I gave much personal attention to them, and that the increase of exacting duties and my illness made it impracticable to keep more than brief memoranda of their details. It may be considered that these fifteen cases were analogous to those which have been met with in the commencement of several recorded epidemics, wherein there was supposed to be a blending, or, rather, a confusion of types; but leaving it to abler hands to draw deductions from these facts, I will remark, that if it be inferred that they were cases of dengue, or, as they were less accurately recorded, remittent fever, the experience of the whole epidemic furnished no means of distinguishing their early symptoms from those of yellow fever, and proved that its occurrence afforded no immunity from subsequent attacks of yellow fever.

The appended table, marked No. 6, gives a record of the temperature and weather for the period. It was observed that a cold storm of rain had a bad effect upon critical cases.

Of twenty-one men of the colored cavalry temporarily attached to the battery of artillery during the height of the epidemic, but one suffered from the disease, and none of the colored servants in the garrison were affected by it. All the ladies and many of the laundresses had the disease, and a child ten years of age, member of the family of an officer, died of it within three days after the attack. It was noticed that but few of the habitually intemperate men recovered, though, on the other hand, of the few who wholly escaped the disease, several were notoriously old inebriates, who found in the excitement of the epidemic favorable occasion for keeping constantly drunk.

Until about the 13th September, when the epidemic became so general, a rigorous isolation, by removal to a separate building a third of a mile distant, was practiced in every case when the diagnosis was certain; in addition, the wards were very frequently fumigated, and all articles of bedding and clothing were at once placed in tubs or barrels containing water with a solution of permanganate of potash, or, when badly soiled, were burned; the bedsteads were washed with a dilute solution of chloride of zinc, and the floors in the vicinity of the patients were scrubbed with the same solution.

It has been already stated that disinfection of the evacuations of the sick was habitually practiced; and though very few of the command escaped the disease, it may be justly inferred that these measures must have lessened its communicability and diminished its severity; and in this connection it may be stated that several men patients in hospital during the whole epidemic with other diseases did not contract the yellow fever. But, at the date above mentioned, so numerous were the seizures and so great the demand for hospital accommodations, that isolation of the cases was no longer practicable, and it became evident that

the disease was then too wide-spread to be materially limited by this measure. I did not observe, nor have I heard of, any case whose occurrence could be clearly traced to personal contact.

Only brief mention will be made of the symptoms of the disease as it appeared here; the absence of detailed records of the cases, which circumstances made it nearly impossible to keep, will not allow that exactness which would be desirable in a strictly professional report. The disease was often sudden in its onset. A man would go on guard and within an hour would be in hospital. My orderly, a stout, healthy-looking man, complained at noon of feeling badly, was sent to hospital, and died within three days. A soldier, Private John Cleaves, Co. "H," 1st Infantry, was remarked for his vivacity early one morning; at night he was prostrated, and died by reveillé next morning before he could be sent to hospital. On post mortem examination his stomach was found to contain a pint of grumous fluid, which was believed to be altered blood; there was no other lesion, and though the case was not recorded as yellow fever, I now believe it to have been such. The most prominent symptoms were pain in the head, in the limbs, and excessive restlessness; the latter was marked, and it required unceasing attention to prevent the men from leaving their beds, and justifies the suggestion I have made that a very large proportion of nurses is necessary. I did not observe any appearance of the tongue that could be considered distinctive; it never presented the dryness of typhus, but the appearance and feel of the skin were unmistakably peculiar; there seemed to be a want of vitality in it; it felt and looked like moistened parchment, but it was generally only after the critical period that it assumed a decided yellow hue.

I observed in a number of cases that black vomit was preceded by a peculiar restlessness and expression of countenance indicative of a hopeless seeking for aid. In passing through a ward I noticed this expression in the case of Sergeant McGuire, 1st Infantry; even then he asked to be allowed to get up. I had not left the ward before the nurse showed me a towel containing a stain of black vomit, which he had at that moment gulped up, and he died of black vomit in 24 hours after. Such cases were not infrequent. Oozing from the gums and nostrils was often observed; in a number of cases, which were generally rapidly fatal, delirium occurred, and in some of these death ensued immediately after a paroxysm, in which the patient would strive with violence to break away from his nurses, as in the cases of Lieutenant Hubbell and Private Hands, 1st Infantry. Early in the epidemic, I tested the urine in a number of cases, but without results worthy of note. Enlargement of the liver, evident on palpitation and percussion, was observed in the majority of cases that I personally attended, and tenderness over the epigastrium was the rule.

It was noticed that boils were very frequent as sequelæ in the cases that recovered, and several patients had large cold abscesses in their thighs. It was found necessary to forbid the making of autopsies.

As to the treatment pursued, but little medication was practiced. A dose of oil at the commencement, and when the state of the tongue indicated disorder of the alimentary canal, calomel or blue mass in a purgative dose, and subsequently hot foot-baths with mustard, was the general treatment; but it was found necessary to restrain, in some cases, the civilian nurses from the too frequent use of hot foot-baths.

Quinine I did not find of any marked advantage; but in some cases diaphoretics, generally the citrate of potash and sweet spirits of nitre, were of service. Mustard plasters to the epigastrium were beneficial from their speedy action, though I think blisters to the epigastrium were preferable. But it may be strongly stated that careful nursing is of the first importance. Nothing but personal observation can convince one of this. The disease, as has been aptly said by that sound physician, Dr. Metcalfe, of New York, is, "to be managed, to be led, but not to be driven violently, towards a favorable issue." There is no disease with which I am acquainted in which minute attention to the comfort of the patient is so necessary; it can hardly be overrated. Instances were frequent where a slight imprudence caused relapse and death; indeed, it is attention to the minutest details, such as not allowing the patient to raise his head or put his arms from under the blanket, that often determines the issue of life and death.

I conclude this report by stating that the medical officers of the post, Acting Assistant Surgeons M. Stovell, Z. P. Dœhnler, and J. T. Payne, U. S. A., performed their arduous duties most satisfactorily. Brevet Major White, Assistant Surgeon, U. S. A., assuming the duties of the post at the most trying period, evinced much energy and devotion during the short time he was on duty, and his overexertion doubtless hastened the attack from which he suffered so severely. Acting Hospital Steward Edward Lettson, 1st Infantry, performed his arduous duties very faithfully, and many enlisted men employed as wardmasters and nurses showed a most commendable zeal and interest in their duties.

Brevet Major White, in his report which he has kindly furnished me, refers in terms of high and grateful praise to the hearty support he received from Brevet Brigadier General Graham, 1st Artillery, temporarily commanding the post in the absence of the permanent commander, and I am personally aware of his earnest efforts to afford every assistance in his power to the medical officers.

I may be permitted to depart from the strict formality of an official report to express the sense I entertain, in common with many officers and men of this command, of the kind attention given by Brevet Brigadier General McParlin, Medical Director of the district, to whose friendly and professional care I am indebted, under a higher power, for my recovery from the disease which has destroyed so many of our comrades.

Very respectfully, your obedient servant,

B. A. CLEMENTS,

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

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

Table No. 1.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA.

Appended to report of Dr. Clements, showing the relation of cases and deaths to strength.

1867. Month.	Mean strength.	Cases.	Deaths.
July.....	312	2	1
August.....	322	22	2
September...	477	303	79
October....	436	45	27
November..	355	2	2
Total...	380	374	111

Ratio of cases per 1,000 of mean strength, 984.2; of deaths to mean strength, 292.1; of deaths to cases, 296 7. By adding a proper proportion of the average strength of Company "G," 6th U. S. Cavalry, (which company was not stationed at this post,) to the average strength for August, September, and October, the ratio of cases to mean strength is reduced to 912.1 per 1,000, and of deaths to strength to 270.7 per 1,000.

Table No. 2.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA.

Appended to report of Dr. Clements, showing the number of cases in each month, the months in which these cases died, and the ratio of deaths for each month.

	1867. Months.	No. of cases.	Months in which the cases of each month died.					Total Deaths.	Ratio of deaths.
			July.	August.	September.	October.	November.		
1	July.....	2	1	.....	.....	.....	.....	1	50, 00
2	August.....	22	.....	2	8	1	.....	11	50, 00
3	September.....	303	.....	.....	71	18	.....	89	29, 37
4	October.....	45	.....	.....	.....	8	2	10	22, 22
5	November.....	2	.....	.....	.....	.....	.....	.....	.....
	Total.....	374	1	2	79	27	2	111	29, 67

Table No. 3.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA.

Appended to report of Dr. Clements, showing the duration of the disease in days in the cases that recovered.

	NO. OF DAYS.																					No. remaining under treatment at this date.	Total.
	Ten.	Eleven.	Twelve.	Thirteen.	Fourteen.	Fifteen.	Sixteen.	Seventeen.	Eighteen.	Nineteen.	Twenty.	Twenty-one.	Twenty-two.	Twenty-three.	Twenty-four.	Twenty-five.	Twenty-six.	Twenty-seven.	Twenty-eight.	Twenty-nine.	Thirty.	Five to sixty-eight days.		
No. of cases.....	6	6	8	5	10	11	11	8	12	8	4	11	15	14	4	8	7	10	8	8	5	77	7	263

Table No. 4.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA.

Appended to report of Dr. Clements, showing the duration of the disease in days, in cases that died.

	NO. OF DAYS.										Total deaths.
	Two.	Three.	Four.	Five.	Six.	Seven.	Eight.	Nine.	Ten.	Eleven to fifty-one days.	
No. of cases.....	4	13	14	14	15	10	11	3	7	20	111

Table No. 5.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA.

Appended to report of Dr. Clements. List of men who had Remittent Fever, or Dengue, and subsequently Yellow Fever.

NO.	NAME.	CO.	REGIMENT.	DATE OF—				
				Remittent Fever or Dengue.		Yellow Fever.		
				Attack.	Recovery.	Attack.	Recovery.	Death.
1	McMahon, Edward	K	1st Artillery	July 1st	July 12th	Sept. 18th	Oct. 15th	
2	Donahoe, George	I	1st Infantry	" 7th	" 12th	Oct. 1st	" 20th	
3	Rumbo, Charles	K	1st Artillery	" 27th	August 1st	Sept. 28th	" 23d	
4	Farley, Peter	E	1st Infantry	August 3d	Sept. 13th	" 14th		Sept. 24th
5	Duffy, Patrick	K	1st Artillery	" 12th	August 16th	Oct. 7th		Oct. 12th
6	Burt, Julius	D	1st Infantry	" 21st	Sept. 4th	Sept. 12th		" 3d.
7	Blacker, John	F	1st Infantry	" 21st	August 23d	" 24th		Sept. 25th
8	O'Keife, Daniel	F	1st Infantry	" 23d	" 25th	" 26th	Oct. 2d	
9	Alexander, James	I	1st Infantry	" 24th	" 26th	" 10th		Sept. 29th
10	McPeak, Patrick	K	1st Artillery	" 27th	" 29th	" 23d	Oct. 11th	
11	Mitchell, Leonard	K	1st Artillery	" 29th	Sept. 1st	" 25th		Oct. 3d
12	Flaherty, John	D	1st Infantry	" 29th	August 31st	" 19th	Oct. 7th	
13	Gorman, Daniel	G	1st Infantry	" 30th	Sept. 4th	" 15th	" 13th	
14	Burk, John H.	F	1st Infantry	" 31st	" 2d	" 28th	" 24th	
15	Young, Henry	H	1st Infantry	" 31st	" 3d	" 15th	Nov. 11th	

Table No. 6.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA.

Showing the temperature, weather, and mortality during the epidemic.

Date.	THERMOMETER.				Weather.	Date.	THERMOMETER.				Weather.
	7 a. m.	2 p. m.	9 p. m.	Average.			7 a. m.	2 p. m.	9 p. m.	Average.	
June 1	80	93	79	84.00	Fair	June 16	92	84	78	84.66	Cloudy.
2	81	91	79	83.66	Fair	17	78	87	78	81.00	Cloudy.
3	82	90	77	83.00	Fair	18	87	92	76	85.00	Fair.
4	82	91	78	83.66	Fair	19	82	90	81	84.33	Fair.
5	85	93	81	86.33	Fair	20	85	90	81	85.33	Fair.
6	84	90	76	83.33	Fair	21	78	89	80	82.33	Fair.
7	82	90	78	83.33	Fair	22	85	93	82	86.66	Fair.
8	86	90	75	83.66	Fair	23	88	96	78	87.33	Fair.
9	85	96	80	87.00	Fair	24	88	98	83	89.66	Fair.
10	85	96	81	87.33	Fair	25	86	76	75	79.00	Cloudy.
11	86	98	80	88.00	Cloudy	26	86	90	79	85.00	Fair.
12	88	94	77	86.33	Fair	27	90	97	77	88.00	Fair.
13	85	88	80	84.33	Fair	28	88	84	75	82.33	Fair.
14	87	92	80	86.33	Fair	29	88	93	78	86.33	Fair.
15	82	90	80	84.00	Fair	30	80	80	78	79.33	Cloudy.

Table No. 6.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA—CONTINUED.

Showing the temperature, weather, and mortality during the epidemic.

Date.	THERMOMETER.				Weather.	Yellow fever.	Other diseases.	Total.	Date.	THERMOMETER.				Weather.	Yellow fever.	Other diseases.	Total.
	7 a. m.	2 p. m.	9 p. m.	Average.						7 a. m.	2 p. m.	9 p. m.	Average.				
July 1	85	77	75	79.00	Cloudy	..	21	21	Aug. 1	83	87	79	83.00	Cloudy	1	23	24
2	80	87	78	81.66	Cloudy	..	10	10	2	82	95	84	87.00	Fair.	3	15	18
3	87	85	78	83.33	Fair	..	15	15	3	86	96	82	88.00	Fair	3	16	19
4	87	86	79	84.00	Fair	..	14	14	4	88	89	79	85.33	Fair	3	22	25
5	88	95	76	86.33	Fair	..	23	23	5	81	92	83	85.33	Fair	2	28	30
6	90	97	92	93.00	Fair	..	18	18	6	85	88	86	86.33	Fair	3	22	25
7	90	92	83	88.33	Fair	1	16	17	7	85	96	77	86.00	Fair	2	24	26
8	91	94	90	91.66	Cloudy	1	16	17	8	84	91	80	85.00	Fair	2	23	25
9	84	80	77	80.33	Cloudy	1	14	15	9	81	95	76	84.00	Fair	3	19	22
10	85	90	78	84.33	Fair	..	12	12	10	82	95	80	85.66	Fair	2	16	18
11	85	101	83	89.66	Fair	..	14	14	11	80	96	84	86.66	Fair	4	23	27
12	88	85	86	86.33	Fair	..	19	19	12	83	95	84	87.33	Fair	2	26	28
13	82	87	84	84.33	Cloudy	1	33	34	13	78	97	81	85.33	Fair	5	28	33
14	84	85	85	84.66	Fair	..	26	26	14	88	95	83	88.66	Fair	5	32	37
15	81	88	78	82.33	Fair	..	24	24	15	89	96	80	88.33	Fair	2	23	25
16	83	98	77	86.00	Fair	..	21	21	16	84	92	77	84.33	Fair	1	34	35
17	85	98	87	90.00	Fair	1	20	21	17	83	94	80	85.66	Fair	5	22	27
18	84	99	99	91.00	Fair	..	20	20	18	85	90	76	83.66	Fair	6	33	39
19	86	98	94	92.66	Fair	..	19	19	19	81	95	78	84.66	Fair	12	22	34
20	88	102	85	91.66	Fair	1	19	20	20	84	94	76	84.66	Fair	12	19	31
21	87	96	85	89.33	Fair	..	24	24	21	81	84	79	81.33	Fair	10	13	23
22	90	98	82	90.00	Cloudy	..	27	27	22	80	97	76	84.33	Fair	4	23	27
23	91	96	78	88.33	Fair	2	20	22	23	79	94	79	84.00	Fair	7	20	27
24	86	94	88	89.33	Fair	1	20	21	24	81	96	78	85.00	Fair	19	30	49
25	87	97	93	92.33	Fair	1	18	19	25	75	84	73	77.33	Fair	14	18	32
26	84	96	90	90.00	Fair	1	21	22	26	78	90	80	82.66	Fair	15	23	38
27	80	87	80	82.33	Fair	..	22	22	27	85	89	76	83.33	Fair	14	22	36
28	86	87	76	83.00	Cloudy	..	15	15	28	80	91	78	83.00	Fair	15	17	32
29	81	92	90	87.66	Cloudy	1	19	20	29	77	92	76	81.66	Fair	20	27	47
30	80	97	83	86.66	Fair	..	19	19	30	78	93	78	83.00	Fair	26	25	51
31	84	98	81	87.33	Fair	..	24	24	31	76	97	74	82.33	Fair	22	20	42

Table No. 6.—YELLOW FEVER AT JACKSON BARRACKS, NEW ORLEANS, LOUISIANA—CONCLUDED.

Showing the temperature, weather, and mortality during the epidemic.

Date.	THERMOMETER.				Weather.	Yellow fever.	Other diseases.	Total.	Date.	THERMOMETER.				Weather.	Yellow fever.	Other diseases.	Total.
	8 a. m.	1 p. m.	6 p. m.	Midnight.						8 a. m.	1 p. m.	6 p. m.	Midnight.				
Sept. 1	80	86	85	81	Fair	17	18	35	Oct. 1	76	84	81	77	Fair	63	34	97
2	82	87	81	80	Changeable	26	27	53	2	79	81	79	81	Changeable	54	38	92
3	78	81	80	77	Rainy	25	29	54	3	81	85	82	82	Cloudy	56	41	97
4	81	80	79	78	Changeable	28	16	44	4	81	79	80	77	Stormy	75	32	107
5	80	75	78	76	Very wet	44	24	68	5	79	84	82	74	Fair	59	31	90
6	75	82	78	76	Rainy	30	24	54	6	63	75	76	73	Changeable	60	37	97
7	78	83	83	82	Fair	43	23	66	7	73	75	74	74	Fair	58	32	90
8	79	85	83	80	Very fair	49	17	66	8	72	78	74	73	Very fair	50	26	76
9	80	85	83	81	Very fair	51	27	78	9	71	81	77	76	Very fair	64	34	98
10	81	87	82	77	Very fair	42	18	60	10	74	78	76	72	Very fair	56	46	102
11	77	83	78	77	Chang. and rain	67	19	86	11	76	79	78	72	Very fair	49	34	83
12	80	80	80	77	Fair	61	28	89	12	69	76	75	78	Very fair	46	42	88
13	81	85	82	80	Pleasant	43	21	64	13	60	69	68	65	Very fair	32	29	61
14	81	86	83	81	Very fair	41	22	63	14	62	73	70	66	Very fair	33	25	58
15	83	85	84	..	Fair	53	27	80	15	66	75	73	68	Very fair	39	22	61
16	82	82	80	..	Fair	50	30	80	16	64	..	76	73	Very fair	28	23	51
17	80	78	79	..	Stormy	68	34	102	17	65	79	76	71	Very fair	31	23	54
18	80	86	83	79	Fair	46	25	71	18	68	..	..	..	Very fair	34	25	59
19	80	86	80	79	Very fair	55	37	92	19	67	79	75	69	Very fair	35	32	67
20	80	86	..	79	Very fair	66	25	91	20	68	76	76	72	Very fair	31	22	53
21	82	88	85	76	Fair	64	32	96	21	70	81	79	73	Very fair	13	22	35
22	78	84	84	80	Very fair	69	44	113	22	70	82	79	74	Very fair	18	32	50
23	78	85	85	75	Very fair	77	35	112	23	67	70	72	69	Very fair	19	28	47
24	76	83	79	79	Fair	82	51	133	24	63	75	73	71	Changeable	18	20	38
25	76	82	80	75	Fair	68	33	101	25	69	76	72	71	Changeable	12	16	28
26	77	83	80	76	Fair	57	28	85	26	71	72	72	70	Very rainy	10	21	31
27	77	..	80	76	Very fair	77	30	107	27	67	68	66	64	Rainy	16	23	39
28	77	84	82	77	Fair	67	36	103	28	64	66	61	..	Cloudy	11	26	37
29	..	..	83	79	Very fair	61	33	94	29	58	68	66	64	Very fair	9	23	32
30	77	88	82	80	Very fair	64	32	96	30	61	68	65	57	Very fair	13	18	31
									31	52	..	..	..		9	20	29

In the above tables the temperatures for September and October are taken from the record kept in the office of the fire-alarm telegraph in the City Hall; the temperatures for June, July, and August from the meteorological records of Jackson Barracks.

[UNOFFICIAL.]

JACKSON BARRACKS, NEW ORLEANS, LA., *January* 17, 1868.

(*Extract.*)

DEAR DOCTOR:

* *

First. In regard to relapses, the report barely alludes to them. I could not get figures and dates with enough accuracy to warrant more than a reference to them.

Second. I do not sufficiently bring out the great importance of careful treatment during convalescence, especially in the matter of diet; the latter is a point of much importance, in view of the difficulty we have had in getting our hospital fund expenditures approved at Washington.

* *

Very truly, yours,

DR. J. J. WOODWARD. B. A. CLEMENTS

JACKSON BARRACKS, NEW ORLEANS, LA., *March* 24, 1868.

GENERAL: I have the honor to respectfully communicate the following information bearing upon the yellow fever epidemic of last year, which has been obtained from official sources and personal inquiry and observation:

At the National cemetery of Chalmette, situated on the left bank of the Mississippi, about two miles below this post, there were employed during the five months beginning with July and ending with November, 1867, (the period of the epidemic,) a monthly average of one hundred and sixty-three laborers. Among this number, but six cases of yellow fever occurred during the period given—a ratio of 3.6 per cent. Eighty per cent. of the men employed were Irishmen, five per cent. Americans and Germans, and fifteen per cent. colored men, natives of Louisiana. The greater part of them were employed continuously, the changes amounting to not more than twelve per month, or 7.3 per cent. They lived in the ordinary A tent, floored and raised some ten inches from the ground, in the immediate vicinity of the cemetery, and some forty yards distant from the river. Their diet consisted exclusively of salt pork, beans, bread and coffee, no fresh meat or vegetables ever being served to them; and they almost invariably took stimulants before each meal, and all, except the negroes, a bath in the river immediately after reveillé. The working hours were from 7 a. m. to 6 p. m., with an interval of one hour at noon; and they were engaged in burying the dead, frequently at night, the detail for such night service being made from the whole force and daily changed. In the evening fires, into which dried coffee-grounds were thrown, were built between the tents, to drive away the mosquitoes. I have the honor to invite your attention to these facts, which I have been at pains to verify, as they show a great immunity from yellow fever among a class of men who may be supposed to have been particularly liable to contract it, and that at a time when scarcely eight per cent. of the command at this post (only two miles distant) escaped the disease.

I enclose a communication from the superintendent of the cemetery, and also from the quartermaster, the latter embodying information obtained from the authorities of the Charity hospital, where the sick of the cemetery force were treated.

Very respectfully, your obedient servant,

B. A. CLEMENTS,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

Brevet Brigadier General T. A. MCPARLIN,
Medical Director Fifth Military District, New Orleans, La.

NATIONAL MONUMENT CEMETERY, CAMP CHALMETTE, LA., *March* 21, 1868.

COLONEL: In compliance with a letter received from the Quartermaster's office, requesting information as to general habits and nationality of the men employed in this cemetery during the yellow fever season, I have the honor to submit the following statement: Eighty per cent. of the men are of Irish nationality; five per cent. a mixture of Germans and Americans; fifteen per cent. are colored men born and raised in this State. The men were required to rise at daybreak, when they would take a bath in the river, with the exception of the colored men. The majority would then adjourn to take a stimulant; after which breakfast was issued, consisting of well-cooked black coffee, salt pork, and home-made bread. Then the men would go to work at 7 and remain until 12 m., when dinner would be served, consisting of bean soup, salt pork, and home-made bread. The working hours in the afternoon would be from 1 to 6 p. m., when supper would be served, the same as breakfast. The men would invariably take a stimulant before their meals. For all drinking and cooking purposes, nothing but river water was used. There were no fresh meats or vegetables of any kind issued here during the season. The quarters consisted of common A tents, floored with common pine boards ten inches off the ground. After working hours the men would retire to their tents and build bonfires between the lines of their tents to keep away the mosquitoes. The coffee that had been used during the day and dried in the sun would be thrown into this fire, giving the air a pleasant and agreeable smell. The men would amuse themselves by dancing and singing songs, jumping, or spinning yarns. Their clothing consisted of red or blue flannel shirts and plain cotton pantaloons.

Very respectfully, your obedient servant,

JACOB GRAY, *Superintendent.*

Colonel CLEMENTS, *Surgeon, U. S. A.*

OFFICE ASSISTANT QUARTERMASTER, NEW ORLEANS, LA., *February* 13, 1868.

GENERAL: In compliance with instructions received from your office, in letter of the 6th instant, I have the honor to state that the aggregate number of employés engaged at Chalmette cemetery from 1st July, 1867, to November 30th, 1867, was 307.

The names, etc., of those admitted to Charity hospital, in this city, for medical treatment during the same period, are as follows:

NAMES.	WHEN ADMITTED.	DISEASE.	NAMES.	WHEN ADMITTED.	DISEASE.
John Riordan	July.	Chills and fever.	Thomas Murphy	September.	Yellow fever.
Abraham Lawler	August.	Yellow fever.	George O'Niel	"	Congestive chills.
Richard Malloney	"	Chills and fever.	Lewis Reckinstine	"	Yellow fever.
S. K. Hodges	"	" "	Christopher Sloan	"	Chills and fever.
Christian Becker	September.	" "	Thomas Williams	"	Not known.
Patrick Fitzgerald	"	Yellow fever.	James Hickey	October.	Yellow fever.
James Dulan	"	Not known.	Baltesi Kiser	"	" "
Richard Keenan	"	Diarrhœa.	Thomas Mallen	November.	Not known.
Andrew Murray	"	Chills and fever.			

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

CHAS. BARNARD,
Captain, and Assistant Quartermaster.

Brevet Brigadier General C. H. TOMPKINS,
Chief Quartermaster Fifth Military District, New Orleans, La.

JACKSON BARRACKS, NEW ORLEANS, LA., *March* 27, 1868.

GENERAL: I have the honor to respectfully communicate the following statement relative to the epidemic of yellow fever at this post last year:

Of forty-eight soldiers employed as cooks and nurses in the hospital at this post during the epidemic, thirty-one had the disease, of which number ten had had it before being employed in this duty. Or the essential fact may be differently stated, thus: Of thirty-eight soldiers employed as cooks and nurses in the hospital who had not previously had yellow fever, twenty-one contracted the disease while so employed—a ratio of 55.2 per cent. It may here be added that the ratio of cases to the mean strength of the whole command for the five months of the epidemic was 98.42 per cent. Of fifty-eight citizens, (28 males and 30 females,) three (all males) contracted the disease while so employed. These persons are believed to have all been acclimated.

Very respectfully, your obedient servant,

B. A. CLEMENTS,
Surgeon, and Brevet Lieutenant Colonel, U. S. A.

Brevet Brigadier General T. A. MCPARLIN,
Medical Director Fifth Military District.

MEDICAL PURVEYING DEPOT, U. S. A.,
NEW ORLEANS, LOUISIANA, *November* 14, 1867.

GENERAL: I have the honor to report the following in reference to my brief duty at Jackson Barracks, Louisiana, during the recent epidemic of yellow fever:

Agreeably to special orders, I proceeded, on September 15th, 1867, to that station, and assumed charge as senior medical officer during the illness of Surgeon B. A. Clements, U. S. A., and remained on duty until the evening of September 20th, when I was attacked by the prevailing disease.

It will only be necessary for me to mention a few matters that appeared to me of interest, as the excellent reputation, wide experience, and observant habits of Dr. Clements (who resumed duty about October 1st) will be guarantees for a full and instructive history of the course of the disease at Jackson Barracks when full reports are rendered. During my days of duty at the post, the number of sick (nearly all from yellow fever) averaged one hundred and ninety-nine; at the same time the average strength of the command was four hundred and eighty-eight; there occurred thirty-three deaths—all but one from yellow fever—in the seven days, 15th to 21st. I bear testimony with pleasure to the excellent system I found pervading the hospital arrangements on my arrival; but so rapidly did the sick, requiring treatment in hospital, increase, that we were compelled to open a large additional ward, to crowd the rooms already in use, and to increase the facilities for cooking, providing hot water, etc. We labored under great difficulties from the fact that several of our best nurses and cooks became

unavailable in the progress of the disease, while the citizen nurses (so promptly furnished by the Medical Director) could not at once assimilate with us.

Among the enlisted men, I found, on my arrival, a prevailing dread of the disease, amounting almost to a panic as greater numbers were taken down with it; and I am sorry to say that many of them resorted to drinking intoxicating liquors to excess and to other irregularities, thus diminishing the chances of recovery if taken sick.

So extended did I find the prevalence of the disease, that I made no efforts to continue the system of isolation previously carried out; not that I disbelieve in the principle of quarantine in this disease, but because, in my opinion, it was unnecessary and impracticable, under the circumstances, to isolate the cases.

A very serious difficulty was the entire lack of appreciation by convalescents of the necessity of extreme prudence in exertions made and in diet. Some of the speedily fatal cases that I attended were convalescents from previous mild attacks, relapsing on account of errors in diet, exposure to fatigue or cold, or abuse of stimulants. The disease seemed to them so new and unusual in its characteristics that the soldiers failed to be guided by the reiterated warnings of their physicians.

Owing to the urgent demands on my time for the care and supervision of the very sick, and attention necessary to officers and their families, as well as for attendance on laundresses and soldiers, either outside the garrison or in inconvenient parts of it, I found no time for taking special notes of cases or for making post mortem examinations, which I much regret.

In my opinion, the use of screens around the beds of the very ill is a valuable precaution, and I have found that the treatment of some cases in separate apartments presented better results. Too much stress cannot be laid on an early giving up to treatment by the patient; frequently untoward symptoms occur on the fifth, sixth, or seventh days of the disease, directly traceable to neglect of caution and omission of treatment in the beginning of the attack. The early establishment of free action of the excretory functions must modify the subsequent conditions, tend to prevent congestion, and place the system in proper condition to receive nutrition and stimulation, when these are indicated.

So simple a means as applying cloths wrung out of hot water I have found very valuable in relieving pain, and, over the epigastrium, in controlling hiccough and nausea. Cold applications to the head, and bits of ice to take into the mouth, I have found to be very greatful to the patient; and the water thus reaching the stomach, rarely, if ever, causes or promotes nausea. Carbonic acid seems peculiarly valuable in restraining vomiting, whether combining stimulation, as in champagne wine, or alone, as in seltzer water.

In many cases where everything is vomited from the stomach, the patient may be sustained for hours—even days—by stimulating and nourishing enemata. Private Huber, 1st U. S. Infantry, afforded a typical instance of this kind: by this means he recovered, after copious discharges of black vomit, frequent epistaxis, bleeding from the gums, and active delirium.

In my opinion, the various alcoholic stimulants should be regarded, in the treatment of this disease, in the light of indispensable medicines, and, until convalescence is established, should be furnished as such to officers under treatment.

I can speak, with grateful remembrance, of the thorough and intelligent co-operation of Brevet Brigadier General W. M. Graham, U. S. A., commanding the post, with my exertions in behalf of the sick and the health of the garrison; and I received valuable aid from Lieutenant W. N. Tisdall, 1st U. S. Infantry, acting assistant and post commissary. As medical assistant, I had Acting Assistant Surgeon M. Stovell, U. S. A., whose assistance was of great consequence, and as fully given as his impaired health permitted. The services of Acting Hospital Steward Edmund Lettson, private of Company "I," 1st U. S. Infantry, were very valuable, and his behavior excellent. Private George Hands, wardmaster, Company "F," 1st U. S. Infantry, since deceased, was so unsparing of himself, so attentive to his duties, as to win golden opinions from all his associates. Private John Carter, Company "K," 1st U. S. Infantry, nurse, and Private Caswell, Company "I," 1st U. S. Infantry, cook, both of whom subsequently died of the fever, rendered most valuable services. Private Robert Potter, 1st U. S. Infantry, managed the dispensing of medicines very satisfactorily during the time I was on duty. On proceeding to the barracks, I found the type of the disease more severe than I had seen in my experience and observation in the city. After my recovery, I ascertained from some of the practitioners of medicine in this city, that, at or about that period, the disease became more severe here also. Many of the soldiers of the 1st U. S. Infantry are, comparatively, recent comers to this climate, which might constitute further explanation.

I cannot conclude, General, without expressing my high appreciation of your counsel and suggestions, given me in connection with critical cases of the disease and other matters, at the times of your frequent visits to the post, as well as to express my sincere thanks for your kind attentions to me in my subsequent severe illness.

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

C. B. WHITE,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Brigadier General T. A. McPARLIN, *Medical Director Fifth Military District.*

Extract from Monthly Report of Sick and Wounded for Colored Troops, Post Hospital, New Orleans, La. E. A. Koerper, Assistant Surgeon, October, 1867.

Yellow Fever: This fever, among colored troops, being of rare occurrence, the question arose, why were these troops so severely visited? The greater portion of yellow fever cases among negro troops was among the unacclimated recruits. Color has, also, much to do with the susceptibility for the disease, the pure African being much less liable than the mulatto. The disease has been quite fatal in the colored wards of this hospital, although the medical attendance, nursing, and diet was the same for negro and white.

NEW ORLEANS POST HOSPITAL, GREENVILLE, LA.,
Forwarded January 12, 1868.

GENERAL: In July, 1867, soon after my arrival in the city of New Orleans, I became acquainted with two prominent city physicians, and I made every effort to gather from them positive data by which to recognize yellow fever, in case it should make its appearance among the troops under my charge; but their statements seemed so vague and unsatisfactory that I came to the conclusion that the diagnosis of this disease by symptoms is a matter of some difficulty.

The first case of yellow fever that came under my care occurred at the Sailors' Home, New Orleans, and at its outset I mistook it for a case of bilious remittent fever, the symptoms seeming to point to that diagnosis as the correct one. This case was soon followed by others in rapid succession.

In the beginning of the epidemic, the approach of the disease was usually indicated by the following prodromes, viz: the patient would experience, for a day or two previous to its outbreak, a feeling of weariness, an inability to exert his mental powers, a sense of fullness across the forehead, slight fever, and constipation of the bowels.

Soon, however, cases occurred with apparently no premonitions of the approach of the fever. A man, previously in apparently excellent health, would be suddenly attacked by an intense fever, (pulse from 120 to 140,) accompanied by frontal or occipital headache, injected conjunctiva, pain in back and lower extremities, and a feeling of distress about the heart, almost amounting to agony, and giving the patient an idea of approaching death. To these symptoms were added the following, viz: a sense of fullness and tenderness in the epigastric and right and left hypochondriac regions; scarlet, tumified gums, bleeding on the slightest pressure; tongue red at the tip and edges, with a whitish coating down its centre. The fever continued, with slight remissions, until forty-eight or seventy-two hours elapsed, when, if the case tended toward a fatal termination, especially if the tongue was dry and denuded of epithelium and the gums greatly disposed to bleed, black vomit might be looked for, although death was by no means always preceded by it, for many died by coma induced by uræmic poisoning, or from exhaustion, without any signs of black vomit. In most of the fatal cases petechiæ made their appearance, and after death the skin invariably became of a yellow color. Among the untoward symptoms, the following seemed the most important, viz: suppression of urine; black vomit, accompanied by a red and glazed tongue; petechiæ, and congestion of the brain. Yellowness of the skin and conjunctiva, to a greater or less degree, made its appearance at some stage of the fever in every case; albuminous urine after the third day.

* * * * * * * * * * * * *

I was placed in charge of the New Orleans post hospital, Greenville, La., September 4, 1867, and there had the opportunity of observing the disease in all shades of intensity. As a rule the severe cases of yellow fever occurred among the men of the gunboat "Mahaska," the "iron-clad fleet," the unacclimated "district headquarter band," a detachment of colored recruits (39th U. S. I.) recently arrived from the north, and those habitually using undue quantities of ardent spirits, indulging in venereal excesses, or suffering from great mental depression.

The robust, when attacked, suffered more than the spare. Those cases that terminated favorably were mostly marked by a milder type of symptoms—the fever of less intensity, the conjunctiva less injected, the pain in back and limbs usually less severe, and the nervous depression and sleeplessness less marked, and usually in forty-eight hours the patient, although left in a debilitated condition, was devoid of fever, and, with proper nursing, stimulation, and support, able to leave his bed on the eighth or ninth day from the beginning of the attack.

The first cases that came under my charge were treated at the outset of the fever by the exhibition of a ten-grain dose of calomel, followed by castor oil or salts; the calomel being given with the idea that it would aid in aborting the disease, or, at least, in lessening the severity of the symptoms; but I subsequently came to the conclusion that in most cases calomel, if not positively hurtful, was at least useless, and castor oil alone was employed. Castor oil is the favorite purgative among the practitioners of New Orleans, and, it is thought, justly so, for it is far more reliable and prompt in its action than the sulphate of magnesia or Rochelle salt, without causing the irritation produced by them. After the exhibition of castor oil (one and a half to two fluid ounces) in porter, the patient was well covered with blankets, and sweating promoted by hot mustard foot-baths, applied until the desired effect was obtained, great care being taken that the perspiration was not checked by the exposure of limb or body; on this last, too much stress can hardly be placed. If the bowels were not moved in the course of four or five hours from the exhibition of the oil, a clyster of soap-suds and castor oil would be resorted to, and this, in conjunction with the oil already taken by mouth, would hardly fail of soon producing several free, dark-colored stools. Ice to the head and sinapisms to the extremities relieved the tendency to congestion of the brain, and sinapisms to the back and epigastric region aided in relieving congestion of the abdominal organs.

In case of vomiting, ice, iced champagne, lime water, bicarbonate of soda, etc., were exhibited in small often-repeated doses, and sinapisms applied to the epigastrium, but nothing seemed to quiet the stomach more certainly than demulcent injections. The patient does not bear purgatives till well advanced in convalescence, and simple injections will answer all purposes, especially as he is allowed no food that is solid until he is past the tenth or eleventh day of his disease. Nothing causes the practitioner inexperienced in the treatment of yellow fever more anxiety than the obstinate constipation of the bowels; but danger besets the patient should irritating purgatives touch the tender epithelial coating of the gastro-enteric mucus membrane. Nervous depression, an inability to sleep, and constipation of the bowels, are the last symptoms to depart. Porter seems the remedy specially fitted to combat these three symptoms. As a sequence, about one-third of all the yellow fever patients treated in this hospital were more or less afflicted with boils, or circumscribed phlegmonous abscesses, showing how thoroughly all the fluids and solids of the body are influenced by the poison. The following case is one that strongly points to the conclusion that the poison of yellow fever, like that of cholera, is a specific one:

Augustus Bertro, aged 21, private in Company "F," 16th U. S. Infantry, was admitted to this hospital November 6th, 1867, in the collapsed stage of cholera, from which he recovered, when, on the 23d of November, he was attacked by well-marked yellow fever, from which he also recovered. This man, when attacked by yellow fever, was still under the care of his medical

attendant, who used all precautions against a return of cholera symptoms, and, consequently, his system was in a renovated condition, and could hardly be affected by any other than a specific poison.

In conclusion, I would remark that an exceedingly guarded use of the articles of the materia medica, with a proper, timely use of supportants and stimulants, is all that pertains to the mystery of a successful treatment of yellow fever. Without proper nursing, the patient dies. I do not wish to convey the idea that the presence of a physician is superfluous; far from it, for no matter how well trained the nurse may be, there are times when the appearance of new symptoms requires the educated mind of the physician for their interpretation.

Enclosed I have the honor to transmit the report of Acting Assistant Surgeon J. J. Auerbach, U. S. A., on duty with yellow fever patients at this hospital during the past epidemic. I also respectfully transmit tabular report of yellow fever cases treated in this hospital.

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

E. A. KOERPER,
Assistant Surgeon, U. S. A.

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

POST HOSPITAL, GREENVILLE, LA., *December* 1, 1867.

GENERAL: On the 12th of the month of August, 1867, I was ordered by the Medical Director of the Districts of Louisiana and Texas to perform duty as medical officer in the New Orleans post hospital, Greenville, Louisiana, where I was especially assigned to attend to the yellow fever patients. The result of my observations, and my opinions on the subject of yellow fever, I most respectfully submit in the following lines: I am of the opinion that the only existing cause of yellow fever is the exposure to marsh miasmata, and that the disease is really a marsh remittent fever. I think myself justified, from repeated observations in Louisiana and Texas, in concluding that the joint influence of marsh miasmata and of an atmosphere unusually and sufficiently heated, upon persons habituated to a cold or temperate climate, is, of itself, fully capable of causing an epidemic of yellow fever. It seems to me very probable that these marsh exhalations, and the effluvia arising from putrid vegetable and animal substances under a concurring vitiated state of the atmosphere, were the causes which gave rise this summer to the outbreak of this fever in New Orleans, and that it was afterwards kept up by contagion, heightened, by various accidental circumstances, to a pestilential degree of violence. During the months of April, May, and June an unusual amount of rain fell in the city, followed by very hot and sultry weather.

Among the sufferers from yellow fever in this hospital, the colored troops quartered in its superfluous wards were by no means so apt to be seized with it as the whites. When the disease did appear among them, it was always much milder, except in those cases occurring among the colored recruits from the north. Soldiers of a full, plethoric habit, and who were intemperate in their mode of living, were much greater sufferers by it than those of a lax fibre and who were guilty of no irregularity. A noteworthy fact has manifested itself in the epidemic of this year, viz: that long residents, natives in general, were attacked by yellow fever in its continued and malignant form, and became victims to it, notwithstanding their bodies had become creolized.

* * * * Our patients were mostly attacked with lassitude and weariness, chilly fits, flushing of the face, redness of the eyes, pains in the eye-balls and lower part of the forehead, as, likewise, in the back and calves of the legs; great anxiety about the præcordia, debility and sighing, thirst, and a tendency to coma; the urine high-colored, small in quantity, and turbid; a quick, small, and hard pulse; skin hot, dry, and hard. Not one case came under my observation among soldiers, as well as among civilians, in which more or less costiveness did not prevail. I could not perceive, in any patient, an evident remission, until the fever had entirely gone through its first stage, which was generally from thirty-six to seventy-two hours. There was then often such an abatement of the symptoms as to induce the patient to think himself tolerably well; but an early recurrence of the symptoms in an aggravated form, accompanied with extreme debility, soon convinced him of the contrary. This extreme debility prevailed in the last stage of the disease: large patches of livid spots could be observed on different parts; the tongue became dry and black, the teeth incrusted with a dark fur, the breath highly offensive, the whole body exhibiting a livid yellow in many cases; hæmorrhages from the mouth and nostrils occurred; dark and fetid stools were discharged; hiccough ensued, the pulse sank, and death quickly followed.

Not unfrequently patients were brought to hospital from the quarters in the city 5 miles distant, after having felt the premonitory symptoms for two or three days, particularly suffering from constipation of the bowels, a dull pain in the right side, defect of appetite, flatulency, heat in the stomach, giddiness and pain in the head and small of the back, red eyes, low spirits, a disposition to sweat after moderate exercise, etc.

The color of the excretions was almost black, the urine, as before mentioned, of a high color, but small in quantity, the tongue, at first moist and pale, became red as the disease advanced, and towards the close a dry black streak appeared in its middle which soon extended to every part of it.

On the nervous system the effects produced were different, according as the fever affected the brain, the muscles, or the nerves; tremors of the limbs and twitching of the tendons were not uncommon; delirium was a frequent symptom, but the majority passed through the disease without the least disarrangement of ideas.

As my case-book shows, two patients in their convalescence were taken with swelling of the right parotid, and one seaman (of the U. S. gunboat Mahaska) with swelling of the inguinal glands, which swellings did not proceed to suppuration. The yellow color was by no means universal; when it did occur, it was seldom before the fifth or seventh day from the first attack. The eyes seldom escaped a yellow tinge. There were eruptions of various kinds on the skin, and in the later stage petechiæ were common. In four cases carbuncles appeared. The fever exhibited during its prevalence this year a greater variety of symptoms than in the years 1859 and 1864, in which years it visited Galveston and Houston, Texas.

It assumed here sometimes a favorable appearance, and then suddenly changed to the worst; patients apparently in a state of convalescence sometimes expired in the course of twelve hours. As regards the treatment, I would simply remark, that, with the mass of practitioners, it was, as in former similar epidemics, as much at variance as their ideas of its cause. I, and, I presume, all the physicians who have lived here for some time, must admit that in the majority of cases the resources of our art were of little benefit in its worst forms. * * * * * * * * * * * *

To obviate the inflammatory diathesis which prevailed in the first stage of the disease, and to divert the determination from the head, as well as to cleanse the primæ viæ of acrid and offending humors, I employed gentle purging, castor oil by the mouth or rectum, cold effusions, hot mustard pediluvia, to be immediately followed by sinapisms applied between the shoulders and to the epigastrium and calves of the legs, for the purpose of assisting in arresting the hot stage and to produce a free determination to the surface; at the same time, either solution of acetate of ammonia or tincture of aconite in small doses until perspiration was produced, or the desired object of reducing the circulation was effected, and as the most useful auxiliaries during the whole course of this disease. I consider enemata, with or without castor oil, with warm or ice-cold water, of the greatest importance. * *

With reference to the ice-water clysters, I convinced myself fully of their most immediate and sensible effect, particularly in cases where vomiting, oppression about the præcordia, and great irritability appeared. I had to contend with cases of very great irritability of the stomach, where excessive vomiting prevailed, and the application of a blister over the part was not attended with any effect. The vomiting did not even cease upon the application of a large poultice of mustard flour to the stomach and feet; cupping, blisters along the spine, internally mineral acids, creasote, etc., etc., failed to allay irritability. In such emergencies, ice-water per anum, swallowing pieces of ice, and ice applied to the stomach, have always been attended with success. I commenced with sulphate of quinia at the outset in 10 grain doses with a small portion of sulphuric acid, as the circumstances of the case indicated. During the convalescence, I ordered that champagne wine, porter, and ale be freely given to the sufferers. * * * * * * * * * * * * *

Very respectfully, your obedient servant,

JULIUS JACOB AUERBACH,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. McPARLIN, *Medical Director Fifth Military District.*

POST HOSPITAL, GREENVILLE, LA., *January* 17, 1868.

SIR: I have the honor to present my special report of yellow fever patients during the recent epidemic, embracing the months of August, September, October, and November, 1867.

Probably my duty would have been performed had I only sent a list of those under my care during the entire period of each case to its result, which would embrace three of the U. S. post band, treated by me in private quarters, and a portion of the officers reported, all of whom I attended a great part or the entire period of their sickness. But at one time all of the attending Surgeons of the post hospital were down with the disease, so that I thought that although the report from these might embrace all, it would do no harm to give the entire list of those sent from under my care. I have therefore added to the tabular form given us, a column showing the date when patients were sent to the hospital. The dates of recovery or death I obtained from their respective company books. I report 83 colored and 93 whites, including 9 officers. The colored troops under my care were: 225 of the 39th U. S. Infantry, of whom 50 were unassigned recruits, but a few days before from Philadelphia; 16 of the 41st U. S. Infantry; 79 of the 9th U. S. Cavalry—all recruits brought here, shortly before or during the progress of the epidemic, from Cincinnati, Ohio, and Louisville, Ky.—making a total of 320 colored. Of whites, there were of the U. S. post band, 24 men; of Companies "A" and "B," 1st U. S. Infantry, 114; making a total of 138 white men. Both commands had 10 officers present. The colored cases, in proportion, were not only fewer, but less severe. The only facts noteworthy in reference to its introduction, and bearing upon its importation from infected points, may be best presented in a short history of its appearance and spread among the troops. The white troops named were stationed in New Orleans until cases of yellow fever occurred among them, causing them to be removed here, where the colored troops had been since the January previous. The band came on the 12th of August, and the companies on the 17th of the same month. Up to that date, some were being sent daily from their former quarters to the post hospital with the disease—for how long, or in what number, I have not ascertained. There was no case of the fever reported among the colored troops until the 24th of August; and I have very grave doubts whether the seven first reported on the list were yellow fever cases; if not, there were no cases of it until the 10th of September. The two companies of infantry were located next to a yellow fever ward—one ward intervening; next to them, the 39th colored wards; and last, and adjoining my office, was the band. It is well to state that all the wards are in a circle. With the hospital wards past the Surgeon's office there was seldom any communication. In the other direction it was frequent and almost unavoidable. I would state that the 9th Cavalry recruits were encamped a few hundred yards behind the 1st Infantry and first hospital wards—the 41st about five hundred yards behind the colored troops. Three days after the arrival of the 1st Infantry three new cases occurred. In the band no new cases occurred until the 6th of September, twenty-five days after their arrival. Not until the 1st and 5th of September did the fever become epidemic, although the white troops were infected when they came. My impression is that the epidemic was hastened and intensified, if not produced, by the intercourse between the hospital and barracks. I sent none of the 41st to the hospital, and knew of no case among them.

Great care had been taken to keep the wards of the troops clean and pure. Apprehending the possibility of both cholera and yellow fever, all efforts within our reach were used to prevent or mitigate such attacks, if they came. Besides the usual means of police, I daily put in the sinks a strong solution of sulphate of iron, and used carbolic acid and permanganate of potash solution freely wherever they promised to be of use. Three times a week each ward was fumigated with sulphurous acid

gas, produced by burning sulphur, once with the addition of nitrate of potassa, always requiring them to expose their bedding and clothing as much as possible to the fumes. Once a week I used Dr. Clement's method of burning the spirit of chlorate of copper, filling the wards with the vapor. Although there have been cases of cholera daily for months, we have had no case among our troops originating here, and only three in all, taken in the city when on duty there. I am not prepared to say that yellow fever would not have become epidemic among us without the intercourse referred to; but there is foundation for the belief that if it had been so at all, it would have been later and less general. I made no autopsies; and as to successful methods of treatment, I do not know that I have anything to write. I am persuaded, after passing through two epidemics, that when premonitory symptoms occur, and during the first stage of the disease, much more can be done with medicine than at any other stage. Few of all these troops were not on the sick list with the fever, and many not sent to the hospital were treated in quarters, where the disease was prevented or aborted by the use of purgatives and quinine, passing from the first stage of the disease to duty in a few days. In none of these cases was there a return of the disease or relapse, with but one exception, No. 12, on list of white patients. After recovery, he had leave of absence, indulged in very hearty eating while in the city, and next day was reattacked. He was immediately sent to hospital and died that night.

I preferred castor oil as a purgative, but in many cases, six hours before giving it, used three compound cathartic pills. I gave quinine soon after the first operation of the purgatives, and at such intervals as to give at least thirty grains within twenty-four hours. I preferred, especially if there was irritability of the stomach, to give the quinine in pills, made by mixing the quinine with aromatic sulphuric acid. As to treatment during the progress of the disease, it hardly comes within the scope of this communication to describe it. I will say, however, that I think quinine is too little administered, because we have been so often told that it has done harm. In my own case, in which the attack was severe, and my liability to miasmatic fever gave reason to apprehend the result, I took thirty grains daily, and in five days I was able to get up, and in ten I returned to duty. I administered it in the same way to three of the U. S. band whom I treated in private quarters, all of whom recovered. Their drum major was one of them—one of the worst cases I saw—and when his stomach was too irritable to retain anything, I gave him 20 grains twice a day in beef tea enemata; in fourteen days he returned to duty. In all the cases in which I had entire control I gave it as I thought opportunity presented or indications suggested, and always, it appeared to me, with benefit. When a stimulant was needed, after carefully trying champagne, porter, and ale, I gave up all for brandy, finding it to serve the purpose well without the evil results sometimes following the use of the others. In one case of marked interest, extending through nearly two months, in which there were two relapses, and constitutional effects seldom seen without a fatal result—when the stomach was so irritable that it often rebelled against everything; the patient delirious; the pulse 130, but very weak—two to four times a day enemata of beef tea were administered, when I would put in one to two tablespoonfuls of brandy, with ten grains of quinine, with an almost immediate reduction of the pulse to eighty with an increase of force. Thus he was carried over a condition which disallowed the use of any food or medicine except by enema.

Very respectfully, your obedient servant,

WM. DEAL,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. McPARLIN,
Medical Director Fifth Military District.

QUARANTINE STATION, MISSISSIPPI RIVER, *April* 20, 1868.

DEAR SIR: In answer to your communication of the 16th instant, I have to state that the first appearance of yellow fever at this station during the year 1867 was on July 1st, four cases arriving on the brig Virginius from Havana—eight days' passage. During their detention two other cases occurred. The crew was composed of unacclimated Spaniards.

The number of cases treated in this hospital during the season was thirty-five, eight of whom died. In reference to the extent to which it prevailed in this vicinity, I learn there were about forty cases, in none of which, however, could the disease be traced to this station; the history of the cases plainly indicating New Orleans as the source of infection.

The disease did not rage as an epidemic, but when introduced into a dwelling by one of the family having received it elsewhere, it generally extended throughout the family.

I have not been able to collect the information you desired some time since in regard to its history in Havana and Vera Cruz, but have written to the United States consuls at those ports, whose replies, I trust, will soon arrive and prove satisfactory.

Very respectfully, yours, &c.,

H. HEILNER, *M. D., Resident Physician.*

Brevet Brigadier General T. A. McPARLIN,
Medical Director Fifth Military District.

BATON ROUGE, LOUISIANA.

POST HOSPITAL, GREENVILLE, LA., *March* 6, 1868.

GENERAL: In reply to your communication requesting a special report of the origin, progress, treatment, &c., of yellow fever at Baton Rouge, Louisiana, 1867, I have the honor to report the cases that occurred among the troops, as follows:

The first case was that of a soldier who had been on detached duty at Hog point, on the Red river, from about the middle of June to the middle of July, and who was admitted to hospital at Baton Rouge, Louisiana, about the last of July. The second case occurred at the barracks, in Company "G," which company had lately reported at Baton Rouge from Young's point and Lake Providence. The soldier attacked with yellow fever was already greatly debilitated from previous sickness contracted at Young's point, and other places in that vicinity. The case was treated in camp by Acting Assistant Surgeon Piper, U. S. A. The third case occurred in November, about ten days after the troops returned to barracks from camp, and was, in my opinion, contracted in the town of Baton Rouge, where the soldier acknowledged to have visited frequently.

I do not think that either of the cases above mentioned found its exciting cause at the barracks, as the cases occurred at long intervals, and in each instance after exposure elsewhere.

The progress of the disease among the troops is told in the above remarks. The first case, after severe and lingering sickness, recovered. The second and third cases died on the third or fourth day of the attack.

The following treatment was pursued in the case that recovered: First day of admission to hospital, blue mass and castor oil, warm bath, mustard plaster to stomach; second day, twelve grains of quinine, at 8 or 10 a. m., warm bath and light diet; third day, cathartic injection, bath, blister to neck. Vomiting now commencing, nutritive enemata were given every six hours, consisting of three fluid ounces of beef essence, or milk punch, two ounces of whiskey, with four grains of quinine. The enemata were continued six or seven days. Various medicines were tried to relieve the vomiting, all without effect, except ice, or small quantities of ice water, administered frequently; slightly stimulating sponge baths were given twice a day. During seven days neither food nor medicine, given by the mouth, were retained, except the ice, or the iced water. After the vomiting ceased, the case was treated as one of continued fever. The treatment of the second and third cases consisted of stimulating baths, diffusable stimulants, applications of heat, and various other means to bring about reaction, as delirium and great depression of the vital forces existed from the day of admission to the hospital until coma occurred, which was the second day in the one, and the third day in the other case.

The few cases treated gives very little weight to the course pursued in regard to the success of the treatment. In my opinion, the removal of the troops to camp (six miles from town) prevented the occurrence of other cases during the summer. Ten days after the return from camp, November 1st, although there had been a heavy frost, the third case occurred. The soldier attacked died on the third day. He acknowledged that he had visited the town frequently. There were two other suspicious cases about the same time. Strict orders were then issued prohibiting the soldiers from visiting the town. No other cases occurred among the troops. * * * * * * * * * * * * *

The camps occupied were about six miles from the Mississippi river. The almost entire freedom of the troops from yellow fever was due, in my opinion, to their removal beyond the immediate limits of the infected place, (Baton Rouge.) I am unable to give any reliable facts referring to the origin, progress, and treatment of yellow fever in Baton Rouge or vicinity. My recollection of the cases that occurred among citizens early in the season is, that they were traced from New Orleans. There was no board of health in the town, or other reliable official source, from which to get even the number of cases of yellow fever treated by the most prominent physicians.*

Very respectfully, your obedient servant,

W. D. WOLVERTON,
Assistant Surgeon, and Brevet Lieutenant Colonel, U. S. A.

Brevet Brigadier General T. A. MCPARLIN,
Medical Director Fifth Military District.

Extract from Special Report of Yellow Fever, Baton Rouge, La. Brevet Lieutenant Colonel W. D. Wolverton, Assistant Surgeon, U. S. A., August and September, 1867.

Private Wells was on duty from June 12th to July 11th, on the west bank of the Red river, near its mouth, where yellow fever was reported to exist. There were no cases of yellow fever reported in Baton Rouge (among citizens) until about September 10th.

Private Kurtz contracted the fever at Baton Rouge, being on duty at the barracks when he was taken sick.

*The command moved from Baton Rouge, La., to Camp Coe, La., about six miles from the Mississippi river, August 9th, 1867; from Camp Coe to Baton Rouge, September 23d; from Baton Rouge to Pierce's plantation, near Camp Coe, September 31st; and from Pierce's plantation to Baton Rouge, November 1st, 1867.

VIDALIA, LOUISIANA.

VIDALIA, LA., *September* 18, 1867.

GENERAL: I have the honor to transmit herewith a special report of yellow fever patients at this post for the month of August, 1867:

Sullivan, a robust man, of intemperate habits both as to food and drink, was first attacked; he had all the unmistakable symptoms of yellow fever. I had him covered up with several blankets, and had a foot-bath prepared for him with mustard, as hot as he could bear it; after this I gave him 15 grains of calomel, followed next morning by an ounce of castor oil, which produced a good operation. The nausea and vomiting were relieved by creasote, given in mucilage, one drop every half hour, and by the application of flannel dipped in hot water and laudanum and applied to the stomach. For several days he could not keep even bland fluids, such as barley water, in his stomach. I gave him brandy and water, which agreed with him. The violent neuralgic pains of which he complained and groaned like a child were relieved by dry cupping and sinapisms. He remained very debilitated for about a week, but he entirely recovered, and at the date of this report has returned to duty.

On the same day, and nearly at the same hour, William Keefe was attacked; he did not suffer much from neuralgic pain, but the nausea and vomiting were intense. He was treated on the same principle as Sullivan and recovered.

Vynerskirk was attacked the next day. This man had to be watched by two nurses constantly, as he wished always to get up to walk around. He was very anxious as to the nature and issue of the disease. He is doing very well at present.

I have to remark that at this period several citizens were taken sick, two of whom died suddenly. The physicians declared the disease to be bilious intermittent fever.

I am exceedingly sorry that I did not take accurate notes of these cases; all I give here is from memory. At that time I had from 20 to 25 patients, and had to prepare their medicines. I had, myself, intermittent fever at the same time.

I am, General, very respectfully, your most obedient servant,

E. ALEXANDER,
Acting Assistant Surgeon, U. S. A.

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

[EXTRACT.]

VIDALIA, LA., *November* 23, 1867.

SIR: I have the honor of submitting the following report of the case of Lieutenant J. W. Hicks:*

In my opinion, Lieutenant Hicks contracted the yellow fever from documents from New Orleans, received by the packet, arriving at night, and opened by him in a close, warm room, immediately on their receipt. * * * * * *

J. S. MENG,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. MCPARLIN,
Medical Director Fifth Military District.

POST OF RICHMOND, LA., *April* 20, 1868.

GENERAL: In reply to the communication dated April 3d, 1868, inquiring whether the three yellow fever patients reported by me during August, 1867, in Company "K," 20th U. S. Infantry, had been in any way exposed to the disease, I have the honor to state that I cannot positively affirm whether such was the case or not. Yellow fever was at that time known to exist in the lower part of the city of Natchez, Mississippi, which city was opposite to our camp, on the other side of the Mississippi, the river being only about half a mile wide. This city was frequently visited, especially by those men of Company "K" who were known to be of irregular habits. Privates O'Sullivan and Keefe were men of bad character, and as liquor could not be procured at Vidalia, Louisiana, I believe they took advantage of the night to go to Natchez, and may possibly have contracted the disease while on a debauch.

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

E. ALEXANDER,
Acting Assistant Surgeon, U. S. A.

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

NATCHEZ, MISSISSIPPI.

POST HOSPITAL, NATCHEZ, MISS., *April* 10, 1868.

SIR: I have the honor to reply, in answer to the letter from your office dated Washington city, April 2d, 1868, requesting me to state whether yellow fever prevailed to any extent among the citizens of Natchez, and how I suppose my patients contracted the disease, that the disease prevailed to a considerable extent among the citizens, but seems to have been of a mild type, few cases, comparatively, having proved fatal.

The two cases reported in monthly report of sick and wounded for Company "K," 24th U. S. Infantry, for September, 1867, in my opinion, contracted the disease on quarantine guard, where, being quartered on the bank of the river, they came in contact with parties diseased and from diseased localities.

Very respectfully, your obedient servant,

F. B. GILLETTE,
Acting Assistant Surgeon, U. S. A.

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

*Lieutenant Hicks was attacked October 14th and died October 22d.

VICKSBURG, MISSISSIPPI.

Extract from Monthly Report of Sick and Wounded, Vicksburg, Mississippi. Assistant Surgeon A. A. Yeomans, U. S. A., October, 1867.

The first case of yellow fever reported in the city occurred about a month ago. Since then the disease has spread, and has lately been pronounced epidemic. One of the local newspapers of last week stated that there were over one hundred cases under treatment in the city.

The first case among the troops was Private Peter Huff, Company "D," 24th U. S. Infantry, who was taken sick October 15th, 1867. As a general rule the disease is of a mild form. All the cases under treatment at present are doing well.

Extract from Monthly Report of Sick and Wounded, Vicksburg, Mississippi. Assistant Surgeon A. A. Yeomans, U. S. A., November, 1867.

All the cases of yellow fever treated at this post, except two, occurred amongst men on duty in the city, or at some other post. Corporal Hardy and Private Rhodes, both fatal cases, are supposed to have contracted the disease at Woodville, Miss., from which place they had just arrived when attacked. The disease in the cases was of the most severe form, ending with hæmorrhage from the throat and mouth and black vomit. Many cases of remittent fever rapidly assume a typhoid form and require the utmost vigilance on the part of the nurse, careful watching by the Surgeon, and the constant exhibition of stimulants, with nourishing diet, to bring them back to their normal condition.

Extract from Monthly Report of Sick and Wounded, Vicksburg, Mississippi. Assistant Surgeon A. A. Yeomans, U. S. A., December, 1867.

There has been no yellow fever reported amongst the troops at this post since the 21st of December.

JACKSON, MISSISSIPPI.

JACKSON, MISSISSIPPI, *April* 14, 1868.

GENERAL: In reply to your communication of the 2d instant, I have the honor to state that yellow fever was prevailing here during the summer of 1867, and only four or five citizens died; but at Byram Station, some nine miles from here, on the New Orleans and Jackson Railroad, were 36 cases of the same disease, of which 20 died, and only three or four of the citizens escaped the epidemic.

I believe that Private Clark, of Company "E," 5th U. S. Cavalry, contracted the disease here at Jackson, as he was in a very feeble condition, when he came to this post from Yazoo City. I was informed by his commander that he was nearly all summer reported as sick.

Only a few squares from our camp a young man (citizen) named Maple died of yellow fever, which case all medical gentlemen here believe to have been the cause of spreading the disease amongst the citizens and troops.

Also a few cases died at Madison Station, some three miles from this post, where the epidemic prevailed more extensively and malignant than here, although Jackson is located between Byram and Madison Stations.

In 1853 I was one of the afflicted of the same epidemic at New Orleans, while visiting physician of the Charity hospital, in which institution I remained until September 22d, 1855, when sent by the Howard Association for the relief of the suffering of this epidemic to this place. I have had great opportunity to treat several hundreds of cases without much loss on the average, and here, in Jackson, I can say I have had thirty-seven cases and have not lost one.

Very respectfully, your obedient servant,

C. G. CADE, *M. D.*

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

MEMPHIS, TENN.

Remarks on Monthly Report of Sick and Wounded, Memphis, Tenn. W. S. Tremaine, Assistant Surgeon, U. S. A., November, 1867.

Two cases of yellow fever occurred this month. I was attacked October 31st and returned to duty November 24th. The other was the case of a man detailed to nurse me. He was under the care of A. A. Surgeon R. McGowan, who has left for Nashville; consequently, I am unable to furnish any detailed account of his sickness beyond the fact that he died on the fourth day, having had a suppression of urine for forty-eight hours. These were the only cases in the command, although the disease prevailed extensively in the city. I had visited a number of cases, during October, by invitation of different physicians in civil practice. During the months of October and November, many of the cases I have reported as remittent and intermittent fever simulated yellow fever. The health of the command, as regards malarial diseases, is improving; due, in my opinion, to the daily administration of quinine and whiskey at reveillé.

ALEXANDRIA, LA.

Extract from Monthly Report of Sick and Wounded, Alexandria, La. Acting Assistant Surgeon J. F. M. Forwood, October, 1867.

Sergeant Bazine was admitted on the 27th from the steamer Fannie Gilbert. The disease was evidently contracted from other cases on this steamer while en route from Baton Rouge to join his command at Jefferson, Texas. Symptoms of black vomit had already set in, and death followed in eight hours after his admission to hospital.

Extract from Monthly Report of Sick and Wounded, Alexandria, La. Acting Assistant Surgeon J. F. M. Forwood, November, 1867.

Private Malan, yellow fever, was admitted from steamer; had been sick at Baton Rouge; was on steamer ten days while en route to this post.

Report of the Epidemic of Yellow Fever at Alexandria, La., during 1867. *Acting Assistant Surgeon J. F. M. Forwood.*

Alexandria is situated on the right bank of Red river, about 80 miles from its mouth and 360 miles from New Orleans; lat. 31° 17′, long. 15° 27′ west. The barracks are on the opposite side of the river, at a distance of three-quarters of a mile from Alexandria and within a few hundred yards of Pineville.

The quarters occupied by the troops are hewed log cabins 12 by 18 feet, and formerly used as officers' quarters. The country on the right bank of the river, and opposite the camp, is cleared level farm land, partly under cultivation. On this side (the left bank) it is rolling and thickly wooded with pine, except a space of less than a mile nearest the camp, one edge of which is a lake or cypress swamp, extending up to the houses in the village of Pineville and within a short distance of camp.

From the overflow during the summer and the rains of the spring, the margins of these swamps are left covered with vegetable matter, which undergoes decomposition as the waters recede, making it exceedingly unhealthy until washed off by the next rains. The soil is a sandy loam, readily washed by the rains as they fall, the water running off into the bayous and swamps. Spring water sufficient for use is found, and well water can be obtained at from ten to twenty feet from the surface in a stratum of quicksand.

Alexandria is the parish seat; consequently it is visited by those living within a circuit of 40 or 50 miles for business purposes and to obtain provisions landed by steamers en route up the river from New Orleans. During the low stages of the river navigation is obstructed by the rapid current of the few inches of water over the falls, a short distance above this point. This renders it necessary to reship the freight at this point on boats of less draught of water.

From this fact, steamers, during the epidemic, direct from New Orleans, an infected city, were compelled to remain several hours here, the passengers, of necessity, detained, and liable to be left here sick with yellow fever. The mail routes via mouth of Red river, and from Opelousas, through Cheneyville, were additional indirect routes of communication with New Orleans.

When I reported at this post, March 2d, 1867, the command consisted of Company "B," 20th U. S. Infantry, numbering 76 enlisted men and 2 commissioned officers; with the exception of 20 recruits, they were men that had been serving in Virginia, and the entire command was in good condition. During the month of March there were 19 on sick report; in May there was an aggregate of 11. About the first of May, three detachments were sent to adjoining parishes, leaving at the post about 40 in all.

Early in September it became evident that the epidemic, then in New Orleans, would soon reach this post; it had already made its appearance along the Mississippi, apparently through the constant travel between New Orleans and these points.

The sanitary condition of both Alexandria and Pineville at this time was exceedingly bad, being overflowed in the beginning of summer, and piles of filth left by the receding water. No rain had fallen in a long time, and the pools of stagnant water left by the overflow filled the air with gases of the most offensive and unhealthy character: this was markedly the case after sunset and before sunrise.

To improve the condition of the town sufficiently would be a work not easily accomplished, since there seemed to be no inclination to assist on the part of the citizens to guard, by cleanliness, against the approaching epidemic.

The imminent danger of the command and the probability of many fatal cases among the unacclimated men rendered it necessary to take steps to prevent the introduction of this disease among the troops. A thorough inspection of the camp and vicinity and of the personal cleanliness of the men was at once made, and a strong police force instituted to keep them thoroughly cleaned every day. The supply of disinfectants on hand was liberally used in the sink and other places, and pulverized quick-lime was scattered about and under the cabins. One fluid ounce of whiskey and three grains of sulphate of quinia were administered to each man at reveillé every second or third day. This was continued until the beginning of October. From the fact that steamboats with merchandise and passengers came direct to this point from New Orleans, and goods were reshipped as before stated, the introduction of the disease through this thoroughfare of direct communication seemed certain, not only into the city, but among the troops at the post, and it was evident that additional steps should at once be taken to prevent, if possible, such a calamity.

In consultation with the commanding officer at the post, Brevet Lieutenant Colonel J. C. Bates, it was thought to be impracticable to establish a quarantine for the following reasons, viz: 1st. There were neither hospital accommodations nor medical supplies provided for the sick under such circumstances by the city of Alexandria. 2d. It could not be effectually accomplished by the few troops, because of the large district of country to be guarded. 3d. It would stop navigation to all points above this, and thereby give much inconvenience and detention, while the result would be not to insure our safety, but to make a depôt for the spread of this disease directly in our midst. It was, therefore, determined to establish a temporary camp sufficiently far back in the pine woods to sever all communication not actually necessary from both the town and river. A personal inspection of several places by the commanding officer and myself resulted in the selection of a site eight miles distant from Pineville, on Haw creek. The chief difficulty was in getting pure water; the stream, however, was one of considerable strength, with a gravel bed, and following in a half circle around an open space of several acres in the pines, once the site of a summer resort, but now entirely unoccupied and in an unsettled part of the woods. As soon as the epidemic made its appearance in the town the command was moved to this camp, and remained there in tents until the middle of December. Those detached to other parishes returned in October, and, not coming from places where the epidemic was prevailing, were sent at once to the temporary camp. Thus the whole command, with the exception of about six men left to guard the permanent camp at Pineville, remained eight miles distant from the river and town from the 2d of October to the 10th of December, 1867, when the epidemic among the citizens had entirely disappeared.

I have stated in a previous report forwarded, that not a single case of yellow fever occurred among these men. The only communication they had with the men in camp was in sending a wagon twice a week with the bread baked at the post bakery and the fresh beef. The number of sick reported for the week ending September 21st was sixteen; mean strength of command, forty; these were cases of ordinary endemic types of fever. At this time some rumored cases of fever were reported as having occurred on steamboats en route up the river, but no well-authenticated cases occurred until about the 25th of September, when a case was seen on the steamboat Frolic, then engaged in transporting cattle between here and New Orleans. It was, I think, the last evening in September that I was called to see a lady in Alexandria who had had a slight chill in the afternoon, and was then suffering from fever without any peculiar symptoms noted at the time. I did not see the patient afterwards; in less than a week from this time I was myself taken sick with what proved to be yellow fever. I afterwards learned that the lady had lived in the locality where the epidemic first appeared and herself had the fever. I had not, to my knowledge, up to this time, been in any way exposed to the epidemic. I remained sick from the 2d to the 27th of October—twenty-five days. On the 27th of October a soldier of Company "D," 20th Infantry, was landed here for treatment from a steamer going up the river, and died of black vomit in six hours A similar case occurred, November 6th, which also proved fatal in four days. A fourth case was that of the commanding officer, who was taken with fever at the post November 3d, after having visited the first patient in hospital, having previous to this been with me during the whole attack. This proved a mild case and terminated favorably in ten days. The above were all the cases that occurred at the post, except one, a laborer in the quartermaster's department, who recovered in about eighteen days. The treatment was, in the commencement of the attack, to administer a laxative either of castor oil or carbonate of magnesia and cream of tartar, and usually a hot mustard foot-bath; rest, cool drinks, and abstinence from all food until after the violence of the fever subsided. After the initial stage, and when the struggle of the prostrate forces began, stimulants, tonics, and beef tea enemata were used in two cases, but did not prove satisfactory.

The progress and origin of the epidemic in the city and vicinity have been furnished by Dr. Casson, a practicing physician of good standing in Alexandria, and are as follows:

"It was during the last days of September, 1867, that I was called to see a negro on board of the steamer Frolic, running between this place and New Orleans, he having arrived here only a few days previous to my visit. The epidemic fever was prevailing in that city at the time of her departure. In consequence of the diagnosis of yellow fever the boat was ordered to leave the port, and the patient, not being put ashore, was lost sight of. About a week subsequent to this event a lad ten years of age, residing in this town, sickened and died in a few days of black vomit; this case occurred in the practice of Dr. Price, who obligingly communicated the facts in connection. Shortly after the death of this patient, another child in the same family contracted the disease and died of the vomit. It became an interesting question how to account for the appearance of infection in this family, and, on instituting a close inquiry, it turned out that the boy who first became ill had been playing and rambling over the boat Frolic as it lay moored to the landing. It seemed that other cases of fever had been observed on the same steamer on a previous trip, during which several of them proved fatal before reaching Natchitoches. About this time a young man from the country visited Alexandria and had transactions with parties connected with the family referred to; soon after his return home he also fell sick and died (as far as could be ascertained from non-medical sources) with symptoms that left no doubt of the nature of his disease. The fever from this time increased rapidly, and in three weeks the epidemic might have been considered to have reached its acme. The largest number of cases at one time under treatment being, perhaps, not far from thirty, in a population of one thousand or twelve hundred; the whole number of persons attacked is estimated at two hundred, the mortality at about fifteen per cent. Those having had the disease in previous epidemics, with scarce an exception,

enjoyed entire immunity. The treatment that appeared most successful consisted in the administration of the mildest remedies and careful watching."

Of the number of cases above reported, but about ten were colored, although the population is largely composed of freedmen. The course of the epidemic could be readily traced from point to point along the indirect mail route between this place and New Orleans, but it did not become general. A number of fatal cases occurred during the last of November and the first of December, on the return of those persons who had moved away from town to escape fever, notwithstanding the epidemic seemed long before to have almost entirely disappeared. From this circumstance the troops were kept away from town until December 10th, before which time we had several severe frosts. Many facts of interest and correct observations that could have been made at the time have necessarily been lost by not being able to note them as they occurred; but this fact seems clear, that yellow fever was brought here in some way by communication with New Orleans, where it was epidemic at the time, and, after being introduced, became epidemic here; and that persons only a few miles distant and not in communication with the infected locality were free from the disease. The cases reported and the mortality do not exceed, but perhaps fall short of, the actual number.

SHREVEPORT, LOUISIANA.

SHREVEPORT, LOUISIANA, *March* 21, 1868.

SIR: I have the honor to make the following report in reference to the late epidemic of yellow fever. The same made its appearance in this city on or about the 24th day of August, 1867. There were about 1,300 cases, and about 124 deaths; the last case occurred about the last of December, 1867. There were no cases in this camp among the troops, on account of the healthy location of the same, the cleanliness of the camp and men, good water and diet; also, the communication between the camp and the city was discontinued, and the men had no access whatever to the town during the epidemic.

Very respectfully, your obedient servant,

CHARLES W. KOECHLING,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General T. A. MCPARLIN,
Medical Director Fifth Military District, New Orleans, Louisiana.

SHIP ISLAND, MISSISSIPPI.

Extract from Monthly Report of Sick and Wounded, Ship Island, Mississippi. B. Gesner, Acting Assistant Surgeon, October, 1867.

Yellow fever made its appearance on the island on or about the 14th of September, being introduced from New Orleans, Louisiana, by a prisoner, and the guard accompanying him. The prisoner died; the guard has since recovered. The disease has not spread.

PASS CHRISTIAN AND WINCHESTER, MISSISSIPPI.

Extract from Monthly Report of Sick and Wounded of Company "K," 24th U. S. Infantry, Winchester, Mississippi. E. C. De Forrest, Acting Assistant Surgeon, October, 1867.

October 11th, 1867, Company "K," 24th U. S. Infantry, was ordered from Pass Christian, Mississippi, to Winchester, Mississippi, to prevent the further spread of yellow fever, which had already made its appearance among the troops. The first case was Lieutenant Matile, 24th U. S. Infantry; the second, Captain C. C. Hyatt, of the same regiment, who died October 5th, 1867, five days after he had taken the fever. Two enlisted men were also down with the disease at that time.

The above cases were left in care of Dr. C. B. New, at Pass Christian, Mississippi, with sufficient medical and hospital supplies, and a detail of five men as nurses; of the nurses, four took the fever, one of whom died.

The troops moved from Pass Christian to this place on the 11th instant were seemingly in good health, and continued so up to the morning of the 13th, when Private Lynch was taken with the fever, and in seventy-two hours thereafter died. The next case, Corporal Graves, who had been a volunteer attendant on Captain Hyatt during his illness, took the fever on the morning of the 14th, and at the present time is convalescing. The third case, Private Nisson, took the fever on the 15th, and died after eighty-two hours' illness. The fourth case, Lieutenant F. W. Paul, 24th U. S. Infantry, took the fever on the morning of the 23d, ten days after our arrival at this post; he is slowly convalescing with a fair prospect of recovery.

The symptoms in the cases of Privates Lynch and Nissón were about the same, being ushered in with a chill, followed by fever; pulse ranging from 120 to 130, lasting six hours before a reaction took place; soon after the febrile excitement was established there was a dry, hot skin, flushed face, brilliant and watery eye; restlessness; complaints of severe pains in the forehead, loins, and legs; breathing hurried; the stomach irritable; the epigastrium painful on pressure; great thirst; the bowels loose, with frequent discharges, (ink-colored, watery evacuations;) the tongue coated with a dark yellow fur, with red tips and edges. There was frequent vomiting—first, of a yellow matter, followed by altered blood, (black vomit;) oozing of blood from mouth and gums. At the sixtieth hour a subsidence of the fever took place, and the patients gradually went into a collapsed stage; low muttering and delirium set in, and death followed—in one case after seventy-two, in the other after eighty-two hours' illness. The symptoms in the other two cases were similar, but not of so aggravated a form as the above; the bowels were constipated, and the patients did not show a disposition to internal congestion and early prostration. The skin of the first two patients changed from a dark bronze color; in the latter cases to a bright yellow. The treatment consisted of mustard foot-baths, warm orange leaf tea, castor oil, dry cups on the stomach, followed, in the first and third cases, with blisters, cold applications to the head during the fever, lime water and milk, gum water enemata, stimulants and tonics, as the indications required.

HOWARD HOSPITAL, LAUDERDALE, MISSISSIPPI, *April* 6, 1868.

SIR: In answer to your communication of the 2d instant, requesting information in regard to the origin of yellow fever at Pass Christian last fall, I would state that the constant communication with New Orleans and Bay St. Louis, then infected points, no doubt, was the cause of the yellow fever making its appearance in that place.

I was informed by Dr. Smyth, a prominent physician at the Pass, that the first case made its appearance in one of the brothers of the christian association of that place, who had been on a visit to New Orleans about the time the yellow fever made its appearance as an epidemic.

Lieutenant Matile and Captain Hyatt were among the first that were taken with the fever. These officers exposed themselves unnecessarily to the morning air, and would remain out fishing until the hot sun drove them to the house for shelter. Lieutenant Matile was taken with the chill while out fishing, having been out since three in the morning. The chill came on about 10 a. m.

Exposure to the night air, or to the hot sun, or any excess in eating or drinking, especially alcoholic stimulants, in my opinion, predisposes a person to take the disease, all the surroundings being the same.

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

E. C. DE FORREST,
Acting Assistant Surgeon, U. S. A.

Brevet Lieutenant Colonel J. J. WOODWARD, *Assistant Surgeon, U. S. A.*

MOBILE AND MOBILE BAY.

Extract from Monthly Report of Sick and Wounded, Fort Morgan, Alabama. L. Reynolds, Acting Assistant Surgeon, August, 1867.

Yellow fever was introduced at this post from New Orleans by Lieut. J. K. Hezlep, who died here. It was communicated by him to Lieutenant Breckenridge, who shared his room, and to Dr. Reynolds, who attended him. It spread to those in immediate connection with them; from Lieutenant Breckenridge to Quartermaster Sergeant Ellmore and others, and from Dr. Reynolds to his hospital steward, his laundress, her husband, and others. A fortnight after Lieutenant Hezlep's death, Dr. Reynolds and Lieutenant Breckenridge were attacked on the same day.

[EXTRACT.]

FORT MORGAN, ALA., *September* 15, 1867.

GENERAL: I regret to inform you that we have had yellow fever at this post. A young officer, Lieutenant Hezlep, sent on a tour of inspection from New Orleans, fell sick when he arrived, and died of it August 13th. A fortnight after the disease broke out here, and nine have died of it up to the present date. * * * * * * * *

Your obedient servant,

LAWRENCE REYNOLDS,
Acting Assistant Surgeon, U. S. A.

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

POST HOSPITAL, MOBILE, ALA., *April* 9, 1868.

GENERAL: I have the honor to state that Sergeant Luther Miller, Company "H," 15th U. S. Infantry, who died at Fort Gaines, Alabama, December 1st, 1867, with yellow fever, contracted the disease in the city of Mobile during a stay of three days on court martial as witness.

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

O. L. CRAMPTON,
Acting Assistant Surgeon, U. S. A.

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

MOBILE, ALA., *September* 19, 1867.

SIR: In answer to your letter of the 2d instant, I have to report no case of yellow fever until the 17th instant, when Major Tracy, 15th U. S. Infantry, is said to have died of it. He was treated in a private hospital, and, consequently, I do not think there was any chance of its infecting the troops. The troops have been removed to the eastern shore and placed in camp. The location for the camp was neither chosen nor recommended by me. The patients remaining in the post hospital are doing well, and in no case are there any indications of yellow fever. Your instructions will be obeyed.

In answer to your question as to the manner in which my recommendations are carried out, I beg to state that, up to the present time, (i. e., to the time that Major Curtis, 15th U. S. Infantry, took command,) they have been disregarded in several instances—such as working the men in fatigue parties in the heat of the sun, &c.

I have given Dr. W. B. Hedges, Acting Assistant Surgeon, charge of the camp hospital, and, in the event of any infectious fever breaking out, have instructed him to isolate the sick, and to take every precaution to avoid its spreading or being brought to the city.

Very respectfully, your obedient servant,

H. J. PHILLIPS,
Assistant Surgeon, U. S. A.

Brevet Brigadier General J. J. MILHAU,
Medical Director Third Military District, Atlanta, Georgia.

POST HOSPITAL, MOBILE, ALA., *September* 24, 1867.

GENERAL: I have the honor to report one case of yellow fever in hospital this morning. The patient is Corporal Hubbard, Company "K," 15th U. S. Infantry.

I would state that this soldier has not been exposed in any manner to the disease; is sober and temperate, and has not been out of the city. This is the fourth day, and his condition this morning is favorable. This is the first case of the season in this hospital. The Board of Health report three cases in the city this morning.

The entire command have left the city, with the exception of thirty-six men, now in hospital.

Very respectfully, your obedient servant,

R. W. COALE,
Acting Assistant Surgeon, U. S. A.

Brevet Brigadier General J. J. MILHAU,
Medical Director Third Military District, Atlanta, Georgia.

Extract from Monthly Report of Sick and Wounded of Companies "A," "C," "G," "I," and "K," 15th U. S. Infantry, Mobile, Alabama. R. W. Coale, Acting Assistant Surgeon, September, 1867.

YELLOW FEVER: This is the first case that has presented itself among the soldiers at this post. The patient has not been exposed to the disease, is temperate and sober, and at this time (September 30th) is improving.

On the 18th instant the command was removed to Stark's landing, on the eastern shore, distant from Mobile about ten miles, and, up to this date, the health of the command has been excellent. The disease so far has not been of a violent character, and most of those attacked have recovered. As yet the Board of Health of the city of Mobile have not reported more than six deaths from yellow fever, though, to my knowledge, about thirty-five cases have occurred during September. The disease, as observed by me at Fort Morgan, Mobile bay, was of a malignant character, and life, in several instances, was destroyed in something less than seventy-two hours. I also recommended the removal of the command there to a distance of four miles from the fort, and at this time there is not a single case of yellow fever at Fort Morgan.

The disease did not originate at the fort, but was brought there on the person of an officer, and from this case the disease was communicated.

Extract from Monthly Report of Sick and Wounded of Companies "A," "C," "G," "I," and "K," 15th U. S. Infantry, Mobile, Alabama. R. W. Coale, Acting Assistant Surgeon, October, 1867.

There were eighteen cases of yellow fever reported during the month, fifteen of whom were treated at this hospital, and three died. The three other cases were treated at camp, Captain Cummings and Private Simpson having died there. Mortality 20 per cent. About one-half of the cases treated by me were mild, and lasted, on the average, about five days.

BARRANCAS, FLORIDA.

Extract from Monthly Report of Sick and Wounded, Barrancas, Florida. Acting Assistant Surgeon C. Eberhard, August, 1867.

"Private W. Snyder, Company "I," 24th Infantry, was admitted into hospital from the quartermaster's steamer Alliance, from New Orleans. He died August 25th of yellow fever."

SIR: The statements in the article on yellow fever at the naval station of Pensacola,* relative to the condition of the troops at Forts Barrancas and Pickens, are substantially correct, so far as I can ascertain. The major portion of the officers and men were removed to Fort Pickens about the 14th of August, 1867, and thus completely isolated. The remaining dozen of men were forbidden to pass into the woods between this command and the naval reserve, and, upon the occurrence of the case from New Orleans, were altogether removed from the barracks into buildings a quarter of a mile westward, adjoining Fort Barrancas. The few patients in hospital at the time were also moved out, and the rooms thoroughly cleaned. The man admitted, Private Wm. Snyder, Company "I," 24th Infantry, stated that he had been sick, and had taken medicine before leaving New Orleans, and, when seen here, made the remark himself, "It is too late now."

The removal of the men, and the avoidance in that way of a continuous exposure to infection, or of an exposure to the fermenting and decomposing products of disease, seems to have been sufficient in this case to prevent any extension of the fever.

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

W. C. MINOR,
Assistant Surgeon, and Brevet Captain, U. S. A.

Brevet Lieutenant Colonel J. J. WOODWARD, *Assistant Surgeon, U. S. A.*

U. S. NAVAL HOSPITAL, PENSACOLA, FLORIDA, *January* 9, 1868.

SIR: In compliance with your request, I herewith transmit a report of epidemic yellow fever† as it occurred on this station during August, September, and October, 1867, prepared by Acting Past Assistant Surgeon N. L. Campbell, U. S. N.

Very respectfully, &c.,

JOHN J. ABERNETHY, *Surgeon, U. S. N.*

Dr. P. J. HORWITZ, *Chief of Bureau of Medicine and Surgery,*
Navy Department, Washington, D. C.

Respectfully forwarded:

JAS. F. ARMSTRONG, *Captain Commandant.*

Report of Epidemic Yellow Fever, Naval Station, Pensacola, Florida, during 1867, *by Acting Past Assistant Surgeon N. L. Campbell, U. S. N.*

The yellow fever epidemic of 1867 will long be remembered by the survivors, both for its severity and its unusual range along the coast of the Gulf of Mexico, from Key West, Florida, to Corpus Christi, Texas, and inland to La Grange, Texas, and Memphis, Tennessee.

At Pensacola, Florida, quarantine was established May 21st, 1867, by military authority. On the 21st of June the English ship Fair Wind arrived from Jamaica, West Indies, in ballast, and, in compliance with general rules, was ordered to quarantine for ten days. She had been reported by the health officer as remarkably clean, well ventilated, and well appointed in every respect, and with no sickness whatever on board, excepting the case of the steward, who was suffering from old age and general debility. During her quarantine one man died very suddenly—reported to have complained somewhat, to have plunged overboard for a bath, and to have died very soon after of congestion; but as the health officer was satisfied that the case did not warrant further detention, and as she had been thoroughly cleansed and fumigated, she was permitted to anchor one mile off Pensacola city, July 2d, to take in a cargo of lumber. Her ballast of stone, freshly quarried from the rock at Kingston, Jamaica, was taken to fill in under and about the wharf at Pensacola, between high and low water.

In this connection it may be well to state that the daily papers contained a statement, under date of Washington, July 6th, to the effect that the United States consul at Kingston, Jamaica, under date of June 6th, had reported to the State Department the existence of yellow fever as a malignant epidemic—one-quarter of the cases fatal. Disease of a febrile nature soon manifested itself among the crew of this healthy ship, and on July 10th the Mayor of Pensacola reported to General Seymour that all the crew of the Fair Wind had been sick excepting one; that three had died, and five were then ill, but that none of the stevedores had been attacked. On the 19th of July the Mayor reported another death on board the Fair Wind, and the vessel was again ordered to quarantine.

* Phila. Medical and Surgical Reporter. Vol. xviii, p. 227. March 14, 1868.

† This interesting report has been furnished through the politeness of Surgeon P. J. Horwitz, Chief of the Bureau of Medicine and Surgery, U. S. N.

Febrile disease, of a grave character, having also appeared on board other vessels in the harbor that had been loading with lumber, much of which was covered with barnacles and grass, General Seymour, in an order of July 23d, directed two to quarantine, and two others to quarantine or to sea.

On the 24th July the schooner Texana arrived from New Orleans, where yellow fever was prevailing, and the health officer reported her health good. In a few days, however, the mate was brought from the vessel to a boarding-house in the town ill of yellow fever. And from this point the disease is said to have spread rapidly, the habitués of the house being infected, and carrying the seeds of the disease to other localities.

Prior to this an unusual number of cases of continued fever had been observed on shore; but with the natural unwillingness of a commercial community to declare itself pest-ridden, the disease was called continued fever, bilious fever, dengue or break-bone fever, red fever, Jamaica fever, &c., until the Mayor of Pensacola, in a letter of August 9th to General Seymour, officially announced the existence of yellow fever in that city, stating that the first case had been that of the mate of the Texana, then convalescent, but that two citizens had died, one on the 8th and one on the 9th, "with symptoms which leave no doubt of the character of the disease."

Upon this the garrison at Barrancas was removed to Fort Pickens, on Santa Rosa island, and all communication with that place forbidden as far as possible. General Seymour and family, with two officers and fifteen men, remained at Barrancas, and all communication with Warrington or the navy yard, less than a mile distant, was prohibited, even to the few civilians residing on the reserve at Barrancas. The mail carrier alone was permitted to go to the village.

Upon receipt of the above intelligence, as, indeed, when disease first appeared among the shipping, Captain Armstrong, commanding the United States navy yard and station some four miles west of Pensacola, had communicated with the senior medical officer, Surgeon J. J. Abernethy, and thorough surveys were made, not only of the navy yard, but of the adjoining villages of Warrington and Woolsey, to discover and, if possible, remove any cause of disease or of impairment of general health.

During the first ten days of August, 1867, there occurred at the navy yard three cases of intermittent and two cases of remittent fever, which require no further notice here than that they all progressed to recovery, excepting the case of Michael Doolin, coal-heaver of the United States steamer Tacony, admitted to hospital on August 8th with remittent fever, from which he was convalescent on the 23d. * * * * * * * * * * * *

[NOTE BY THE EDITOR.—Here the report gives a detailed history of each case, too long for publication in this work. From these histories it appears that the first case was that of Lieutenant Henry Y. Glesson, marine corps, who was attacked August 10th. The last case was a seaman of the United States steamer Glasgow, attacked October 25th.]

NUMBER OF PERSONS ATTACHED TO U. S. NAVAL STATION, PENSACOLA, FLA., AUGUST 1, 1867.

Commissioned officers, line and staff		10	
Warrant		3	
Civil		1	
Clerks		1	
	Total		15
Commissioned officers U. S. Marine Corps		4	
Non-commissioned officers, privates, &c.		125	
	Total		129
Ladies, servants, and children			17
Officers and men belonging to North Atlantic Squadron.	U. S. Steamer Tacony	140	
	U. S. Steamer Yucca	56	
	U. S. Steamer Glasgow	40	
Officers and men belonging to Naval Station	U. S. Steamer Buckthorn	16	
	U. S. Steamer Rose	13	
	Total		265
	Aggregate		426

The above constituted all residing within the precincts of the navy yard; besides these, there were two hundred and twenty others employed in the yard as clerks, mechanics, &c., but who resided in the adjoining villages of Warrington and Woolsey.

NATIVITY OF THE YELLOW FEVER PATIENTS.

United States, 96 cases, 18 deaths; Great Britain, 49 cases, 10 deaths; France, 1 case; Spain, 1 case; Germany, 12 cases, 5 deaths; Sweden, 1 case, 1 death; Sandwich Islands, 1 case. Total 161 cases, 34 deaths.

NUMBER OF CASES OF YELLOW FEVER AND OF OTHER FEVERS DURING EACH MONTH.

AUGUST.			
DISEASE.	Recovered.	Died.	Total.
Intermittent fever	16	.....	16
Remittent fever	3	.....	3
Continued fever	23	1	24
Yellow fever	57	17	74
Total	99	18	117
Percentage of cases of yellow fever..... 63.24. Percentage mortality of yellow fever cases, 22.97.			

SEPTEMBER.			
DISEASE.	Recovered.	Died.	Total.
Intermittent fever	3	.....	3
Remittent fever	.....	.....	.....
Continued fever	1	.....	1
Yellow fever	63	14	77
Total	67	14	81
Percentage of cases of yellow fever ..... 95.06. Percentage mortality of yellow fever cases, 18.18.			

OCTOBER.			
DISEASE.	Recovered.	Died.	Total.
Intermittent fever	1	.....	1
Remittent fever	.....	.....	.....
Continued fever	.....	.....	.....
Yellow fever	7	3	10
Total	8	3	11
Percentage of cases of yellow fever..... 90.90. Percentage mortality of yellow fever cases, 30.			

General aggregate of fevers of all kinds..... 209. Aggregate of yellow fever cases 161
Aggregate percentage of cases of yellow fever... 77.03. Aggregate percentage mortality of yellow fever cases, 21.11

Of the whole number of yellow fever cases, 11 were of negro blood, all of whom recovered.

Of the 426 persons recorded as in navy yard and aboard vessels, 37.79 per cent. were attacked, and 7.98 per cent. died of yellow fever.

Of the 34 fatal cases of yellow fever, 21 were distinguished as follows:

By black vomit	8
By black vomit and epistaxis	1
By black vomit, suppression of urine, and bleeding from gums	1
By black vomit and suppression of urine	1
By black vomit, suppression of urine, and epistaxis	1
By epistaxis	1
By epistaxis and bleeding from mouth	1
By epistaxis and parotitis	1
By suppression of urine	2
By parotitis	2
By cutaneous eruptions	2
Total	21

Among the recoveries, the following were distinguished:

By suppression of urine	2
By epistaxis	1
By cutaneous eruptions	4
Total	7

The number of cases of yellow fever in the adjacent villages of Warrington and Woolsey could not be ascertained, the two civilian practitioners having fallen victims to the disease; but there were twenty-four deaths from yellow fever reported to the commandant of the station; of these, ten had been employed in the navy yard.

The immunity from the prevailing epidemic enjoyed by the military at Forts Pickens and Barrancas, under the command of General Seymour, forms a notable point in medical history. From a memorandum kindly furnished by General Seymour, it appears that Barrancas, situated some three-fourths of a mile west of the navy yard, is built on a ridge of sand some twenty-five feet above tide-water, and is backed by a plain of sand at that elevation. In front is a strip of low ground only two or three feet above tide-water, very damp, wet, and even swampy. Those who have inhabited this low ground in summer have almost invariably been attacked with intermittent fever. The barrack is built some fifty feet above the plain; it is a three-story brick building, and the company occupies the upper story.

Between Barrancas and Warrington is a dense belt of woods, about one-fourth of a mile through; on all the other sides, Barrancas is quite open for long distances. The fever extended in Warrington quite to this belt of woods, several cases having been reported in the houses nearest the woods.

On the 23d of August the U. S. army transport Alliance came to Barrancas from New Orleans, where yellow fever was raging, bound to Key West and Tortugas. On board was a detachment of the 24th U. S. Infantry, escorting prisoners to the latter place. During the day Private Wm. Snyder, of Company "I," 24th U. S. Infantry, came ashore and was found at the kitchen of the commanding officer complaining of illness; was sent to the post hopital and placed in a ward among other sick. These, as well as the hospital steward and attendant, were all northern men and unacclimated. Snyder died at 1 a. m. of the 25th of malignant yellow fever, and was not buried until 11 a. m. The few men in barracks were immediately removed to Fort Barrancas, two hundred yards distant, and the hospital rooms were thoroughly fumigated. General Seymour adds: "There was no sequence to this case, and not a single case occurred in the command, which, otherwise, was never more healthy than during this summer."

As an instance, on the other hand, of the portability of the disease, I may state that a Mr. McGinn, an old resident of Warrington, who had, in previous epidemics, been thrice attacked by yellow fever, lost a member of his family in this epidemic, and removed the others to the house of a Mr. Este, some three miles west of the light-house and six miles from the navy yard; a locality hitherto deemed unusually healthy, some fifty feet above the neighboring lagoon, and with no marsh near worth notice. Here McGinn himself soon fell ill of yellow fever for the fourth time in his life, and the disease spread to his wife, to Mr. Este, his wife and child, and to five colored people living near by.

Careful examination of the meteorological records kept at the office of the naval commandant shows that the lowest thermometrical range in August was 70° Fahrenheit at 4 a. m. of the 25th and 26th; the highest, 96° Fahrenheit at 4 p. m. of the 9th. Averages, 78.6° and 89.2°. In September, the lowest was 72° at 4 a. m. of the 30th; the highest, 96° at 4 p. m. of the 29th. Averages, 77.5° and 87°. In October, the lowest was 50° at 4 a. m. of the 31st; the highest, 93° at 4 p. m. of the 22d. Averages, 68.4° and 81.8°.

During August the prevailing winds were eleven days northerly, thirteen southerly, six easterly, and one westerly. During September, eighteen days northerly, seven southerly, and five easterly. During October, twenty days northerly, two southerly, eight easterly, and one westerly. Rain fell in two days in August, five in September, and three in October.

The excessively infectious nature of the breath and of the black vomit was shown in the fatal case of M. Doolin, as well as in the statement by Doctor Drummond, that in his efforts to assist Doctor Piek in the dying moments of the latter, he received upon his garments much of the ejected matter; upon returning to his quarters the discarded things were placed in a tub full of boiling water by his servant, a middle-aged negress, native of Pensacola, who, upon inhaling the steam, fell to the ground in a state of syncope that called for free stimulation. Other cases of sickness and prostration from the breath of patients were also noticed. The writer has seen a gold stud-button worn by Mrs. S. during her fatal attack of August 31st, and it is even more discolored by the nature of the perspiration than the gold ring spoken of belonging to Dr. Murphy.*

Treatment: If the patient was seen in the stage of chill or rigors, or after the hot stage had set in—as was, indeed, the more frequent—the following was found to be the best mode of procedure: the patient was stripped, well rubbed from head to foot with dry mustard, and then put in a full length bath at his bedside, made as hot as could be borne, a blanket thrown over to retain the heat, the patient's head only appearing, and there he was kept until the pulse began to lower and he expressed relief from headache and other pains. Not only were all these effects experienced at the end of five or seven minutes, but in many cases the desire to free micturition was irresistible. The patient, when taken out of the bath, was laid upon a spare bed, quickly rubbed dry, clad in dry night clothing, and placed in his bed with plenty of blankets above and beneath him. By this time the perspiration, that had already begun in the bath, would greatly increase. While in the bath and during the sweating stage the patient partook freely of hot drinks; table tea, orange leaf tea, and the hot infusion of the horse-mint, which grows abundantly in the neighborhood, were used. Flaxseed tea was found to be as good as any other; but as the patient was apt to tire of any one drink, it was found well to have the others by way of change. At the same time, an alkaline diaphoretic seemed to be indicated. The liquor of the acetate of ammonia was given in half-ounce doses, alone or combined with fifteen minims of spirits of nitric ether, or five grains of nitrate of potash, with spirits of nitric ether every three hours; or five grains of sulphate of soda, every three hours, in flaxseed tea; or chlorate of potassa, in five-grain doses, every two or three hours, either alone or with spirits of nitric ether. This last combination was found to answer best. Some one of the above was continued until subsidence of the febrile stage.

After the patient was put to bed from the hot bath, all muscular exertion on his part was strictly forbidden as extremely detrimental, not only by deranging the bed covering and checking the perspiration, but also by exhausting his strength. Raising the head frequently to drink was tiresome, increasing headache and productive of harm. To obviate this, he was kept still and his drink administered through a tube; a common clay pipe, new and well washed, was found to answer this purpose very well. After the fever abated the sweating was allowed to subside of itself, and the bedding, &c., changed. This was found to be an important process requiring great care. It should not be performed until the fever abates and the sweating subsides. At this time the odor from the blankets saturated with perspiration is very offensive to those about the patient, and, for the first time generally, to himself. The blankets only should be removed, to be replaced instantly by others previously well warmed, as the least cooling of the patient's surface may be followed by suppression of perspiration and other serious consequences. The covering should now be sufficient to encourage gentle diaphoresis. In four or five hours after, the body clothes should be removed, the patient well rubbed with dry warm towels under the bed clothes, shifted to a clean dry bed, with warm cotton sheets and fresh body clothes put on, keeping him covered all the while. By this time the headache is, in most cases, greatly abated, although the pain of back and limbs still continues. A cathartic is generally of service now, especially if the bowels had not been moved since the seizure, as was, indeed, almost invariably the case. For this purpose, an emulsion of castor oil was found to answer best, on account of the tendency to irritability of stomach. Any further necessary purgation was generally effected by enemata. The cathartic usually brought away copious dark, offensive dejections, and relieved greatly,

* Of Dr. Murphy, the writer says, in the history of his case, that before he was attacked "his general health all this time was good, but a gold ring that he had worn for many years in this and other climates was now discolored—of a bluish tint around the edges and in the chasing; something that he had never before witnessed."—*Ed.*

if not entirely, the remaining headache and muscular pains. Quinine or mercury, in ordinary cases, were found to be productive of harm. When the pains in the muscles of the back and limbs were very severe, flannels, made as hot as the patient could bear and applied in single thickness, were found more productive of relief than aught else. Opiates were not found beneficial. After the subsidence of the febrile excitement comes a state of depression, of which the patient is not always aware, expressing himself, generally, as feeling very well. He has a return of appetite, and if left to his own guidance would, in most cases, seal his own doom. The patient was now restricted to thin corn-meal gruel and warm flaxseed tea. The process of stimulation was commenced and conducted with great care. In most cases, aromatic spirits of ammonia in half-drachm doses, with fifteen minims of spirits of nitric ether, answered well. If the patient continued to do well, he was allowed chicken tea as a common drink, with warm gruel and the ammonia mixture continued. All drinks should still be given warm. This treatment was continued for another day, aromatic sulphuric acid being sometimes given and the ammonia mixture omitted. After this, sherry wine was given in half-ounce doses three or four times a day, and soup once a day added to the diet. In most cases this was as much as could be advantageously borne until the sixth, or, as with many, the ninth day, when mush and milk in the morning, soup, roast beef, and baked potatoes at noon, and tea and toast for supper, made a very good diet, with one or two glasses of ale or porter during the day. The diet was then gradually increased in nourishment until full diet could be borne.

After running a continued course for a certain time, the fever sometimes assumed the remittent or intermittent type. In these cases, at the time of the paroxysm, a hot bath was given, and diaphoresis re-established if possible. Quinine was here found to be hurtful, although beneficial in the intermittent attacks sometimes attending convalescence.

The stage of febrile excitement was not unfrequently followed by a typhoid condition, attended with very weak digestion. This was met by muriated tincture of iron with tincture of capsicum, or citrate of quinine and iron with sherry wine, and in other cases with carbonate of ammonia and sherry, repeated hourly. Chicken tea was freely given, and was found, indeed, to answer better than beef tea.

Sometimes diarrhœa would set in about the third day. This was allowed to take its course with no further medication than free administration of aromatic spirits of ammonia. In flatulence, with colicky pains, the aromatic spirits of ammonia, in combination with compound spirits of ether and peppermint water, answered very well, with five grains of bicarbonate of soda occasionally to correct acidity, or, if there seemed to be unhealthy secretions retained in the intestines, an emulsion of castor oil added to the other treatment was beneficial.

From hiccough, relief was obtained by compound spirits of ether occasionally repeated. Delirium was treated by cold water to forehead and sinapisms over the cervical vertebræ. Some extreme cases of hyperæsthesia of the nervous system, occurring during the second week, were treated with ten grains of Dover's powder and two of camphor, repeated every three or six hours, with diffusible stimulants and supporting treatment. Suppression of urine was met by aromatic spirits of ammonia, one drachm every two hours; dry cups over region of kidneys; purgative enemata; alkaline diuretic enemata; hot bath, &c.

In black vomit, bicarbonate of soda, five grains every 3 hours, was tried in cases attended with frequent acid eructations; as was also carbonate or subnitrate of bismuth; in some cases, muriatic and aromatic sulphuric acids; in others, creasote mixture, or milk and lime water in equal parts. No case of black vomit recovered, but it is believed that the course of treatment pursued prevented many from falling into that condition. All that did occur were in debilitated constitutions. During convalescence, the condition of the digestive apparatus particularly required close attention, and a strong tendency to indigestion and to sluggishness of bowels was to be combated.

Patients frequently complained in early stage of convalescence of being tormented by voluptuous thoughts and desires. Happily the surroundings and discipline at this station prevented a yielding to temptation that would almost certainly have proved fatal; and it cannot be too strongly urged upon the junior medical officers of the Navy to forbid their convalescents from yellow fever placing themselves within such pernicious influence.

KEY WEST, FLORIDA, *October* 10, 1867.

GENERAL: Your letter of the 21st September, enclosing Circular No. 3 from your office, has been received. In compliance with said circular and letter, I herewith enclose a special report of yellow fever patients at this post for the month of September, 1867, the fever commencing here in that month.

It is almost impossible to give you the exact treatment of all the cases. Many peculiar symptoms, as they arose, according to the patient's constitution, age, &c., had to be treated accordingly, upon general principles. The large majority of cases, however, (and this was also the treatment used in the epidemic here in 1862, with very good results, considering the command were just passing through an epidemic of typhoid fever, which, on account of the climate, is peculiarly debilitating, and, consequently, gives the patient less chance to recover his strength,) were treated thus: The patient was immediately put into a strong, hot mustard bath up to his neck, remaining in that until perspiration commenced to show itself; then taken from bath, wiped dry, placed between blankets, and took from twenty-five to thirty grains of calomel. Four hours after giving the calomel, gave one ounce of castor oil, (repeated, if necessary;) after the oil had operated sufficiently, commenced giving quinine in five-grain doses every hour. This was given even if the patient had fever, which was generally the case, more or less, until he has taken almost twenty grains; then gave two-grain doses until the peculiar symptoms of the medicine showed themselves. Also, gave sweet spirits of nitre, one teaspoonful to a tablespoonful of water, every two hours or so, so as to keep up the secretion of the skin and kidneys; the abdomen was kept irritated with mustard plasters. Very light diet for several days, and the patient kept quiet—not under any circumstances allowed to converse on any subject whereby he was likely to become excited. As a general result, in my experience, the patient, in the course of thirty-six hours, will be found very comfortable. Competent nurses are absolutely necessary, to see that all orders are strictly carried out. Should the patient at times seem to be very restless and need sleep, I know of nothing better than Hoffman's Anodyne combined with tincture of valerian—say one drachm of the

latter to two ounces of the former—of which a teaspoonful may be given every hour or two until the patient becomes composed. It may be necessary, under certain circumstances, to use other remedies, and here the physician must use his judgment.

In case of symptoms of black vomit, I know of nothing better—after trying a good many other remedies—than the creasote, as generally recommended. I wish I could write to you more fully on this subject. I can, however, only report general ideas on this disease. It will be observed from the special report of yellow fever patients, that there has been but one death from yellow fever in this command, and that, I can assure you, was by his own imprudence, the disease having been nicely checked and doing well. A great many yellow fever convalescents think themselves well enough to travel around, and, when too late, a relapse sets in, and very often proves fatal.

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

W. F. CORNICK,
Acting Assistant Surgeon, U. S. A.

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

NOTE.—It may look very strange about the dose of calomel given in this disease, and the giving of quinine when the patient has a fever, particularly in such doses. No one was more opposed to such treatment than myself when I came to this section of our country, but, after quite a long experience, I believe it to be not only right, but actually necessary. It is, again, to be understood, that this would not do in all cases—I speak of the general treatment.

W. F. CORNICK,
Acting Assistant Surgeon, U. S. A.

KEY WEST, FLORIDA.

KEY WEST, FLORIDA, *January* 10, 1868.

GENERAL: I have the honor to acknowledge the receipt of your letter of the 14th of November, 1867, with reference to the yellow fever at this place during the past summer. I would state that the island of Key West was perfectly healthy up to the middle of August, when the fever made its appearance. A strict military quarantine had been kept up to that time; all vessels having any contagious or infectious diseases, or coming from an infected port, being immediately placed in quarantine, and there kept until all danger was over. With reference to the introduction of yellow fever on this island, the cause, in my opinion, is very plain. On the 31st July, 1867, the Spanish frigate Francisco de Assiz arrived from Havana, being followed, in a few hours, by the English steamer Narva. The Narva was the steamer that had the cable on board to be laid between Key West and the Island of Cuba. Immediately upon the arrival of the Spanish frigate in the harbor she was boarded by the health officer, who, upon inquiry, found that she had been lying, for some time, in the harbor of Havana, where there was a great deal of fever, and she had also had a good many cases, and was, most decidedly, an infected ship. It was the intention of the health officer to put this ship immediately in quarantine, but orders came from superior authority not to do so; consequently, she remained in the harbor amongst the shipping and in constant communication with the shore. I think there is no doubt that the yellow fever was first introduced on this island last season by this ship. Shortly after this time yellow fever made its appearance on board the Narva; she would, also, have been put in quarantine by the health officer had he not received similar instructions as to the Spanish ship. Her officers and men were brought on shore and treated in the principal hotel, Marine hospital, and private dwellings, where a good many of them died. I do not, of course, say that we would not have had yellow fever here but for the arrival of these vessels, but one thing is certain, that up to their arrival the island was perfectly healthy, and, so far as could be judged, likely to remain so. * * * * * * * * * *

I think, from what has been said, it will be seen how necessary it is to have a strict quarantine—a military one is decidedly preferable. Then the health officer, acting only under the authority of his commanding officer, would act without fear or favor. The people of the island have either had the fever or become perfectly acclimated, so they have no dread of the disease.

With reference to the discrepancies in the reports for August and September, (weekly with reference to monthly,) they will be rectified.

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

W. F. CORNICK,
Acting Assistant Surgeon, U. S. A.

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

FORT JEFFERSON, FLORIDA.

FORT JEFFERSON, FLORIDA, *April* 17, 1868.

DEAR SIR: In reply to yours of the 1st instant, received yesterday, I would state that Captain Crabb returned from Havana on the 3d or 4th of July; that on the 18th of July he was attacked with severe pains in the limbs and back, had a heavy chill, and vomited. The vomiting continued for three days, when he was able to get up and go about. Dr. Bell and Dr. Holder both told him that they thought it was a slight attack of yellow fever. He left for the north on the 3d of August. None of

those who attended him were attacked with the fever until after it had broken out in Company "K," on the opposite side of the fort, sixteen days after he left the post. I have heard of no other suspicious cases before the outbreak of the epidemic.

In the report to which you refer it should have been stated that Company "K," in which the disease broke out, contained a very large proportion of unacclimated men, probably more than two-thirds of the company being composed of recruits who arrived in May and June preceding. This fact is probably more significant than the location of the quarters of the company.

Very respectfully, your obedient servant,

A. H. SMITH,
Assistant Surgeon, and Brevet Major, U. S. A.

Brevet Lieutenant Colonel J. J. WOODWARD, *Assistant Surgeon, U. S. A.*

Report of a Board of Officers convened at Fort Jefferson, Florida, in pursuance of the following order:

SPECIAL ORDER, No. 233.

HEADQUARTERS, FORT JEFFERSON, FLORIDA,
December 14, 1867.

A board of officers will meet on the 16th of December, or as soon thereafter as may be practicable, to collect and report facts in relation to the epidemic of the year 1857, and to propose the proper means of avoiding any injury to the service by the appearance of disease in the Tortugas islands in future. The board will not be limited in its field of examination or recommendation, and will take evidence whenever it may be necessary.

Detail for the Board: Brevet Major A. H. Smith, Captain and Assistant Surgeon, U. S. A.; First Lieutenant Paul Roemer, 5th U. S. Artillery; Acting Assistant Surgeon Edward Thomas, U. S. A.

By order of Major Geo. P. Andrews:

PAUL ROEMER,
First Lieutenant 5th U. S. Artillery, Post Adjutant.

The board met December 16th, 1867, in pursuance of the above order, all the members being present, and proceeded to collate evidence from persons present during the epidemic—from the records of the post and of the hospital, and by personal inspection of the fort and its vicinity—and, as the result of these investigations, respectfully report as follows:

The subject of these investigations consists of an epidemic of yellow fever which occurred at Fort Jefferson, Dry Tortugas, Florida, beginning on the 19th of August and ending on the 14th of November, 1867, furnishing 270 cases, and occasioning 38 deaths.*

Fort Jefferson is in latitude 24° 38′ N., and longitude 82° 53′ W. It is constructed upon a coral island, 3½ feet above the level of the sea. The island contains about seven acres, nearly the whole being occupied by the fort. At the depth of two feet brackish water is obtained. The only sources of procuring fresh water are the rainfall, which averages 39.38 inches annually, and two condensers for evaporating sea water. The present available surface of roofing would yield an average of 2,500,000 gallons annually. If the buildings now in process of construction were properly roofed the yield would be about an average of 3,500,000 gallons annually. There are ample cisterns. The condensers are capable of yielding about 6,000 gallons per day.

The facilities for supplying fresh meat to the troops are exceedingly defective. The cattle for beef are usually brought from the vicinity of Tampa, Florida, and are very inferior when purchased. They are then subjected to a passage of about seven days in the hold of a schooner. On arriving, they are placed upon a small barren island in the vicinity of the fort and fed upon dry forage, to which they are wholly unaccustomed. By the time they are slaughtered, it is rarely that a full-grown bullock will dress three hundred pounds. The supply of meat, wretched as it is, is often deficient; when at the best, but three rations per man can be afforded in ten days; but it frequently happens that no fresh meat can be had for days at a time, on account of deficient transportation and the difficulty of getting estimates approved in time to take advantage of the sailing of the chartered schooners. This is owing to the isolated position of the post and the unfrequent and uncertain communication with the mainland.

The greater portion of the troops are quartered in casemates, which are very leaky and constantly damp. In that portion of the fort where the fever first appeared the walls are slimy and covered with a green mould. Notwithstanding these disadvantages, the general health of the post in past years has been remarkably good.

From January 15th, 1866, to August 15th, 1867, the mean ratio of sick per 1,000 mean strength was 66.30; among the prisoners during the same period the ratio was 70.10. The principal diseases have been intermittent and remittent fevers and diarrhœa. A considerable number of cases of dengue or break-bone fever have occurred during the summers. Although but little actual sickness occurs as a rule, yet the climate produces a remarkable deterioration of bodily strength. The superintendent of the laborers in the engineer department states that it is customary, in making up labor estimates, to allow two men for the same amount of work as is performed by one man at the north, and that in practice these estimates always fall short, three men not accomplishing more work than one man is accustomed to perform in the northern States. A remarkable example of this effect of the climate occurred here a few days ago. A piano which was handled with ease by three men in New York required fourteen to carry it here, and then they were obliged to put it down every few rods and rest.

These being the general facts bearing upon the health of the garrison, the special circumstances which may have influenced the late epidemic are the following:

* This includes prisoners and others at the post, as well as troops, and also 58 relapses.

1st. The prevalence of yellow fever in the West Indies, at Key West, and at numerous points along the Gulf coast.

2d. The arrival in May and June of about one hundred unacclimated recruits.

3d. An unusual fall of rain during the months of June, July, and August, amounting to 37.20 inches—within about two inches of the average fall for a whole year.

4th. A remarkably persistent wind from the southeast, commencing about the 20th of May and continuing, almost without intermission, until the 1st of September. This direction of the wind is very exceptional, its course being generally from the northeast.

5th. The moat along two faces of the fort was in an unfinished condition, and had filled in to such an extent that the bottom was exposed at low tide. The stench at such times is represented as being very decided.

6th. The connection of many of the privies with the sewers had become interrupted, and a great amount of filth had consequently accumulated in the vaults. Immediately preceding the outbreak of the fever an attempt was made to clean out these places, which attempt, however, was abandoned, as the resulting effluvia was so overpowering that the further prosecution of the work during the hot weather was deemed hazardous.

On the 19th of August the first case of yellow fever occurred. The patient was a member of Company "K," 5th U. S. Artillery, then quartered in casemates on the south side of the fort, overlooking the unfinished portion of the moat previously referred to. On the 20th the second case occurred, also from Company "K," while quartered in the same locality. The next three cases were also from this company. On the 25th the schooner Matchless arrived from Tampa, having on board a case of yellow fever. This was the sixth case. The patients had all been removed to the hospital on the east side of the fort, in the immediate vicinity of which Company "L" was quartered. On the 23d Company "K" was removed into casemates on the east side of the fort, adjoining Company "L." On the 25th the disease broke out in the latter company. It next appeared among the servants in the officers' quarters. Company "I," quartered in the barracks adjoining the hospital, was then attacked. Company "M," on the north side of the fort, escaped for nearly three weeks, when, on the 7th of September, thirty-five cases occurred in the company. On the 4th of September Company "L" was removed to Bird Key, three-quarters of a mile from the fort. After the removal none were attacked except those whose duties called them to the post.

On the 1st of September a hospital was established on Sand Key, two miles from the fort. A small building capable of accommodating about ten patients was already on the island, having been erected some years before as a small-pox hospital. Three hospital tents were added. Twenty-six patients were treated at this place, all of whom had taken the fever before they were sent from the fort; seven died.

On the 5th of September Brevet Major J. Sim. Smith, Assistant Surgeon, U. S. A., the medical officer of the post, was taken sick. He died on the 8th. During his illness, Dr. Mudd, a prisoner, was placed in charge of the hospital by the commanding officer, and rendered faithful and efficient service until the arrival of Dr. Whitehurst from Key West, September 7th.

On the 8th of September Company "K" was removed to Loggerhead Key and encamped. On the 21st Company "L" was, for greater convenience, transferred to the same place from Bird Key. But one case occurred at Loggerhead, while the disease continued to rage with unabated severity at the fort. This encampment was continued until the close of the epidemic. The supply of provisions and water was derived from the post. The disease reached its height about the 20th of September, and gradually declined until the last of October, the last case occurring on the 14th of November.

The total number of cases of officers, soldiers, citizens, and prisoners amounted to 270. The number of deaths was 38. The mortality among the recruits coming from the north, who had been here but a few months previous to the outbreak of the fever, was in every instance very much greater than among those who had spent a winter here.

Of the 54 prisoners at the post, 44 had been here upwards of a year. Of these one died, or 3.33 per cent. Of the other ten prisoners who had been here but a few months, one died, making ten per cent. Of the men detailed as cooks and nurses in the hospital, not one escaped the disease; four died.

We add the following table as a matter of much interest in elucidating the subject:

	ACCLIMATED.						UNACCLIMATED.					
	Present.	Taken sick.	Died.	Per cent. sick.	Per cent. of whole number present died.	Per cent. of sick died.	Present.	Taken sick.	Died.	Per cent. sick.	Per cent. of whole number present died.	Per cent. of sick died.
Officers and soldiers....	207	126	9	60.38	4.34	7.14	106	60	24	56.60	22.64	41.00
Citizens.....	11	.....	.....	.....	.....	.....	9	7	3	77.77	33.33	42.85
Prisoners, White....	30	9	1	30.00	3.33	11.11	10	10	1	100.00	10.00	10.00
Prisoners, Colored..	14	4	.....	28.57	.....	.....	.....	.....	.....	.....	.....	.....
	262	135	10	51.52	3.81	7.40	125	77	28	61.06	22.40	36.36

In addition to the above, there were 58 cases of relapse, making in all 270 cases.

The facts which have been presented to the board lead them to concur in the following recommendations:

1st. That unacclimated troops should never be sent to this post except to arrive in the months of November, December, and January.

2d. That care should be taken to have always at least one company of thoroughly acclimated troops at the post to act as cooks and nurses, and to perform fatigue duty in the event of an epidemic of yellow fever.

3d. That the barracks be finished and the men removed from their present damp and unhealthy quarters in the casemates.

4th. That the sea wall be completed as soon as possible, and the moat dredged so that the bottom will not be exposed at low tide.

5th. That the connecting sluices between the privies and the sewers be opened, and, if necessary, enlarged, and the outlets of the sewers be carried across the moat so that they will discharge outside the wall, and not, as at present, into the moat.

6th. That the temporary wooden buildings in the interior of the fort be removed.

7th. That the post hospital should not be erected on the site contemplated in the original plan, viz: within the fort, between the officers quarters and the barracks, but outside of and to the leeward of the fort, where there is very favorable ground for that purpose. As proposed in the original plan, the hospital, besides being in the closest proximity to the quarters of the officers and men, would be enclosed on three sides by lofty structures, which would completely shut out a free circulation of air.

8th. That a supply of ice, sufficient to provide for its liberal use in case of sickness, be furnished before the approach of summer. There is a well-constructed ice-house here capable of holding over 200 tons.

9th. That, in the event of the reappearance of yellow fever in the vicinity, the requisite means be on hand to construct summer quarters for the troops on one of the neighboring keys.

10th. That a small steamer should take the place of the schooners now in the employ of the Quartermaster's Department, in order that prompt communication may be had with the mainland and the procuring of supplies be facilitated.

11th. That, at least during the summer, there be two medical officers at the post and two hospital stewards.

12th. That the fact that a grave cannot be dug to a greater depth than one and a half or two feet without filling with water, renders a proper interment of the dead, in the ordinary manner, difficult, if not impossible. It is therefore recommended that vaults be built above ground, having separate cells, each of which should be large enough to contain one coffin.

These cells can be hermetically sealed, and the remains of the dead, it is believed, be better preserved for removal afterwards by relatives or friends. We would also add in the recommendation, that Loggerhead, being the most desirable key for the location of barracks, should have erected upon it one of these vaults, to contain not less than twenty cells for the reception of the remains of those dying there, and Long Key, one-quarter of a mile from the post, should have another, to contain not less than thirty cells, in which to deposit the dead from this place. The commanding officer states that these vaults can be easily and cheaply constructed.

In conclusion, we would say of the origin of the disease, that not much can be determined with certainty; but it appears, from all the evidence we have been able to collate, reasonable to believe that it originated here, was caused by deficient and bad drainage, and the consequent accumulation of a great quantity of decomposed animal and vegetable matter was aggravated, in all probability, by damp and unhealthy quarters and the universally great amount of moisture in the months of June, July, and August last.

The exemption of the troops at Loggerhead would seem to indicate that the poison was confined within the limits of the post, and at the same time throw some disproof upon the commonly advanced theory that the disease is wafted by the wind.

A. H. SMITH,
Assistant Surgeon, and Brevet Major, U. S. A.
PAUL ROEMER,
First Lieutenant Fifth U. S. Artillery.
EDWARD THOMAS,
Acting Assistant Surgeon, U. S. A., Recorder.

Extract from a Special Report on Yellow Fever at Fort Jefferson. Acting Assistant Surgeon E. Thomas, October 31, 1867.

My treatment has been substantially as follows: At the outset, a brisk cathartic, composed of ten grains of calomel, ten of jalap, and one of podophyllin. Sometimes the podophyllin was omitted, as the case seemed to require. After the bowels had been thoroughly cleansed out, the following was given: Chlorate of potassa, a drachm and a half to the ounce of water; dose, a tablespoonful, in half a tumbler of water, every four hours. The patients have been allowed all the ice and cold water that they wanted. Limeade and lemonade also has been given them ad libitum, whenever they desired it. In cases of a marked typhoid character, even in the height of the fever, ale and porter has been freely used until sweating was induced. The principal aim in the treatment has been to keep the skin moist and the kidneys active. So soon as convalescence set in, ale, porter, and milk punch were administered two, three, or four times a day, as the case required.

The underclothing of the patients has been changed twice a week; they have also, occasionally, been changed from bed to bed. Their quarters have been thoroughly cleansed, with a thin solution of chloride of lime, from time to time. The chambers, after being used, had chloride of lime sprinkled in them. In cases of delirium ice poultices to the head and mustard plasters to the stomach were used.

This has been, substantially, the treatment which I have pursued, and not a single death has occurred since its adoption.*

* Dr. Thomas' cases were those which occurred at the close of the epidemic: the October report, to which the above remarks were appended, gives thirteen cases and three deaths for the whole month.— *Ed.*

TALLAHASSEE, FLORIDA.

Extract from Weekly Report of Companies "G" and "K," 7th U. S. Infantry, Tallahassee, Florida. Acting Assistant Surgeon T. Artaud. October 5, 1867.

Private C. Brady, Company "K," 7th U. S. Infantry, died October 1st, 1867, of well characterized yellow fever; a sporadic case brought from Madison, Florida. I will remark that no yellow fever was existing at that place, nor is there any existing in this place.

[NOTE.]

SURGEON GENERAL'S OFFICE,

WASHINGTON CITY, D. C., *June* 22, 1867.

Copies of the missing reports for certain posts in Texas, (see page XIII and tables,) for the month of October, 1866, having at length been received, it has been considered proper to present the facts therein contained.

WHITE TROOPS AT CERTAIN STATIONS IN TEXAS FOR OCTOBER, 1866.

Stations	GALVESTON.		BROWNSVILLE.		AT AND NEAR SAN ANTONIO.		AUSTIN.		TOTAL.	
Mean strength	665		195		692		482			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	3	2	23	7	3	3	9	5	38	17
Cholera morbus	.....	.....	8	.....	.....	.....	3	.....	11	.....
Acute diarrhœa	61	.....	20	.....	47	.....	18	.....	146	.....
Chronic diarrhœa	6	.....	.....	.....	.....	.....	11	.....	17	.....
Acute dysentery	11	.....	.....	.....	2	.....	1	.....	14	.....
Chronic dysentery	.....	.....	.....	.....	3	.....	1	.....	4	.....
Total	81	2	51	7	55	3	43	5	230	17
All other diseases	102	3	32	.....	34	.....	75	2	243	5
Aggregate	183	5	83	7	89	3	118	7	473	22

COLORED TROOPS AT CERTAIN STATIONS IN TEXAS FOR OCTOBER, 1866.

Stations	BRAZOS SANTIAGO.		BROWNSVILLE.		INDIANOLA.		TOTAL.	
Mean strength	*		1001		448†			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	3	1	14	9	34	25	51	35
Cholera morbus	.....	.....	25	.....	.....	.....	25	.....
Acute diarrhœa	2	.....	88	.....	26	.....	116	.....
Chronic diarrhœa	2	.....	2	1	.....	.....	4	1
Acute dysentery	1	.....	20	1	7	.....	28	1
Chronic dysentery	1	.....	.....	.....	.....	.....	1	.....
Total	9	1	149	11	67	25	225	37
All other diseases	15	1	76	2	17	.....	108	3
Aggregate	24	2	225	13	84	25	333	40

* No mean strength reported.

† The figures in this column are to be added to those in the October column for Indianola on page 17.

Besides the cases included in the foregoing tables there were also during October six cases and four deaths of colored soldiers at Galveston, Texas, which were not reported at the date of publication. It also appears from a letter of Brevet Major J. F. Weeds, Assistant Surgeon, U. S. Army, dated May 20, 1867, and just received, that the case of cholera at Albuquerque, New Mexico, in October was erroneously reported among white troops. The patient was a New Mexican woman, and her disease appears, from Dr. Weeds' account, to have been sporadic cholera, induced by excesses in diet indulged in while laboring under diarrhœa.

GOVERNMENT PRINTING OFFICE.
1867.

CIRCULAR No. 5.

WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

WASHINGTON, MAY 4, 1867.

REPORT

ON

EPIDEMIC CHOLERA

IN THE ARMY OF THE UNITED STATES,

DURING THE YEAR 1866.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1867.

R35053

CIRCULAR No. 5.

WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

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.

REPORT

ON

EPIDEMIC CHOLERA

IN THE

ARMY OF THE UNITED STATES,

DURING THE YEAR 1866.

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

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 Whitemarsh 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

* 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 recuits 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

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.

* 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 diarrhœal 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 diarrhœal 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
Diarrhœal 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
Diarrhœal 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
Diarrhœal diseases	162.3	.9	185.5	1.8	131.7	.9	111.9	1.4	79.1	.8	50.0	.7	633.4	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 diarrhœal 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.

APPENDIX.

A.—STATISTICAL TABLES.

B.—EXTRACTS FROM OFFICIAL REPORTS.

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	.....	809	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	4	.....
Acute dysentery	.....	.....	19	.....	2	.....	3	.....	2	.....	1	.....	27	.....
Chronic dysentery	3	1	6	4	1	.....	1	1	.....	.....	.....	.....	11	6
Total	392	26	305	17	117	.....	128	4	28	.....	21	.....	991	47
*All other diseases	186	2	195	.....	128	6	136	4	130	1	146	1	921	14
Aggregate	578	28	500	17	245	6	264	8	158	1	167	1	1,912	61

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	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	251	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	251	30
All other diseases	122	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	122	2
Aggregate	373	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	373	32

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				1				18	7
Cholera morbus	4		19		1								24	
Acute diarrhœa	58		74		6	1			6				144	1
Chronic diarrhœa									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												1	
Cholera morbus	1												1	
Acute diarrhœa	8		12		10		1		2		3		36	
Chronic diarrhœa											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 diarrhœa	12		19										31	
Chronic diarrhœa														
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

6. NEW ORLEANS, LA.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength	1,444		914		961		923		844		931		1,003	
	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 diarrhœa	132	1	235	.....	152	1	82	.....	77	.....	53	.....	731	2
Chronic diarrhœa	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	285	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	587	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 diarrhœa	125	1	133	5	15	.....	.....	.....	50	2	18	1	341	9
Chronic diarrhœa	.....	.....	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 diarrhœa	.....	.....	10	.....	12	.....	.....	.....	40	.....	40	.....	102	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	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.

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 diarrhœa					66								66	
Chronic diarrhœa					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				670		472			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera					2	2			10	10			12	12
Cholera morbus														
Acute diarrhœa					4				58		8		70	
Chronic diarrhœa					3	1							3	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		1,049		1,002		1,267		1,281			
	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 diarrhœa			293		198		63		22		16		592	
Chronic diarrhœa			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.

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 diarrhœa					16		9		6				31	
Chronic diarrhœa														
Acute dysentery														
Chronic dysentery														
Total					17	1	12	1	6				35	2
All other diseases					47		24		13				84	
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 diarrhœa			19		23		28		7		9		86	
Chronic diarrhœa														
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 diarrhœa			28		22		16		26		11		103	
Chronic diarrhœa														
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

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

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 diarrhœa			2		3				1		10		16	
Chronic diarrhœa														
Acute dysentery			1		1		1				2		5	
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 diarrhœa					136		74		28		3		241	
Chronic diarrhœa									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	85		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		439		378			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera					21	16							21	16
Cholera morbus														
Acute diarrhœa					67		21		18		4		110	
Chronic diarrhœa					1	1	1	1					2	2
Acute dysentery					5		4		5				14	
Chronic dysentery					1				1				2	
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

21. VICKSBURG, MISS.

Months	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength			544		591		567		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 diarrhœa			100	1	62		39	1	6		6		213	2
Chronic diarrhœa			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 diarrhœa			10		20		4		3		3		40	
Chronic diarrhœa														
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 diarrhœa			103		103		70		44		51		371	
Chronic diarrhœa														
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

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 diarrhœa			14		20				7		5		46	
Chronic diarrhœa					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	2
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 diarrhœa			27		301		192		62		53		635	
Chronic diarrhœa														
Acute dysentery			2		2				1		1		6	
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					520		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 diarrhœa					14		110		105		63		292	
Chronic diarrhœa							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

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 diarrhœa			4		6	1							10	1
Chronic diarrhœa					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 diarrhœa					78		59		13		8		158	
Chronic diarrhœa							1		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 diarrhœa					45		50		15				110	
Chronic diarrhœa									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

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 diarrhœa							14	1					14	1
Chronic diarrhœa							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 diarrhœa											39		39	
Chronic diarrhœa														
Acute dysentery														
Chronic dysentery														
Total											93	27	93	27
All other diseases											22		22	
Aggregate											115	27	115	27

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	394	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 diarrhœa	897	2	1,446	6	1,548	3	972	2	648	2	443	1	5,954	16
Chronic diarrhœa	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 diarrhœa	12	.....	71	.....	52	.....	114	.....	223	1	84	.....	556	1
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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	408	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 diarrhœa	.....	.....	64	1	11	.....	4	.....	4	.....	1	.....	84	1
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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 diarrhœa	.....	.....	.....	.....	6	.....	3	.....	3	.....	1	.....	13	.....
Chronic diarrhœa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	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

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 diarrhœa			59		62		83	1	56		16		276	1
Chronic diarrhœa							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 diarrhœa					16		26		1		1		44	
Chronic diarrhœa														
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 diarrhœa			22		133				28		23		206	
Chronic diarrhœa											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.

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 diarrhœa			162		194								356	
Chronic diarrhœa														
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 diarrhœa			46										46	
Chronic diarrhœa			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 diarrhœa			2		6		9						17	
Chronic diarrhœa			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

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 diarrhœa			230		4								234	
Chronic diarrhœa														
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 diarrhœa					31								31	
Chronic diarrhœa														
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 diarrhœa					2		3		1				6	
Chronic diarrhœa														
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 diarrhœa	12	.....	656	1	517	.....	242	1	316	1	126	.....	1,869	3
Chronic diarrhœa	.....	.....	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	36	.....	20	.....	2	.....	238	1
Acute diarrhœa	909	2	2,102	7	2,065	3	1,214	3	964	3	569	1	7,823	19
Chronic diarrhœa	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

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.
WHITE TROOPS.														
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
COLORED TROOPS.														
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 diarrhœa 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-

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 diarrhœa 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 diarrhœa is treated by the administration of Squibb's mixture, paregoric, 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 uræmia 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 sacks 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.*

[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 342¼ 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 diarrhœa 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 diarrhœa are reported. These cases were mostly characterized by headache, giddiness, nausea, abdominal pains, and diarrhœic stools, which, however, were not very frequent, and as a rule were decidedly fœcal. 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 diarrhœa. 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 diarrhœas 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 diarrhœal 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.*

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 diarrhœa and no new cases during the previous night. Surgeon Heger, United States Army, reported yesterday morning, but being affected with slight diarrhœa, 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, *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 diarrhœa 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.

The disease was undoubtedly cholera Asiatica, presenting all the symptoms of a malignant form, viz., diarrhœa, 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 incipiency 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 cholerine, 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 atrophia ($\frac{1}{4}$ to $\frac{1}{15}$) 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 fœcal 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 diarrhœa 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 diarrhœa was prevailing generally, and Squibb's compound tincture of opium or diarrhœa mixture. The former was given in twenty minim 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 diarrhœa 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 diarrhœa 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 diarrhœa 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 diarrhœa 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 diarrhœa in this case continued about six hours. Two doses of the diarrhœa 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 diarrhœa occurring in warm weather. Squibb's compound tincture of opium has met all the indications afforded. For the removal of epidemic diarrhœa 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 diarrhœa 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 informaion 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 diarrhœa. 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 diarrhœa 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 diarrhœa, 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 diarrhœa 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	94

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	94

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	180

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	115

* * * * * * * * *

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 diarrhœa 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 diarrhœa, 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 cholerine, diarrhœa, 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 diarrhœa 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 morbific 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.℥ ii; chloroform, f.℥ iv; theriaca, f.℥ ii; mucil. acacia, f.℥ ii; morph. muriat., grs. v; acid hydrocyanic dil., (2 per cent.,) f. ℥ ii; ol. menth pip., gtt. vi; misce 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 diarrhœa. 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 28, 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 diarrhœa 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 diarrhœa 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 viscidity 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 28, in poor health, (having suffered for some days previously from diarrhœa,) 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 wich 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 McElray, 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 diarrhœa 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 diarrhœa 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 venders 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 Alleghanies, 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. I, 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 diarrhœa, the disease is quite manageable.

The tendency to diarrhœa 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 Ranche, 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 Merrimac 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

diarrhœa 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, diarrhœa, 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 diarrhœa, 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 diarrhœa, 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 diarrhœa, 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 diarrhœa 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 northers, 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 diarrhœa 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 diarrhœa until the disease actually appeared, when they became very numerous and severe. For the diarrhœa 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 diarrhœa 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. Diarrhœa 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 diarrhœa. In a few days after the appearance of cholera diarrhœa 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 uræmia, the secretion of urine having been interfered with in every single case. In many cases of convalescence a diarrhœa set in of frequent light-yellowish discharges, which was very readily controlled by the use of aromatic sulpuric 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 morbific 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 diarrhœa, 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 Beloit, 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 diarrhœa 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 diarrhœa in these cases. It is a fact worthy of remark that in no instance has diarrhœa, under treatment, resulted in cholera, although many times the diarrhœa 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 diarrhœa 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 diarrhœa 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 cholerine. 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, diarrhœa 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 diarrhœa before seized with the first-named disease.

By reference to the number of cases of diarrhœa 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 diarrhœa, and that, therefore, the conclusion seems proper to treat diarrhœa, 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 head quarters 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

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 employés, 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 diarrhœas 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 diarrhœa, 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 339 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 diarrhœa, 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 strong, 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 diarrhœa in nearly all his cases; and in nearly all the cases of Surgeon Vansant which were seen by myself, I know a milder diarrhœa 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 diarrhœa 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		

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	Total	17
On sixth day	4		

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	Total	47
On twentieth day	2		

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.—Sunshiny, 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, 78°; 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 diarrhœa I found Squibbs's mixture generally successful, and in the cases that recovered from the latter stages of the disease alcoholic and diffusable stimulants were freely used, and seemed to me entitled to the credit of producing beneficial results. Strychnia was a favorite remedy with Surgeon Vansant 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 diarrhœa 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 diarrhœa. 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 diarrhœa, 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 diarrhœa, 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 diffusable stimulants. I have prescribed it in cases of intermittent fever and diarrhœa 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 diarrhœa, but nearly always with paroxysms of intermittent fever, and were reported as quotidian or tertian intermittent.

Previous to the time that the diarrhœa spoken of commenced, cases of intermittent fever nearly always required an active cathartic in beginning their treatment; but at this time the diarrhœa 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 diarrhœa, 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 diarrhœa, 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 diarrhœa for several days, with intermittent fever, and had been under treatment for those diseases. After the cholera commenced there were many cases of severe diarrhœa, but without the intermittent fever in most cases. The diarrhœa was also of a different character; for, before the appearance of the epidemic, quinine would always have a good effect upon the diarrhœa; 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 diarrhœa, and apparently with very good effect. Where the diarrhœa 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 diarrhœa 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 Forth 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 diarrhœas 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 diarrhœa. 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 diarrhœa 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 diarrhœa 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 diarrhœa. 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. Th 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 steamboat* 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 diarrhœa 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 diarrhœa 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 diarrhœa. 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 diarrhœa 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 diarrhœas, 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 diarrhœas 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,

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 Sheilds, 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 diarrhœa, 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 dentoxide 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 germs 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 if 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.

It is, therefore, particularly useful for spreading over decomposing substances, and, as it were, masking them. The presence of moisture interferes greatly with its efficacy, and it is not, therefore, to be relied on where there is much water present.

A mixture of charcoal and lime in the state of powder has been used in New York and elsewhere, and has this advantage, that the hygroscopic power of the lime keeps the charcoal dry, and in a state of full activity, while the caustic oxide performs its own part as a destructive disinfectant.

During the prevalence or imminence of an epidemic of cholera the following measures would be among the most important disinfectant precautions:

To prepare a saturated solution of sulphate of iron by adding the salt to hot water, in the proportion of about five pounds to the gallon, and stirring it for some time; to this solution sulphuric acid may be added at the rate of about half an ounce to each gallon. If sulphate of iron is not on hand, common salt may be substituted, or about one pound to the gallon of chloride of zinc, which is the most powerful antiseptic of all, or either of these salts may be advantageously added to the solution of iron. This solution is to be mixed with the discharges in all cases of cholera and diarrhœa in the proportion of from five to fifteen per cent. of the amount of fluid present.

Water-closets, and all collections of matter in an advanced state of decomposition, had better be treated first with a solution of chlorinated lime, which should be rendered acid by oil of vitriol immediately before use; and then, after the lapse of a day, the solution of the sulphate of iron or of common salt should be poured on.

A solution of carbolic acid of the strength of about one per cent. should also be prepared and used on the floors and walls of privies, and wherever there is refuse matter in a tolerably dry condition.

The clothes of those coming from a suspected locality may be immediately moistened with the solution of carbolic alcohol, and afterwards be exposed to the temperature of a baker's oven, and the same treatment may be applied to the clothes of men about to be sent out from an infected locality.

Clothes soiled by choleraic discharges are to be soaked in a solution either of permanganate of potash or of chlorinated lime, or soda, before being washed.

Floors soiled in a similar manner are best treated with chlorinated soda.

Buildings in which there has been much cholera should be fumigated with sulphur or chlorine, and, if practicable, white-washed; and the ground under hospital wards may be covered with powdered lime or with the mixture of lime and charcoal, or sprinkled with a solution of carbolic acid.

The disinfecting of drinking-water requires attention. The treatment of it by permanganate of potash has been described above. The use of alum removes much of its impurity from water, reacting with the carbonate of lime generally present, and producing a gelatinous precipitate of alumina, which carries down much organic matter mechanically entangled in it.

The persalts of iron, when added to water, act in the same way, producing a precipitate of peroxide which not only acts mechanically, like alumina, but exerts an oxidizing power over the organic matter.

I have been able to render Potomac water very clear and pure by adding first a small quantity of muriated tincture of iron, and then a little carbonate of soda. The sesquioxide of iron settles to the bottom, and a little common salt remains in solution.

In all these methods of procedure, whether by permanganate, by alum, or by sesquisalts of iron, mechanical agitation is often necessary to dispose the precipitate to settle down.

Places where articles of food, and especially where meats are kept, should be, from time to time, slightly fumigated by the vapor of burning sulphur, and woollen clothing in store may be sprinkled with the solution of carbolic acid.

Very respectfully, your obedient servant,

B. F. CRAIG,
Acting Assistant Surgeon U. S. A.

Brevet Lieutenant Colonel J. J. WOODWARD,
Assistant Surgeon U. S. A.

CIRCULAR No. 6.

WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

Washington, November 1, 1865.

REPORTS

ON THE

EXTENT AND NATURE OF THE MATERIALS

AVAILABLE FOR THE PREPARATION

OF A

MEDICAL AND SURGICAL HISTORY

OF

THE REBELLION.

PRINTED FOR THE SURGEON GENERAL'S OFFICE
BY
J. B. LIPPINCOTT & CO.
PHILADELPHIA.
1866.

SURGEON GENERAL'S OFFICE,
WASHINGTON, D. C.,
November 1st, 1865.

The following Circular is published for the information of the Medical Officers of the Army.

JOSEPH K. BARNES,
SURGEON GENERAL.

CIRCULAR NO. 6.

SURGEON GENERAL'S OFFICE,
WASHINGTON, D. C.,
October 20th, 1865.

BREVET MAJOR GENERAL JOSEPH K. BARNES,
SURGEON GENERAL U. S. ARMY.

GENERAL:—

IN response to your inquiries relative to the nature, extent, and value of the surgical data that have accumulated in the department of your office under my charge, and in regard to the progress that has been made in arranging these materials, I have the honor to make the following report:

The materials in the office relating to the surgery of the late war consist of the reports of the medical officers engaged in it, and of illustrations of these reports in the shape of pathological specimens, drawings, and models. The documentary data are of three kinds: first, the numerical returns, in which the number alone of the different forms of wounds, accidents, injuries, and surgical diseases is given; secondly, what may be called the nominal returns, in which are furnished the name and military description of each patient, and the particulars of the case, with more or less of detail; and thirdly, the miscellaneous reports. To the first class belong the "classified return of wounds and injuries" which every medical officer has been required to furnish immediately after every engagement, the "tabular statement of gunshot wounds," and the portion of the "monthly report of sick and wounded" referring to surgical diseases and accidents. The second class comprises the "quarterly reports of wounded" and the "quarterly reports of surgical operations" required of all general and post hospitals, the quarterly "sanitary reports" of regimental surgeons, the "nominal lists of wounded" forwarded by medical directors after every general engagement, and extracts from "case books." In the third class are included the reports of medical directors of armies

in regard to the operations of the Medical Department, and the succor given to the wounded; reports and dissertations on new methods and modes of treatment, and modifications of surgical apparatus and appliances; pathological researches on morbid processes pertaining to surgery, as hospital gangrene, osteomyelitis, pyæmia, and the like; plans for ambulance organization, and the transportation of the wounded by land and water.

The extent of these materials is simply enormous. The returns are of as huge proportions as the armies that have been engaged in active operations for the last four years. The great body of the medical officers have made the reports required of them with commendable diligence and promptitude, and their zeal is the more deserving of praise when the engrossing nature of their field duties is considered. The result has been the accumulation of a mass of facts and observations in military surgery of unprecedented magnitude.

It is as yet impracticable to determine with accuracy the number of wounds received in action during the late war, though data for a near approximative estimate are accessible. But a comparison of a portion of the returns with the complete statistics of other armies will sufficiently indicate the vast numbers that are dealt with.

In the British Army in the Crimea, during the entire war there were 12,094 wounded and 2755 killed, or a total of 14,849.*

In the French Army in the Crimea, of a total effective force of 309,268, according to the report recently made by M. Chenu, there were 39,868 wounded and 8250 killed, or a total of 48,118, although in his report of injuries of different regions M. Chenu records but 26,681 cases.†

In the late war, the monthly reports from a little more than half the regiments in the field give, for the year ending June 30th, 1862, an aggregate of 17,496 gunshot wounds. The reports from rather more than three-fourths of the regiments, for the year ending June 30th, 1863, give a total of 55,974 gunshot wounds. The battle-field lists of wounded for the years 1864–65 include over 114,000 names. But these returns are to be completed by collating with them the reports of general hospitals, where many wounded were received whose names the recorders of field hospitals or regimental medical officers failed to obtain, and by adding the names of those killed in battle.

In comparing the numbers of cases of some important injury, as, for example, gunshot fractures of the femur, it is found that in the French Crimean Army there were 459 such injuries, and in the English Army 194, while over 5000 such cases have been reported to this office. Or if one of the major operations is selected for comparison, as excision of the head of the humerus, the Crimean returns give 16 of these excisions in the British, and 38 in the French Army, but the registers of this office contain the detailed histories of 575 such operations.

---

* Medical and Surgical History of the British Army which served in the Crimea, during the war against Russia, in the years 1854, 1855, 1856. London, 1858. Vol. ii. p. 259.

† Rapport au Conseil de Santé des Armeés sur les Résultats du Service Médico-Chirurgical aux Ambulances de Crimée et aux Hôpitaux Militaires Français en Turquie pendant la Campagne d'Orient en 1854, 1855, 1856. Par J. C. Chenu, D.M., Médecin Principal, Bibliothécaire de l'École Imperiale de Médecine Militaire, Officier de la Légion d'Honneur, etc. Paris: Victor Masson et Fils, 1865.

The surgical specimens of the Army Medical Museum number 5480; and not only in specimens of recent injuries, but in illustrations of reparative processes after injury, of morbid processes, of the results of operations, and of surgical apparatus and appliances, this institution is richer, numerically at least, than the medico-military museums of France or Great Britain.

The value of these materials has been foreshadowed in referring to their nature and extent. It may be emphatically said that they throw much light on some of the great moot points in surgery; that they comprise on some subjects, as, for example, on the question of the propriety of excising the head of the femur for injury, fuller data than are now extant in the entire range of surgical literature; and that it may be hoped, without temerity, that they include the elements for the solution of many grave surgical problems.

To render intelligible an account of the progress that has been made in collating and classifying the surgical records of this office, and the collections of the Army Medical Museum, it is requisite to review briefly the measures that have been adopted by the Medical Department to gather and preserve the observations of the medical officers of the Army, and to compile, in an available form, the results of their inquiries and of their vast surgical experience in the late war.

In 1861, and during the first eight months of 1862, the "case book" and "register," made obligatory by regulations, the monthly and quarterly reports of sick and wounded, and the sanitary reports required of regimental surgeons, and of the surgeons in charge of hospitals, were the channels through which medical officers communicated such professional facts as they desired to place on record. These sources of information have been decried in some quarters, and in an official report to this office,* in July, 1863, it was declared that previous to September, 1862, "the surgical statistics of the war were absolutely worthless," and that "the only information procurable is such as can be derived from the examination of a mass of reports, all of which present merely certain figures under the vague and unsatisfactory heading, 'Vulnus sclopeticum.'"

That the surgical records of a period including the casualties of the first and second battles of Manassas, the battles on the Chickahominy, Ball's Bluff, Cedar Mountain, and Shiloh, and in which the returns from about one-half of the regiments in the field give an aggregate of over thirty thousand cases of gunshot injury, were deserving of such emphatic censure would be a source of grave regret, and it is gratifying to be able to state that a careful re-examination of these records proves that they contain a large amount of material that is far from valueless. The reports of the Washington, Fort Monroe, Baltimore, and Philadelphia hospitals of the treatment of the wounded from the Peninsular campaign, are replete with interest; the reports of the hospitals at Alexandria give voluminous materials in regard to the wounded from Cedar Mountain and the second Bull Run. The surgical records of the Fort Donelson campaign are very complete. The returns of the casualties incurred in the operations in North Carolina are satisfactory. The extracts from the case books of Surgeons Page and Clements, and Assistant Surgeons Peters and Billings, of the Army, and of Sur-

* Consolidated Statement of Gunshot Wounds. Washington, July 1st, 1863. Octavo, pp. 11.

geons Neill, Bontecou, and Bently, of the Volunteers, give a multitude of observations that throw light on some of the most important subjects in military surgery.

On May 21st, 1862, it was enjoined upon medical officers, by a circular order from the Surgeon General's Office, to enter upon the monthly reports details in regard to the surgical cases that came under their care, and to forward pathological specimens to the Surgeon General's Office, with the view to the establishment of an Army Medical Museum.

In June, 1862, a "tabular statement of gunshot wounds" was appended to the monthly report of sick and wounded. A consolidation of these tables for the months of September, October, November, and December, 1862, was published. The tabular statements of the first two quarters of 1863 have been consolidated also, but it has not been deemed expedient to publish them, because materials are on hand in which fewer sources of error exist.

On March 25th, 1863, Circular No. 4, of the Surgeon General's Office, established the "classified return of killed and wounded in battle."

On November 4th, 1863, by General Order 355, War Department, medical directors of armies in the field were directed to forward to this office duplicates of their reports of killed and wounded; and, in promulgating this order, you instructed medical directors to detail suitable officers to collate and prepare all obtainable statistics and data in connection with past or future operations in the field that might be useful in the accurate compilation of the Medical and Surgical History of the War, and you directed the attention of all medical officers to this subject, and urged their co-operation in the work.

Circular 26, of November 26th, 1863, S. G. O., called the attention of medical officers in charge of general hospitals to the importance of preserving representations of the results of surgical operations for the Army Medical Museum.

It was found that the details in regard to wounds, accidents, and injuries, inserted in the monthly and quarterly reports of sick and wounded, were insufficient, and that, although the defects in the reports were supplied by those officers who diligently recorded their cases in the registers and case books, yet such fidelity was not universal, and the histories of many cases were meagre or imperfect, or omitted altogether. It was considered that the register in use was too bulky for field service, and too small for the requirements of general hospitals. A board of medical officers was accordingly directed to recommend a new form of register. The recommendations of the board were approved, and small portable registers were issued to medical officers in the field, while to each general hospital two large folio volumes were distributed, one as a register of sick and wounded, the other as a register of surgical operations. These registers contained minute directions as to the form in which cases should be entered under appropriate headings. The form of the register of sick and wounded is illustrated in the portion of this report that refers to injuries of the head, and the form of the register of surgical operations is given in connection with the subject of excisions of the head of the femur. To assist in the compilation of these registers, a new form of bed-card was adopted. Blank forms of quarterly reports of wounded and of surgical operations corresponding with the registers were prepared, and, on December 26th, 1863, by a special circular from this office, the officers in charge of general hospitals were

required to fill up these forms for the months of October, November, and December, 1863. In January, 1864, the new registers were introduced in all the general hospitals, the "consolidated statement of gunshot wounds" was discontinued, and a quarterly transcript from the registers of all cases of wounds or of operations was required.

The new system has been found to work well, and the surgical records of the last quarter of 1863, and for 1864–65, are believed to possess a higher degree of statistical accuracy than has heretofore been attained.

Early in 1864, the new forms of reports of wounds and operations began to arrive at this office, and the work of transcribing and classifying their contents began. The cases of wounds were recorded in ten books, the new hospital registers being used for this purpose. The classification was as follows: nine volumes of gunshot injuries, viz.: 1. Wounds of the Head and Face. 2. Wounds of the Neck and Chest. 3. Wounds of the Abdomen, Back, and Spine. 4. Wounds of the Perineum and Genito-Urinary Organs. 5. Fractures of the Upper Extremities. 6. Fractures of the Lower Extremities. 7. Flesh Wounds of the Upper Extremities. 8. Flesh Wounds of the Lower Extremities. 9. Wounds of Arteries, Veins, and Nerves; and a tenth volume embracing Sword, Bayonet, and Miscellaneous Wounds. The cases of operations were recorded in five books, viz.: 1. Amputations in the Continuity. 2. Amputations in the Contiguity. 3. Excisions. 4. Ligations. 5. Miscellaneous Operations. On September 1st, 1864, there had been transcribed upon these registers the histories of 30,435 wounds, and of 1179 operations.

It was objected to this mode of registration, that injuries of the gravest and most trivial nature were confounded, and that the great mass of materials contained in the special reports, which medical officers had been encouraged to forward, was entirely omitted from the records. The least important cases received as much attention as the most serious, or even more, because the patients with trifling wounds were more likely to be transferred from hospital to hospital, and their histories were traced with greater difficulty. Moreover, the registers, though well adapted to the requirements of hospitals, were unsuitable for permanent records, the space being inadequate for the requisite details of important cases, or for summaries of the treatment and results in cases protracted through several quarters.

It was therefore determined that an effort should be made to arrange the records in a form more convenient for reference and study. In the first place, the early returns of the war were examined, and cases of the more important injuries were gleaned from them, and tabulated upon the new form of surgical reports. This work was of necessity performed by medical officers, or by clerks possessing a competent share of surgical information. In October, 1864, suitable books of record having been procured, the task of revising the surgical records began. It was decided to make numerous subdivisions, and, while avoiding impracticable refinements, to group together similar classes of injuries. On the new registers were entered, in the first place, the cases extracted from the early reports. Then the registers in use were examined, and the category in which each case should be placed was indicated; or, if from lack of precision in the report this was impossible, additional information was sought from the source from which the report had originated. Thus the cases recorded in the register of gunshot wounds of the head and face were distributed in six registers, viz.: those

of Fractures of the Cranium, of Fractures of the Bones of the Face, of Fractures of the Vertebræ, of Scalp Wounds, of Flesh Wounds of the Face, and of Flesh Wounds of the Neck. Especial attention was given to collecting all the information on file in the office in relation to gunshot wounds of the three great cavities, gunshot fractures of the femur, and the less common surgical operations. The histories of several thousand specimens at the Army Medical Museum, that had been forwarded prior to the adoption of the new system of reports, were tabulated upon the proper forms and transcribed upon the records; and, on the other hand, the records were found to furnish histories for many later specimens that had been forwarded without memoranda. An endeavor was made to co-ordinate and harmonize these data.

The following classification of wounds and their results and of operations was finally adopted. It is less elaborate than that employed in the British statistics of the surgery in the Crimea, and more detailed than that followed by M. Chenu, in the French surgical report of the Crimean war. The appended figures give the number of cases of each class that were revised and corrected upon the new registers on September 30th, 1865.

Classification of Wounds and Injuries, and their Results, followed in the Division of Surgical Records S. G. O.		*Classification of Surgical Operations followed in the Division of Surgical Records S. G. O.*	
Gunshot Fractures and Injuries of the Cranium	1108	Amputations of the Fingers	1849
Gunshot Fractures of the Bones of the Face	1579	Amputations at the Wrist-Joint	46
Gunshot Fractures of the Spine, not involving the Chest or Abdomen	187	Amputations of the Forearm	992
		Amputations at the Elbow-Joint	19
Gunshot Fractures of the Ribs, without injury of the Thoracic or Abdominal Viscera	180	Amputations of the Arm	2706
		Amputations at the Shoulder-Joint	437
Gunshot Fractures of the Pelvis, not involving the Peritoneal Cavity	397	Amputations of the Toes	802
		Amputations of the Foot (Partial)	160
Gunshot Fractures of the Scapula and Clavicle, not implicating the Thoracic Cavity	389	Amputations at the Ankle-Joint	73
		Amputations of the Leg	3014
Gunshot Fractures of the Humerus	2408	Amputations at the Knee-Joint	132
Gunshot Fractures of the Radius and Ulna	785	Amputations of the Thigh	2984
Gunshot Fractures of the Carpus and Metacarpus	790	Amputations at the Hip-Joint	21
Gunshot Fractures of the Femur	1957	Excisions of the Head of the Humerus	575
Gunshot Fractures of the Patella and Knee-Joint	1220	Excisions of the Elbow	315
Gunshot Fractures of the Tibia and Fibula	1056	Excisions of the Wrist	34
Gunshot Fractures of the Tarsus and Metatarsus	629	Excisions of the Ankle	22
Gunshot Penetrating Wounds of the Chest, and injuries implicating the Thoracic Viscera	2303	Excisions in the Continuity of the Upper Extremities: Shaft of Humerus	695
		Radius	
Gunshot Penetrating Wounds of the Abdomen, and injuries involving the Abdominal Viscera	565	Ulna	
		Radius and Ulna	
Gunshot Scalp Wounds	3942	Excisions of the Shafts of the Tibia and Fibula: Tibia	220
Gunshot Flesh Wounds of the Face	2588	Fibula	
Gunshot Wounds of the Neck	1329	Tibia and Fibula	
Gunshot Wounds of the Thoracic Parietes	4759	Excisions of the Knee	11
Gunshot Wounds of the Back	5195	Excisions of the Shaft of the Femur	68
Gunshot Wounds of the Abdominal Parietes	2181	Excisions of the Head of the Femur	32
Gunshot Wounds of the Genito-Urinary Organs	468	Excisions of Bones of the Face or Trunk	101
Gunshot Wounds of the Upper Extremities	21,248	Trephining	221
Gunshot Wounds of the Lower Extremities	25,152	Ligations of Arteries	404
Gunshot Wounds of Arteries	44	Extractions of Foreign Bodies	726
Gunshot Wounds of Veins	3	Operations for Surgical Diseases	443
Gunshot Wounds of Nerves	76	Operations not included in other categories	23
Sabre Wounds	106		
Bayonet Wounds	143		
Simple Fractures, and Miscellaneous Wounds and Injuries	2883		
Cases of Tetanus	363		
Cases of Secondary Hæmorrhage	1035		
Cases of Pyæmia	754		
Total	87,822	Total	17,125

Some observations on each of these classes will be offered in another portion of this report.

The several circulars requesting medical officers to forward preparations to the Army Medical Museum met with very general and liberal responses, and, in January, 1863, a numerical list of 1248 surgical specimens was published by this office. Shortly afterwards, a suitable building was procured, and cases were erected in it for the reception of specimens. Several artists were engaged: a colorist to prepare illustrations of surgical pathology and representations of remarkable injuries; a draughtsman to make maps and plans; and two engravers. The requisite workshops were connected with the Museum. A medical officer was detailed to describe and classify the preparations. In short, this branch of the office was rapidly augmenting in importance. At the end of 1864, the number of specimens had quadrupled. Among the later specimens a large proportion of illustrations of reparative and morbid processes and of the results of operations were included. A valuable collection of drawings had been accumulated; draughtsmen having been sent to battle-fields and hospitals to portray the effects of recent wounds, or the results of surgery. A photograph gallery was now established at the Museum. Typical specimens were reproduced, and the photographs, accompanied by brief printed histories, were distributed to medical directors, to be shown to the medical officers serving with them, in order that the knowledge to be obtained from a study of these instructive examples might be generally disseminated. Other preparations were photographed for the use of the engravers. Many of them are reproduced in this report. Numerous patients in hospitals were photographed, and the Museum now possesses four quarto volumes, with over a thousand photographic representations of wounded or mutilated men. Meanwhile the work of describing and classifying the collections at the Museum has been steadily pursued, and the descriptive catalogue is now nearly ready for publication.

To state, then, in brief, what the records of the surgery of the late war are, and what progress has been made in their arrangement, over 40,000 monthly regimental reports of sick and wounded are on file, which furnish, under Class V.,* the total number of wounds, accidents, and injuries in the army, and the resulting mortality, as ascertained by the regimental medical officers, and which, having served their purpose of informing military commanders, month by month, of the extent of the losses in their commands, by the casualties of war, are now available for estimating the entire losses of the army from diseases and wounds. These reports have been consolidated for the first two years of the war and for the greater portion of the third year. But, as a certain number of regimental medical officers failed to make the required reports, it is necessary to correct these results by other numerical returns. Prior to September, 1862, these are only to be sought in special reports and case books of hospitals, and in the reports by medical directors of battles and minor engagements. It is found that these supply the deficiencies of the regimental returns to a satisfactory degree. For the latter part of 1862, and the whole of 1863, the "tabular statements of gunshot wounds" give the number of such injuries, separated according to regions, and the

* The form of the Report of Sick and Wounded being printed in the accompanying Report on the Medical Statistics of the War, it is not inserted here.

number of operations to which they gave rise. These tabular statements have been consolidated for the entire period, and the results for 1862 have been published. After March, 1863, consolidated classified returns of wounds and injuries were rendered, after every engagement, by the medical directors of armies or detached commands. This series is very complete. It serves as a check upon the monthly reports, and as a basis for estimating the frequency and fatality of wounds according to regions, and the total losses of the army in killed and wounded for the period covered by the returns. These results are not yet worked out, although satisfactory progress has been made towards their attainment. Throughout the war, many medical directors had transmitted to this office nominal lists of the wounded in battle; but after November 4th, 1863, this was made obligatory. After October 1st, 1863, all general hospitals reported by name all wounded men received, and gave full details of their injuries. From these two sources nearly complete lists of the wounded for the last two years of the war have been procured; for the names of those who died before reaching the base or general hospitals are found on the battle-field casualty lists. The progress that has been made in classifying and collating these returns has been already indicated. It will appear, hereafter, that the additional information afforded by case books and special reports has not been neglected.

The formal reports of medical directors of armies give a general view of the operations of the Medical Department. For the Army of the Potomac, the reports of Medical Directors Tripler, Letterman, and McParlin furnish a connected narrative of the services rendered by the medical staff. For the Western armies, the reports of Medical Directors McDougall, Murray, Cooper, Perin, Moore, and Hewit afford similar information. These papers will guide the future historiographer of the surgery of the war, and enable him to put in evidence the immensity of the task that devolved on the Medical Department, and to vindicate its achievements, in showing the extent of the succor given to the wounded in despite of almost incredible obstacles. Besides these authoritative documents, there are on file in the office, to serve as supplementary reports, individual narratives of observations in active service from each member of the regular or volunteer medical staff. The remaining papers for reference are the reports of boards on surgical improvements and appliances, or methods of transport for the wounded; 17,000 descriptive lists of surgical cases; 4200 reports from the manufacturers of artificial limbs of cases of recovery after amputation; and the surgical essays and dissertations that have been contributed. All of these have either been bound, or indexed and filed in a convenient and accessible form. Lastly, the great treasures of the Army Medical Museum, comprising over five thousand illustrations of military surgery, have been so far classified and arranged as to be available for scientific inquiry.

ON SPECIAL WOUNDS AND INJURIES.

It is now proposed to review briefly the records of special wounds and injuries, of some of their complications, and of the operations which they have rendered necessary.

GUNSHOT INJURIES OF THE HEAD.

In this important class of injuries, the utmost pains has been taken to secure completeness and accuracy in the records. The registers have been copied by experienced clerks, and have been supervised by a medical officer. Exclusive reliance has not been placed upon the field and hospital reports; but in a large proportion of cases, specific inquiries in regard to the extent and results of individual injuries have been made by letter.

All, or nearly all, cases of gunshot injuries of the head that have been reported to the office from the commencement of the war to October 1st, 1864, have been entered in the records. They number 5046, and have been recorded in two classes: first, the gunshot fractures and injuries of the cranium, including the perforating and penetrating and depressed fractures, the fractures without known depression, and the contusions of the skull resulting in lesions of the encephalon; and, secondly, the simple contusions and flesh wounds of the scalp.

It is quite possible now to establish subdivisions in the first class; but to have attempted this heretofore, would have been premature, and likely to produce confusion.

In the first class 1104 cases are recorded. Of 704 of them, of which the results have been ascertained, 505 died and 199 recovered. In 107 of these terminated cases the operation of trephining was performed, of which 60 died and 47 recovered. In 114 cases fragments of bone or of foreign substances were removed by the elevator or forceps, without the use of the trephine; and of these 61 died and 53 recovered. When operative procedures were instituted, the recoveries were 45·3 per cent. But it must be apprehended that this favorable exhibit will be materially modified when a larger number of results are ascertained, and that a great proportion of the field operations of trephining, in which the results are stated to be undetermined, were lost sight of, and terminated fatally. In the 483 cases treated by expectancy, the ratio of recovery is only 20·5 per cent. But the latter group of cases includes nearly all of the penetrating and perforating fractures, and it would be unwise to base on these figures an argument in favor of operative interference.

The gunshot contusions and wounds of the scalp that have been entered on the records number 3942, of which 103 terminated fatally. It is altogether probable that in all of these fatal cases some undiscovered injury was done to the cranium or its contents; or that the pericranium was removed, and death of bone ensued, with consecutive lesions of the encephalon. The histories of many of these cases are now under investigation. So far as ascertained, the fatal results have depended upon concussion or compression of the brain, or upon the formation of abscesses in the liver or lungs, in

consequence of inflammation in the veins of the diploe. Compression has resulted either from extravasation of blood, or inflammation of the brain or its membranes, or from suppuration. The following is an example of a scalp wound, followed by inflammation of bone and meningitis:

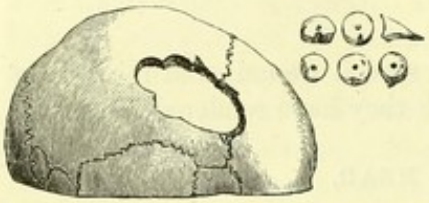


FIG. 1.—Section of a cranium, exhibiting five trephine perforations for the evacuation of pus, the result of a gunshot contusion of the right parietal. *Spec.* 2000, A. M. M.

Private Joseph R——, Co. E, 151st New York Vols., received, in a reconnoissance near the Rapidan, November 27th, 1863, a gunshot wound of the scalp. The nature of the missile was unknown. The patient was removed to Fairfax Seminary General Hospital near Alexandria. There were no cerebral symptoms at the time of his admission, and it was hoped that the pericranium had escaped uninjured. He was up, and apparently well on December 13th, 1863, when he was suddenly seized with convulsions, which were followed by coma. Surgeon D. P. Smith, U. S. Vols., laid bare the calvaria at the seat of injury, and finding the bone diseased, applied the trephine. Matter was found immediately beneath the bone and oozing from the diploe. It was thought expedient to make five perforations with the trephine, in order to remove the diseased bone and to give free exit to pus. Convulsions did not recur, but the comatose condition continued, and the case terminated fatally twelve hours after the operation. The autopsy revealed diffuse inflammation of the arachnoid and of the dura mater.

The foregoing case illustrates the fallacy of Pott's views in relation to trephining for pus under the skull-cap; and yet, under such circumstances, the best modern authorities advise the use of the trephine as affording the patient the only chance of recovery. The records attest how slight this chance is, and corroborate the observation of Mr. Hewett, that "the successful issue of a case of trephining for matter between the bone and the dura mater is almost unknown to surgeons of our own time."*

The Army Medical Museum furnishes very ample illustrations of almost every variety of gunshot injury of the skull and its contents. The number of osteological specimens relating to this class of injuries is 246, of wet preparations 22, of drawings, photographs, engravings, and plaster casts 97.

There are 22 specimens of gunshot contusion of the cranium. In these, either necrosis has taken place, with exfoliation of the external table only, or of the entire thickness of the bone, or else inflammatory suppuration has occurred in the diploe or between the skull and dura mater.

The Museum possesses eight examples of that rare and interesting variety of gunshot fracture of the cranium, in which the external table is unbroken, while the vitreous table is fissured and sometimes depressed. One of the most perfect of these specimens (No. 1568, A. M. M.) is figured in No. 94, Photographic Series, S. G. O. An abstract of the case is subjoined:

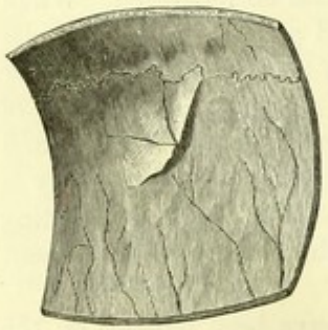


FIG. 2.—Section of skull-cap, exhibiting a depressed fracture of the vitreous table. *Spec.* 1568, A. M. M.

Private David P——, Co. C, 35th Wisconsin Vols., was wounded at Tupelo, Mississippi, July 18th, 1864, by a musket-ball, which struck the skull obliquely, and apparently inflicted a scalp wound merely, between the sagittal suture and the left parietal protuberance. There were no signs of cerebral disturbance. The wound was dressed simply, and the patient was conveyed to Memphis, Tennessee, and admitted into the Adams U. S. General Hospital on July 23d. He was then perfectly rational and free from head symptoms. Two days subsequently, indications of compression of the brain were observed, and on the afternoon of the 25th they had rapidly become aggravated. The pulse was slow, the respiration labored, the pupils dilated, the sphincters relaxed. A very careful exploration of the wound was made, but, of course, no cranial fracture could be detected. The treatment was limited to cold applications to the head, scarified cups to the nucha, and brisk purging. On the 26th, the patient gradually became comatose. The discharges from the bowels and bladder were involuntary.

* A System of Surgery, Theoretical and Practical, in treatises by various authors, edited by T. Holmes, M.A. Cantab. London, 1861. Vol. ii. p. 101.

The patient continued to sink on the 27th, and died at 1 A.M. on the 28th of July. At the autopsy the internal table of the left parietal was found to be fractured and depressed at a point corresponding with the wound in the scalp. The dura mater was wounded, and there was a large abscess in the left cerebral hemisphere.



FIG. 3.—Exterior view of the foregoing specimen.

In a specimen which is believed to be unique, without any apparent lesion of the external table, a fragment of the vitreous plate of the frontal bone was found to be completely detached and depressed upon the dura mater. The history in this case is unfortunately imperfect.

Private A—— L——, Co. C, 78th New York Vols., was wounded by a conoidal musket-ball, at the battle of the Wilderness, May 6th, 1864, and entered Armory Square Hospital, at Washington, on May 12th. He was in a comatose condition when admitted, and died on May 24th, eighteen days after receiving the injury. No further particulars of the case could be obtained. At the autopsy a fracture was discovered of the inner table of the frontal bone, near the coronal suture, to the left of the median line. There was no solution of continuity in the outer table; but it was softened where the pericranium was destroyed by the ball. A fragment, an inch and a half in length and half an inch broad, was completely detached from the vitreous table. The specimen was forwarded by Surgeon D. W. Bliss, U. S. Vols.

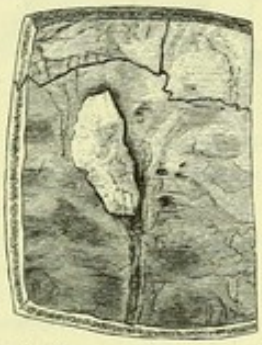


FIG. 4.—Fracture of the vitreous table of the frontal bone, without fracture of the external table. *Spec.* 2313, A. M. M.

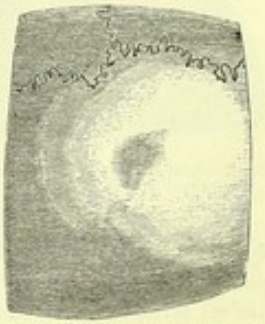


FIG. 5.—Exterior view of the foregoing specimen.

In a case which was observed by Surgeon Bontecou, U. S. V., who had examined the specimens above referred to, the probability of a depression of the vitreous table was inferred, and the diagnosis was verified, during life, by the application of the trephine. Unhappily, an abscess had formed in the brain, and the operation, though performed as soon as evidence of compression existed, was too late to save the patient.

Private D—— S——, Co. E, 2d Virginia Cavalry, aged twenty-one, was wounded at Appomattox Court House, April 6th, 1865, and admitted to Harewood Hospital, at Washington, on April 19th, with a gunshot wound of the scalp, just below the coronal suture. The bone was denuded of its pericranium, but there was no apparent fracture. Prior to his admission, the patient had chills, which recurred at intervals of twelve hours, until April 25th, quinia having no appreciable influence upon the paroxysms. There was no pain in the head nor disturbance of the cerebral faculties until April 26th. On the 25th, inflammation of the lower lobe of the right lung was observed, and on the 26th, there was endocarditis. At 10 P.M. of the 26th, the patient became unconscious. Shortly afterwards he was trephined. When the external table was passed, pus exuded from the cells of the diploe. A depressed fracture of the inner table was discovered, and the detached fragments were removed. The patient did not arouse from his comatose state, and died the next morning, April 27th, 1865. A photograph of this patient, prior to the operation, was preserved at the Museum. (Photo. Surg. Cases, vol. i. No. 58.)

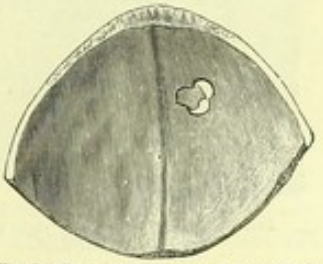


FIG. 6.—Section of cranium, showing a depressed fracture of the vitreous table. There was a contusion only of the outer table. *Spec.* 4344, A. M. M.

Specimens 3639, 3406, 622, 1922, and 646, A. M. M., afford other examples of this rare form of injury, to which S. Cooper,* Guthrie,† Hennen,‡ Hewett,§ Williamson,‖ and Legouest¶ allude, illustrating their observations by a case examined by Mr. Dean, of Cambridgeshire, a specimen in the Dupuytren Museum, which is figured in M. Legouest's work, and specimen No. 2893 of the Netley Collection.

---

* S. Cooper, Dictionary of Practical Surgery.

† Guthrie, Commentaries, paragraph 262.

‡ Hennen, Military Surgery, p. 326, ed. 1829.

§ Holmes' System of Surgery, vol. ii. p. 114.

‖ Williamson, Military Surgery, pp. 29, 30.

¶ Legouest, Traité de Chirurgie d'Armée, p. 283. See also Compendium de Chirurgie, t. ii. p. 573.

It is believed that this accident results, in most instances, from a small projectile striking the cranium very obliquely, or possibly, in some cases, from a comparatively slight blow from a body with a large plane surface.

Closely allied, clinically, to the foregoing cases are those in which a ball produces linear fissure of the external table with displacement of the inner table. Specimen No. 24, of the Army Medical Museum, affords an excellent illustration. The following is an abstract of the case:

Private M. L. H——, Co. E, 21st Virginia (Rebel) Regiment, aged twenty years, was wounded and taken prisoner in one of the later engagements prior to the capitulation of the Army of Northern Virginia, and was admitted into the Lincoln General Hospital, at Washington, on March 25th, 1865, with a wound over the left supra-orbital ridge, inflicted apparently by a glancing musket-ball. There were no cerebral symptoms when the patient was admitted, and he seemed to be doing well for several days, being quite free from pain or any febrile movement. The pulse was normal and the bowels in good condition. On April 1st, he complained of a dull deep-seated pain over the left eye. Later in the day he was feverish and restless, his countenance was pale, and his pulse slow and weak. On April 2d, he failed rapidly. On the night of the 3d, he was delirious. On the 4th, there was violent raving, which continued until his death, on the afternoon of April 5th, 1865. At the post-mortem examination, a fissure was found extending into the right orbit, and upwards beyond the left frontal prominence. The vitreous table beneath was largely depressed. There was a small abscess in the anterior lobe of the left cerebral hemisphere.



Fig. 7.—Section of the frontal bone exhibiting a fissure over the left supra-orbital region. *Spec.* 24, A. M. M.



Fig. 8.—Internal view of the foregoing specimen, showing the extensive splintering of the vitreous table.

Of fractures without depression, the cases in which the mastoid process is knocked off by a ball afford examples. Specimen 183, A. M. M., is a very perfect illustration of this accident. The mastoid cells were opened. After a fortnight, meningitis supervened. Specimen 3451 was furnished by a fortunate case of recovery after a fracture of the mastoid process.

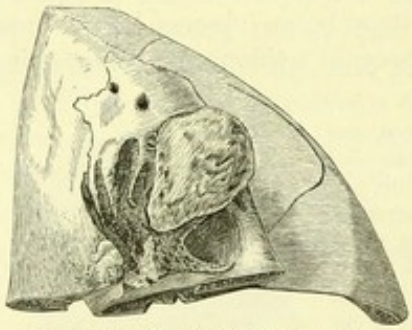


Fig. 9.—Gunshot fracture of right temporal. *Spec.* 183, A. M. M.

Private William F——, Co. G, 98th Pennsylvania Vols., was wounded near Fort Stevens, Washington, July 12th, 1864, by a glancing shot from a conoidal musket-ball, and was admitted into Mount Pleasant Hospital on the following day. A little above the right auditory meatus was a scalp wound an inch and a half long. A piece of the mastoid process was chipped off, and a fracture extended into the petrous portion of the temporal. The patient did well with simple dressings and rest and gentle cathartics till the 20th of July, when the wound began to slough. Applications of nitric acid, creosote, etc., failed to arrest the sloughing, which presently gave rise to repeated hæmorrhages from branches of the temporal artery. The gangrene continued to spread until August 9th, when the eschars separated, leaving a space five inches in diameter on the right lateral region of the head, denuded of integument, fascia, and muscles. During this long period, the patient complained of no inconvenience at the seat of fracture, though there was at times acute frontal pain. Early in September, it was evident that the exposed portions of the temporal and parietal bones were necrosed, and on September 6th a fragment of the squamous portion of the temporal was removed. Two days subsequently other fragments were detached and extracted. After this the wound began to cicatrize rapidly, and on December 3d, 1864, the patient was reported to be entirely out of danger, and in fact nearly well.



Fig. 10.—Exfoliation from the right parietal and temporal, resulting from gunshot injury. *Spec.* 3451, A. M. M.

Several cases of undepressed fracture are reported in which a ball gouged out a small portion of the external table. A number of instances are recorded in which con-

siderable portions of the calvaria have been removed by explosions of shell, without depression. Very rarely a musket-ball produces the same effect, as in the following remarkable case. The patient is represented in Photograph No. 58, A. M. M.:

Private Edson D. Bemis, Co. K, 12th Massachusetts Vols., was wounded at Antietam by a musket-ball, which fractured the shaft of his left humerus. The fracture united kindly, with very slight angular displacement and quarter of an inch shortening. Promoted to be corporal, Bemis received, May 6th, 1864, at the battle of the Wilderness, a wound from a musket-ball in the right iliac fossa. He was treated in the Chester Hospital, near Philadelphia. There was extensive sloughing about the wound, but it ultimately healed entirely, leaving a large cicatrix, parallel with Poupart's ligament. Eight months after the injury, Bemis returned to duty with his regiment. On February 5th, 1865, Corporal Bemis was again severely wounded at the engagement at Hatcher's Run, near Petersburg, Virginia. Surgeon A. Vanderveer, 66th New York Vols., reports that the ball entered a little outside of the left frontal protuberance, and passing backwards and upwards, removed a piece of the squamous portion of the temporal bone, with brain substance and membranes. When the patient entered the hospital of the 1st Division of the 2d Corps, brain matter was oozing from the wound. Respiration was slow; the pulse 40; the right side paralyzed; insensibility total. On February 8th, the ball was removed from the substance of the left hemisphere. In a few days paralysis disappeared. The patient was transferred to Fort Richmond, New York Harbor. He recovered perfectly, and on July 15th visited Washington, and was photographed at the Army Medical Museum. The wound in the head was then nearly healed. There was a slight discharge of healthy pus from one point. The pulsations of the brain could be felt through the integument. The mental and sensory faculties were unimpaired. The corporal had been discharged from service, and recommended for a pension.

From the numerous instances of fracture with depression of both tables of the skull, a very few are selected. The first is an example of a common class of cases, in which symptoms of compression of the brain depend upon extravasation of blood, or inflammation of the membranes, and come on tardily.

Private Leonard L——, Co. F, 74th New York Vols., was wounded at the battle of Williamsburg, May 5th, 1862, and was admitted into Broad and Cherry Streets Hospital, at Philadelphia, May 13th, 1862. A musket-ball had struck near the left parietal eminence, and, producing a slight depression of the outer table, had lodged under the scalp, whence it had been removed by a surgeon on the field. The wound had a healthy aspect when the man was admitted, and there was no cerebral disorder. This favorable condition continued unaltered till May 20th, when a febrile movement set in, accompanied by nausea and vomiting; drowsiness and stupor followed, and the patient died comatose on May 23d, eighteen days after the injury. At the autopsy, a small clot was found beneath the depressed portion of the vitreous plate; the dura mater was uninjured; the arachnoid, near the seat of injury, was opaque, and studded with deposits of lymph; the gray matter of the brain was softened.

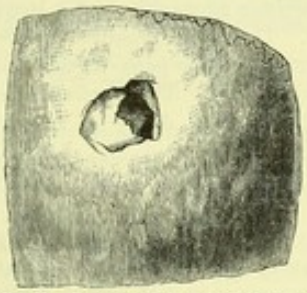


FIG. 11.—Portion of left parietal, showing a slightly depressed fracture of the outer table. *Spec.* 224, A. M. M.

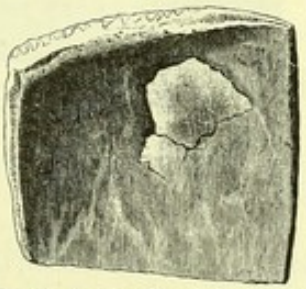


FIG. 12.—Interior view of the foregoing specimen, exhibiting extensive splintering of the vitreous table.

Private George V——, Co. C, 84th New York Vols., was wounded at Chancellorsville, May 3d, 1863, and admitted into Carver Hospital, at Washington, D. C., on May 7th, 1863. His injury was supposed to be a simple scalp wound from a musket-ball. It was situated over the right parietal protuberance, and, on admission, was granulating kindly. Ten days subsequently, the patient, after a walk out of doors, had headache and nausea, and the wound gaped and its edges ulcerated. On the 18th of May, the probe detected denuded bone; but no fracture was discovered. There were no febrile or cerebral symptoms. On May 20th, a depression of the outer table of the skull was detected. At night there was delirium, and the following day the pulse became feeble and irregular, the stomach irritable, the tongue heavily furred. The patient died on May 22d, 1863, being conscious and rational to the last. At the autopsy, extensive inflammation of the dura mater was observed, and softening of the middle lobe of the right cerebral hemisphere.



FIG. 13.—Gunshot fracture of the right parietal bone. *Spec.* 1257, A. M. M.



FIG. 14.—Interior view of the foregoing specimen.

The next case is an example of the classical "punctured" gunshot fracture of systematic writers.



Fig. 15.—Fracture of the frontal bone by a pistol-ball. *Spec.* 1673, A. M. M.

Private James K——, Co. G, 6th New York Cavalry, was wounded at the battle of Gettysburg, July 3d, 1863, by a pistol-ball, which produced a punctured fracture of the os frontis. He was conveyed to a hospital at Baltimore, and from thence to Carver Hospital, at Washington, on July 24th. He stated that, at Baltimore, he walked about and felt no inconvenience from his wound. On July 27th, he had a convulsion. The wound, which was nearly healed, was laid open, and depressed bone being detected, an effort was made to elevate it. Several small necrosed fragments were removed, and a small quantity of fetid pus escaped. The patient had become comatose, and the operation had no influence in relieving the symptoms. Death took place a few hours subsequently.



Fig. 16.—Interior view of the foregoing specimen.

At the autopsy, the extended depression of the inner table was discovered, and a large abscess of the brain.

Instances were not uncommon of the splitting of round musket-balls in striking the skull at an acute angle. The following is an example:

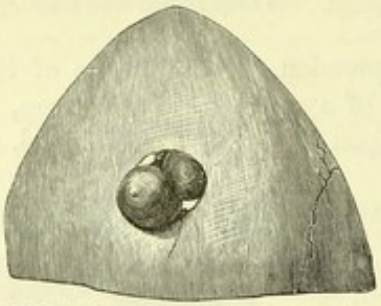


Fig. 17.—Section of a frontal bone, with a split musket-ball. *Spec.* 1293, A. M. M.

Corporal John N——, aged eighteen years, Co. H, 159th New York Vols., was struck on the left side of the forehead, on April 14th, 1863, at an engagement at Irish Bend, Louisiana, by a round musket-ball. He was admitted to the University Hospital, at New Orleans, on April 17th. The ball had been removed on the field. Several depressed fragments of bone were removed, and cold water-dressings were applied. The case progressed without a bad symptom until April 30th, when there were clonic spasms, which, after a few hours, were followed by a semi-comatose condition, which continued until death, on May 2d, 1863. A necroscopic examination revealed extensive meningitis, and a large abscess of the left cerebral hemisphere. The lateral ventricles were filled with sero-purulent matter. The surfaces of the pons Varolii and of the medulla oblongata were covered with lymph. The specimen was forwarded by Assistant Surgeon P. H. Conner, U. S. A.

Conoidal balls were less liable to split after this fashion, yet such instances were occasionally observed.

Private C. C. W——, Co. I, 6th Wisconsin Vols., aged twenty-one years, was wounded at Spottsylvania, May 12th, 1864, and was admitted to Douglas Hospital, in Washington, four days subsequently. It was ascertained that the cranium was fractured, but the symptoms were not urgent, being limited to slight paralysis of the right upper extremity, and operative interference was deferred. On May 31st, a conoidal musket-ball and several fragments of the left parietal were removed by Assistant Surgeon Wm. F. Norris, U. S. A. One large fragment of the vitreous plate was pressing on the dura mater; this was elevated and removed. The next day symptoms of compression of the brain were manifested. An exploration of the wound was made and a quantity of pus evacuated. On June 4th, 1864, twenty-three days after the injury, the case terminated fatally. At the autopsy, the arachnoid was found little altered. There was an abscess in the posterior lobe of the left hemisphere near the longitudinal sinus, of the size of a walnut. Its walls were of a greenish-yellow color. It communicated with the lateral ventricle. The right ventricle was filled with sero-sanguinolent fluid. There was a deposition of lymph at the base of the brain, extending from the medulla oblongata to the bifurcation of the optic nerves. The specimen and facts connected with it were contributed by Assistant Surgeon William Thomson, U. S. A.

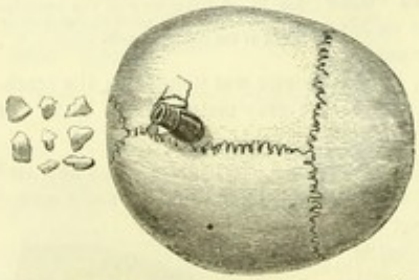


Fig. 18.—Skull-cap, exhibiting gunshot fracture near the vertex, by a conoidal musket-ball which has split against the lamina of the left parietal. *Spec.* 3543, A. M. M.

The depressed fractures produced by cannon-balls, or by the explosion of large shells, were commonly attended by frightful comminution and disjunction of the sutures, and were almost always immediately fatal, and hence had little surgical interest. A single example is given:

A Confederate soldier was wounded in the demonstration on Washington, July 17th, 1864, by a shell from one of the large guns of Fort Stevens, and was admitted into Lincoln U. S. General Hospital, on that day, and died two hours after admission. Over the anterior superior angle of the left parietal bone there was an extended scalp wound. On reflecting the scalp, multiple depressed fractures of the vault of the cranium came into view. The point of greatest depression is an inch to the left of the median line, near the coronal suture. The depressed fragments measure from before backwards two inches, and from right to left three inches, and involve both parietals and the os frontis. A fissure runs through the squamous portion of the left temporal, and all the sutures of this bone are separated.

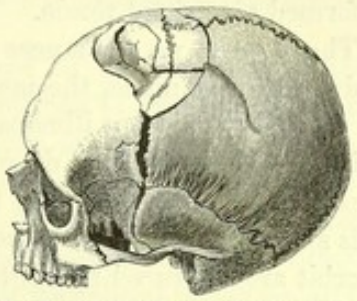


FIG. 19.—Cranium fractured by the explosion of an 11-inch shell. *Spec.* 2871, A. M. M.

There have been a very few extraordinary and exceptional recoveries after penetrating and perforating fractures of the cranium, and, in rare instances, the fatal termination has been long delayed. In the following curious case, the presence of a ball within the cranial cavity was unsuspected:

Corporal G. W. S——, 12th Massachusetts Vols., aged twenty-nine years, was wounded at the battle of Fredericksburg, December 13th, 1862, and was admitted to Camden Street Hospital, Baltimore, six days subsequently. The humors of the right eye had been evacuated by a ball, which had likewise inflicted a slight wound of the lower lid. The left eye was observed to be unnaturally prominent, but its functions were undisturbed. The patient did not complain of pain or any inconvenience, except a slight headache. There were no cerebral symptoms, and no one suspected that the projectile had entered the brain. The wound healed kindly, and, after three weeks, the man walked about the city habitually, with a hospital pass. He appeared to be well, except that he had an occasional pain over the left eye, until February 6th, 1863, when he had a chill, followed by a febrile reaction. No marked cerebral disorder supervened, however, until February 10th, when delirium was noticed at night. On the following day the patient was comatose, and at midnight of February 15th, he died. The autopsy revealed a conoidal musket-ball wedged between the sphenoid and the left orbital plate of the frontal bone, and lying in contact with the dura mater. The orbital plate was pressed inwards and fractured, and a fissure extended through the superciliary ridge. Over the ball, at the base of the anterior lobe of the left hemisphere, was an abscess containing two drachms of pus. The ball was incrusted by callus, and the opening it had made in entering through the walls of the right orbit was greatly diminished by osseous deposition.



FIG. 20.—Conoidal ball embedded between the sphenoid and frontal bones. *Spec.* 1108, A. M. M.



FIG. 21.—Exterior view of the foregoing specimen.

In the next case, half of the ball had deeply penetrated the brain:

Sergeant J. N. H——, Co. K, 19th Maine Vols., aged thirty-six years, was struck on the right side of the head, by a musket-ball, in a skirmish at Morton's Ford, on the Rappahannock, February 6th, 1864. The ball was smoothly cut in two, one-half lodging under the scalp, and the other passing into the brain. The patient was perfectly rational until February 11th, when his mind wandered at times. On the 12th, Surgeon Justin Dwinelle, 101st Pennsylvania Vols., extracted the fragment of the ball which had buried itself in the brain. Its track communicated with the right lateral ventricle. The other portion of the ball had been removed from under the scalp immediately after the injury. When the patient recovered from the influence of the chloroform, he was rational, and continued so for twenty-four hours or more. Coma gradually supervened, and death took place on February 15th. The left ventricle was found filled with pus.

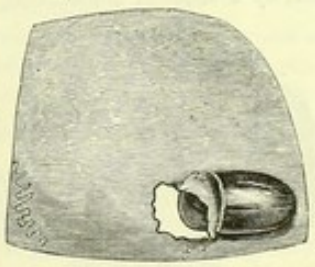


FIG. 22.—Section of right parietal on which a conoidal musket-ball has split. *Spec.* 2121, A. M. M.

A very remarkable case of perforating fracture of the skull, with recovery, is represented by No. 16 of the Surgical Series of Drawings, S. G. O. The ball entered a little to the right of the occiput, and passed out somewhat below and to the left of the vertex. The intervening bridge of bone was about three inches wide. There had been a cerebral hernia at the wound of exit, and, when the drawing was made, four months after the reception of the injury, there was still a small tumor, covered by half-

formed cicatricial tissue. There was a firm depressed cicatrix at the aperture of entry. There were no evidences of impairment of the cerebral faculties. At the time the drawing was made, the man was employed as an orderly.

The next case illustrates Mr. Erichsen's remark that the greater splintering of the inner table does not depend exclusively upon its greater density and brittleness, but partly on the direction of the fracturing force. At the aperture of exit, the outer table is splintered more than the inner. In the same specimen the bones forming the right orbit are fractured by contre-coup:

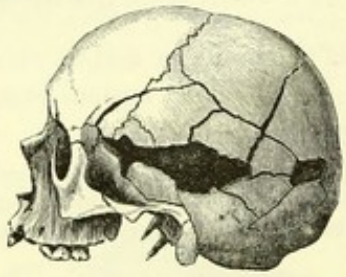


Fig. 23.—Skull, exhibiting an extensive fracture by grapeshot. *Spec.* 1318, A. M. M.

A soldier of Longstreet's Corps was killed in a charge upon a Union battery, in the second battle of Manassas, August 29th, 1862, by a grapeshot at short range. The cranium was picked up a year subsequently by Surgeon F. Wolfe, 39th New York Vols., under an abatis near the stone bridge over Bull Run. The missile entered the left parietal near the lambdoidal suture, and made its exit through the squamous portion of the temporal.

According to Mr. Teevan's experimental inquiries,* the aperture of exit in gunshot perforations of the cranium is always larger than the aperture of entry, because it is made by the ball *plus* the fragments of bone driven out from the proximal table and the diploe.

While the number of fatal results after trephining are very great, the examples of success are yet numerous. The data are not sufficiently complete to admit of fair comparative analysis; still it is difficult to avoid the impression that a larger measure of success has attended this operation in the late war, than the previous experience of military surgeons would have led us to anticipate. Surgeon D. W. Bliss, U. S. Vols., alone has reported eleven successes after the use of the elevator or trephine. Even in those almost hopeless cases in which compression of the brain follows a gunshot injury of the skull at a late date, instances of recovery are reported.

In the following case it is not likely that suppuration had occurred, a complication that has rarely presented itself prior to the fifteenth day after the injury; but it can hardly be doubted that meningitis was averted or relieved by the opportune employment of the trephine:

Private John McK——, Co. H, 105th Pennsylvania Vols., was wounded at Petersburg, Virginia, June 14th, 1864, by a conoidal musket-ball, which struck the right side of the skull very obliquely, and produced a slightly depressed fracture of the right parietal bone. He was admitted to Mount Pleasant General Hospital, Washington, on June 24th, with the report that the progress of the case had been so far eminently satisfactory. After admission, he was found to be insensible, and a few hours subsequently, convulsions supervened in rapidly recurring paroxysms. Twelve ounces of blood were taken from the temporal artery without apparent benefit. A trephine was then applied to the seat of fracture, and, upon the removal of a button of bone, a portion of the inner table was found slightly depressed. This was elevated, and the patient soon afterwards regained consciousness. On the 28th of June, the wound in the scalp became erysipelatous, and before the inflammation subsided, there was extensive loss of substance of the integuments and pericranium, denuding a large portion of the parietal bone. Necrosis ensued, and embraced the whole thickness of the bone. In September, 1864, a portion of the parietal, three inches by four, had become so much loosened that it was readily removed. After this, cicatrization went on rapidly, and, at the date of the last report, December 2d, 1864, the wound had contracted to an ulcer less than an inch in diameter. The patient's mental faculties were impaired somewhat, the ward physician thought, but not to a great extent. The specimen was contributed by Assistant Surgeon C. A. McCall,

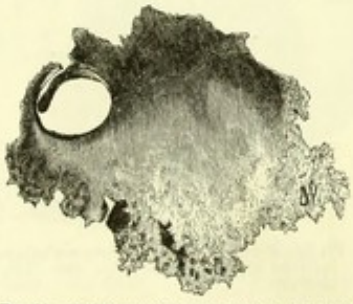


Fig. 24.—Exfoliation from the right parietal bone. *Spec.* 3452, A. M. M.

* British and Foreign Medico-Chirurgical Review, vol. xxxiv. p. 205.

U. S. A. A colored drawing was made representing the appearance of the parts prior to the separation of the exfoliation. (No. 74, Surgical Series of Drawings, S. G. O.)

The occurrence of hernia or fungus cerebri is mentioned in connection with 18 cases of gunshot fracture of the skull, complicated by lacerations of the dura mater and brain. In 4 of these cases, recovery took place without operative interference with the protruding fungous mass, which, in these instances, gradually contracted, was then covered by granulations, and finally cicatrized. In those cases in which bandaging and compression were resorted to, cerebral oppression was soon manifested, and stupor and coma eventually supervened. In those in which the tumor was sliced off, as usually recommended, at the proper level of the brain, it was commonly speedily reproduced, and death from irritation ensued.

Charles T——, Co. H, 63d New York Vols., aged seventeen years, was admitted to Hospital No. 1, Frederick, Maryland, on September 28th, 1862, with a fracture of the skull. He was wounded at Antietam, September 17th, 1862, by a conoidal musket-ball, which struck at the lower anterior angle of the right parietal, fractured both tables of the cranium, and lodged under the scalp in the occipital region. The scalp was lacerated, and a dark pulsating mass protruded in the wound. The left side of the body was paralyzed. The patient's mental faculties were unimpaired. On September 29th, flaps of integument were reflected by a T-shaped incision. The ball and a number of fragments of bone were removed, some of the latter being embedded in the brain substance. The inner table was found badly splintered, but the fracture of the external table was still more extensive. The protruding cerebral mass was shaved off. The rough edges of the fractured bone were smoothed by cutting forceps. The following day, the paralysis was more complete than before the operation. There was severe headache. The pulse was slow and weak. On October 3d, the fungus was sprouting and sloughing. The left arm was powerless; the paralysis of the left leg was less complete. On October 4th, the hernia was again sliced off, and gentle compression was applied. There was great irritability and restlessness. On October 21st, the patient had improved. His appetite was voracious. He was less irritable, and the hemiplegia was much less complete. He was very sensitive to cold. The temperature of the left side was lower than that of the right. The fungus was of the size of a pigeon's egg. On November 17th, a dilatation of the left pupil was first noticed. Sensation in the left leg, and partial control of the muscles had returned. Since the last report the tumor of the brain had continued to grow and slough away, so that it remained of about the same size. On December 7th, the report states that little change had taken place, except a gradual amelioration of the hemiplegia, and improvement in regard to the fretfulness and irritability. On this day there was a severe chill. After this, the patient never regained his accustomed readiness and clearness of mind. The discharge from the wound became watery, unhealthy, and more copious. There was an exacerbation of fever every afternoon. On December 17th, there was a severe convulsion, which lasted half an hour, and was terminated by death.

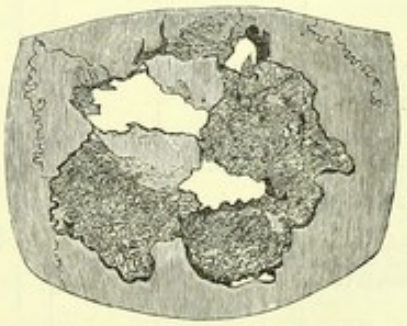


Fig. 25.—Gunshot fracture of right parietal, followed by necrosis. *Spec.* 3859, A. M. M.

At the autopsy, an irregular portion of the right parietal, four inches in diameter, was found to be necrosed and detached. The dura mater was much thickened in the vicinity of the fracture, and was adherent to the margins of the healthy bone. Except in the immediate vicinity of the hernia, the brain matter appeared to be in a healthy state.

In looking over the registers of gunshot injuries of the head, two general facts are noticed: First, that in the after-treatment of scalp wounds, a multitude of surgeons did not consider spare diet, perfect rest, and antiphlogistic measures as of essential importance; and, secondly, that in the treatment of cranial fractures, the general tendency was to the practice recommended by Guthrie in regard to operative procedures, rather than the more expectant plan insisted upon by the majority of modern European writers on military surgery. The interest of the material and the importance of the subject alike invite extended comment; but in this brief and cursory review, the motto of Montaigne, *je raconte, je ne juge pas*, must be rigorously adhered to. A few more cases of gunshot injuries of the head are appended, to illustrate the form of the register of wounds now in use in the army.

Hospital.	NAME.	Rank.	Co.	Regiment.	Age.	When admitted.	From what General Hospital Transferred.	From what other source admitted. From Field, from Field Hospital, etc.	DIAGNOSIS. In Surgical Cases, state Seat and Character of Wound or Injury.	On what occasion Wounded. — *Date.*
Hygeia Hospital, Old Point Comfort, Va.	Burd, Charles W.	Lieutenant.	F	4th Maine Volunteers.	26	Feb. 20, 1862.	.....	Prison in Richmond	Gunshot fracture of both tables of os frontis at left frontal eminence. Penetration of the substance of the brain by a portion of the ball.	Bull Run, July 21, 1861.
National Hospital, Baltimore, Maryland.	Stallman, John	Private.	A	4th Penn. Cavalry.	21	Sept. 8, 1864.	Sandy Hook, Maryland.	.....	Missile entered at the right temple, and emerged at the opposite side of the head.	Winchester, Va., July 24, 1864.
Cuyler Hospital, Philadelphia, Penn.	Stallman, John H.	Private.	A	4th Penn. Cavalry.	21	Dec. 11, 1864.	National, Baltimore.	.....	Missile entered the right side of the frontal bone near its superior margin. Evidently passed through the brain, and emerged on the opposite side.	Winchester, July 24, 1864.
Mower Hospital, Philadelphia, Penn.	Stallman, J. H.	Private.	A	4th Penn. Cavalry.	21	May 10, 1865.	Cuyler, Phila., Penn.	.....	Ball passed through brain, carrying away anterior portion.	Winchester, July 24, 1864.
Armory Square Hospital, Washington, D. C.	Kennedy, Charles	Lieutenant.	I	28th Penn. Volunteers.	25	May 7, 1863.	.....	Hospital Transport.	Missile removed the superior angle of the occipital bone and the dura mater beneath.	Chancellorsville, Va., May 2, 1863.
1st Division Hospital, Annapolis, Md. 13,254.	Kennedy, Charles	Lieutenant.	I	28th Penn. Volunteers.	25	Nov. 14, 1863.	Armory Square.	From furlough.	.....	.....
U. S. A. General Hospital, Frederick, Md.	W——, Charles	Private.	E	14th Virginia Infantry.	22	Sept. 17, 1864.	.....	Field.	Missile entered the left temporal bone one inch from the meatus auditorius externus, and penetrated the cavity of the skull, lodging on the side of the sella turcica.	Berryville, Sept. 3, 1864.
Grafton Hospital, West Virginia. 788.	W——, Charles	Private.	E	14th Virginia Infantry.	22	Nov. 2, 1864.	Frederick, Maryland.	.....	.....	.....

IN SURGICAL CASES ONLY.		RESULT.								
Nature of Missile or Weapon. Round or Conical Bullet, Solid Shot Bayonet, Sword.	TREATMENT. Amputation...Date of Excision..... " " Other operation..... " " Simple dressings..... " "	Returned to duty. — *Date.*	Transferred to Veteran Reserve Corps. — *Date.*	To other General Hospital. State or City. — *Date.*	Furloughed. — *Date*	Deserted. — *Date.*	Discharged from Service. — *Date.*	Death. — *Date.*	Readmitted from Furlough or Desertion. — *Date.*	REMARKS. Here state cause of death, of discharge, or of transfer to Veteran Reserve Corps.
Musket Ball.	A portion of the ball was removed from under the integument, on the field. Seven months afterwards the fistulous orifice of the wound was dilated, depressed bone was removed, and a portion of the ball from within the cavity of the cranium.	March, 1863.								During his imprisonment he suffered from pain in the head, but had no delirium, coma, or paralysis. Was perfectly well when he rejoined his regiment. (Vide Special Report from Surgeon R. B. Bontecou, U.S.V. General Index A, No. 59.)
Musket Ball.	Simple dressings.			Dec. 10, 1864, to Cuyler Hospital.						When admitted, his bowels were constipated, and nausea was almost constant. His pulse was slow and feeble. His pupils were constantly dilated. When discharged his mental operations seemed slow and uncertain, but there was no aberration of mind, and his memory was unimpaired. (See Report of Assistant Surgeon Schell, U.S.A.)
.....	.....	.....	.....	May 10, 1865, to Mower Hospital, Phila., Pa.	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	May 23, 1865.	.....	.....	.....
Probably a piece of shell.	May 7th. Hair shaven, water-dressings, cathartics, injections and anodynes, leeches to temples and behind the ears. May 13th. A splinter of bone removed.	.....	.....	.....	June 20, 1863.	.....	.....	.....	.....	On admission, substance of brain protruded about one inch and a half; wound was about two inches long and one inch wide; pulsation was distinct; total loss of vision; pulse 60; inclined to sleep but could not; mind dull; partial paraplegia. May 11th. Rests quietly but cannot sleep; has not slept from date of injury, no alvine evacuation. May 12th. Not so much pain. May 13th. Had four dejections. May 15th. Fungus retracted somewhat, with a healthy granulating surface; vision partially restored. June 16th. Sitting about ward, talking and laughing; fungus retracted entirely, but pulsation distinct; vision restored; pulse and bowels regular; sleeps well; intellect perfect; no pain. The wound is represented in Nos. 26 and 27 Surgical Series of Drawings, S. G. O.
.....	.....	Jan'y 12, 1864.	.....	.....	.....	.....	.....	.....	.....	.....
Conoidal Musket Ball.	Part of ball extracted from under the scalp in the frontal region, by forceps. This fragment was about one-third of the ball.	.....	.....	To Grafton, Nov. 2, 1864.	.....	.....	.....	.....	.....	When admitted patient had paralysis of 2d, 3d, 4th, 5th, 6th, and 7th nerves of the left side. No pain in the head. General health of patient was good. His pulse, skin, and bowels were natural. His consciousness perfect. His articulation was thick, but improved, and after the extraction of the ball became almost natural. There was a free evacuation of pus after the operation, the pupil of the left eye diminished in size, and vision partially returned. Oct. 10th, 1864. Was so far recovered as to walk about and assist in nursing in the ward. If, however, he exerted himself too much he suffered from headache. While being transferred to Grafton, Va., he drank a large quantity of whiskey. The day after his arrival he had a violent chill, followed the next morning by convulsion, and strabismus of right eye; these continued during the day, and coma succeeded on the following morning, and he died without reaction. Post-mortem showed the larger portion of a conoidal musket-ball resting against the sella turcica. The encephalon was extensively disorganized; the ventricles, and nearly the whole base of the brain, bathed in pus. (Med. Des List, from J. H. Bartholf, A. A. Surg U.S.A.)
.....	.....	.....	.....	.....	.....	.....	.....	Nov. 6, 1864.	.....	.....

GUNSHOT WOUNDS OF THE FACE.

Of 4167 gunshot wounds of the face transcribed from the reports from the beginning of the war to October, 1864, there were 1579 fractures of the facial bones, and 2588 flesh wounds. Of the former 891 recovered, 107 died, and the terminations are still to be ascertained in 581 cases.

Secondary hæmorrhage has been the principal source of fatality in these injuries. It is a frequent complication in gunshot fractures of the facial bones; and the difficulties in securing bleeding vessels in this region are very great. Recourse has often been had to ligations of the carotid, with the result of postponing for a time the fatal event.

Owing to the great vascularity and vitality of the tissues in this region, gunshot wounds of the face have commonly healed rapidly, and many creditable plastic operations for the relief of deformities following such injuries have been accomplished. Such operations are illustrated at the Army Medical Museum by numerous casts and photographs. An interesting example is the case of Private Rowland Ward, Co. E, 4th New York Heavy Artillery. A fragment of shell removed the anterior portion of the lower jaw within one inch of the ramus on both sides, destroyed the genio-hyoglossus and genio-hyoid muscles, and afforded the occasion for a very successful cheiloplastic operation by Surgeon J. C. McKee, U. S. A. (See Photographs of Surgical Cases, S. G. O., vol. iii. p. 1, *et seq.*)

GUNSHOT WOUNDS OF THE NECK.

Of the 1329 cases of this category that have been entered on the records, the ultimate results have been ascertained in 546 cases only. Time has not been found to trace the histories of many of the remaining cases. In the terminated cases, the mortality is 14 per cent.

Several instances are recorded in which large grapeshot, on striking the hyoid bone, were deflected, and buried themselves in the supra-spinous fossa of the scapula, or among the muscles of the back. These patients died from laryngitis or œdema of the glottis, and might have been saved, perhaps, by tracheotomy; but they died suddenly, when surgical assistance could not be immediately procured.

Wounds of the neck, with lesions of the vertebræ, are classified with fractures of the spine.

There are eight examples of gunshot perforations of the larynx or trachea among the specimens at the Army Medical Museum. The series of surgical drawings includes several curious illustrations of the escape of the great blood-vessels of the neck from injury, when balls have traversed the neck directly in their course.

Cases in which the great vessels were injured are classified with wounds of the arteries.

GUNSHOT WOUNDS OF THE BACK AND SPINE.

In this class have been included the fractures of the vertebral column which were not complicated by penetrating wounds of the chest or abdominal cavity, and flesh wounds of the region covered by the trapezius, latissimus dorsi, and gluteal muscles.

Of 187 recorded cases of gunshot fracture of the vertebræ, all but 7 proved fatal. Six of these were fractures of the transverse or spinous apophyses. The seventh case is that of a soldier wounded at Chickamauga, September 20th, 1863, by a musket-ball, which fractured the spinous process of the fourth lumbar vertebra, and penetrated to the vertebral canal. The ball and fragments of bone were extracted at a Nashville hospital. The patient was transferred to Louisville, thence to Jefferson Barracks, Missouri, thence to Madison, Indiana, and finally, on July 26th, 1864, to Quincy, Illinois. The last report states that he was likely to recover.

Gunshot lesions of the vertebræ and spinal cord are illustrated at the Army Medical Museum by 66 specimens.

An engraving of one of these is subjoined.

Private Frederick L——, Co. H, 8th New York Vols., aged twenty-six years, was wounded at Cold Harbor June 3d, 1864, and admitted into Carver Hospital, at Washington, D. C., June 11th, 1864. A conoidal musket-ball had entered the right side of his back and penetrated the vertebral canal, shattering the transverse and articular processes of the eighth and ninth dorsal vertebræ. The patient stated that, immediately upon the reception of his injury, he lost all sensation and power of motion below the wound. On admission, he was in a very feeble state; his pulse was slow, his respiration labored, his skin cool, clammy, and cyanosed, his excretions involuntary. In this wretched condition he lingered till the 27th of June, when symptoms of extreme gastric irritability supervened, and every form of nourishment was promptly rejected by the stomach. He died July 2d, 1864. At the autopsy, the spinal cord appeared to have been completely severed at the seat of injury, and was disorganized above and below.



Fig. 26.—Eighth, ninth, and tenth dorsal vertebræ, with a conoidal ball in the vertebral canal. *Spec.* 2939, A. M. M.

Five thousand one hundred and ninety-five gunshot flesh wounds of the back have been recorded, of which a large proportion are injuries from shell. Troops being often ordered to lie down under a shell fire, this region becomes particularly exposed.

GUNSHOT WOUNDS OF THE CHEST.

Of 7062 gunshot wounds of the chest that have been examined and transcribed from the reports belonging to the period prior to July, 1864, there were 2303 that either penetrated the thoracic cavity or were accompanied by lesions of the thoracic viscera. The results have been ascertained in 1272 of these, and were fatal in 930, or 73 per cent. The 4759 flesh wounds presented a very small ratio of mortality. It was observed, however, that they were commonly long in healing, in consequence, no doubt, of the mobility of the thoracic parietes.

The cases of wounds of the lung by the sharp edges of the fractured ribs, or of contusion of the lung by non-penetrating gunshot injuries, have been recorded with the penetrating wounds.

In the treatment of penetrating wounds of the chest, venesection appears to have been abandoned altogether. Hæmorrhage was treated by the application of cold, perfect rest, and the administration of opium. These measures seem to have proved adequate generally, and no instances are reported of the performance of paracentesis or of the enlargement of wounds for the evacuation of effused blood. Hæmorrhage from the vessels of the costal parietes has been exceedingly rare, and, in the few instances recorded, was a secondary accident. Hence the management of bleeding from wounded intercostal arteries has presented theoretical rather than practical difficulties.

It has been the common practice to remove splintered portions of fractured ribs, and to round off sharp edges that were likely to wound the pleura or lung. After this, with the exception of extracting foreign bodies whenever practicable, and performing paracentesis when empyema was developed, it has been usual to leave these cases to the natural process of cure.

The records of the results of the so-called method of "hermetically sealing" gunshot penetrating wounds of the chest are sufficiently ample to warrant an unqualified condemnation of the practice. The histories of the cases in which this plan was adopted have been traced, in most instances, to their rapidly fatal conclusion. The following case is the only recorded exception:

Corporal Peter Welker, Co. A, 1st U. S. Sharpshooters, was admitted July 30th, 1863, into Mount Pleasant Hospital, at Washington, having received, at Manassas Gap, July 23d, 1863, a gunshot wound of the chest. The missile entered near the nipple, between the fourth and fifth ribs, traversed the lung, and emerged at the inferior border of the scapula, fracturing the sixth rib. Treatment: Opiates and stimulants, the wound being hermetically sealed. When admitted, the patient had much pain in the chest, and dyspnœa. The latter increased almost to suffocation, and was accompanied by fever. On July 31st, the posterior wound gave way, and a profuse discharge of clotted blood and purulent matter escaped. The next day the anterior wound was opened, and a pint of matter of similar character escaped, after which the patient became much better. He continued to improve until furloughed. On December 13th, 1863, when readmitted, he had entirely recovered.

Few examples of recovery are recorded where the track of the ball passed near the root of the lung. The cases in which there was a fracture of the rib at the wound of entry were very dangerous. The established opinion, that penetrating wounds with lodgement of the ball are more fatal than perforating wounds, was amply illustrated. But very few recoveries with balls lodged in the lung are recorded, and the histories of such cases are less explicit and complete than could be desired.

Private John H. Prouty, Co. G, 27th Illinois Vols., was admitted into the Sherman U. S. General Hospital, at Nashville, Tennessee, from the Field Hospital at Chattanooga, Tennessee, with gunshot wound of the thorax. He was struck in the left chest at Dallas, Georgia, May 25th, 1864, by a musket-ball, which lodged in the substance of the left lung, and was not extracted. The case progressed favorably, and on July 14th, 1864, the patient was furloughed and went to his home.

Private Isaac Miller, Co. B, 139th Pennsylvania Vols., was admitted into the Haddington General Hospital, at Philadelphia, on the 3d of August, 1864, from Fort Schuyler Hospital, New York Harbor. He was wounded at the battle of the Wilderness, May 5th, 1864, by a musket-ball, which entered at the left shoulder, and passed downwards and inwards, and lodged in the left lung. He was fairly convalescent when admitted to Haddington Hospital, and ultimately regained his usual health almost, and on May 3d, 1865, was transferred to the Veteran Reserve Corps.

In the following case the ball was believed to have lodged in the body of one of the upper dorsal vertebræ:

Private Daniel Rich, Co. B, 55th Pennsylvania Vols., aged twenty-one, was wounded at the battle of Pocotaligo, October 22d, 1862, and was admitted to Hospital No. 1, at Beaufort, South Carolina, on October 24th. The ball had entered at the left sterno-clavicular articulation, traversed the apex of the left lung, and lodged in the vertebral column. Immediately after his injury, he had hæmoptysis. He was able to walk from the field of battle to the hospital steamer, six miles distant. He stated that the wound bled very freely. When admitted to the hospital his face was dusky, his pulse accelerated, and crepitant rales were audible in the left chest. There was partial paralysis of the arms. He was ordered $\frac{1}{4}$th of a grain of tartarized antimony every two hours, low diet, and perfect quiet. On October 25th, there was less vascular excitement and less dyspnœa. The medicine had nauseated and purged the patient. There was great tenderness of the spine in the upper dorsal region, and the vertebral column was perfectly rigid. The patient would allow no one to touch him anywhere but on the head. He was lifted by his head into an upright position, like a stick. The antimony was continued till October 31st. At this date an abscess pointed over the sternum, and was evacuated by a free incision. The wounds were poulticed. On November 13th, he was allowed to sit up a portion of the time, and was much less troubled by a cough in this position. On November 20th, he began to walk about the ward, and the wounds discharged but little. On December 1st, a necrosed bit of the sternum was removed. Cerate dressings were applied to the wounds. On December 20th, erysipelas attacked the wounds

and spread over the chest. On December 28th, the patient had recovered from the erysipelas, the wounds were nearly healed, but the immobility of the spine continued. He was this day sent to a Northern hospital, on the steamer "Star of the South." He ultimately recovered, and was transferred to the First Battalion of the Veteran Reserve Corps. A photograph of the recent wound is preserved. (See Photographs of Surgical Cases, S. G. O., vol. i. No. 47.)

In the next case the ball was extracted. Nature made an effort to repair the fractured ribs, but the wound of the lung was followed by fatal suppuration.

Private S—— B——, Co. A, 83d New York Vols., was wounded at the battle of Fredericksburg, and was admitted into the Lincoln Hospital, at Washington, December 23d, 1862. He had been struck by a conoidal musket-ball in the back of the right chest, the ball entering over the attachment of the eleventh rib, and passing forwards. The ball was extracted and simple dressings were applied. Pleuro-pneumonia ensued, and resulted in empyema. On January 3d, 1863, a pint of pus was evacuated from the pleural cavity. The case terminated fatally on January 21st, 1863. The specimen was contributed by Surgeon H. Bryant, U. S. Vols., and the particulars of the case were furnished by Surgeon J. Cooper McKee, U. S. A. At the point of fracture, necrosed splinters are seen, attached by large irregular formations of callus.

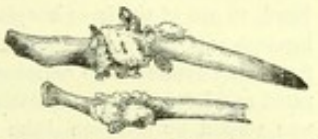


Fig. 27.—Portions of the eleventh and twelfth ribs of the right side, exhibiting gunshot fractures of the shafts with attempts at reparation. *Spec.* 845, A M. M.

A remarkable recovery is recorded, in a case in which the anterior mediastinum was opened.

Private Charles P. Betts, Co. I, 26th New Jersey Vols., aged twenty-two, was struck by a three-ounce grape-shot, on the morning of May 3d, 1863, in a charge upon the heights of Fredericksburg. The ball comminuted the sternum, at the level of the third rib, on the left side, and tore through the costal pleura. It remained in the wound and was removed by the patient. On the following day, Betts entered the hospital of the Second Division of the Sixth Corps. Through the wound the arch of the aorta was distinctly visible, and its pulsations could be counted. The left lung was collapsed. When sitting up there was but slight dyspnœa. Several fragments of the sternum were removed, and the wound soon granulated kindly. On May 10th, a colored drawing of the wound was made. (No. 19, Surgical Series of Drawings, S. G. O.) On July 5th, the patient was transferred to Washington, convalescent. He ultimately recovered perfectly.

The result was less favorable in the next case.

Private Patrick H. B——, Co. C, 147th Pennsylvania Vols., was wounded at Chancellorsville, May 2d, 1863, by a conoidal musket-ball, which entered between the second and third ribs, on the right side, two inches from the median line, fractured the sternum, and lodged beneath it. The wound bled profusely, but the hæmorrhage was arrested by pressure. The patient was conveyed to Douglas Hospital, at Washington, on May 8th, and died the following day. He had hæmoptysis and the symptoms of traumatic pneumonia.

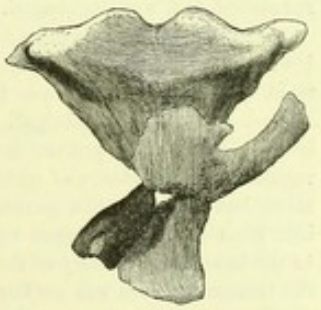


Fig. 28.—Sternum, showing a gunshot fracture by a musket-ball. The misshapen, battered ball is attached. *Spec.* 1073, A. M. M.

Only four cases are recorded of gunshot wounds of the heart that came under treatment. The specimens from these four cases are preserved in the Army Medical Museum. The patient that lived longest after a gunshot wound of the heart survived twelve hours (Spec. 837, A. M. M.). In this case a small pistol-shot entered the left ventricle and passed out through the right auricle.

Not a few cases are recorded of gunshot wounds involving both the thoracic and abdominal cavities. Among them occur the following remarkable instances of recovery from this formidable kind of injury:

Lieutenant Daniel B——, 63d New York Vols., was wounded at Gettysburg, July 2d, 1863, by a conoidal musket-ball, which passed through the belly of the biceps of the right arm, entered the chest, traversed the base of the right lung and diaphragm, wounded the intestines, and passed out above the anterior superior spinous process of the left ilium. When admitted to the field hospital, he had dyspnœa and bloody sputa, and there was a fæcal discharge from the wound of exit. He was treated by large doses of opium, and, at the end of three weeks, convalescence was fairly established. In the course of a few months his wounds had entirely closed, and he rejoined his regiment for duty.

Captain Robert S ——, Co. A, 29th New York Vols., was wounded at Chancellorsville, on the 2d of May, 1863. A round musket-ball, fired from a distance of about one hundred and fifty yards, entered the eighth intercostal space of the left side, at a point nine and a half inches to the left of the extremity of the ensiform cartilage, and fractured the ninth rib. Without wounding the lung apparently, the ball passed through the diaphragm, and entered some portion of the alimentary canal. Captain S—— walked a mile and a half to the rear, and entered a field hospital. On examining his wound, the surgeons found a protrusion of the lung of the size of a small orange, which they unavailingly attempted to reduce. The wound was enlarged, and still it was impracticable to replace the protruded lung. On May 3d, the field hospital where Captain S—— lay was exposed to the enemy's fire. He walked half a mile further to the rear, and was there placed in an ambulance, and taken across the Rappahannock, at United States Ford, to one of the base hospitals. Here fruitless efforts were again made to reduce the hernial tumor, after which a ligature was thrown around its base and tightened. A day or two subsequently the patient passed into the hands of Surgeon Tomaine, who removed the ligature from the base of the tumor. A small portion of gangrenous lung separated and left a clean granulating surface beneath. On May 7th, the ball was voided at stool. On May 8th, the patient was visited by Surgeon John H. Brinton, U. S. Vols., who found him walking about the ward, smoking a cigar. There was an entire absence of general constitutional symptoms; no cough, no dyspnœa, no abdominal pain; the bowels were regular and appetite good. The protruding portion of the lung was carnified, and there was a dullness on percussion and absence of the respiratory murmur in a zone an inch and a half in width around the circumference of the base of the tumor. Surgeon Tomaine stated that the hernia had been gradually diminishing in volume. It was at this date half the size of an egg, and covered with florid granulations. On May 10th, a drawing of the parts was executed by Mr. Stauch, artist of the Army Medical Museum. On June 2d, Captain S—— was transferred to Washington. There was an elastic partly reducible tumor, over which was an oval granulating surface, an inch and a half by three-quarters of an inch. The vesicular murmur was perfect throughout the lung, except in the immediate vicinity of the tumor. Compression of the tumor was advised. After a furlough of sixty days, Captain S—— was again examined. The wound had entirely healed; the respiratory sounds were normal; there was still a slight hernia of the lung. The general health of the patient was excellent. At this date a second drawing was executed.

Private B. S. Sheridan, Co. A, 9th Massachusetts Vols., was wounded at Malvern Hill, July 1st, 1862, by a musket-ball, which entered the right side between the ninth and tenth ribs, and passed out a little to the right of the xyphoid cartilage. Soon after the reception of the injury, a portion of the lung protruded from the anterior wound, and from the posterior wound there was a constant dripping of bile. On July 4th, Sheridan walked from the ambulance station to James River, a distance of a mile and a half, with the hope of getting on board of a gunboat. He was disappointed, and was taken prisoner and conveyed to Richmond. No dressings were applied to the hernia of the lung. It was uncovered, and the patient occasionally washed it. He suffered little pain or dyspnœa, and there was an amazing absence of shock or prostration. On July 25th, the bile had ceased to dribble from the posterior wound, and the hernia of the lung had greatly receded. The imperfect field notes state that the patient ultimately recovered, and was exchanged.

Private Latimer Whipple, Co. H, 73d New York Vols., was wounded at Bristoe Station, Virginia, August 27th, 1862, and admitted to the First Division Hospital, at Alexandria, on August 31st. A musket-ball struck him on the right side, four inches above the crest of the ilium, and six inches from the spine, passed upwards and inwards, and lodged. On admission, the patient had cough, with bloody expectoration, and crepitant rales in the lower lobe of the left lung. There was a profuse discharge of bile from the wound. There was acute pain and tenderness in the hepatic region, but no evidence of peritonitis. At the end of a week the symptoms of acute inflammation of the lung subsided, but a cough, with purulent expectoration, persisted for months. Early in October the discharge of pus and bile from the wound began to diminish, and in November the pain ceased in the hepatic region, and was referred to the immediate vicinity of the orifice of the wound. The patient now began to walk about the ward. Throughout the treatment there was great tendency to constipation, which was obviated by enemata. In the middle of December the cough had nearly disappeared, and there was but a scanty discharge from the wound. On January 12th, 1863, the wound was entirely healed, and the patient was discharged from service.

GUNSHOT WOUNDS OF THE ABDOMEN.

Of 2707 gunshot wounds of the abdomen reported from the beginning of the war to July 1st, 1864, there were 2164 flesh wounds, and 543 cases in which the peritoneal cavity was penetrated or the abdominal viscera injured. Among the flesh wounds, 114 fatal cases are recorded, which were, in most instances, cases of sloughing from injuries of the abdominal parietes by shells. Of the 543 penetrating wounds, the results have been ascertained in 414, and were fatal in 308, or 74 per cent. The number of re-

coveries is unexpectedly large, but includes only cases in which the reports showed, beyond question, that the abdominal cavity had been involved. Abstracts of several such cases are subjoined:

Private John Barr, Co. E, 76th New York Vols., aged forty-five years, was admitted into Douglas Hospital, at Washington, May 18th, 1864, with a penetrating gunshot wound of the abdomen, received on May 9th, at the battle of the Wilderness. A conoidal musket-ball had entered at the junction of the left twelfth rib with its cartilage, and, passing downwards, backwards, and outwards through the ilium, lodged in the gluteal muscles, whence it was removed by incision. On admission, the wound copiously discharged a thin translucent fluid, resembling diluted bile, which evidently came from the small intestine, for, among other reasons, it had no fæcal odor. Were further proof of the origin of the discharge required, it would be furnished by the fact that three ascarides lumbricoides escaped from the wound during the second and third weeks of the treatment. The discharge, for nine days prior to admission, was, according to the patient, similar to that above noted. The patient was kept perfectly quiet in a recumbent posture. The discharge from the wound was facilitated by large masses of charpie being used to absorb it. For several weeks the patient was nourished solely by milk, milk-punch, and beef tea. His appetite was poor, his sleep much disturbed by cough. But there was no abdominal pain or tenderness, and at no time, throughout the treatment, was there any symptom of peritoneal inflammation. On May 22d, a soap and water enema was administered without result. Nothing more was attempted in this direction, as the patient was doing well, and nature seemed competent to meet every indication. On June 3d, the discharge had entirely ceased, and the patient was much improved. On June 6th, he had a large alvine evacuation, the first since May 9th. On June 11th, with the aid of an enema, he had another large dejection. From this time he improved rapidly. On August 16th, a fragment of necrosed bone, that could be recognized as a portion of the ilium, was removed from the wound in the gluteal region. About the same period bits of necrosed cartilage were taken from the fistulous orifices opening near the wound of entrance. The bowels were disposed to costiveness, and flatulence was troublesome. Early in October there was an attack of dysentery, which lasted one week. On May 5th, 1865, a needle-shaped bit of bone escaped from the wound of entrance. On May 8th, both wounds were entirely healed. On July 16th, the patient was photographed at the Army Medical Museum. He was then in good health.

Private George H. Bowers, 8th Illinois Cavalry, was wounded in a skirmish near Frederick, Maryland, September 13th, 1862, by a musket-ball, which entered two inches above the umbilicus, an inch to the left of the linea alba, and made its exit beneath the tenth rib, three inches to the left of the spinous process of the tenth dorsal vertebra. Immediately after he was shot, he vomited blood copiously until syncope supervened. Hæmatemesis recurred frequently for seven days, and blood was passed at stool. Acute peritonitis ensued. The medical attendants had no doubt that the stomach was perforated. Liquids taken into the stomach passed freely through the anterior wound. The case was treated by opium in large doses. In May, 1863, the patient was transferred to the hospital at Stewart's Mansion, in Baltimore. The wound had healed, and the digestive organs had resumed their normal action. But the body was bent forward by intra-abdominal adhesions. The patient was subsequently discharged from service.

In many instances fæcal fistulæ were produced. They commonly closed after a time, without operative interference, reopening at intervals, and then healing permanently.

Sergeant Lewis E. Morley, Co. F, 61st New York Vols., was wounded at Gettysburg, July 1st, 1863, by a conoidal musket-ball, which entered a little below the umbilicus and to the left of the linea alba, and passed directly through the body, dividing the intestine in its passage. When brought to the field hospital he was in a state of collapse. Fæces escaped from the wound. There was excessive tenderness and pain. Opiates were freely administered, and the symptoms of peritonitis gradually abated. On July 10th, the patient was in a condition to be removed to Baltimore. The discharge of fæces from the wounds continued until September 28th, when there was an evacuation by the rectum. The wounds soon afterwards closed, and on October 27th, the patient was sent home on furlough.

Private A. J. Marker, Co. I, 4th Maine Vols., aged eighteen years, was wounded at Centreville, September 1st, 1862, by a conoidal musket-ball, which entered the left hypochondriac region, between the eighth and ninth ribs, and lodged under the skin a little to the left of the spinous process of the second lumbar vertebra. He entered Epiphany Hospital, at Washington, on the following day, and the ball was removed by an incision. There was immediately a copious fæcal discharge through the incision. It was ascertained that the ninth rib was fractured, and fragments of it were removed. On September 5th, a portion of gangrenous omentum presented at the posterior wound and was excised. A sphacelated portion of the descending colon was also removed. The fæcal fistula persisted until May, 1863, when the discharge from the anterior wound became sero-purulent. A month afterwards both wounds healed up soundly, and the patient was sent to his home in Belfast, Maine. In November, 1863, while the wounds were still discharging stercoraceous matter, a colored drawing was made, which is No. 15 of the Surgical Series of Drawings, S. G. O.

Private John Harm, Co. I, 20th Indiana Vols., was wounded at the battle of Fair Oaks, May 31st, 1862, by a

musket-ball, which entered three inches to the right of the spine and one inch above the crest of the ilium, and, passing upwards across the abdominal cavity, made its exit in the left hypochondriac region. He was admitted to Broad and Cherry Streets Hospital, in Philadelphia, on July 29th, 1862. He stated that there was free hæmorrhage from the wounds at first, and subsequently a discharge of fæces. At the date of his admission, the wound of exit had closed; but fæces and flatus still escaped by the posterior wound. At the end of October, 1862, this wound also closed; but it reopened a few weeks subsequently, and a fragment of flannel was extracted from it. After this it healed soundly, and the patient was discharged from service.

Private Franklin Harsh, Co. G, 7th Ohio Vols., was wounded at Chancellorsville, May 3d, 1863, by a conoidal musket-ball, which entered the abdomen six inches to the right of the umbilicus, and passed out posteriorly, having wounded the ascending colon and the crest of the right ilium. He was admitted to Armory Square Hospital, at Washington, and remained there for a long time with a fæcal fistula. On September 13th, 1863, the anterior wound had closed, and the discharge from the posterior wound was much diminished. Ultimately the fistula closed, and the patient was discharged from service. Early in the history of the case, a colored drawing of the patient was made. (Nos. 21 and 22, Surgical Series of Drawings, S. G. O.)

Sergeant Joseph E. Fletcher, Co. D, 8th Connecticut Vols., aged twenty, was struck at the battle of Antietam, September 17th, 1862, by a musket-ball, which entered six inches to the left of the umbilicus, and, passing somewhat downwards, emerged an inch and a half to the left of the spine. The ball opened the descending colon, and when the patient was examined by Surgeon T. H. Squire, 89th New York Vols., there was a profuse fæcal discharge from the wound of exit. The ensuing peritonitis was circumscribed, and the patient was transferred to Frederick, a few weeks subsequently, in a satisfactory condition. The fæcal fistula finally closed and the patient recovered.

Lieutenant G. P. Deichler, Co. I, 69th Pennsylvania Vols., aged twenty-two years, was wounded by a conoidal musket-ball, at Hatcher's Run, Virginia, in March, 1865. The ball entered the right iliac region, and, passing through the ascending colon, made its exit a little to the left of the last dorsal vertebra. The patient was taken to a field hospital, and from thence to Armory Square Hospital, at Washington, where he was admitted on April 1st, in an exhausted condition, with grave symptoms of peritonitis. There was a copious fæcal discharge from both wounds. Appropriate dressings were applied, a fourth of a grain of sulphate of morphia was ordered to be given every second hour, and stimulants were directed. On April 7th, sloughs separated from both wounds, and left a clean granulating surface. A large piece of sphacelated omentum was removed from the anterior wound. The opiate treatment was continued till April 27th, when there was a fæcal evacuation by the anus, for the first time since the injury. On June 12th, the discharge from the wounds was very slight. The edges of the wounds were now refreshed and approximated by adhesive strips. On August 10th, the anterior wound was firmly healed. There was a small fistulous sinus at the posterior wound, discharging pus scantily. On this day, a photograph was taken at the Army Medical Museum, from which the plate opposite is copied, and the patient left the hospital for his home in excellent general health.

Private Robert Brierly, Co. A, 1st Delaware Vols., aged twenty-two, was wounded at the battle of Antietam, by a conoidal musket-ball, which entered a little to the left of the umbilicus, and lodged under the muscles near the anterior superior spinous process of the right ilium. There was great prostration, with nausea and vomiting, which were treated at the field hospital by the administration of opiates. Three weeks subsequently, the patient was transferred to Frederick, Maryland. On October 25th, fæces escaped through the lower wound, which had been for several days in a sloughing state. The artificial anus continued open until November 15th. On November 25th and December 11th, there were attacks of colic, followed by reopening of the fæcal fistula. By the end of December, the wounds appeared sound and permanently healed, and the patient was transferred to Baltimore, and subsequently was discharged from service.

Private James T. Dowdy, 28th Virginia (Rebel) Regiment, aged twenty-three years, was wounded at the battle of Gettysburg, July 3d, 1863, by a conoidal musket-ball, which entered at the tip of the ensiform cartilage, and remained in the body. He was removed to one of the Gettysburg field hospitals. On July 4th, fourteen hours after he was shot, he passed the ball at stool. There was no general peritonitis, and the wound healed promptly, and the patient was transferred to Baltimore, and thence sent to City Point, Virginia, for exchange.

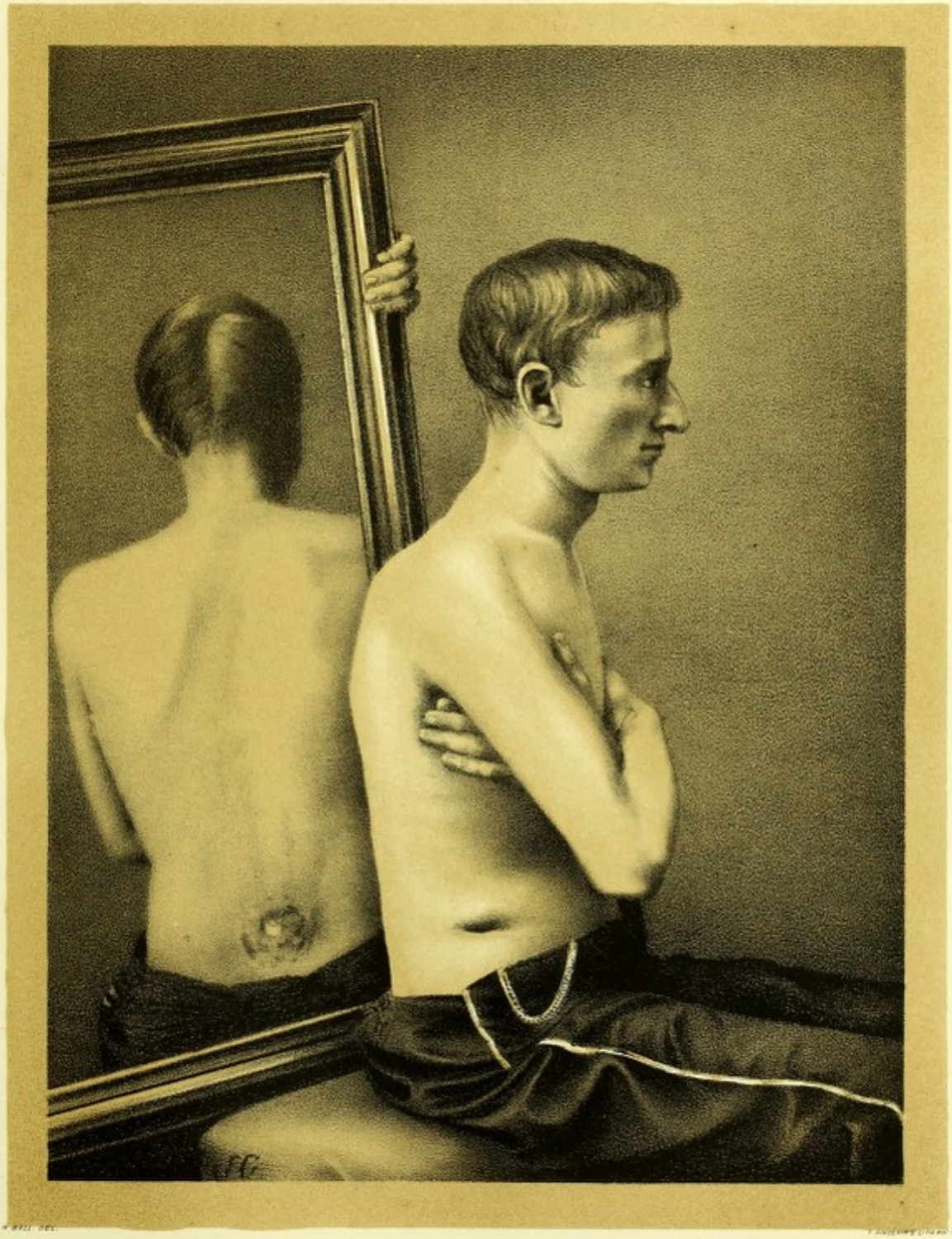
Recoveries after wounds of the large intestines have been much more numerous than after wounds of the ileum or jejunum.

No case has been reported in which it was thought expedient to apply a suture to the intestines after gunshot wounds.

Gunshot wounds of the liver were usually followed by extravasation into the abdominal cavity and rapidly fatal peritonitis. Of 32 cases in which the diagnosis was unquestionable, all but 4 terminated fatally. Abstracts of two of the fortunate cases are appended:

Private Fritz Siebel, Co. D, 139th New York Vols., aged twenty-three years, was wounded at Cold Harbor,





PERFORATING GUNSHOT WOUND OF THE ABDOMEN.

CASE OF LIEUTENANT DEICHLER.

Virginia, June 3d, 1863, by a musket-ball, which entered the right hypochondriac region, below the tenth rib, and passed out posteriorly an inch and a half to the right of the spine. He was admitted to Harewood Hospital, at Washington, on June 18th, in a very feeble state. There was a fæcal discharge from the wound, mixed with bile. The ball had passed through the colon and the liver. There was great abdominal pain, an anxious countenance, nausea, and the other symptoms of traumatic peritonitis. A cold water-dressing was applied, and opium was administered in full doses. On July 1st, the pain on pressure was circumscribed, and the general symptoms were less threatening. The discharge from the wound was unaltered. On September 1st, the wound of exit had healed, and the anterior wound discharged only a thin serum. On September 14th, the wound of entrance closed. The patient was furloughed on October 8th, 1863, and on the expiration of his furlough was returned to duty.

Corporal W. A. C. Biles, Co. K, 25th North Carolina (Rebel) Regiment, was wounded at Gettysburg, July 3d, 1863, by a conoidal musket-ball, which passed through the lower portion of the right lobe of the liver. He was treated at one of the field hospitals at Gettysburg, and his case was carefully observed by Surgeon H. Janes, U. S. Vols. There was a free discharge of bile from both the wound of entry and of exit. There was circumscribed pain and tenderness on pressure, but apparently no extra-abdominal extravasation. The wounds continued to discharge bile until August 27th. On November 1st, the patient was transferred to West's Buildings Hospital, at Baltimore, and on November 12th, 1863, he was sent to City Point, Virginia, for exchange, his wound being entirely healed.

All the cases of gunshot wounds of the spleen that have been reported, were fatal. No symptoms are mentioned that particularly distinguished these from other gunshot injuries involving the abdominal cavity, and it is quite possible that the list of recoveries may include cases in which this viscus was injured, though the diagnosis was not made out.

A case is recorded of a lacerated wound of the abdominal walls, with lesion and protrusion of the pancreas, a portion of which is reported to have been excised. It appears probable that it was rather a portion of the omentum that was removed. Several cases are reported in which it was believed that recovery took place after gunshot wounds of the kidney:

Private Groff, Co. D, 61st Pennsylvania Vols., was admitted on June 8th, 1862, to Fifth Street Hospital, in Philadelphia, for wounds received at the battle of Fair Oaks, June 1st, 1862. He had a flesh wound of the left hip, another of the right thigh, and a wound in the left lumbar region, which was considered to be a penetrating wound of the abdomen. Immediately after he was struck, blood passed freely by the urethra. When he entered the hospital, he had hæmaturia. His wounds healed, however, kindly, and he left the hospital entirely well.

Sergeant Galloway, Co. H, 8th Pennsylvania Reserves, was wounded at South Mountain, September 14th, 1862, by a musket-ball, which passed through the abdomen. He was treated at Satterlee Hospital, in Philadelphia. He had hæmaturia, and pain and tenderness in the region of the left kidney. He ultimately recovered.

It can hardly be considered that the evidence of gunshot wound of the kidney was, in these cases, unequivocal.

Gunshot wounds of the bladder, when the projectile entered above the pubes or through the pelvic bones, have proved fatal, so far as the records have been examined. There are many examples of recovery, however, from injuries of the parts of the bladder uncovered by the peritonæum.

Several examples of recovery, after protrusions of the abdominal viscera through gunshot wounds, have been reported. In two cases in which loops of small intestine issued, they were immediately returned and retained by means of adhesive strips and bandages, and the patients recovered with ventral hernia. The escape of omentum, through wounds, would not appear to be a very serious complication, for in many cases portions of protruding omentum have been excised, and the patients have, nevertheless, recovered promptly.

In relation to gunshot wounds of the great vessels of the abdomen, a few words will be said in treating of ligations.

Penetrating wounds of the abdomen, complicated with fractures of the vertebræ,

uniformly proved fatal. A single extract will suffice to show the usual progress of such cases.



FIG. 29.—Gunshot fracture of the second and third lumbar vertebræ. *Spec.* 3583, A. M. M.

Corporal John E——, Co. M, 14th New York Heavy Artillery, was wounded before Petersburg, in July, 1864. He was sent to Washington, and admitted to Douglas Hospital, with peritonitis and complete paraplegia. A musket-ball had entered at the right hypochondriac region, passed downwards through the right lobe of the liver and the abdominal cavity, and fractured the second and third lumbar vertebræ. He died on August 3d, 1864.

At the Army Medical Museum are specimens of 18 gunshot wounds of the stomach or intestines, 10 of the liver, 8 of the spleen, 10 of the kidneys, 4 of the bladder, and 6 of the genito-urinary organs

GUNSHOT FRACTURES OF THE PELVIS.

The records under this head include only the cases in which the abdominal cavity was not penetrated. From the beginning of the war to October 1st, 1864, 359 such cases have been reported. Recovery took place in 97, death in 77, and the result is still to be ascertained in 185. In 256 cases the ilium alone was injured, the ischium alone in 19, the pubes in 12, the sacrum in 32, and in 40 cases the lesions extended to two or more portions of the innominata.

The gravity of these cases depended upon the location and extent of the fracture. The majority of recoveries were from fracture of the ilium by musket-balls, in which the crest was grooved, or comparatively slight injury was inflicted. Yet there were many examples of perforation of the body of the ilium with ultimate recovery. The following is an abstract of such a case:

Major H. A. Barnum, 12th New York Vols., was wounded at Malvern Hill, July 1st, 1862, by a conoidal musket-ball, which entered midway between the umbilicus and the anterior superior spinous process of the left ilium, passed through the middle of the ilium, and emerged posteriorly. On July 2d, he was captured and taken to Libby Prison, a distance of eighteen miles, in an express wagon. On July 17th, he was taken to Aikens' Landing in an ambulance, a distance of seventeen miles, and exchanged. He was conveyed by water to Albany, and thence by rail to Syracuse, New York. At no time were any symptoms of peritonitis manifested. On October 1st, Major Barnum went to Albany, where Dr. March dilated the anterior wound by an incision and extracted several fragments of the ilium, and directed that a tent should be worn. Promoted to the command of the 149th New York Vols., Colonel Barnum took the field in January, 1863. He wore the tent about a month, when the anterior wound healed. About the middle of March, a large abscess formed, and evacuated itself at the site of the anterior wound. In April, Dr. March again cut down to the ilium, and introduced a tent. No loose fragments of bone were found. The Colonel resumed his duties, and commanded his regiment at Gettysburg. In January, 1864, another large abscess formed, and discharged posteriorly. The orifice was enlarged by Dr. L. A. Sayre, of New York, and a seton of oakum was passed from before backwards through the entire track of the ball. This was worn for several weeks, when Surgeon M. K. Hogan, U. S. Vols., substituted a seton of candle-wick, which was gradually reduced in size, and finally replaced by a single linen thread. A photograph of the patient was taken at the Army Medical Museum in August, 1865. The wound still discharged slightly, and the thread seton was still worn. Promoted to be a brigade commander, General Barnum has been almost continually in the field for the past two years. He participated in the campaigns of Atlanta, Georgia, and Carolina, was shot through the right forearm at Kenesaw Mountain, and received a shell wound of the side at Peach Tree Creek.

In most cases of injury of the pelvic bones, very tedious suppuration ensued, and surgery could do but little, except to facilitate the escape of pus, and to remove dead bone as it became separated. The returns corroborate the observation of Stromeyer, that there is a great liability to pyæmia in gunshot fractures of the pelvis.

GUNSHOT WOUNDS OF THE GENITO-URINARY ORGANS.

In this category are included gunshot wounds of the genitals or urinary organs that are not complicated with fractures of the pelvis, or with penetration of the abdominal cavity. To October 1st, 1864, the reports furnish 457 such wounds, of which 37 had a fatal result.

Surgeon S. W. Gross, U. S. Vols., reports the singular history of a soldier of the 16th U. S. Infantry, struck at Shiloh, on the right side of the penis, by a conoidal musket-ball, which buried itself in the corpus cavernosum, and became encysted. It gave no pain, and the patient refused to have it extracted.

The following is an interesting case of gunshot wound of the bladder:

Private Conrad L——, Co. A, 23d Indiana Vols., aged thirty-two years, was wounded at Vicksburg, Miss., June 23d, 1863, by a fragment of a hand-grenade, which entered the right nates two inches outside of the end of the coccyx, and passed into the bladder, where it lodged. Urine passed by the wound immediately after its reception. The patient was admitted into the General Hospital at Jefferson Barracks, Missouri, August 5th, 1863. His general health was much impaired. The urine passed mainly by the wound, and was largely mixed with pus and blood. The treatment directed comprised warm fomentations, mild diuretics, stimulants, and nutritious diet. On February 20th, 1864, a catheter was with much difficulty passed by the urethra, and the presence of a foreign body was ascertained. On March 19th, the general condition was improved, the wound was so far closed as to admit only a large-sized probe. Attempts to pass a catheter or to probe the wound caused chills and febrile irritation. On April 2d, 1864, the lateral operation of lithotomy was performed by Surgeon John F. Randolph, U. S. A., the patient being anæsthetized by equal parts by bulk of chloroform and ether. A rectangular fragment of shell, largely incrusted with earthy phosphates, was extracted. It was two inches in length, seven-eighths of an inch in width, and three-eighths of an inch in thickness. It weighed two ounces and five grains troy. On April 12th, the urine passed by the wound. On April 27th, the wound had healed, and the patient was soon afterwards restored to his ordinary condition of health. The incrusted fragment of shell is preserved in the collection of the Army Medical Museum (Spec. 88). It weighs 898 grains, portions of the phosphatic deposit having crumbled away.



FIG. 20.—Fragment of grenade incrusted with calculous matter, extracted from the bladder by lithotomy. Spec. 88, A. M. M.

GUNSHOT WOUNDS OF THE UPPER EXTREMITIES.

When unaccompanied by lesions of the vessels and nerves, the gunshot flesh wounds of the upper extremity are not very serious injuries. All foreign bodies having been extracted, they commonly heal, under the use of water-dressings and the lightest bandaging, in a few weeks. The 21,248 cases entered on the registers are all copied from the reports for the last quarter of 1863 and the first two quarters of 1864.

The gunshot fractures of the upper extremity are recorded in four classes: those of the scapula and clavicle, which are not, at the same time, penetrating wounds of the chest; those of the shaft of the humerus and either of its articular extremities; those of the ulna and radius; and those of the carpus and metacarpus. It is only with the second class that much progress has been made. This comprises 2408 cases of gunshot fractures of the humerus that have been examined and recorded. Recovery followed in 1253 cases, death in 436, and the result is as yet undetermined in 719 cases. In the 1689 completed cases, amputation or excision were practised in 996, and conservative treatment was adopted in 693, with a ratio of mortality of 21 per cent. in the former and 30 per cent. in the latter. But it is premature to make deductions from statistics which are daily augmenting and tending towards completion.

Gunshot lesions of the upper extremity are illustrated at the Army Medical Museum by 978 specimens, including examples of almost every variety of contusion and fracture, of the repair of fractures, of consecutive diseases of bones, and of excisions, amputations, and their secondary lesions. A few specimens are copied here.



FIG. 31.—Left scapula, showing a gunshot fracture, nearly parallel with the spine of the scapula, with two fragments of a conoidal musket-ball. *Spec.* 178, A. M. M.

Private William F——, Co. F, 18th Massachusetts Vols., aged thirty years, was wounded at the second battle of Bull Run, August 30th, 1862, by a conoidal musket-ball, which entered to the left of the spinal column, and, passing outwards, traversed the body of the scapula and the muscles of the upper part of the arm. The patient was conveyed to Union Chapel Hospital, at Alexandria. On the 3d, and again on the 5th of September, misshapen pieces of ball and a few fragments of bone were extracted through an incision on the outer edge of the scapula. On September 19th, symptoms of purulent infection were manifested. An active treatment by stimulants, quinia, iron, and ammonia, was instituted, but unavailingly, and on September 25th, 1862, the case terminated fatally. At the autopsy, a large collection of extravasated blood was found beneath the scapula, and between the muscles of the shoulder. There was extensive serous effusion in the left pleural cavity, and numerous metastatic foci in both lungs.



FIG. 32.—Left humerus, comminuted by a conoidal musket-ball. *Spec.* 1082, A. M. M.

A soldier of the 2d Division of the 12th Army Corps had his left arm shattered by an elongated musket-ball, in the attack on the stone wall on the heights at Fredericksburg, December 14th, 1862. Primary amputation at the shoulder-joint was performed, and the patient recovered. The specimen illustrates the ordinary longitudinal splitting produced by a conoidal ball in the shaft of a long bone.

Private B—— W——, Co. I, 37th New York Vols., aged twenty-two years, was wounded at Williamsburg, Virginia, May 5th, 1862, in the right elbow, by a conoidal musket-ball. A simple dressing was applied, and he was removed to Yorktown, and thence to Philadelphia, where he was admitted to Race Street Hospital. No report could be obtained of the progress of the case until March 13th, 1863, when the patient was transferred to the McClellan General Hospital, at Nicetown, with extensive necrosis of the shaft of the humerus and caries of the elbow-joint. About the joint and arm there were numerous sinuses, through which a profuse purulent discharge escaped, and, occasionally, small fragments of detached bone. Under a supporting treatment, the general condition improved. About the middle of July, it was first noticed that the patient's legs were œdematous. General anasarca ensued, and an examination of the urine showed that it was highly albuminous. The patient became rapidly worse, and on August 12th, an uncontrollable diarrhœa set in, accompanied by vomiting. The case terminated fatally, August 22d, 1863. The characteristic lesions of Bright's disease were revealed by the autopsy.



FIG. 33.—Necrosis of the shaft of the humerus, following a gunshot wound of the elbow. *Spec.* 2749, A. M. M.

GUNSHOT WOUNDS OF THE LOWER EXTREMITIES.

Of these, 30,014 cases have been recorded, of which 4862 were fractures, and 25,152 were flesh wounds. The latter were transcribed from the reports from October 1st, 1863, to October 1st, 1864. It has not been practicable as yet to tabulate the flesh wounds of the lower extremities that occurred in the earlier part of the war.

For gunshot fractures of the femur, two registers have been kept. On one, all cases were entered. On the other, only those in which the histories of the cases had been carefully scrutinized, and in which the locality and extent of the injury were clearly designated in the reports. In the latter register 1823 cases had been entered on September 1st, 1865, or about one-third of the total number that have been reported.

Gunshot wounds of the knee-joint, with or without fracture of the patella, or of the epiphyses of the femur or tibia, have been recorded in like manner, to the number, thus far, of 1183.

Of the 1823 cases of gunshot fracture of the femur that have been entered on the permanent records, the results have been ascertained in 1233. Of the 1183 cases of gunshot wounds of the knee-joint, the results are known in 740.

While it is deemed premature to discuss these results when it may be reasonably hoped that the completed statistics will definitely settle the important questions that are here involved, it is yet thought expedient to report them, chiefly that the magnitude of the subject may be put in evidence, and that the absolute necessity for long and patient investigation may be acknowledged.

The following table exhibits at a glance the results of 2003 cases of gunshot fracture of the femur, or of gunshot wounds of the knee-joint, out of a total of 3106 cases hitherto recorded. The fractures of the femur are separated according to regions. The left hand column gives the number of cases belonging to each region of which the ultimate results have been satisfactorily determined. The right hand column gives the total number of cases of injuries of each region that have been recorded. The intermediate columns give the comparative results of treatment by amputation, excision, or attempt at conservation of the limb, the number of recoveries and deaths and unfinished cases in each category being mentioned, and the rate of mortality calculated for the finished cases alone.

Table, exhibiting the Results of 2003 *Terminated Cases of Gunshot Fracture of the Femur, or of Gunshot Wounds of the Knee-Joint, out of* 3106 *Cases that have been entered on the Records.*

	Total terminated.	Amputation.				Excision.				Conservative Measures.				Aggregate.
		Recovered.	Died.	Undetermined.	Mortality rate of determined cases.	Recovered.	Died.	Undetermined.	Mortality rate of determined cases.	Recovered.	Died.	Undetermined.	Mortality rate of determined cases.	
Gunshot Fractures of Femur, implicating Hip-Joint	82	0	2	0	100·	2	10	1	83·33	0	68	14	100·	97
Gunshot Fractures of upper third of Femur	387	8	24	11	75·	7	18	6	72·	93	237	199	71·81	603
Gunshot Fractures of middle third of Femur	346	42	51	47	54·83	2	13	10	86·66	106	132	148	55·46	551
Gunshot Fractures of lower third of Femur	418	131	112	117	46·09	1	1	0	50·	72	101	137	58·38	672
Gunshot Wounds of the Knee-Joint, with or without Fracture	770	121	331	266	73·23	1	9	1	90·	50	258	146	83·76	1183
	2003	302	520	441	63·26	13	51	18	79·68	321	796	644	71·26	3106

In examining the above table in detail, it is seen that the results are ascertained in 822 of the 1263 cases treated by amputation, or 65 per cent.; in 64 of the 82 cases treated by excision, or 78 per cent.; and in 1117 of the 1761 cases treated by conservative measures, or 63 per cent.

The only recorded recoveries after gunshot fracture of the femur involving the hip-joint are those in which excision was practised. In fractures of the upper third, the mortality rate is greatest for the cases treated by amputation. There were 43 of these cases, and in 19 of them the amputation was done at the hip-joint. Excision gives 7 recoveries after fractures of the upper third; 2 of these were excisions of the head and a portion of the shaft of the femur, 4 were formal excisions of the continuity, and 1 was a removal of fragments and rounding off of sharp edges of bone, which was admitted among the excisions with some hesitation. Under conservative measures 93 cases of fracture of the upper third had survived the injury a year or more, and are reported as recovered. The mortality rate of the completed cases of amputation for gunshot wounds of the knee-joint is large, and will probably be modified when the results of the numerous unfinished cases are recorded. It depends partly, however, upon the excessive mortality of intermediate amputations of knee-joint injuries. With six or eight exceptions, the 50 recoveries without amputation classified with gunshot wounds of the knee-joint were examples of fractures of the patella, in which the evidence that the joint was opened was not unequivocal.

Comparing in gross the 822 finished cases treated by amputation, with the 1117 treated by conservation, the mortality rate of the former has the advantage by 8 per cent.; an advantage that is maintained in the different regions, except in the upper third. It must be remembered that the amputations include most of the bad cases, and those in which preservation of the limb was attempted and abandoned.

But little progress has been made in the examination and registration of the fractures of the tibia and fibula. Only 1056 have been recorded, of which 696 are terminated cases, chiefly belonging to the earlier periods of the war. Of these, 169, or 24 per cent., were fatal.

A similar remark applies to the fractures of the tarsus and metatarsus. But 629 cases have as yet been recorded.

For gunshot fractures of the phalanges, it has been thought superfluous to keep a separate register, as the majority of such cases will appear on the register of amputations of the toes.

At the Army Medical Museum, the gunshot injuries of the lower extremity are illustrated by 1984 specimens, comprising examples of almost every conceivable form of contusion or fracture, illustrations of secondary lesions, and of reparative attempts in all stages, wet preparations showing the appearances of wounds of entrance and exit, the ravages of hospital gangrene, wounds or consecutive lesions of the great vessels, numerous drawings, casts, and photographs, and, among the latter, representations of over seventy patients, who had so far recovered after gunshot fracture of the femur as to be able to move about.

The specimens of fractured or diseased bones at the Museum are arranged according to the regions involved, the primary being separated from the secondary lesions, and the illustrations of operations being classified apart. Representations of a few specimens will be introduced here.

In Stromeyer's classification of the action of bullets on bone, the fifth division is that in which the ball pierces the bone and forms a canal without causing further splintering. Examples are common in the upper portion of the tibia, but very rare in the upper extremity of the femur. The following is such an instance:

Captain James M. L——, Co. I, 20th Indiana Vols., was admitted into Columbia College Hospital, at Washington, June 29th, 1862, with two gunshot wounds, received a day or two previously in one of the battles before Richmond. The first wound was through the left lumbar muscles. After receiving it the officer fell, and while lying on the field he was again struck by an elongated musket-ball, which entered on the outer side of the left thigh, a little below the great trochanters, and, passing upwards and inwards, lodged. A finger could be readily passed into the perforation in the femur, but the ball could not be reached. Three formal attempts to ascertain its position and accomplish its removal were made unsuccessfully. The patient died from exhaustion on August 19th, 1862. The near proximity of the ball had not induced any disease of the hip-joint. The specimen and the facts relating to it were contributed by Assistant Surgeon W. M. Notson, U. S. A.



Fig. 34.—Upper extremity of left femur perforated by a conoidal ball. *Spec.* 565, A. M. M.

An illustration of a comminuted gunshot fracture in the trochanteric region is given in the section on excisions of the head of the femur. Of comminuted fractures of the shaft of the femur by the conoidal musket-ball, the following is a fair example:



Fig. 35.—Fracture of the shaft of the left femur by a musket-ball. *Spec.* 1907, A. M. M.

Private John Draker, Co. I, 57th Pennsylvania Vols., aged twenty-five years, was wounded while on picket duty on the Rapidan, November 27th, 1863. A conoidal musket-ball passed through the muscles of the right thigh, and, entering the middle of the left thigh at its inner side, flattened itself against the femur, and shattered the bone. The patient was transferred to Alexandria by rail, and admitted, December 4th, 1863, to the Second Division U. S. A. General Hospital. He died December 13th, 1863.

Just above the condyles, where the cancellated structure of bone predominates, musket-balls often make a clean perforation. But the wedge-like action of the elongated musket-ball almost invariably involves longitudinal splintering. The following is a good illustration:

Private Samuel S. Kopp, Co. E, 10th Pennsylvania Reserves, was shot through the lower third of the right thigh, by a musket-ball, at the second battle of Bull Run, August 28th, 1862. The ball entered just above the patella, and made its exit in the popliteal space. The patient was taken, after a few days, to Alexandria. On September 20th, 1862, his thigh was amputated at the middle. He survived the operation two days.

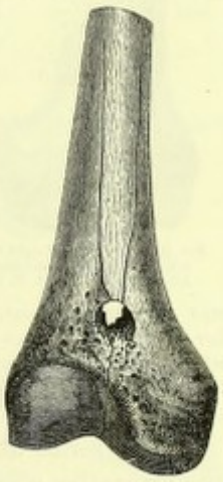


Fig. 36.—Perforation of the right femur by a musket-ball. *Spec.* 76, A. M. M.

The later writers on military surgery have duly insisted upon the different effect upon bones of the impact of round musket-balls and of the cylindro-conical projectiles. The degree of difference in the injuries inflicted has, perhaps, been exaggerated. It is unquestionably true, however, that the round ball usually produces much less longitudinal splintering than the conoidal ball, with its greater weight and immense force of propulsion and wedge-like action. In the case which furnished Specimen 3228, A. M. M., where a round ball entering the outer condyle behind, passed upwards, forwards, and inwards through the bone, it was practicable to amputate successfully much nearer the track of the ball than would have been admissible in the case quoted just before.



Fig. 37.—Condyle of left femur nearly perforated by a round musket-ball. *Spec.* 3228, A. M. M.

One curious effect, occasionally produced by the heavy conoidal ball in striking the femur, has not been very generally noticed. The bone is fissured and comminuted, though less than is common,

at the point at which the ball impinges, while at two or three inches above or below this point, according as the point of impact is below or above the middle of the shaft, a nearly transverse fracture of the shaft is produced. The accompanying figure is an example; but the Museum contains a dozen better illustrations. The best are of cases in which a ball has struck the condyles anteriorly, and the shaft is snapped across two inches above. In several of these specimens, the transverse fracture is not connected by fissures with the comminuted fracture produced by the ball. It appears that these injuries were produced by balls fired at short range.



Fig. 38.—Fracture of the upper third of the left femur by a conoidal musket-ball. *Spec.* 1148, A. M. M.

When the femur is simply contused by a ball, a limited necrosis commonly ensues from the destruction of the periosteum, and inflammation of the medullary cavity often results, and death from pyæmic infection. The records would indicate that gunshot contusions of the long bones, a subject ably discussed* of late by Surgeon J. A. Lidell, U. S. Vols., are more dangerous accidents than comminuted gunshot fractures even. Of gunshot contusions of the femur, there are seventeen specimens at the Army Medical Museum. Several of these bones were sawn through the long axis, immediately after the death of the patient, and colored drawings were prepared, exhibiting the appearances of the inflamed or suppurating or gangrenous medulla.



Fig. 39.—Lower end of right femur, split by a conoidal musket-ball. *Spec.* 1788, A. M. M.

Cases in which a portion of the shaft of the femur is gouged out, or a part of its cylinder crushed without entire division of the continuity, are also very fatal. The following is an example:

Private Orson B. Norwood, Co. K, 3d Michigan Cavalry, was wounded July 15th, 1863, in a skirmish near Jackson, Tennessee. He was acting as a vidette at the time, and was stationed on a bridge. The ball, fired from below, produced a long fissure in the lower third of the inner aspect of the femur, and was itself split by the compact lamina of the bone. This patient was removed to the General Hospital, at La Grange, Tennessee, July 22d, 1863. The thigh was then erysipelatous, and amputation was deemed inadvisable. September 27th, 1863, he was removed to the Washington Hospital, at Memphis, where he died of pyæmia, October 2d, 1863. The fragment of the inner surface of the femur, though but slightly separated from the diaphysis, was found to be necrosed.



Fig. 40.—Left femur, exhibiting attempts at repair after a gunshot fracture of the upper third. The patient survived ten weeks. *Spec.* 1938, A. M. M.

The series at the Army Medical Museum, illustrating the reparative efforts of nature after gunshot fractures of the femur, consists of 190 specimens, and is of exceeding interest. A few cases are selected. The first shows the extent of repair ten weeks subsequent to the injury.

Private E. W. A——, Co. G, 5th Florida (Rebel) Regiment, aged eighteen years, was wounded July 3d, 1863, at the battle of Gettysburg, by a conoidal musket-ball, which shattered the upper third of the left femur. He was first treated at a field hospital, but on August 5th, 1863, was admitted to Camp Letterman General Hospital. At that date, the patient was reduced by profuse suppuration; he was greatly emaciated, and large bed-sores had formed on his back. On August 12th, a troublesome diarrhœa set in. He lingered

* American Journal of Medical Sciences, vol. xlix. p. 17, *et seq.*

till September 15th, 1863, when he died from exhaustion. The large foliaceous masses of callus uniting the fragments were extremely delicate and brittle.

In the next case, the patient likewise survived ten weeks after a comminuted gunshot fracture of the middle third.

Corporal H. Burns, Co. H, 31st New York Vols., was struck by a conoidal ball, at the battle of Chancellorsville, May 3d, 1863. The missile fractured the shaft of the left femur, with the usual longitudinal splintering. On May 8th, the patient was admitted to Douglas Hospital, at Washington, and it was decided to attempt to save the limb. This was first suspended by Smith's anterior splint. Afterwards Hodgen's apparatus was applied, and apparently answered a better purpose; but large abscesses having formed in the thigh, and free incisions becoming requisite, a long fracture-box, filled with bran, was substituted. On June 16th, 1863, the ball and several fragments of detached bone were removed. The patient died on July 11th, 1863, from exhaustive suppuration. Several days before his death gangrenous patches appeared on the left leg. (Figure 41.)



Fig. 41.—Partially consolidated gunshot fracture of the middle third of the left femur. *Spec.* 1643, A. M. M.

In the next case, the patient survived more than four months.



Fig. 42.—Partially consolidated gunshot fracture of the left femur. *Spec.* 3267, A. M. M.

Sergeant Sewell T. Douglas, Co. G, 1st Regiment Maine Heavy Artillery, aged twenty-eight years, was wounded at the battle of Spottsylvania, and was admitted to Emory Hospital, at Washington, May 22d, 1864. A musket-ball entering posteriorly, had fractured the lower third of the left femur, and lodged in the medullary cavity. The injured limb was placed on a double inclined plane, and moderate extension was used. Internally, stimulants and tonics were employed. In August, 1864, the patient suffered from severe diarrhœa. There was a copious ill-conditioned discharge from the wound. The patient died September 26th, 1864, from exhaustion, and, at the autopsy, a deposition of callus was found at the seat of injury, enclosing several necrosed splinters and a battered musket-ball.

In the following case the process of repair had gone on for nine months, and union was nearly complete, when the patient was carried off by an intercurrent disease.

Private Christian Holzworth, Co. B, 20th Indiana Vols., was wounded at the second battle of Manassas, August 29th, 1862, by a conoidal musket-ball, which entered on the anterior aspect of the upper third of the left thigh, and lodged against the femur, which was fractured with extensive longitudinal splitting. He was conveyed to Armory Square Hospital, at Washington. No particulars of the treatment employed can be ascertained, but it is reported that in March, 1863, he was able to go about on crutches, and that he was "doing well" until the latter part of May, when an attack of cerebro-spinal meningitis supervened, and terminated fatally on May 25th, 1863. Upon examination of the injured limb, the fractured extremities of the femur were found to be united, with great angular deformity, by irregular arches of callus. A fragment of the ball was enclosed between the arches. The specimen was contributed by Assistant Surgeon Byrne, U. S. A. (Figure 43.)



Fig. 43.—Partially consolidated gunshot fracture of the left femur. *Spec.* 1161, A. M. M.

The next figure represents a specimen in which consolidation is quite firm. The patient succumbed to phthisis seven months after the injury.

Private Luman M. Millius, Co. K, 6th Pennsylvania Reserves, was wounded at Antietam, September 17th, 1862, by a conoidal musket-ball, which entered a little below the great trochanter of the right thigh, shattered the upper third of the femur, and lodged beneath the skin on the inner part of the right thigh, whence it was extracted through an incision. The patient was treated in a field hospital until the middle of October, when he was transferred to the General Hospital, at Smoketown. Although a slender man, with a narrow chest and feeble organization, his condition on admission was not unpromising. During the autumn of 1862, the suppuration was copious, and fragments of necrosed bone were occasionally discharged. Under a nourishing diet, the patient's strength was supported remarkably. On January 21st, 1863, the fracture was firmly consolidated. The

limb was shortened four inches. The wound on the inner side of the thigh had closed. There was a slight fistula, with trifling discharge at the wound of entrance. The patient passed several hours daily in the open air, on crutches. About this time, cough and night-sweats, and other indications of tuberculosis of the lungs, appeared, and confirmed phthisis was soon established. The patient died March 9th, 1863. (Figure 44.)



Fig. 44.—Upper half of right femur, exhibiting a consolidated gunshot fracture. *Spec.* 1042, A. M. M.

Of gunshot injuries of the knee-joint, the Museum possesses 355 specimens. A number of illustrations will be given.

The case that furnished Specimen No. 2134 (Private Baldwin, Co. K, 42d Indiana Vols.) was treated by laying open the knee-joint, by free incisions, as soon as suppuration was established. The patient was wounded September 20th, at Murfreesboro', and died December 12th, 1863. The injury to the outer condyle was very slight. The specimen was contributed by Surgeon Israel Moses, U. S. Vols.



Fig. 45.—Outer condyle of right femur, grooved by a musket-ball. *Spec.* 2134, A. M. M.

Dr. Bellanger has recorded* five fatal cases of gunshot injuries of the knee-joint treated by free incisions into the articulation, and Surgeon Lidell, U. S. Vols., has published three such cases.† The records contain a score of similar examples. Yet amputations for gunshot injuries of the knee that have reached the secondary period are scarcely less disastrous.

The next case well illustrates the obscurity of symptoms and difficulty of diagnosis of a serious gunshot injury of an articulation so accessible for examination as the knee. The fracture of the internal condyle was not discovered until after death. The specimen was contributed by Surgeon J. A. Lidell, U. S. Vols.



Fig. 46.—Gunshot fracture of the internal condyle of the left knee. *Spec.* 1390, A. M. M.

Private Kisner, aged twenty-nine, Co. E, 7th Michigan Cavalry, was wounded June 19th, 1863, while on picket at Chantilly, Virginia, by an elongated carbine-ball, which entered in front at the middle of the left thigh. He was admitted to hospital, in Washington, on June 26th, and the ball was cut out from beneath the integument on the inner aspect of the knee. On the next day, there was pain and tenderness of the joint. Death took place July 18th, 1863.

In the next case a conoidal ball, fired from a great distance, has crushed the anterior part of the femur just above the condyles, and produced fissures that extend to the joint. The patient that furnished this specimen was wounded at Petersburg, March 31st, was amputated at Emory Hospital, April 7th, and died on June 24th, 1865. The specimen was contributed by Surgeon N. B. Mosely, U. S. Vols.

The two following figures exhibit the common appearances of fractures of the bones composing the knee-joint by round musket-balls.



Fig. 47.—Partial fracture of the left femur by a conoidal ball, which has lodged in the cancellated structure. *Spec.* 4071, A. M. M.

Private Richard Williams, 28th Pennsylvania Vols., was wounded September 16th, 1862, at the battle of South Mountain, by a musket-ball, which entered near the outer hamstring, and lodged between the condyles of the right femur. He was conveyed to Washington, D. C.,

* American Journal of Medical Sciences, vol. xlvi. p. 42. † Ibid., vol. xlix. p. 295.

and admitted into Mount Pleasant General Hospital, September 22d, 1862. On September 30th, his right thigh was amputated by flap incisions. At this date the limb was excessively swollen; the discharge of pus was profuse; abscesses had burrowed in the soft parts, and irritative fever existed to an alarming degree. The case terminated fatally on October 2d, 1862.



Fig. 48.—Lower extremity of right femur, the outer condyle split off by a round musket-ball. *Spec.* 59, A. M. M.

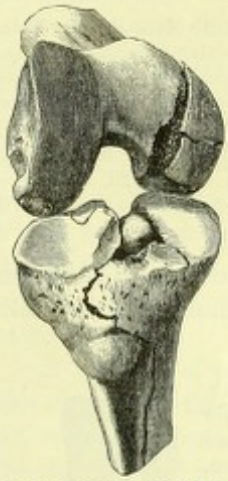


Fig. 49.—Amputated end of right femur and head of tibia, with a round musket-ball impacted in the latter. *Spec.* 1481, A. M. M.

Private —— ——, a soldier of the 3d Division of the 1st Army Corps, was wounded at Gettysburg, Pennsylvania, on July 1st, 1863, by a musket-ball, which entered through the right popliteal space, fissured the internal condyle of the femur, and lodged in the head of the tibia. He underwent amputation at the lower third of the thigh on July 15th, and died July 17th, 1863. The specimen was contributed by Surgeon Quinan, in charge of the Division Hospital. (Figure 49.)

Three patients have been photographed at the Army Medical Museum who had recovered without amputation after gunshot injuries of the knee-joint. (Photographs Nos. 63, 64, and 78.) Four or five additional cases appear upon the records. In scarcely any of these cases could it be asserted that the danger of consecutive disease of the knee-joint was passed. The "curious fact," adverted to by Surgeon I. Moses, U. S. Vols.,* "that more men had been discharged the service at that post [Louisville, Kentucky] who had received gunshot wounds of the knee-joint with recovery than when amputation of the thigh had been performed," is directly contradicted by the official reports from that post.

The following is the most carefully compiled of the abstracts of cases of recovery after gunshot wounds involving the knee. Photograph 63, A. M. M., represents the patient.

Private Peter Stuck, Co. E, 116th Pennsylvania Vols., was wounded on May 12th, 1864, at the battle of Spottsylvania, and was admitted, on May 18th, to Douglas Hospital, in Washington. The projectile, which was probably a conoidal musket-ball, had entered at the inner edge of the right patella, passed directly through the articulation, and made its exit near the centre of the popliteal space. The inner condyle was slightly grooved, but the ball passed mainly through the intercondyloid notch. There was an abundant thin discharge of mingled pus and synovia. The joint was somewhat swollen, but the inflammatory symptoms and constitutional disturbance were moderate. The patient was of a delicate organization. The treatment was limited to rest and water-dressings. On June 9th, there was swelling and pain in the joint, and a febrile reaction. Poultices were applied to the wound of exit, the anterior wound having healed. In a few days the bad symptoms abated. In the latter part of August, 1864, the patient began to walk about on crutches, the leg being flexed at an angle of 135° with the thigh. In October, the limb was bandaged to a movable angular splint, and the flexion was gradually reduced. Almost complete extension was obtained without exciting inflammation in the joint. The patient kept his bed during this period of the treatment. For the following eight months nothing of special interest transpired. There were several attacks of inflammation of the joint; but they were moderate in degree, and were readily subdued by poulticing. On such occasions abscesses sometimes formed in the thigh. For the greater part of the time the patient's appetite was fair, his bowels regular, his sleep refreshing. When inflammatory mischief was threatened, poultices, hot fomentations with flannel covered with oiled silk, and applications of tincture of iodine were employed. At other times, cold water-dressings, with charpie to absorb the discharge, were used. Ice was never applied. A photograph was taken July 9th, and the patient was discharged from service and the hospital July 14th, 1865. The posterior wound was still open, and a probe could be



Fig. 50.—Destruction of the left knee by a shell explosion. *Spec.* 709, A. M. M.

* American Journal of Medical Sciences, vol. xlvii. p. 341.

introduced through it for three inches. There was a large deposit of new bone. The patella was firmly anchylosed to the femur. The facts of the case were forwarded by Assistant Surgeon Wm. F. Norris, U. S. A.



FIG. 51.—Upper portion of left tibia comminuted by a fragment of the base of a shell, which is attached. *Spec.* 4121, A. M. M.

Two more illustrations of gunshot injuries of the knee-joint are here introduced:

The patient who furnished the first (Private B. M——, Co. A, 28th Massachusetts Vols.) was brought to Washington on December 26th, 1862, his left knee having been shattered by a shell at the battle of Fredericksburg, on December 14th. He died on December 29th. Evidently primary amputation could alone have saved this man, and this was probably impracticable on that disastrous day. (See Figure 50 on the preceding page.)

In the next case of shell wound involving the knee-joint (Private C. H. M——, Co. F, 1st Maine Heavy Artillery), primary amputation was performed on October 2d, by Surgeon Jamieson, 86th New York Vols. The patient died of exhaustive suppuration on October 27th, 1864. (Figure 51.)

Of gunshot injuries of the tibia and fibula, two examples are given, one of fracture by a musket-ball, the other of comminution by solid shot:



FIG. 52.—Right tibia and fibula fractured by a musket-ball. *Spec.* 3004, A. M. M.

A general officer was wounded at the assault on Port Hudson, May 27th, 1863, by a conoidal musket-ball, which passed from the inner to the outer aspect of the right leg, and shattered the upper thirds of the tibia and fibula. A staff surgeon extracted a number of detached fragments of bone, and dressed the limb, and, on June 2d, the patient was removed to New Orleans. The wounds were opened, and decomposed coagula, pus, and bone splinters in large quantities were evacuated. The constitutional symptoms were of the most aggravated character. About the middle of June, amputation was performed at the lower third of the thigh by Professor Warren Stone, with the very slightest hope of success. The patient, however, struggled through, and ultimately wore an artificial limb with comfort. The specimen and the particulars of the case were contributed by Prof. F. Bacon, of Yale College, formerly Surgeon U. S. Vols. (Figure 52.)

Major General D. E. Sickles, U. S. Vols., was wounded on the evening of the second day of the battle of Gettysburg, by a twelve-pounder solid shot, which shattered his right leg. General Sickles was on horseback at the time and unattended. He succeeded in quieting his affrighted horse and in dismounting unassisted. Aid arriving promptly, he was removed a short distance to the rear, to a sheltered ravine, and amputation was performed low down in the thigh by Surgeon Thomas Sim, U. S. Vols. The patient was then sent to the rear, and the following day was transferred to Washington. The stump healed with great rapidity. On July 16th, the patient was able to ride about in a carriage. Early in September, 1863, the stump was completely cicatrized, and the general was able again to mount his horse. The specimen was contributed to the Army Medical Museum by General Sickles, and the facts of the case by his staff surgeon, Dr. Sim. (Figure 53.)



FIG. 53.—Right tibia and fibula shattered by a cannon-shot. *Spec.* 1335, A. M. M.

GUNSHOT WOUNDS OF THE ARTERIES.

The number of cases reported under this head is extremely small. In the campaign of the Army of the Potomac from the Rapidan to the James, in May, June, and July, 1864, of a total of 36,508 gunshot wounds, only 27 belonged to this category. The cases of compound fracture complicated with injuries of the large vessels, the cases in which limbs are carried away by solid shot or shell, and the cases in which all the tissues of a limb are disorganized by contusion from a large projectile and the vitality of the arteries is destroyed, are all returned under other heads. Those only are included in which the canal of a large vessel is primarily opened, and in which this

is the principal accident. Such cases are to be sought for among the dead on the battle-field rather than in the field hospitals. Surgeon J. A. Lidell, U. S. Vols., reports that on the morning of March 25th, 1865, he examined 43 bodies of soldiers killed in the combat near Fort Steadman, in the lines before Petersburg; 23 were shot in the head, 15 in the chest, and 5 in the abdomen. "The bodies of all those wounded in the abdomen were very much blanched, as if they had died of hæmorrhage, and the same remark held true in regard to all but two or three of those wounded in the chest." In the few cases of primary gunshot lesions of the arteries that came under treatment, it was usually found that only a portion of the calibre of the vessel had been carried away, and that retraction had been thus prevented. But 44 cases are entered on the records. In most of them, ligatures were placed above and below the seat of injury; but, in a few instances, the main trunk was tied at a distance, and amputation was practised when the bleeding recurred. Twenty of the 44 cases terminated fatally.

A number of drawings at the Army Medical Museum, exhibiting the course of balls directly in the track of the great vessels of the neck or of the limbs, illustrate the fact so well known to military surgeons of the great resiliency of the large arteries. The dread of primary hæmorrhage on the battle-field is confined to the inexperienced. It was so exaggerated at the beginning of the war, that it was seriously proposed by several benevolent associations that every soldier should carry a field tourniquet with his equipments.

GUNSHOT WOUNDS OF VEINS.

No cases have been reported in which the bleeding could not be controlled by pressure.

GUNSHOT WOUNDS OF NERVES.

Only those cases are recorded as yet upon the register that were reported in the last quarter of 1863 and the first quarter of 1864. Numerous and careful observations on this class of injuries have been received from the Christian Street Hospital, in Philadelphia, in which wards were especially assigned, in 1863, for the treatment of such cases.

SABRE AND BAYONET WOUNDS.

The number of sabre and bayonet wounds that have come under treatment has been comparatively small; 105 cases of the former and 143 of the latter comprise nearly all that have been reported for the first three years of the war. Of these wounds, two-thirds were received in action, and the remainder were inflicted by sentinels or patrols. There are 11 deaths from sword wounds recorded, and 6 from bayonet wounds. At the Army Medical Museum there are 9 specimens of sabre cuts of the cranium,* a specimen of punctured fracture of the skull by a bayonet, and a preparation exhibiting a bayonet thrust through the stomach.† From General Sheridan's

* Specimens 235, 970, 971, 974, 1672, 2623, 3307, 3684, 4206.

† Specimen 2258, A. M. M.

campaign in the Shenandoah Valley, 25 sabre wounds are reported; and from the battle of Jonesborough, in Georgia, 30 bayonet wounds. After the first battle of Bull Run, several of the wounded left upon the field were bayoneted by the insurgents.* A patient, brought afterwards to Georgetown, received no less than fourteen stabs. A similar instance occurred after the battle of Fair Oaks.† Later in the war such atrocities were very infrequent. A few abstracts are subjoined of cases of sword and bayonet wounds:



FIG. 54.—Three sabre cuts on the left parietal. *Spec.* 3307, A. M. M.

Private R—— H——, Co. C, 7th Colored Regiment, U. S. Artillery, was wounded at Fort Pillow, Tennessee, April 12th, 1864, by three sabre cuts on the left side of the head, one of the wounds penetrating the skull. The symptoms are not recorded, but it is stated that the patient died on April 21st, 1864, and that the post-mortem examination revealed a large extravasation of blood upon the brain, and a splinter an inch and a half long from the inner table driven through the dura mater.

Private J. T. B——, Co. F, 7th Michigan Cavalry, was captured on July 3d, 1863, at Gettysburg, his horse being shot under him. He was hurried to the rear with other prisoners. In the subsequent retreat he was unable to keep up with the column, and all efforts to goad him on being unavailing, a confederate lieutenant, in command of the provost guard, cut him down, and left him for dead by the roadside. He was brought in by a scouting party, and admitted to the Cavalry Corps Hospital. On the 25th of July, he was sufficiently rational to give the above account to Surgeon Rulison, 9th New York Cavalry. He was in a very depressed state at this time. His pulse was weak, and beat from 40 to 45 per minute. He was indisposed to mental exertion; but when aroused and interested was quite rational. He lingered until August 15th, 1863, the tendency to stupor becoming greater and greater towards the close. The autopsy revealed a sabre cut six inches long, which had raised an osseous flap, adherent at its base, from the left parietal, and cloven the right parietal, with great splintering of the vitreous plate. The sabre had penetrated the dura mater on the left side, and on the right side the meninges were injured by the depressed inner table. The posterior lobes of both hemispheres of the brain were extensively disorganized. The specimen, with the above history, was contributed by Surgeon W. H. Rulison, 9th New York Cavalry, since killed in battle.

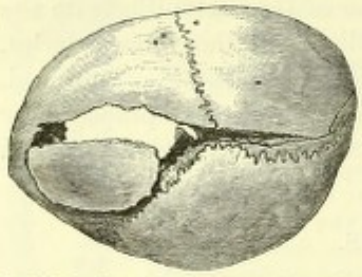


FIG. 55.—Section of the posterior portion of a cranium, showing a sabre cut of both parietals parallel to the lambdoidal suture. *Spec.* 1672, A. M. M.

Private John H——, aged twenty-five, of the guard of Lovell General Hospital, Portsmouth Grove, Rhode Island, was confined on February 28th, 1863, in a strong box, as a punishment for bringing liquor into camp. When released, he rushed upon the sergeant of the guard and struck him, whereupon the sergeant drew his sword and put himself *en garde*. In this position the prisoner made a second assault, but the ground being uneven he slipped, and fell heavily upon the point of the sword, and to the ground. When raised, his face was bleeding, and he was insensible. He was examined by the medical officer of the day, who found a slight cut on the ala of the nose, and ascribed the insensibility to intoxication, and to the fall on the head. The prisoner was removed to the guard-house and there spent the night. In the morning, he was still unconscious and breathed stertorously, and had a slow pulse and dilated pupils. He was removed to a ward in the hospital, and the remedies commonly employed in cases of apoplexy were prescribed. There was no return of consciousness, and the case terminated fatally on March 2d, thirty-one hours after the injury. At the autopsy, it was found that the sword had entered at the right nostril, pierced the right superior turbinated bone and the body of the sphenoid, and caused a transverse fracture at the base of the posterior clinoid process. There was much extravasated blood in the cranial cavity, especially on the surface of the right hemisphere.

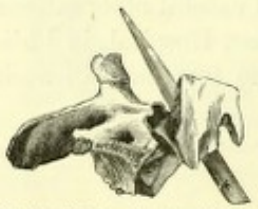


FIG. 56.—Portion of a sphenoid bone transfixed by a sword. *Spec.* 1612, A. M. M.

---

* Surgeon Joseph R. Smith's Report.

† Report of Assistant Surgeon H. E. Brown, 70th New York Vols.

Private Thomas B——, Co. B, 90th Ohio Vols., was admitted into Hospital No. 1, Nashville, Tennessee, on November 27th, 1863, with a bayonet wound behind the left parietal protuberance, inflicted by a sentinel, whom the patient, being intoxicated, had refused to obey. For several days after admission he was somnolent and obstinately constipated. Under the use of powerful purgatives this condition was removed, and the wound nearly cicatrized. But, on December 8th, the patient complained of headache, and a probe passed through the small orifice of the wound revealed the presence of denuded and detached bone. A crucial incision was made and the fragments of dead bone were removed. On December 11th, there was more headache, and a tendency to stupor; the pulse was at 48; there was intolerance of light and sound; the scalp was tumid; the wound gaping, and filled with fungous granulations. The incisions in the scalp were extended, an ice-bladder was applied to the head, and purgatives and purgative enemata were employed. A day or two subsequently cerebral hernia took place; then extended suppuration in the left hemisphere; then delirium and coma, and death on December 23d, 1863. The description and specimen were contributed by Assistant Surgeon C. J. Kipp, U. S. Vols.

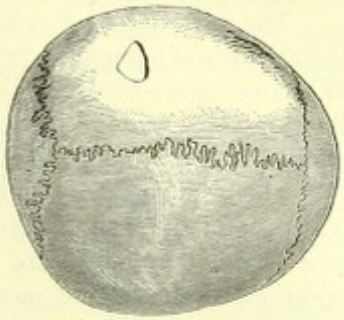


Fig. 57.—Skull-cap, exhibiting a fracture of the left parietal bone by a bayonet. *Spec.* 2179, A. M. M.

SIMPLE FRACTURES AND MISCELLANEOUS WOUNDS.

The number of cases reported is quite large, and the record is still very incomplete. For the first two years of the war, the monthly reports give of simple fractures alone 2864 cases with 92 deaths.

The Army Medical Museum possesses comparatively few illustrations of this class of injuries, and it is to be desired that this department of the collection may be augmented.

Specimen No. 6 presents a good example of a united simple fracture of the femur through the trochanters. It was taken from a man of forty, who died of pneumonia two years after recovery from the local injury.

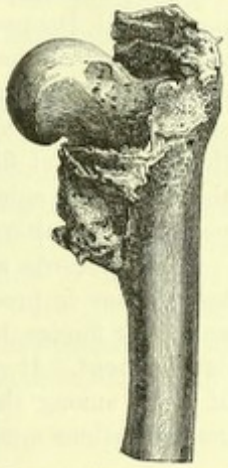


Fig. 58.—Firmly consolidated simple fracture of the left femur. *Spec.* No. 6, A. M. M.

The number of incised and punctured wounds received in broils and altercations is quite numerous. The following is an interesting example of this class of cases:

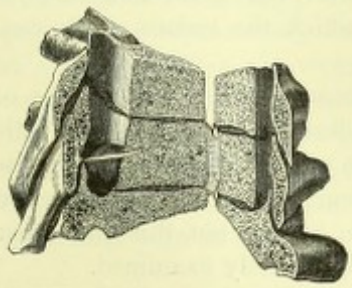


Fig. 59.—Fourth, fifth, and a portion of the sixth dorsal vertebræ, sawn asunder to exhibit a dirk which traversed the spinal canal. *Spec.* 1160, A. M. M.

Private George S——, Co. B, 15th New York Engineers, was stabbed in the back by a dirk, April 20th, 1863, at Falmouth, Virginia, in an altercation with a comrade. The blade passed between the transverse processes of the fourth and fifth vertebræ, and severed the spinal cord. The man fell instantly, completely paraplegic. He was admitted to Armory Square Hospital, at Washington, April 22d. On April 27th, he began to pass his fæces and urine involuntarily, and bed-sores appeared on the portions of the lower part of the body exposed to pressure. He sank gradually, and died from exhaustion on May 27th, 1863. The specimen was contributed by Assistant Surgeon C. C. Byrne, U. S. A.

TETANUS.

The 363 cases of traumatic tetanus recorded in the register for that subject are all that have been reported during the war. The proportion to the total number of wounds is not large. In the Schleswick Holstein war, Stromeyer had 6 cases among 2000 wounded. In Napoleon's campaign in Egypt, in the Peninsular campaign, and

in the revolt in India, the ratio appears to have been larger than this. Among 12,094 wounded, the British in the Crimea had 19 cases only.

The histories of the 363 reported cases of tetanus are generally satisfactory in their details of symptoms, progress, and treatment: 336 cases terminated fatally. Of the 27 recoveries reported, the disease was of a chronic form in 23. In the 4 remaining cases, the symptoms were very grave. In 2, recovery took place under the use of opiates and stimulants; in 2, after amputation of the wounded part.

The great majority of the cases were treated by the free use of opium, conjoined with stimulants and concentrated nourishment. Chloroform inhalations were very generally employed during the paroxysms of spasmodic contraction. Subcutaneous injections of the salts of morphia and atropia were frequently used. Cathartics, quinia, camphor, cannabis indica, bromide of potassium, strychnia, belladonna, and aconite are mentioned among the remedies employed. Cups, blisters, turpentine stupes, and ice were among the applications made to the spine; and fomentations with opium or tobacco were, in some cases, applied to the wound. Amputation, the division of nerves, and the extirpation of neuromata in stumps were the surgical measures sometimes employed. The results have not modified the conclusion of Romberg, that "wherever tetanus puts on the acute form, no curative proceeding will avail, while in the milder and more tardy form, the most various remedies have been followed by cure." The value of nicotine, of the Calabar bean, and of curare* as curative agents in tetanus was not tested.

Autopsies were made in many cases; but with almost negative results. There were no microscopic examinations to corroborate or disprove the assertions of Rokitansky and Demme,† that tetanus has a constant anatomical lesion, consisting in a proliferation of the connective tissue of the white medullary substance of the medulla oblongata, of the inferior peduncles of the cerebellum, of the crura cerebri, and of the spinal cord, producing a viscous mass, abounding in nuclei, and never progressing to the formation of fibres. It is frequently mentioned, however, that great congestion of the brain and spinal cord was observed, a condition on which the lesions of the connective tissue above described are believed to depend.

The records abound with illustrations of the influence of sudden vicissitudes of temperature in producing this fatal affection, and of the effect which unextracted balls and other foreign bodies and matter confined under fasciæ appear to exercise upon its development. It seems probable also that the disease occurred in a larger proportion of cases among the troops serving in the more Southern States; but this and other generalizations must be deferred until the records are more minutely examined.

SECONDARY HÆMORRHAGE.

On this important subject the records are still very incomplete. There are 1450 special reports relating to it yet to be examined, which will furnish a large number of cases to be transcribed upon the register. The cases have been reported in three

* According to H. Demme, of 22 cases of traumatic tetanus treated by the latter agent, 8 recovered. See Schweiz. Zeitschrift für Heilkunde, ii. 356.

† Schmidt's Jahrbucher, vol. cxii.

classes: bleeding proceeding from a stump, from a gunshot wound, or from an artery previously ligated in its continuity. Cases of the latter series have not been placed on the registers of secondary hæmorrhage, but the repetition of the bleeding has been noted in the history of the case in the volume of the registers of surgical operations devoted to ligations.*

Of the two other classes, 1037 cases have been examined and recorded on the registers of secondary hæmorrhage. Of these, 387 were cases of secondary bleeding from a stump, and 650 were cases of secondary hæmorrhage from gunshot wounds. Of the first class, 233, or 60 per cent., ended fatally; of the second, the termination was fatal in 330 cases, or 51 per cent.

In the 1037 recorded cases, the femoral artery was ligated 93 times for bleeding from stumps, and 45 times for bleeding from wounds; the subclavian was tied 5 times for bleeding after amputation at the shoulder-joint, and 6 times for hæmorrhage from gunshot wounds of the axilla. The common carotid was ligated 15 times for hæmorrhage from the deep branches of the internal maxillary. Amputation was practised 78 times for secondary bleeding from gunshot wounds, and reamputation was performed 14 times when other means of arresting hæmorrhage from stumps had failed.

The 387 cases of secondary hæmorrhage from stumps were chiefly examples of arterial bleeding. In 95 cases, the hæmorrhage was, perhaps, mainly venous, and was checked by elevating the stump, or applying cold water, ice, pressure, or the solution of the persulphate of iron. When the hæmorrhage was arterial, the most common practice was to tie the main vessel, at the second bleeding, as near as was prudent to the end of the stump. In a few cases, the artery was successfully tied on the face of the stump. The results of tying the vessel above, according to Anel's method, were very unfortunate.

In reviewing the 650 recorded cases of secondary hæmorrhage from gunshot wounds, it appears that, during the earlier part of the war, there were many surgeons who were not sufficiently impressed by the precepts of Bell and Guthrie, and who frequently treated secondary hæmorrhage from gunshot wounds by tying the main trunk at a distance from the wound, even when the bleeding occurred at a comparatively early period. Later in the war, however, it was the universal practice to endeavor to secure both ends of the bleeding vessel at the seat of injury, and some brilliant examples are recorded in which this was accomplished in wounds of the posterior tibial or popliteal, when limbs had become infiltrated and swollen, and the difficulties of the operations were immense.

PYÆMIA.

On this subject 281 reports have been examined, and the individual cases detailed in them have been transcribed upon the registers: 251 special reports on the subject remain to be examined. The histories of 754 cases are recorded in the register, the post-mortem observations accompanying a large proportion of the fatal cases. These number 719, or 95·35 per cent. Pyæmia supervened in 377 cases of gunshot injury in which no operation had been performed, and after 295 cases of amputation, of which

* See page 85 of this Report.

155 were cases of amputation in the continuity of the femur. The purulent infection was subsequent to excision of the shafts of long bones in 27 cases, and to excisions of joints in 28 cases.

These figures by no means represent the frequency with which pyæmic poisoning has occurred. It has been one of the great sources of mortality after amputations, and its victims are to be counted by thousands. The small number of cases on the register are taken from special reports. Several valuable papers have been contributed on the pathology of this affection, and a number of statistical reports on its treatment. The conclusions of the latter are adverse to the therapeutical utility of the sulphites and hyposulphites in this disease.

A series of colored drawings, illustrating the embolic phenomena attendant on pyæmia, the metastatic dépôts, etc., have been prepared at the Army Medical Museum.

SURGICAL OPERATIONS.

All surgical operations are recorded on the registers of the office, according to the form which will be presented on a subsequent page, in treating of excisions of the head of the femur. The name and military description of the patient are given, the nature and date of his injury, an account of the operation, a notice of the local lesions which made it necessary, and of the constitutional condition of the patient at the period it was performed. A summary of the progress and after-treatment follows, and the result, if ascertained, the name of the operator, and the post-mortem appearances, when known, if the case terminated fatally. If the case furnished a pathological preparation to the Army Medical Museum, a reference is made to the number of the specimen on the catalogue.

While this plan involves much labor, it effectually precludes the duplication of cases, and ensures, probably, the highest attainable degree of statistical accuracy. The name and military designation of the patient being known in all cases, the ultimate results of operations can be traced, hereafter, and errors may be corrected.

Operations have been reported in this form from all general hospitals since October, 1863. But nearly half of the sixteen thousand operations now recorded were taken from special reports and field returns belonging to an earlier period of the war, and it was necessary that these should first be transcribed on the proper forms, a task that has been accomplished by clerks who were students of medicine, their work being revised by a medical officer.

AMPUTATIONS.

The histories of 13,397 amputations for gunshot injury have been examined and recorded, and the final results have been ascertained in 9705 cases. The following table exhibits the number belonging to each region, and includes both primary and secondary cases. It shows the regular increase in the rate of mortality as the trunk is approached.

Amputations of the Superior Extremities.	Recovered.	Died.	Total.	Per cent. of Mortality.
Fingers and Parts of the Hand	1778	29	1807	1·60
Wrist	34	2	36	5·55
Elbow	19	0	19	
Forearm	500	99	599	16·52
Arm	1535	414	1949	21·24
Shoulder-Joint	144	93	237	39·24
Total of Upper Extremity	4010	637	4647	13·70
Amputations of the Inferior Extremities.				
Toes	784	6	790	·75
Partial Amputations of the Foot	108	11	119	9·24
Ankle-Joint	58	9	67	13·43
Leg	1737	611	2348	26·02
Knee-Joint	52	64	116	55·17
Thigh	568	1029	1597	64·43
Hip-Joint	3	18	21	85·71
Total of Lower Extremity	3310	1748	5058	34·55
Aggregate	7320	2385	9705	24·57

Amputations of the Fingers and Portions of the Hand.—The cases that have been transcribed on the records form but a small proportion of the total number included in the reports. In the 1807 terminated cases, the mortality has been comparatively large. The causes of death in the 29 fatal cases are stated to have been: in 4, pyæmia; in 4, erysipelas; in 2, gangrene; in 1, tetanus; in 18, different intercurrent diseases, as typhoid and malarial fevers, pleurisy, etc.

Amputations at the Wrist.—The disarticulation at the wrist has been performed in preference to the amputation of the forearm, when the hand was totally disorganized. When practised by the circular method it is a good operation. The results of the cases examined are satisfactory, the mortality being ten per cent. less than in amputation of the forearm.

Amputations of the Forearm.—Except in those cases in which the wrist or lower extremity of the radius have been shattered by large projectiles, this amputation has commonly been practised secondarily. It has been impracticable to examine all the cases that have been reported. Of the terminated cases that have been transcribed upon the records, 99 died and 500 recovered. Of the latter, 397 have been supplied

with artificial limbs. In the forearm, the amputation by the double flap method has been generally preferred.

AMPUTATIONS AT THE ELBOW.—The returns corroborate the conclusions of Dupuytren, Malgaigne, and Legouest, who combat the disfavor into which this operation has fallen. It was done infrequently in the late war, but 19 cases having been reported. But in all of these the ultimate results have been ascertained, and were favorable in every instance. The success of Salleron and other French surgeons with this operation in the Crimea is well known. Whenever, then, it is impracticable to amputate the forearm, disarticulation at the elbow should be preferred to amputation of the arm. The oval method answers the purpose best in this locality.

AMPUTATIONS OF THE ARM.—Of 2774 cases of amputation of the arm that have been entered on the registers, the results are ascertained in 1949 cases: 1535 recovered, and 1014 of these patients have been furnished with artificial arms.

AMPUTATIONS AT THE SHOULDER-JOINT.—It is creditable to the surgery of the war that the number of cases of amputation at the shoulder-joint reported is less than the number of cases of excisions of the head of the humerus, and that the latter operation appears to have been adopted in nearly all the cases in which it was admissible. The reported cases of amputation at the shoulder-joint, for the entire period, number 458; of excisions of the head of the humerus, there were 575. Of the 237 terminated cases of amputation, 93 died, a ratio of mortality of 39·2, which is 6·7 per cent. greater than the mortality in excisions. The amputations of the upper extremity for gunshot injuries are illustrated at the Army Medical Museum by 89 examples of diseases of stumps, and by a large number of plaster casts and photographs, exhibiting the successful results of operations.

AMPUTATIONS OF THE TOES.—Of 784 cases that have been examined, 6 were fatal. Tetanus supervened in one case, and phlegmonous erysipelas invaded the leg in another. In the four remaining cases, the fatal termination was due to causes foreign to the operation.

PARTIAL AMPUTATIONS OF THE FOOT.—Of the 160 recorded cases, 119 were terminated, with a mortality of 9 24 per cent. The tarso-metatarsal operation of Hey or Lisfranc was performed 25 times; the medio-tarsal operation of Chopart 45 times. The remaining cases were ablations of toes with one or more of the metatarsals. There are several casts of stumps, made by Chopart's method, at the Army Medical Museum, which exhibit the drawing up of the heel which so frequently occurs after this operation.

AMPUTATIONS AT THE ANKLE-JOINT.—The record is far from complete. In the terminated cases, Syme's method was employed in 25 cases, Roux's method in 2 cases, and Pirogoff's in 9 cases. Several casts and photographs of well-rounded stumps, obtained by the latter procedure, are deposited in the Army Medical Museum. But the operation appears to be regarded with little favor. Baron von Horronitz, Surgeon-in-Chief of the Russian Marine, in his recent visit to this office, mentioned that Pirogoff had himself abandoned it, finding the segment of the os calcis likely to become necrosed. An abstract of a favorable case, with an illustration, is subjoined:

Lieutenant W. C. W——, Co. I, 5th Michigan Cavalry, was wounded April 1st, 1865, at the battle of Five Forks, by a conoidal musket-ball, which passed through his left ankle-joint. He was immediately carried to the hospital at City Point, and amputation at the ankle was performed on the same day by Surgeon St. Clair, 5th Michigan Cavalry. The articulating surfaces of the tibia and calcaneum were removed, and the cut surfaces were brought into apposition. On April 16th, 1865, the patient was transferred to Armory Square Hospital, at Washington. On admission, he was in a feeble condition. An erysipelatous blush extended above the knee on the injured side; an abscess had formed in the lower part of the leg; and no union of the flap had taken place. With the employment of stimulants and nutritious diet with emollient applications to the limb, there was a gradual improvement, until April 28th, 1865, when symptoms of pyæmic infection supervened. Rapidly recurring chills, an icteroid coloration of the skin and conjunctiva, anorexia, and a frequent feeble pulse, suggested the gravest prognosis. Energetic treatment was adopted. An ounce of brandy was given every two hours, and quinia, sesquichloride of iron, and beef tea were freely administered. On May 6th, the grave symptoms began to subside, and, by the end of the month, the patient was fairly convalescent. On June 26th, he was pronounced well. The os calcis had firmly united to the tibia, and there was a good solid stump. A cast in plaster was taken from it (Spec. 2298, A. M. M.), and a few days subsequently a photograph, which is numbered 75 in the Photographic Series of the Army Medical Museum.



FIG. 60.—Stump after a Pirogoff amputation.

AMPUTATIONS OF THE LEG.—Of the 3302 amputations of the leg that have been recorded, the results have been ascertained in 2348. The ratio of mortality was 26·02, which will doubtless be augmented by further examination of the returns. The operation just above the malleoli, sometimes called Lenoir's operation, has not been very largely practised, but it has given some excellent results, and its mortality rate is surprisingly small. The majority of the cases were amputations at the middle of the leg and at the place of election. The circular method has been most commonly employed. Larrey's operation through the head of the tibia has been done but little, though an examination of the specimens at the Army Medical Museum leads to the conviction that this procedure might have been substituted, in some instances, for disarticulation at the knee-joint, or amputations at the lower third of the thigh. Of the 1737 patients that recovered after amputation of the leg, 1057 have been furnished with artificial limbs.

AMPUTATIONS AT THE KNEE-JOINT.—This operation has found numerous advocates during the war, and has been frequently performed. The returns to October, 1864, give 132 cases, of which 52 recovered and 64 died. In 6 cases, amputation of the thigh was subsequently performed, with 3 recoveries and 3 deaths. In 10 cases, the result is undetermined. These figures are encouraging, and if we look at the primary operations alone, the result is still more gratifying. Of 49 cases of primary amputation at the knee-joint, 31 recovered and 16 died; while 2 underwent reamputation, of whom 1 recovered, and 1, a tuberculous subject, died. This gives a percentage of mortality in primary amputations at the knee-joint of 34·9. The mortality in primary amputation at the lower third of the thigh is much larger than this: indeed, it has been already indisputably proved by the Crimean statistics, and by M. Malgaigne, that the mortality in amputation augments in exact proportion as the incisions approach the trunk.

At the Army Medical Museum there is a photograph, accompanying Specimen 2778, of the fine, well-rounded stump of Private Nevelling, Co. A, 71st Pennsylvania

Vols., who was wounded at White Oak Swamp, and amputated, at Philadelphia, by Acting Assistant Surgeon T. G. Morton. The objection to amputations at the knee-joint, that the resulting stump is ill adapted to the use of an artificial limb, is set at rest by the results obtained by Hudson and other manufacturers, who distinctly declare that the stumps from the operation at the knee-joint give a base of support far better than any possibly to be gained in thigh-stumps.

It is well known that M. Legouest emphatically pronounces the disarticulation at the knee "une mauvaise opération, plus grave que l'amputation de la cuisse dans la continuité, et qui doit etre rejetée de la pratique," basing this assertion on the Crimean returns; but it is probable that the more extended experience of the late war will lead surgeons to share the convictions of Macleod, Baudens, and Malgaigne, that this operation is altogether preferable to the amputation at the lower third of the thigh.

Amputations of the Thigh.—In 1597 terminated cases, 568 recovered and 1029 died, or 64·43 per cent., which is within a fraction of the mortality after amputations of the thigh in the English army in the Crimea during the latter part of the campaign. In the French army in the Crimea, the whole number of amputations of the thigh for gunshot injuries was 1666, of which 1531, or 91·89 per cent., terminated fatally.

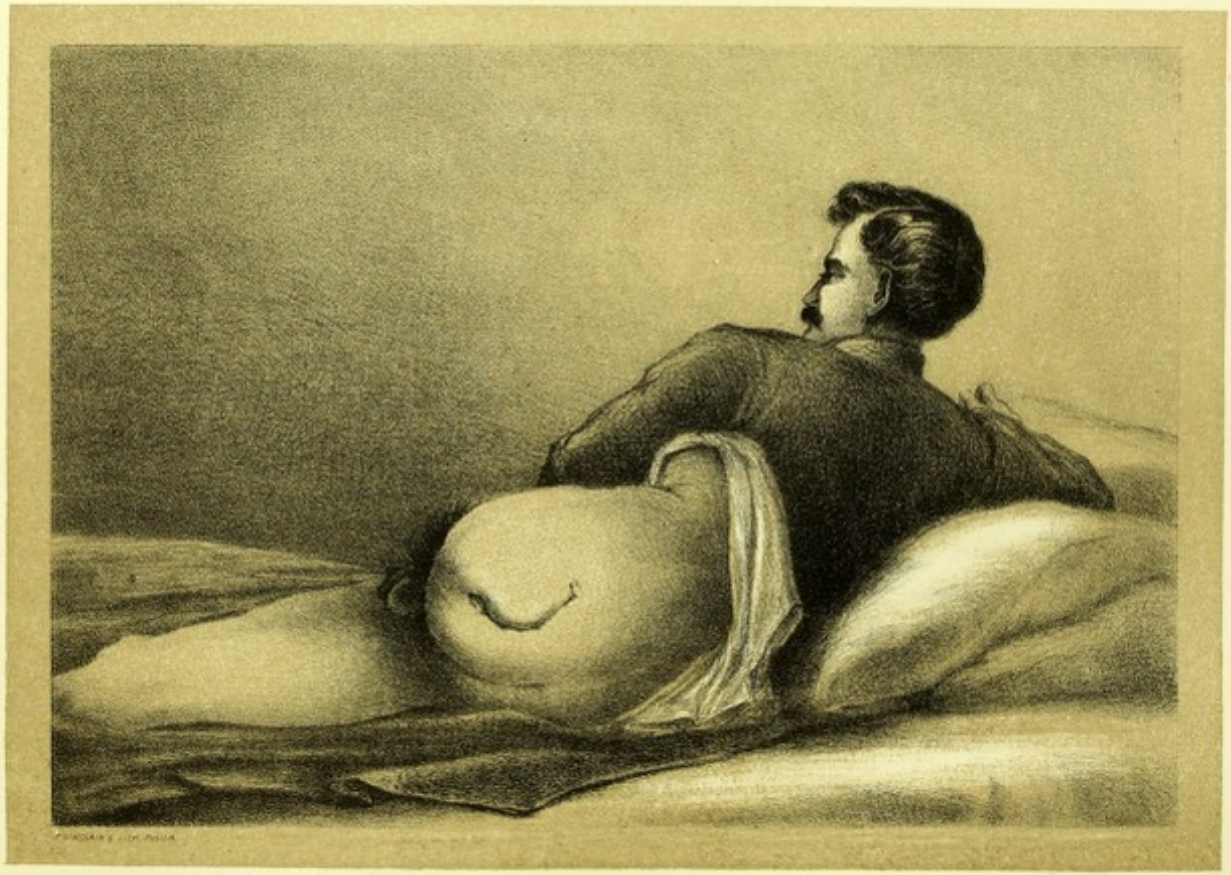
Of these 1597 amputations, the date of operation is ascertained with precision in 1061. Of these, 423 were primary and 638 were intermediate or secondary. The ratio of mortality was 54·13 in the former, and 74·76 in the latter.

In the 568 recoveries after amputation of the thigh above mentioned, the patients have been supplied with artificial limbs in 254 cases, and reports are on file of 439 other cases of recovery after this operation in which artificial limbs have been provided. These cases are not entered on the registers, because the returns exhibiting the deaths for the corresponding periods have not yet been reached.

Amputations at the Hip-Joint.—At the commencement of the war, the uniform fatality of amputation at the hip-joint in the Crimean war was impressed upon the minds of surgeons, and many believed that the operation should be discarded altogether. Still, it has been occasionally performed, and several lives have unquestionably been saved by it. A noted case is that of Kelly, whose appearance, after recovery, is represented in the plate opposite. The following is an abstract of the case:

Private James E. Kelly, Co. B, 56th Pennsylvania Vols., aged twenty-eight years, was wounded at about 9 o'clock of the morning of April 29th, 1863, in a skirmish of the First Division, First Corps, on the Rappahannock, nearly opposite the "Pratt House," below Fredericksburg. A conoidal musket-ball, fired from a distance of about three hundred yards, shattered his left femur. A consultation of the senior surgeons of brigades decided that exarticulation of the femur was expedient, and the operation was performed, at four in the afternoon, at the "Fitzhugh House," by Surgeon Edward Shippen, U. S. Vols., Surgeon-in-Chief of the First Division. The single flap method was adopted, and the amputation was accomplished with slight loss of blood. The patient was at first placed in a hospital tent, and was transferred, May 22d, to the Corps Hospital, progressing favorably. By May 28th, all the ligatures had been removed. On June 15th, 1863, the patient was captured by the enemy, and was removed to the Libby Prison, in Richmond. Up to this date there had been no bad symptoms. On July 14th, Kelly was exchanged, and was sent to the Annapolis U. S. A. General Hospital. On his admission, he was much exhausted by profuse diarrhœa. The internal portion of the wound had united, but the external portion was gangrenous. Applications of bromine were made to the sloughing surface without amelioration. A chlorinated soda lotion was substituted, and in the latter part of July, there was a healthy granulating surface. On December 23d, 1863, the wound had entirely healed, and Kelly visited Washington and obtained an honorable discharge from service, and a pension. Kelly then went to his home, near Black Lick P. O., Indiana County, Pennsylvania. A letter dated January 12th, 1865, was received from him at this office, and represented him as in excellent health and spirits at that time. A year after the operation, a photograph of the stump was obtained. The accompanying plate is copied from it.

SHOWING SUCCESSIVE AMPUTATION AT THE HIP JOINT



SHIPPEN'S SUCCESSFUL AMPUTATION AT THE HIP JOINT.

A successful primary case, operated upon at Memphis, by Dr. Fenner, is reported by a student of Dr. F. H. Hamilton, late Medical Inspector U. S. A., who saw the subject of it after his complete recovery.

A successful secondary case, reported by Assistant Surgeon C. Wagner, U. S. A., was a reamputation of a diseased stump. Necrosis of the femur was induced by osteomyelitis, and the disarticulation was effected at a period when the traumatic phenomena had entirely disappeared. The particulars of this case are subjoined:

Private Eben. E. Smith, Co. A, 11th Maine Vols., aged nineteen years, was wounded at the engagement at Deep Bottom, near Drury's Bluff, Virginia, on August 16th, 1864, by a musket-ball, which fractured the head of the right tibia. He was admitted at the U. S. General Hospital, at Beverly, New Jersey, on August 22d, 1864. On admission, the injured knee-joint was swollen and painful, and there was irritative fever of a moderate grade. On September 12th, secondary hæmorrhage occurred, and the thigh was amputated by circular incisions at the lower third, by Acting Assistant Surgeon T. M. Morton, U. S. A., the patient being under chloroform. The case progressed favorably until October 17th, when secondary hæmorrhage recurred, and was arrested by ligating the femoral artery in Scarpa's triangle. The stump remained swollen and painful, and furnished a profuse fœtid suppuration. Osteomyelitis supervened; the end of the femur protruded, and was removed by the chain-saw. Necrosis finally extended as high as the trochanters, and numerous abscesses formed. On January 19th, 1865, amputation at the hip-joint was performed, under chloroform, by Acting Assistant Surgeon J. H. Packard, U. S. A., the antero-posterior flap operation being adopted. On January 27th, there was hæmorrhage from the stump, and the external iliac artery was tied. The ligature separated on February 17th, and two days afterwards there was profuse bleeding from the divided artery, which was controlled by pressure for fourteen days. After this the patient rapidly improved. In April he was reported well, and Hospital Steward Baumgras, one of the artists of the Army Medical Museum, was sent to Beverly, and made the drawing from which the engraving was taken. It is numbered 67 in the Surgical Series of Drawings of the Surgeon General's Office. On April 12th, 1865, Smith was transferred to White Hall Hospital, near Bristol, Pennsylvania. Assistant Surgeon W. H. Forwood, U. S. A., reports that, on May 27th, 1865, he was discharged from service quite well and strong, the wounds being entirely healed. The necrosed lower portion of the femur is Specimen 3709; the upper portion is Specimen 81, A. M. M.

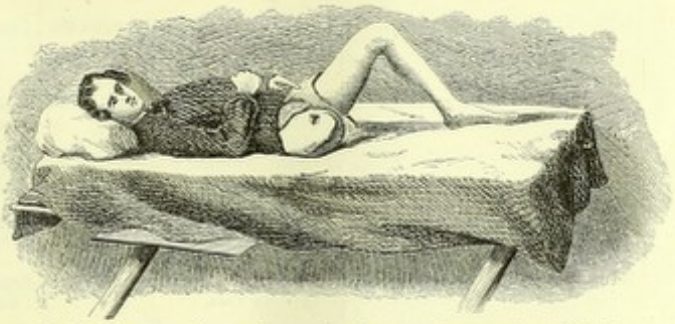


FIG. 61.—Appearance of stump three months after secondary amputation at hip joint.

Another successful secondary disarticulation of the femur is reported, which was also a case of reamputation, necessitated by disease of the femur. The first amputation was performed at the lower third of the thigh on account of a bayonet wound of the knee-joint. The case is consequently excluded from the tabular statement of amputations for gunshot injury. The patient is represented in Photograph 113, A. M. M.

Private Lewis Francis, Co. I, 14th New York Vols., aged forty-three years, was admitted to Ladies' Home U. S. A. General Hospital, New York City, on October 28th, 1863. He had been wounded by a bayonet in the right knee, at the battle of Bull Run, July 21st, 1861, and was taken prisoner, and suffered amputation of the thigh in Richmond, Virginia, May 28th, 1862. The femur becoming diseased subsequently, its protruding extremity had been sawn off. What remained of the femur was necrosed, when the patient arrived in New York, and, on May 21st, 1864, the flaps were laid open, and the necrosed femur was removed by Surgeon Alexander B. Mott, U. S. Vols. No untoward symptoms followed, and the patient recovered, and was discharged from the service, August 12th, 1864.

A memorandum is subjoined of all amputations at the hip-joint for gunshot injury that have been reported. Nine were primary, and twelve were secondary operations. This is followed by a table exhibiting the results of this operation in previous wars.

AMPUTATIONS AT

No.	Name of Operator.	Name and Rank of Patient.	Nature and Date of Injury.
1	David P. Smith, Surgeon U. S. Vols.	Private on Hospital Steamer Crescent City.	Comminution of the upper half of the femur by canister, April 6th, 1862.
2	Prof. Geo. E. Blackman, Act. Asst. Surgeon U. S. A.	Private on Hospital Transport.	Gunshot fracture of upper extremity of femur, April 6th, 1862.
3	E. S. Fenner, Surgeon P. A. C. S.	A private of the Confederate Army.	Gunshot fracture of the left femur, March, 1862.
4	Edward Shippen, Surgeon U. S. Vols.	Private James E. Kelly, aged 28, Co. B, 56th Penn. Vols.	Conoidal ball comminuted upper extremity of left femur, April 29th, 1863.
5	B. Howard, Asst. Surgeon U. S. A.	Private J. Martin, aged 20, Co. I, 146th N. Y. Vols.	Conoidal ball fractured the upper part of left femur, July 13th, 1863.
6	Unknown.	Private William Waters, Co. K, 123d N. Y. Vols.	Gunshot fracture of left femur, May 15th, 1864.
7	Prof. J. M. Carnochan, Act. Asst. Surgeon U. S. A.	Private of 9th Corps, aged 28.	Left femur shattered by a shell, May 18th, 1864.
8	Edward Shippen, Surgeon U. S. Vols.	Private J. M. Brown, Co. K, 63d Indiana Vols.	Fracture of upper third of right femur by a conoidal musket-ball, June 16th, 1864.
9	Edward Shippen, Surgeon U. S. Vols.	Private of 23d Corps.	Conoidal ball shattered head and neck of femur, and involved the hip-joint.
10	Peter Pineo, Medical Inspector U. S. A.	Private P. Johnson, Co. C, 2d Delaware Vols.	Fracture of the upper third of the right femur, and wound of the femoral artery, by a conoidal musket-ball, Dec. 14th, 1862.
11	Alexander Ingram, Asst. Surgeon U. S. A.	Private Charles Lackey, aged 19, Co. E, 7th Wisconsin Vols.	Upper third of right femur fractured by a musket-ball, May 12th, 1864.
12	H. C. Roberts, Asst. Surgeon U. S. Vols.	Private Levi Eckley, aged 33, Co. I, 67th Ohio Vols.	Gunshot fracture of left thigh, May 20th, 1864.
13	Albert C. Gorgas, Surgeon U. S. Navy.	Seaman George Cook, aged 21.	Rifle-ball passed through both testicles, and entered left thigh, comminuting the femur and passing out, Feb. 1st, 1864.
14	Edwin Bently, Surgeon U. S. Vols.	Private Michael O'Neil, aged 19, Co. E, 58th Mass. Vols.	Gunshot comminuted fracture of right femur, by a conoidal musket-ball, June 3d, 1864.
15	J. C. McKee, Asst. Surgeon U. S. A.	Private Daniel H. Bowman, aged 24, Co. C, 110th Penn. Vols.	Gunshot comminuted fracture of upper third of right femur, July 27th, 1864.
16	F. Hassenburg, Act. Asst. Surgeon U. S. A.	Private Lewis Larry, aged 23, Co. A, 1st New Orleans Vols.	Amputation of thigh on account of gunshot fracture. Subsequent necrosis of femur. First injury July 17th, 1864.
17	Dr. Gurdon Buck, New York City.	Lieutenant Charles H. Hawkins, Co. C, 4th N. Y. Cavalry.	Amputation of right thigh, on account of gunshot fracture of femur received June 8th, 1862.
18	Edwin Bently, Surgeon U. S. Vols.	Sergeant Lewis Carroll, aged 33, Co. A, 1st Delaware Vols.	Gunshot fracture of right femur just below lesser trochanter, by a musket-ball, Oct. 22d, 1864.
19	J. H. Packard, Act. Asst. Surgeon U. S. A.	Private Eben. E. Smith, aged 19, Co. A, 11th Maine Vols.	Amputation of right thigh on account of gunshot fracture. Subsequent necrosis of femur. First injury Aug. 16th, 1864.
20	C. Wagner, Asst. Surgeon U. S. A.	Private John Williams, aged 44, Co. F, 13th Ohio Cavalry.	Gunshot fracture of left femur, Sept. 30th, 1864.
21	E. Griswold, Surgeon U. S. Vols.	Private Geo. M. Spencer, aged 17, Co. B, 2d N. Y. Mounted Rifles.	Gunshot fracture of right femur, March 31st, 1865.

THE HIP-JOINT.

Date of Operation.	Result.	Authority.	Remarks.
April 8, 1862.	Died in five days.	Smith's Report, Surgical Records, A, No. 11. J. H. Brinton's Report.	Was transferred to a hospital at St. Louis.
April 8, 1862.	Died in twenty minutes.	Surgeon J. H. Brinton's Report.	A patient wounded at Shiloh.
March, 1862.	Recovered.	Report from Memphis U. S. A. General Hospital.	Operation performed twenty-four hours after reception of wound.
April 29, 1863.	Recovered.	Shippen's Report. Vanderkieft's Report. Letters from Kelly.	Was quite well in the summer of 1865. Spec. 1148, A. M. M. Drawings 31 and 72, Surg. Series, S.G.O.
July 14, 1863.	Died in forty-eight hours.	Report of Surgeon Flandrin, N. Y. Vols. History of Specimen 1379, Army Med. Museum.	See Specimen 1379, Army Medical Museum.
May 15, 1864.	Died May 15th, 1864.	Report of Army of Cumberland, Book ix. p. 355, S. G. O.	
May 18, 1864.	Died in ten hours.	Letter of Prof. Carnochan of Nov. 7th, 1864.	Done at 9th Corps Hospital, at battle of Spottsylvania.
June 16, 1864.	Died in one hour.	Special Report of Surgeon Shippen, U. S. Vols.	A primary operation.
1864.	Died in less than one hour.	Special Report of Surgeon Shippen, U. S. Vols.	A primary operation.
Dec. 27, 1862.	Died in a few hours.	Letter from Medical Inspector Pineo.	See Specimen 710, Army Medical Museum, and Photographic Series A. M. M., No. 14.
May 21, 1864.	Died in twenty-four hours.	Quarterly Report of Surgical Operations from Judiciary Square Hospital.	
May 24, 1864.	Died in four days.	Quarterly Report of Chesapeake Hospital.	
1864.	Died in less than two hours.	Report from U. S. Naval Hospital, Norfolk, Va.	See Specimen 2773, Army Medical Museum.
August 10, 1864.	Died in nineteen days.	Quarterly Report from Third Division General Hospital, Alexandria, Va.	Ligation of external iliac artery. See Spec. 3098, Army Med. Museum.
Sept. 15, 1864.	Died in one day.	Quarterly Report from Lincoln General Hospital, Washington, D. C.	
Sept. 21, 1864.	Died in nine days.	Quarterly Report from University General Hospital, New Orleans, La.	Reamputation.
Sept. 21, 1864.	Died in one day.	Report from St. Luke's Civil Hospital, New York City, and letter from Professor Buck.	Reamputation.
Nov. 11, 1864.	Died in eight days.	Report from Alexandria Hospital.	See Specimen 1020, Army Medical Museum.
January 9, 1865.	Recovered.	Quarterly Report from U. S. A. General Hospital, Beverly, New Jersey.	Reamputation. See Specimen 81, Army Medical Museum, and Photographic Series A. M. M., No. 29.
Feb. 17, 1865.	Died in one day.	Quarterly Report from U. S. A. General Hospital, Beverly, N. J.	See Specimen 84, Army Medical Museum.
April 12, 1865.	Died before removal to the ward.	Quarterly Report from Judiciary Square General Hospital, Washington, D. C.	An excision of the head of the femur was first practised.

Table, showing the Mortality of Amputations at the Hip-Joint for Gunshot Injury, including Primary, Intermediate, and Secondary Cases.

	Recovered.	Died.	Total.
Larrey's primary cases	.....	6	6
Larrey's intermediate cases	1	.....	1
Guthrie's Ciudad Rodrigo case (intermediate)	.....	1	1
Guthrie's Waterloo case (primary)	1	.....	1
S. Cooper's case	.....	1	1
Blandin's cases (in 1794)	.....	3	3
Hutin (Mém. de Méd. Mil., t. xliv.)	.....	2	2
Brownrigg (Elvas, 1811)	.....	1	1
Wedemeyer (Bull. de Férussac, t. iii. p. 161)	.....	2	2
Letulle (Siége d'Anvers)	.....	1	1
Clot Bey (Legouest's table)	.....	1	1
Jubiot (Legouest's table)	.....	3	3
Guyon (Algeria, 1840)	.....	1	1
Sédillot (Annales de la Chir., t. ii. p. 279)	.....	5	5
Richet (Journées de Juin, 1848)	.....	1	1
Robert (Idem)	.....	1	1
Guersant (Idem)	.....	1	1
Vidal (Idem)	.....	1	1
Baudens (Traité des Plaies d'Armes à Feu)	1	.....	1
Schleswick Holstein cases	.....	6	6
Langenbeck's case (Schleswick Holstein)	1	.....	1
Two operations in the English Army in the Crimea by the Director General	.....	2	2
A soldier of the 33d English Regiment	.....	1	1
Two other cases prior to April, 1855, in the English Army in the Crimea	.....	2	2
Seven enlisted men and two officers (Med. and Surg. Hist. of Brit. Army in the Crimea)	.....	9	9
Twelve primary cases in the French Army in the Crimea	.....	12	12
Mounier's case at Dolma Batchi	.....	3	3
Legouest's case (really recovered, and died of cholera)	.....	1	1
Four other secondary cases in the French Crimean hospitals	.....	4	4
Bertherand's case after the engagement at Novara (Campagne d'Italie de 1859, p. 37)	.....	1	1
Jules Roux's cases at Toulon (all secondary)	4	2	6
Primary cases in the late war	2	7	9
Secondary cases in the late war	1	11	12
	11	92	103

There seem to be but three conditions under which early amputation at the hip-joint is admissible in military surgery, viz., when nearly the entire thigh is carried away by a large projectile, when the totality of the femur is destroyed by osteomyelitis, and, possibly, when, with comminution of the upper extremity of the femur, the femoral vessels are wounded.

The experience of M. Jules Roux, in the Italian war, seems to prove conclusively that secondary amputations at the hip-joint are less dangerous than primary ones.

As to the method of operating, it may be observed that the anterior single flap procedure has of late been generally preferred.*

Amputations of the lower extremity are illustrated at the Army Medical Museum by numerous casts, drawings, and photographs, by 9 specimens of shattered femurs removed by amputation at the hip-joint, and by 211 specimens of the diseases of the

* Since this report was put in print, two additional cases of amputation at the hip-joint have been reported. In the case of Private F. Kelb, Co. H, 7th New York Vols., whose right femur was fractured at Fredericksburg, by a musket-ball, in December, 1862, Dr. R. F. Weir amputated at the hip-joint, at St. Luke's Hospital, New York, on June 7th, 1865, on account of necrosis of the entire femur. The stump nearly healed; but the patient died October 4th, 1865, of pulmonary tuberculosis. On October 12th, 1865, Surgeon E. Bently, U. S. Vols., amputated at the hip-joint, in the case of Private Lemon, 6th Maryland Vols., on account of necrosis of the left femur, resulting from a gunshot fracture of the upper third, received at the battle of the Wilderness, May 5th, 1864. The patient was in a satisfactory condition on November 24th, 1865. (Specimen 4386, A. M. M.)

bone after amputation. Wood-cuts of a few of the latter are subjoined. In regard to Specimen 4225, the following particulars are recorded:

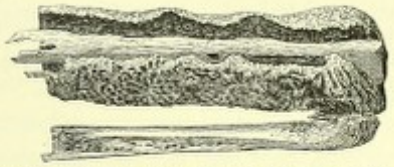


Fig. 62.—Necrosis of right tibia and fibula after amputation of the leg. *Spec.* 4225, A. M. M.

Private Daniel S. Crawford, Co. A, 47th Pennsylvania Vols., aged twenty-seven, was wounded at Cedar Creek, October 19th, 1864, his right leg being fractured at the middle third. Amputation at the middle of the leg was performed the same day. On October 26th, he was transferred to the National Hospital, at Baltimore, and thence to the Jarvis Hospital, where it was found that the amputated extremities of the tibia and fibula were necrosed. On March 25th, 1865, lateral flaps were reflected and five inches of the diseased bones were resected by Acting Assistant Surgeon W. G. Small, U. S. A. After this the stump healed promptly, and the patient was discharged from service May 31st, 1865. (See Surg. Rec. S. G. O., Amputations, vol. vi. part ii. p. 141.

Specimen 2778 presents a remarkable example of the exaggeration of the natural process by which the amputated ends of bones are rounded off. The redundant osseous formation presents the histological characters of ordinary callus. In the case which furnished this specimen, a successful secondary amputation was performed through the knee-joint.

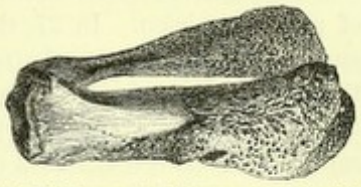


Fig. 63.—Hyperostosis of the extremities of the right tibia and fibula after amputation. *Spec.* 2778, A. M. M.

Cases of myelitis after amputation of the thigh have furnished the Museum with a large number of sequestra comprehending the entire circumference of the bone. The accompanying example is remarkable for the unusual length of the sequestrum, and from the fact that the patient recovered after its removal. It was contributed, with the following narrative, by Assistant Surgeon W. Thomson, U. S. A.:

Corporal H. H. Ellis, Co. I, 16th New York Vols., was wounded at Chancellorsville, May 3d, 1863, and admitted into Douglas Hospital, at Washington, May 8th, 1863. A conoidal ball had comminuted the left patella (Spec. 1852, A. M. M.), and the knee-joint was involved. On the 13th of May, the thigh was amputated at the lower third by the circular method. This patient's health was much impaired by chronic diarrhœa, and after the operation, his condition was unpromising. Secondary hæmorrhage occurred on May 20th, and recurred on the 21st, when the femoral artery was tied in Scarpa's triangle. For many weeks this man clung to life by the slenderest thread. The thigh stump was greatly swollen and very tender on pressure. The line of incision, however, was not unhealthy in appearance, and the discharge was moderate. From the inner angle of the stump the necrosed extremity of the femur protruded. August 9th, 1863, the sequestrum was found to be loose, and was removed. After its extraction there was considerable hæmorrhage; nevertheless, convalescence now proceeded rapidly. A formation of new bone, replacing the original femur, could be readily felt. The stump was not shorter than at first. It soon closed entirely, was firm, and in every respect satisfactory. The man was discharged from the hospital, and from the service of the United States, October 26th, 1863. In December, 1864, he reported himself in good health.



9¼ inches

Fig. 64.—Cylindrical sequestrum from the left femur after amputation at the lower third of the thigh. *Spec.* 1853, A. M. M.

The next specimen illustrates the numerous class of cases in which pyæmia accompanies osteomyelitis, and proves fatal before the dead bone is sufficiently detached to be extracted. The involucrum is thin and eroded. The specimen, with the following facts relating to it, was forwarded by Surgeon E. Bently, U. S. Vols.:



Fig. 65.—Necrosis of the amputated end of the left femur. *Spec.* 3342, A. M. M.

Private Andrew H——, Co. B, 6th New Jersey Vols., was wounded May 6th, 1864, at the battle of the Wilderness, by a musket-ball, which entered the left knee-joint, at the upper outer margin of the patella. He was admitted to the 3d Division General Hospital at Alexandria, Virginia, on May 26th. On July 9th, a large abscess near the elbow was laid open. Others formed along the thigh, and were likewise opened. On July 16th, the thigh was amputated in the lower part of the middle third. The case terminated fatally on July 26th. The autopsy revealed numerous metastatic foci in the lungs; the liver was fatty; the spleen much enlarged. There were bed-sores on the back, and the body was much emaciated.

EXCISIONS.

The number of excisions after gunshot injuries that have been transcribed from the reports is given on page 6 of this report, and indicates that this branch of conservative surgery was largely practised in the late war. It is proposed here to review very briefly the records of the individual excisions.

Excisions of the Wrist.—The 35 cases included in this category were all examples of partial excision. In 27, the ends of the radius or ulna, or of both, were removed, and, in some instances, shattered fragments of the upper row of carpal bones. In 8, the greater part of the carpus was excised. Death took place once from pyæmia, and twice from exhaustion from protracted suppuration and irritative fever: 26 cases are reported as recovered. In 2 cases, amputation of the forearm became necessary. The reports are unsatisfactory in relation to the amount of mobility left in the hand, and the cases are now under investigation with reference to this point.

As the literature of this subject is meagre, a few illustrative cases are appended:

Private Joseph Hoover, Co. A, 62d Pennsylvania Vols., aged twenty-six years, was wounded at Spottsylvania, May 12th, 1864, by a musket-ball, which passed through both wrists. He entered Judiciary Square Hospital, at Washington, on May 26th. His right forearm had been amputated on the field. On May 30th, Assistant Surgeon A. Ingram, U. S. A., removed nearly all the left carpus, the styloid process of the ulna, and the carpal end of the first metacarpal bone, and made free incisions over the ulna and the dorsum of the hand for the evacuation of pus. The patient recovered, and was discharged from service. The condition of the hand is not reported.

Surgeon H. Culbertson, U. S. Vols., removed the cuneiform and pisiform, and a portion of the os magnum, and extracted fragments of the unciform and semilunare in the case of Private Neal, Co. D, 3d Wisconsin, who was shot through the carpus, at Dallas, Georgia. The patient recovered with some use of his hand, and entered the Veteran Reserve Corps, April 1st, 1865.

Assistant Surgeon C. Bacon, U. S. A., excised the lower portion of the right radius, the trapezoid, scaphoid, os magnum, and the second, third, and fourth metacarpals, in the case of Private Bard, Co. I, 1st Pennsylvania Vols., who was wounded at Antietam. The result is stated to have been favorable.

Photograph 59 of the Army Medical Museum represents the forearm and hand of Major C. W. Hobbs, 7th New York Heavy Artillery, who was wounded at Cold Harbor, Virginia, June 3d, 1863, by three musket-balls. One inflicted a flesh wound of the left thigh, passing across the popliteal space, close to the hamstring tendons. A second fractured the third and fourth metacarpal bones of the left hand, and made its exit near the wrist. The third entered the left hand between the distal extremities of the first and second metacarpals, comminuting the second and third metacarpals, the unciform and cuneiform bones, and the lower extremity of the ulna, and made its exit on the outer side of the forearm. Primary excision was performed by Surgeon J. E. Pomfret, 7th New York Heavy Artillery. Two inches of the distal extremity of the ulna were removed, with the fractured bones of the carpus and metacarpus, and three outer fingers. The case progressed without any untoward complication, and recovery was complete in two months. The remaining portion of the radio-carpal articulation was not anchylosed, and the movements of the thumb and forefinger were unimpaired.

Professor Joseph Lister's recent paper,* in which are narrated the successes obtained by his method of excising the entire wrist-joint for caries, encourages the hope that the same operation may be hereafter successfully adopted in cases of gunshot wounds of the wrist.

* Lancet, American edition, July, 1865, p. 306.

EXCISIONS OF THE ELBOW.—The returns for three-fourths of the entire period give 315 cases of excision of the elbow, and the results are ascertained in 286 cases. In 16 cases, amputation of the arm became necessary: 62 cases terminated fatally, or 21·67 per cent., which is a mortality a fraction greater than that resulting from amputations of the arm. This result is altogether opposed to the Schleswick Holstein and Crimean experience, and will doubtless be modified when the statistics are completed. It may be ascribed partly to the fact that the returns for the earlier part of the war include quite a large proportion of partial excisions, which are far more hazardous than complete removal of the articular surfaces.

The Army Medical Museum possesses 98 specimens of the injured epiphyses removed in excisions of the elbow, and a goodly number of photographs of patients in whom the operation has been performed.

The happy results of this well established operation are so fully known, that it is unnecessary to give more than a single illustrative case:

Private William D. Riley, Co. D, 86th New York Vols., aged twenty-one years, was accidentally wounded at Brandy Station, Virginia, November 26th, 1863, by a musket-ball, which shattered the inner condyle of the right humerus and the olecranon process of the ulna. He was admitted to Mansion House Hospital, at Alexandria, the same day, having bled quite largely on the way. On December 19th, 1863, Surgeon Charles Page, U. S. A., excised the elbow-joint, employing the H-shaped incision. Two and a half inches of the lower extremity of the humerus, an inch of the upper extremity of the ulna, and a small portion of the head of the radius were removed. The case progressed most favorably, and in May, 1864, Riley went to his home, on furlough, with a useful arm. He was subsequently discharged from service. In 1865, he re-enlisted in Co. K, 5th Regiment, First Army Corps, with the approval of Lieutenant Colonel Dougherty, Medical Director of the Corps. "The man went through the manual before me," Surgeon Dougherty writes, "and stated his readiness to do all the duties of a soldier. He wished it recorded that he was competent and prepared, in order that, during the term of his service, he might be held to full duty. The degree of motion was, perhaps, one-third of the normal amount." A photograph of the patient (No. 54, A. M. M.) was taken in June, 1865, at the Army Medical Museum.

EXCISIONS OF THE SHOULDER-JOINT.—Nearly all of the cases that have been reported during the war have been recorded. The results are given in the following table:

Table, exhibiting the Results of Cases of Excisions of the Shoulder-Joint for Gunshot Injuries.

	Primary Operations.	Secondary Operations.
Died	50	115
Recovered	160	183
Results undetermined	42	25
	252	323
Aggregate	575	

The percentage of mortality is 23·8 in primary cases, 38·59 in secondary cases, or a mean ratio of 32·48. The ratio in amputations at the shoulder-joint is 39·24, a percentage of 6·76 in favor of excision. Of 36 cases of gunshot fracture of the head of the humerus, selected as favorable cases for the expectant plan and treated without excision or amputation, 16 died, or 44·4 per cent., a ratio in favor of excision of 11·96 per cent. But it is superfluous to offer further proofs in behalf of this admirable operation.

Esmarch* makes the curious observation, that resection of the left shoulder gives less favorable results than the operation on the right side. This statement is not confirmed by the returns. Of 442 terminated cases in which mention is made of the side injured, the right shoulder was involved in 200 and the left in 242. The operation resulted fatally in 72 of the former, or 36 per cent., and in 71 of the latter, or 29·3 per cent. The greater frequency of injuries requiring the operation on the left side is doubtless due to the exposed position of the left shoulder in firing.

Generally the operation has been done in cases in which the head of the bone was alone implicated, and consisted simply in a decapitation of the humerus. Partial excisions have been seldom practised. The method commonly preferred was that by a single vertical incision, though some operators raised a V-shaped flap, and all endeavored to include the wound made by the ball in the incisions. It is frequently mentioned that the long tendon of the biceps was preserved. In 29 cases, portions of the clavicle, or of the coracoid and acromion processes and neck of the scapula, were excised, as well as the head of the humerus. Only 4 of these cases terminated fatally, and the average result in the recovered cases was as satisfactory as the ordinary result in decapitation of the humerus.



Fig. 66.—Ball impacted in the head of the humerus. A typical case for excision. *Spec.* 1206, A. M. M.

Where the shaft of the humerus has been extensively shattered, our surgeons have not been deterred by the prohibition of Guthrie, but have frequently removed the head with even five and six inches of the diaphysis. It is true, as Stromeyer has clearly shown, that in gunshot fracture of the surgical neck of the humerus, with extensive longitudinal splitting, the fissures rarely implicated the epiphysis; yet no good purpose seems to be answered by leaving the head of the bone in these cases, and excellent results are obtained after excision of the head with very considerable portions of the shaft. The following case is an example:

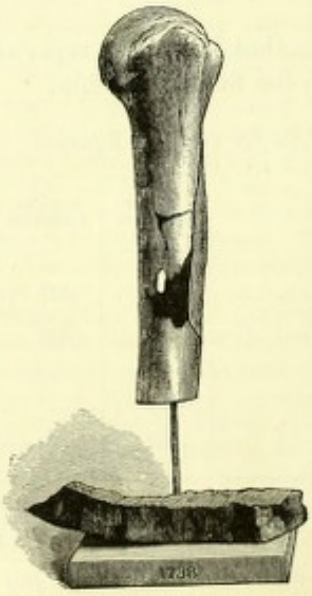


Fig. 67.—Excised head and shaft of right humerus, with the fragment of shell that caused the fracture. *Spec.* 1738, A. M. M.

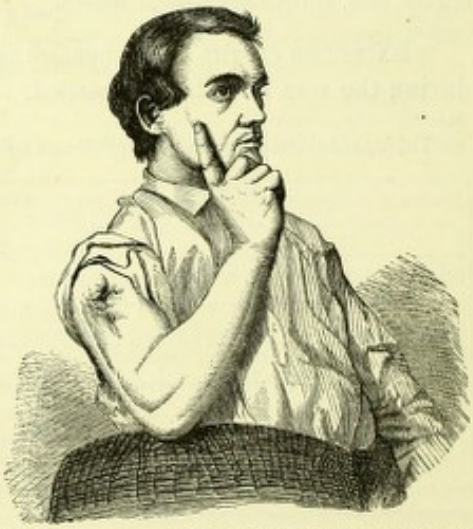


Fig. 68.—Appearance of the patient who furnished the foregoing specimen, two years subsequent to the operation. Photographed on wood.

Private John F. Readon, Co. C, 6th New York Cavalry, aged twenty-two years, was wounded at Culpepper, Virginia, October 11th, 1863, and entered Armory Square U. S. General Hospital, at Washington, on the following day. It was found that his right humerus had been fractured by a fragment of shell, which was removed from its lodgement under the deltoid muscle, and proved to be four inches long and one inch broad, and to weigh nine ounces. The head and upper third of the shaft of the humerus were then excised through a straight incision, by Surgeon D. W. Bliss, U. S. Vols. The patient recovered

* Statham's edition of Esmarch, American edition, 1862, p. 57.

without a bad symptom, and with a remarkably useful limb. He visited the Army Medical Museum nearly two years after the operation, and a photograph was then taken of his arm. The motions of the forearm and hand were unimpaired. The arm could be moved forwards and backwards with considerable freedom. The hand could be readily raised to the mouth, and placed in the position represented in the wood-cut.

In the remarkable case of Private Cleghorn, 1st New Jersey Cavalry, after an excision of the head and upper third of the humerus, the remainder of the bone became necrosed, and was excised, together with the articular ends of the radius and ulna, and yet a limb was preserved, which, with the aid of ingenious apparatus, is very useful. (Photograph 112, A. M. M.)

Numerous patients have been photographed at the Army Medical Museum, in whom, after excision, a very satisfactory degree of motion at the shoulder-joint existed. Photograph No. 103, A. M. M., represents the case of Lieutenant Jacobs, who retains to a remarkable degree the power of abducting the arm, which is usually very limited. The control over the movements of the arm is much augmented by the contrivance furnished by the makers of surgical apparatus, in which elastic bands supply the diminished power of the deltoid and biceps.

Sixty-one excised heads of humeri have been contributed to the Museum.

Excisions of the Ankle-Joint.—Of 22 recorded cases, 8 were excisions of the tibio-tarsal articulation, and the remainder were nearly all ablations of portions of the tarsal bones. Of 18 terminated cases, 12 recovered and 6 died.

Five of the fatal cases are reported by Surgeon R. B. Bontecou, U. S. Vols., the operations being described as "excisions of the ankle-joint" in four cases, and in one as "excision of the lower end of the tibia and head of astragalus." They were all secondary operations, performed on account of perforation of the ankle, with comminution, by musket-balls. They seem to have been formal resections, and not mere gougings of necrosed bone. The results are sufficiently discouraging.

The sixth fatal case is reported by Surgeon J. A. Lidell, U. S. Vols. It was a secondary excision of portions of the calcaneum and astragalus.

Surgeon Whitehill, U. S. Vols., reports a complete excision of the calcaneum and astragalus in the case of Private Roberts, 7th Wisconsin Battery, with the prospect, two months after the operation, of a useful limb.

Assistant Surgeon Billings, U. S. A., removed the external malleolus, the entire astragalus, and a portion of the scaphoid, in the case of Private Ludwig Ettinger, 58th New York Vols., and eight months afterwards the patient could walk with the aid of a cane.

In the case of a negro boy of nineteen, with a ball lodged in the astragalus, Dr. Billings extracted the ball and fragments of the astragalus, and the patient recovered without anchylosis, and was able to walk with no perceptible limp two months after the operation.

Surgeon J. A. Lidell, U. S. Vols., extracted the shattered fragments of the cuboid and external cuneiform in the case of Private Ganlert, Co. K, 6th New York Cavalry, with satisfactory results.

It appears, then, that the judicious use of the gouge and bone forceps is admissible in gunshot wounds of the ankle-joint; but that the formal excisions are rarely successful.

EXCISIONS OF THE KNEE-JOINT.—Prior to the present war, there were but seven recorded examples of excision of the knee for gunshot injury. These were, the elder Textor's case* (in 1847); the Schleswick Holstein case† (1851), in which Fahle operated by Stromeyer's direction; Mr. Lakin's case‡ (1855), in the Crimea; the Alumbaugh case§ (1857), in the Indian mutiny; the case of a man in the London hospitals wounded by bird shot‖ (1861); a similar case at Birmingham¶ (1861); and lastly, Verneuil's case.**

Verneuil's case and the Birmingham case were successful. The patients were lads of seventeen and nineteen.

Modern surgeons have bravely striven to escape the deplorable necessity which has led to the establishment of the imperative rule of amputation in every gunshot fracture involving the knee-joint, and such eminent authorities as Legouest and Macleod have advised that excision should be substituted for amputation in cases in which the injury to the epiphyses is inconsiderable, the patient young and robust, and the requisite hygienic and surgical resources for careful after-treatment attainable. Unhappily, in an active campaign in the field, these circumstances are rarely met in conjunction.

During the late war, complete excision of the knee-joint has been performed eleven times. An abstract of each case is here furnished:

Private Alexander Rider, Co. I, 76th Pennsylvania Vols., aged twenty-five, was admitted into Hospital No. 1, Beaufort, South Carolina, October 24th, 1862. He was wounded at Pocotaligo, South Carolina, October 22d, 1862, by a rough lead canister ball, which entered over the front of the external condyle of the right femur, passed through the articulation, and lodged in the popliteal space. October 24th, 1862, Surgeon Reed B. Bontecou, U. S. Vols., removed the ball by an incision, and sawed off the lower portion of the condyles of the femur, and excised a very thin slice from the head of the tibia. An H-shaped incision was employed. The transverse cut was accurately brought together by lead-wire sutures. The azygos artery was tied. The circulation and appearance of the limb were good, but there was some swelling of the knee-joint, which was painful on pressure or when moved. At the date of operation the patient was in good health. An ice-bag and lint wet in a solution of morphia were applied to the joint. October 25th, 1862, sulph. magnes. ℥i. The ice dressing was continued till November 2d. About this time there was a troublesome diarrhœa, which was checked by pills of opium and nitrate of silver. Diet, milk porridge. October 27th, the limb was placed in a trough, stuffed with hay, which afforded much relief. Before this the pain had been excessive. November 8th, no evidence of inflammation about the knee. Transverse incision healed without suppuration. November 18th, has steadily improved. December 1st, the bones had apparently united, and the incisions had healed except at a point on either side of the joint, from which a few drops of pus escaped on pressure. December 20th, starch bandage. December 26th, febrile disturbance. An erythematous blush over skin of lower extremity. Bandage removed. December 28th, febrile symptoms gone. The man was this day sent to the North on the steamer "Star of the South." He was seen by Dr. Bontecou in July, 1863, at "Fort Wood" Hospital, New York Harbor. He was not then able to walk, but subsequently did so with the aid of a cane. He was discharged from service August, 1863. In the summer of 1865, he was again heard from by Dr. Bontecou, and was still in good health.

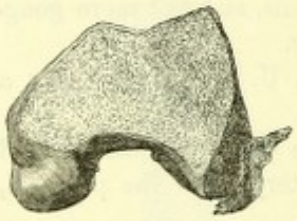


FIG. 69.—Condyle of right femur, excised on account of gunshot fracture of the external condyle. *Spec.* 2030, A. M. M.

Corporal Charles Derrell, Co. F, 74th Indiana Vols., aged twenty-seven, was admitted, November 25th, 1863, into Branch No. 6, Field Hospital, Chattanooga, Tennessee, with fracture of the right knee-joint, by a round musket-

* Fuch's Dissertat. 1854; and O. Heyfelder's Traité des Résections, par E. Bœckel. Paris, 1863, p. 106.

† Friedrich Esmarch, Die Resectionen nach Schusswunden, Kiel, 1851; and Statham's Esmarch, p. 113.

‡ Macleod, Notes on the Surgery of the Crimea, p. 349.

§ Edinburgh Medical and Surgical Journal, October, 1860.

‖ The Lancet, April 20th, 1861. ¶ Medical Times and Gazette, May, 1861.

** Gazette Hebdomadaire, Nov. 1862; Soc. de Chirurgie de Paris, Séance de 10 Juin, 1863; and Legouest, Traité de Chirurgie d'Armée, p. 750.

ball, received on date of admission, at Mission Ridge. Missile had entered on inner aspect of the joint, fractured the inner condyle of the femur, and passed obliquely downwards and outwards, lodging in the head of the tibia. November 26th, Surgeon James Heller, 38th Ohio Vols., operated. An anterior semicircular incision, including the wound of entrance, being made, and the patella removed, seven-eighths of an inch was sawn from both tibia and femur. Two arteries required torsion, none ligature. The patient was in robust health at the time of the operation. About December 25th, symptoms of exhaustion were manifest. A supporting treatment was adopted, without avail. Death, January 18th, 1864.

Private Gardiner Lewis, Co. B, 19th Indiana Vols., aged twenty-two, was wounded at the battle of Gettysburg, July 1st, 1863, by a round musket-ball, which lodged in the internal condyle of the right femur. On November 27th, 1863, he was admitted into Jarvis U. S. A. General Hospital, Baltimore, Maryland, the knee being disorganized and discharging a fœtid pus. On December 1st, Acting Assistant Surgeon F. Hinkle, U. S. A., excised the articular ends of the tibia and femur, sawing off an inch of the condyle of the femur, and three-fourths of an inch of the head of the tibia. An H-shaped incision was employed. At the time of the operation the patient was feverish, anxious, without appetite, and sleepless from intense pain. He did well until several days after the operation, when he had a chill. Chills recurred each alternate day, and other symptoms of purulent infection were manifested. On December 23d, the case terminated fatally. The autopsy revealed metastatic foci in the lungs, and six ounces of pus in the left pleural cavity. The incisions were healed, and the ends of the bones were found in apposition, but no union had occurred. The excised portions of the femur and tibia are preserved in the Army Medical Museum. (Spec. No. 1956.)



Fig. 70.—Excised knee-joint. A round ball in the inner condyle of right femur. *Spec.* 1956, A. M. M.

Private Jacob Miller, Co. A, 3d Pennsylvania Cavalry, aged thirty-eight, was admitted December 5th, 1863, into the 3d Division U. S. A. General Hospital, Alexandria, Virginia, with a compound comminuted fracture of the right patella, involving the knee-joint. The injury was received in action, November 27th, 1863, at Mine Run, Virginia. On December 7th, 1863, Surgeon Edwin Bently, U. S. Vols., excised half an inch of the articulating extremities of the femur and tibia, and removed the patella. The parts were considerably swollen at the time of operation, and the patient was prostrated. Profuse suppuration ensued. A stimulating and supporting treatment was adopted; but the case resulted fatally, from pyæmia, on December 18th, 1863.

Corporal Jesse Sims, Co. B, 4th Ohio Vols., aged twenty-three, was admitted, December 5th, 1863, into the 3d Division U. S. A. General Hospital, at Alexandria, Virginia, with gunshot fracture opening the right knee-joint, received on the 27th of November, 1863, at Mine Run, Virginia. On December 8th, an excision of an inch and a half of the tibia and fibula, and an inch of the femur, was made by Surgeon Edwin Bently, U. S. Vols. The parts were much swollen and the patient greatly prostrated and anxious. Simple dressings were applied. Pyæmia was soon developed, and death occurred on the 13th. A post-mortem examination showed no attempt at repair. The wound was sloughing. Metastatic abscesses were formed along the inside of the thigh, and one at the base of the lower lobe of the right lung. (Spec. 1909, A. M. M.)

Private Thomas Clark, Co. D, 2d New Hampshire Cavalry, was wounded in a skirmish near Alexandria, Louisiana, on May 4th, 1864, by a musket-ball, which entered the popliteal space, and, passing behind the artery, emerged two inches above the joint on its outer side, having fractured the external condyle. The patient was admitted to the General Hospital, at Alexandria, Louisiana, on the day that he was wounded. Immediate amputation was advised, but the patient objected so strenuously, that excision was substituted. Assistant Surgeon John Homans, Jr., U. S. A., removed two inches of the condyles of the femur, and half an inch from the head of the tibia, through a straight incision across the joint, the patient being under the influence of chloroform. The limb was put in a fracture-box, the wound being closed by sutures. No great depression followed the operation immediately. The patient took a full anodyne, and rested well. Next morning, his leg was very cold, and no pulsation could be discerned in any of the arteries below the knee. The patient was placed on a transport steamer and sent to New Orleans, where he died a week after the operation. The report adds that no necroscopic examination was made, and no satisfactory explanation could be given of the arrest of the circulation in the limb; but it seems highly probable that the explanation is to be found in the proximity of the track of the ball to the popliteal artery, and the formation of an occluding clot in that vessel.

Sergeant Henry J. Moore, Co. F, 7th Maine Vols., aged twenty-four, was admitted, May 24th, 1864, into the 3d Division U. S. A. General Hospital, at Alexandria, Virginia, with a wound of the left knee-joint, from a conoidal ball, received May 12th, 1864, in the battle of Spottsylvania, Virginia. An excision had been made by an unknown operator, by a straight incision across the anterior aspect of the joint. On admission, the limb was in a fracture-box, the wound partially closed by sutures, and discharging but very little. The patient was prostrated by the fatigue of transportation to the hospital, and he died of exhaustion on the 26th of May, 1864.

Corporal George W. Hays, Co. K, 2d Michigan Vols., aged nineteen, was wounded on June 17th, 1864, before the intrenched lines at Petersburg, Virginia, by a musket-ball, which shattered the left knee, and fractured the right

patella and opened the right knee-joint. Primary amputation at the lower third of the left thigh was performed at the field hospital, and the patient was transferred to Washington, where he was admitted to Harewood Hospital, on June 20th. On admission, the stump was in a satisfactory condition; the right knee-joint, however, was disorganized. The ball, after fracturing the patella, had passed through the articulation, grooving the head of the tibia. On June 24th, the patient was etherized, and Surgeon Bontecou, U. S. Vols., excised two-thirds of the condyles of the femur, the articular surface of the tibia, and the shattered patella. The limb was dressed with the bandage of Scultetus, and supported by bran bags. The case terminated fatally on July 2d, 1864. The specimen is No. 3046, Army Medical Museum.



FIG. 71.—Excised knee-joint. Spec. 4212, A. M. M.

Private D. F. R——, Co. I, 49th Georgia (Rebel) Regiment, was wounded and taken prisoner at Petersburg, Virginia, on April 2d, 1865. A conoidal musket-ball struck his right knee, and fractured the patella and the external condyle of the femur. He was admitted at the General Hospital, at Fort Monroe, on April 13th. The joint was intensely inflamed, and there was great suffering. On April 18th, the patient was placed under the influence of chloroform, and Surgeon D. G. Rush, 101st Pennsylvania Vols., excised the knee-joint, removing an inch from the femur, half an inch from the tibia, and the entire patella. The patient rallied well after the operation; but the wound began to suppurate freely, and the case terminated fatally on April 26th, 1865. At the autopsy, it was found that there was no attempt at reparation.

Of the tenth case it is only known that a complete excision of the knee-joint for gunshot injury was performed at Fairfax Seminary Hospital, in the autumn of 1862, and that the case terminated fatally, but not until the H-shaped incision had nearly healed. The pathological preparation from the case was forwarded to the Army Medical Museum by Acting Assistant Surgeon Bannister, and is numbered Specimen 600, but it is unaccompanied by a history.

The success claimed in the next case is so extraordinary as to suggest some doubts of its authenticity. It appears on the quarterly report of the General Hospital at Kansas City, Missouri, for the last quarter of 1863.

Private Samuel Miller, Co. L, 1st Missouri State Militia, was admitted into the General Hospital, at Kansas City, Missouri, April 1st, 1863. He was wounded near Independence, Missouri, on December 28th, 1862, the ball having fractured the outer condyle of the right femur, passed obliquely through the patella, and lodged in the head of the tibia. On April 7th, 1863, Acting Assistant Surgeon Joshua Thorne, U. S. A., performed an excision of the outer condyle of the femur, with part of the shaft, removing by an oblique section two and a half inches from the femur, together with the patella and articulating surface of the tibia. No anæsthetic was used. The wound was full of shattered bone, and an extraordinary amount of pus came out of the joint. There was severe pain and extensive inflammation in the leg. The patient was much emaciated from copious diarrhœa. Skin dark and dry, very like parchment. At the time of the operation he was nearly insensible, pulse 120 and feeble. He was greatly prostrated after the operation, but on the next day he revived. Nutritious diet, with porter, was given him, and he continued to improve. Complete bony anchylosis resulted, with the leg bent about ten degrees. On December 8th, 1863, Miller was discharged from service. He was able to walk almost as well as ever.

Seven partial excisions of the knee-joint for gunshot injury have been reported. Three of these were excisions of the patella. The operators were Surgeon Bontecou, U. S. Vols., Surgeon Mosely, U. S. Vols., and Acting Assistant Surgeon Coale, U. S. A. The patients survived the operations fifteen, eighteen, and twelve days, respectively.

Surgeon John A. Lidell, U. S. Vols., laid open the knee-joint, and removed the fragments of a patella, shattered by a musket-ball. His patient lived ten days. Acting Assistant Surgeon Theo. Siebold, U. S. A., made a free incision into a knee-joint disorganized by inflammation following a gunshot fracture, extracted fragments of the head of the tibia and of the patella, removed the semilunar cartilages, painted the synovial membrane with tincture of iodine, and scraped the articular cartilages from the end of the condyles. His patient survived twelve days. In two cases the head of the fibula was excised, and portions of the head of the tibia. Both recovered. In these cases, reported by Surgeon Judson, U. S. Vols., and Dr. Bournonville, it does not clearly appear that the articulation was opened.

EXCISIONS OF THE HEAD OF THE FEMUR.—In 1861, our information in regard to excisions of the head of the femur for gunshot injury was summed up by Dr. Hodges in his excellent monograph,* and in 1863, by M. Legouest† and M. Bœckel.‡

Dr. Hodges quotes the observations of Oppenheim, Seutin, Schwartz, and Baum, and the six cases given in the Surgical History of the British Army in the Crimea, and with more detail by Macleod. Legouest adds Textor's case, and Bœckel ascribes a case to Guthrie, which is apocryphal. Dr. Esmarch refers to another case operated on by Dr. Ross, and described in the *Deutsches Klinik* for 1850, No. 41.

Statistical Table of Excisions of the Head of the Femur for Gunshot Injury prior to the late war.

No.	Surgeon.	Date of operation.	Result.	Remarks.	Authority.
1	Oppenheim.	May 5th, 1829.	Died in 17 days. The fatal event was attributed to true typhus.	Performed for a gunshot fracture of the head of the femur and rim of the acetabulum.	Hamburg. Zeitschrift, vol. i. p. 137.
2	Seutin.	1832.	Died in 8 days.	Gunshot fracture of the neck of the femur.	Histoire Chirurgicale du Siége d'Anvers, par H. Larrey, Mém. de Méd. Mil. t. 34.
3	Textor.	1847.	Died in 9 days.	Gunshot fracture of the trochanters, followed by caries.	Heyfelder's table. Traité des Résections, p. 68.
4	Schwartz.	May 13th, 1849.	Died on May 20th, 1849.	Gunshot fracture through the trochanters of the left femur, received April 23d, 1849.	Esmarch, Am. ed., p. 160.
5	Ross.	1850.	Fatal.	Caries of the head of the femur, resulting from gunshot injury.	Deutsches Klinik, No. 41.
6	Baum.	1854.	Died in 22 hours.	Gunshot fracture of the head of the femur.	Lohmeyer, Ueber Schusswunden, p. 199.
7	Macleod.	July 6th, 1855.	Died in 1 week, with symptoms of cholera.	Fracture of the trochanter and neck of the left femur by a musket-ball, on June 18th, 1855.	Macleod's Notes on the Surgery of the Crimean War, p. 338.
8	Blenkins.	1855.	Died in the 5th week.	Fracture by shell of the upper part of right femur.	Ibid., p. 341.
9	Crerar.	August, 1855.	Died in a fortnight.	Fracture of the femur high up by shell.	Guthrie's Commentaries, 5th ed., p. 622.
10	O'Leary.	August, 1855.	Recovered.	Fracture of the great trochanter by a shell.	Med. and Surg. History of the British Army in the Crimea, vol. ii. p. 378.
11	Hyde.	1855.	Died in 5 days.	Upper extremity of femur comminuted by a grape-shot.	Macleod's Notes, p. 344.
12	Combe.	1855.	Died in a fortnight.	Gunshot fracture of the neck of the femur.	Ibid., p. 344.

There were then on record, previous to the late war, twelve cases of this operation, with one success. This was the case reported by Surgeon O'Leary of the 68th British Infantry, who excised the head and several inches of the shaft of the femur for Private Thomas Mackenena, the great trochanter being shattered by a fragment of shell.

Experience having demonstrated the uniform fatality of gunshot fractures of the head or neck of the femur when abandoned to the resources of nature, and the excessive mortality of amputations at the hip-joint for gunshot injury, the highest authorities in military surgery were then unanimous in advising, under suitable conditions, excision of the head of the femur, until, as Baron Hippolyte Larrey expressed it, the experiments of the future proved more discouraging than the experience of the past.§

How far this advice has been acted upon in the late war, may be seen from the following table, which exhibits also the form in which all surgical operations are recorded on the registers of this office.

* The Excisions of Joints. Boston, 1861, pp. 204. † Op. cit.

‡ Traité des Résections, par le Docteur O. Heyfelder, traduit de l'Allemand, avec additions et notes, par le Docteur Eug. Bœckel. Paris: Baillière, 1863, pp. 310.

§ Bulletin de l'Académie de Médecine, Nov. 12th, 1861.

TABULAR STATEMENT OF THE OPERATIONS OF EXCISIONS OF THE HEAD

THE SURGEON

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation.	Condition of injured Parts at Time of Operation.
1. E Street Infirmary, Washington, D. C.	Timothy Greely, Private Co. C, 5th Excelsior (74th N. Y. Vols.). Age, —. Admitted October 5, 1861.	Round ball from smooth-bore musket entered near fold of nates, passed through femur, between trochanters, opened hip-joint and made its exit anteriorly.	October, 1861.	Excision of the head, neck, and trochanters of the femur.	A stream of blood, and another of synovia (clear and pellucid), issued from wound of exit. External wound small.
2. Nashville, Tenn.	———, Private. An infantry soldier of Gen. Buell's Army. Admitted March 18, 1862.	Fracture of upper extremity of femur by a musket-ball. In a skirmish near Nashville, just before the occupation of the city by Gen. Buell.	March, 1862, a few days after the injury.	Excision of the head, neck, and trochanter of the femur.	The fracture was limited to the neck and trochanteric region.
3. Cliffburne U. S. A. General Hospital, Washington, D. C.	T. C. Christopher, Private Co. D, 18th S. C. (Confederate). Age, 21. Admitted May 17, 1862. A robust and muscular man, but melancholy and despondent.	Wounded May 5, 1862, by a minié-ball, which entered two inches below and behind the trochanter major of the left side, and, passing forward, upward, and inward, remained in the body.	May 20, 1862.	A curvilinear incision four inches long was made behind the trochanter major, and parallel to the axis of the limb; through this the shattered fragments of the head and neck were removed; the ball was then found in the obturator foramen, and removed; the hæmorrhage was slight. Chloroform (pure) used.	Tissues about joint swollen, and limb shortened and everted; sanious pus discharging from wound; neck of femur comminuted and head split into two pieces; acetabulum uninjured; the trochanter major was intact, and was left so by the operation.
4. National U. S. A. General Hospital, Baltimore, Md.	John W. Nelling, Private Co. K, 1st Massachusetts Vols. Age, 25. Admitted July 25, 1864.	A musket-ball entered the right groin and implicated the hip-joint. The patient was taken prisoner, and confined at Richmond for three months. White Oak Swamp, June 30, 1862.	August 21, 1862.	Excision of the head and neck of the right femur, through a straight incision carried down to the bone; the head was found stricken off from the neck of the epiphysis, and only retained in the acetabulum by the ligamentum teres. Chloroform.	Ball entered right groin, passed horizontally backwards, and escaped posteriorly.
5. Field Hospital, Gainesville, Va.	———, Private, Gen. R. King's Division. Admitted August 28, 1862.	Ball entered over great trochanter of left femur, shattered the trochanter and produced a long fissure, running down the shaft to two inches below the lesser trochanter; the missile then entered the pelvis. Gainesville, Va., August 28, 1862.	August 28, 1862.	Excision of the head, neck, trochanters, and two inches of the shaft of the left femur; the extreme length from the tip of the trochanter to the point at which the shaft was sawn, was four and three-fourths inches.	Head and neck of the femur were sound; the great trochanter was split off in five fragments; from its base a very oblique fracture ran downwards and inwards, and produced a complete solution of continuity of the shaft about two inches below the lesser trochanter.

OF THE FEMUR FOR GUNSHOT INJURY THAT HAVE BEEN REPORTED TO GENERAL'S OFFICE.

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS.
Pulse but slightly depressed; patient congratulates himself on slight extent of his injury, as he supposes.	Sank gradually.	Survived the operation but a few days.	Operator, John W. S. Gouley, Asst. Surgeon U. S. A. Case taken from Sanitary Report of Surgeon John T. Calhoun, 5th Excelsior, December 31st, 1861. (See paper No. 71.)
Satisfactory. Surgeon Goldsmith thought the case peculiarly well adapted for the operation of excision.	Failed gradually, and died within one week.	Died March, 1862.	Operator, A. H. Thurston, Surgeon U. S. Vols. Case reported verbally by Surgeon M. Goldsmith, U. S. Vols.
Very fair; pulse 100; rather weak. He had complained of severe pain in the hip and knees. He reacted well from the chloroform, and expressed himself as feeling much better.	Simple water-dressing was applied to the wound. The foot was fastened by strips of adhesive plaster to a strip of wood at the foot of the bed, which being elevated, the weight of the body made extension. Brandy, egg-nog, beef essence, etc., given freely.	Died May 24th, 1862, at 7 P. M., of exhaustion. The autopsy revealed a clot of blood, about three ounces in weight, between the peritonæum and iliacus internus of the left side, probably from the rupture of a small arterial branch.	Operator, J. S. Billings, Asst. Surgeon U. S. A. This may be called a typical case of a gunshot injury requiring exsection of the hip-joint. Everything appeared favorable, the patient being young, strong, and healthy, and the injury seemingly uncomplicated. Army Medical Museum, Specimen No. 19. Special Report of Dr. Billings.
Feeble.	Patient rallied well from operation. Very little blood was lost. Limb sustained by anterior splint. Progressed favorably until the afternoon of August 25th, when a sudden and extremely profuse gush of dark blood took place from the anterior bullet wound and posterior incision, which caused death in a few minutes.	Died August 25th, 1862.	Operator, Robert Bartholow, Asst. Surgeon U. S. A. Parts much softened and semi-gangrenous; end of excised neck denuded of periosteum and necrosed; femoral vein melted down, and was not, at the point of injury, distinguishable from surrounding tissues; a quantity of dark fluid blood found anteriorly under the integuments. Army Medical Museum, Specimen No. 400.
The symptoms were grave, and the prognosis unfavorable.	Internal hæmorrhage from some vessel in the pelvic cavity.	The man fell into the hands of the enemy. In all probability he survived but a few hours.	Operator, Peter Pineo, Brigade Surgeon U. S. V. Army Medical Museum, Specimen No. 71. The specimen has been photographed, and a wood-cut taken from it. Photographic Series, No. 13. Letter from Lt. Col. Pineo.

TABULAR STATEMENT OF THE OPERATIONS OF

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation	Condition of injured Parts at Time of Operation.
6. Cliffburne U. S. A. General Hospital, Washington, D. C.	——, Private, Army of Virginia. Admitted September 2, 1862.	Minié-ball entered the left hip directly over the trochanter major, and embedded itself in the neck of the bone. Second Bull Run, August 29, 1862.	Sept. 4, 1862.	Straight incision was made over trochanter major, and all fragments removed; the head of the femur was then removed, and the shaft of the femur cut off with a chain-saw at the level of trochanter minor.	Trochanter major and neck of femur split and comminuted; head of bone not injured; no joint opened; tissues about joint but slightly swollen, and discharging healthy pus.
7. Warehouse Hospital, Georgetown, D. C.	F. Machlin, Private Co. —, 11th Pennsylvania Vols. Age, —. Admitted September 8, 1862.	Musket-ball entered the right buttock and emerged an inch and a half below and within the anterior superior spinous process of the right ilium, comminuting the neck of the femur.	Sept. 20, 1862.	Excision of head and neck of right femur; a straight incision five inches long from a point two inches behind and one inch below the anterior-superior spinous process to the trochanteric region; removal of neck at junction with trochanter, with chain-saw; exarticulation of head; one small vessel tied.	Neck of femur in fragments; head in situ, and not fractured; shaft uninjured; foot everted; limb shortened; acetabulum uninjured.
8. College Hospital, Georgetown, D. C.	Charles E. Marston, Private Co. F, 1st Massachusetts Vols. Age, 19. Admitted September 6, 1862.	A large bullet wound one inch anterior to and on a level with the right trochanter major; no exit; comminution of the head and neck of the femur. Second Bull Run, August 30, 1862.	Sept. 27, 1862.	Excision of head and neck of the right femur; a slightly curved incision, five inches long, on the outside of the thigh, the shot-hole in the middle of the incision; rough end of femur removed by small saw; one small vessel tied; conoidal ball removed.	Limb half as large again as its fellow; neck broken into at least forty small fragments; trochanter uninjured; head shattered.
9. No. 3 U. S. A. General Hospital, Frederick, Md.	Cornelius Callaghan, Private Co. —, Pennsylvania Vols. Age, —. Admitted September 19, 1862.	A shell wound of the outer upper portion of left thigh, with fracture of trochanter major.	Sept. 29, 1862.	An examination under chloroform, recommended by Medical Inspector Coolidge and Surgeon Milhau, U. S. A., revealed a fracture through the trochanter and fissure extending within the capsule; the incision was extended three inches below the trochanter major, and a chain-saw was passed around the shaft of the femur, which was divided just below the seat of fracture; the head of the bone was then disarticulated; no vessels required ligature.	The trochanter was entirely separated and detached by muscular action.

EXCISIONS OF THE HEAD OF THE FEMUR—*Continued.*

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS.
This man had suffered greatly from the journey from the field, and had diarrhœa of a malarial type.	He reacted well after the operation. Was placed on a fracture bed, and extension made on the leg by means of a weight. Diarrhœa increased in severity.	Died September 24th, 1862, of exhaustion caused by colliquative diarrhœa.	Operator, J. S. Billings, Asst. Surgeon U. S. A. No autopsy. "The man died from malarial complications, and not, in my opinion, from the wound or operation." Special report of Dr. Billings.
Most unfavorable. By careful nursing, and the use of stimulants, beef essence, etc., condition so far improved that the operation was regarded as justifiable.	Wound syringed; rallied after operation; in six hours pulse 136; free from pain; gradually sank.	Died September 21st, 1862.	Operator, B. A. Clements, Asst. Surgeon U. S. A. No autopsy. Surgical Series, Army Medical Museum, vol. i. page 41, Specimen No. 329.
Pulse 112; a delicate boy; pale; tongue dryish; general condition bad, but not so bad as in Machlin's case.	Sand-bags to keep limb in position. Pulse quick and feeble.	Died September 30th, 1862, 8 P. M.	Operator, B. A. Clements, Asst. Surgeon U. S. A., assisted by staff of hospital and Asst. Surgeon Alden, U. S. A. Autopsy showed that lower half of the acetabulum was fractured. Surgical Series, Army Medical Museum, vol. i. p. 43, Specimen No. 328.
Comparatively favorable.	September 30th. Patient comfortable; pulse 120; takes full diet; sleeps at night. Oct. 1st. Thigh swollen; profuse sweating. Oct. 2d. Diarrhœa and fever; at night, vomiting and hiccough.	Died October 4th, 1862.	Operator, J. H. Bill, Asst. Surgeon U. S. A. No facilities for autopsy, and none made. Symptoms, those of pyæmia. Army Medical Museum, Specimen No. 840.

TABULAR STATEMENT OF THE OPERATIONS OF

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation.	Condition of injured Parts at Time of Operation.
10. Fairfax Seminary U. S. A. General Hospital, Va.	Joseph Brown, Private Co. I, 3d Michigan Vols. Age, 38. Admitted September 11, 1862.	A musket-ball passed through the trochanter of the left femur at the second battle of Bull Run. After lying exposed on the battle-field for three days, the patient was taken to Centreville, and thence to Fairfax Seminary Hospital. On two occasions fragments of bone were removed from the wound.	March 21, 1863.	A large exploratory incision was made from three inches above to five inches below the trochanter; the femur was divided squarely by powerful bone-cutting forceps, six inches below the trochanter; the neck of the femur was so much diseased that the head of the bone was then removed.	Early in March the limb began to swell immoderately, and the discharge from the wound became scanty and fœtid; much callus had been thrown out. A drawing of the case represents much burrowing of pus amid the muscles of the thigh.
11. Frederick General Hospital, Md. No. 5.	Edward Hunt, Private Co. D, 71st Pennsylvania Vols. Age, 24. Admitted January 20, 1863.	Missile entered two inches above trochanter major, and grazed the neck of femur; passed out at the nates.	Feb. 23, 1863	Excision of the head of the femur, the neck being divided by the lion-jawed cutting forceps; very little blood lost. Chloroform.	Profuse suppuration, estimated at a quart in twenty-four hours; abscesses about the hip and upper part of thigh.
12. Field.	James Tallman, Sergeant Co. H, 18th Wisconsin Vols.	Comminuted fracture of left femur by a conoidal musket-ball. After Jackson, Miss., May 14, 1863.	May 15, 1863.	Excision of the head and portion of the shaft of the left femur.	Head of femur comminuted, and shaft shattered three inches below the surgical neck.
13.	Private. Confederate.	Gunshot fracture of the upper extremity of the femur.	1863.	Excision of the head of the femur. Chloroform. Secondary operation.	.....
14. "Stewart" Confederate Hospital, Richmond, Va.	—— Jarratt, Lieutenant, 15th North Carolina Confederate States Army.	Comminuted gunshot fracture of the upper extremity of the left femur by a conoidal musket-ball.	January 9, 1864.	Excision of the head, trochanters, and several inches of the shaft of the left femur. Chloroform.	.....
15. Judiciary Square U. S. A. General Hospital, Washington, D. C. 7019.	Charles Cleaver, Private Co. C, 2d U. S. Infantry. Age, —. Admitted May 18, 1864.	Compound comminuted fracture of femur involving the joint and four inches of shaft by minié-ball. Spottsylvania, Va., May 12, 1864.	May 19, 1864.	Excision of head of bone and four and a quarter inches of shaft; incision curved, and six inches in length.	Extensive laceration of soft parts; pus, of an ill-conditioned character, burrowing in every direction.

EXCISIONS OF THE HEAD OF THE FEMUR—*Continued.*

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS
Loss of appetite; pulse small and frequent.	Rallied with difficulty from the shock of the operation. In forty-eight hours an erysipelatous blush pervaded the whole thigh, and typhoid symptoms were manifested. A catheter was passed into the wound, and maintained there as a drainage tube. The wound was frequently washed out through this tube. March 26th. A rigor, apparently caused by hæmorrhage to the extent of six ounces. After the first few days the limb was supported by the anterior splint of Professor Smith, and subsequently by a kind of hammock. Brandy, beef tea, and eggs were given in large quantities.	April 30th, 1863. Nearly well. May 31st, 1863. Entirely well. August 22d, 1863. Successful result.	Operator, David P. Smith, Surgeon U. S. Vols. A letter from this man, dated Coopersville, March 21st, 1864, in which he speaks of himself as being in good health. He walks about and attends to home business, splits and saws a little wood, but complains of some pain in the leg and stiffness in the knee. On the whole, he says, "there is a constant improvement, and he is exceedingly thankful for the service done him by his surgeon." Another letter, dated September 26th, 1865, states that he continues in good health. Army Medical Museum, Specimen No. 1192. Surgical Series of Drawings, S. G. O., No. 73, represents the appearance of the patient in August, 1863.
Emaciated, and has night-sweats.	Recovered well from chloroform, but never fairly reacted from the shock of the operation.	Died February 25th, 1863.	Operator, H. A. Dubois, Asst. Surgeon U. S. A. Specimen 3907, Army Medical Museum.
.....	Patient removed to a comfortable hospital in Jackson the same day. Gradually sank.	Died May 19th, 1863.	Operator, Henry S. Hewit, Surgeon U. S. V. History compiled from his verbal report.
.....	.....	Died.	Operator, a Confederate Surgeon. See Confederate States Medical and Surgical Journal, vol. i. No. 10, p. 155, October, 1864.
Satisfactory.	Very favorable. It was stated by Dr. Latimer that the patient could ultimately walk without crutches, with the aid of a cane and a high-heeled boot.	The patient so far recovered, at the end of six weeks from the date of operation, as to be able to be removed to his home in North Carolina. He was last heard from in September, 1864, when all sinuses had healed, and considerable weight could be borne on the injured limb.	Operator, J. B. Reed, Surgeon Confederate States Army. The facts in this case were obtained by Surgeon Otis, U. S. Vols., from Dr. Latimer, Asst. Surgeon C. S. A., who conducted the after-treatment in Lieut. Jarratt's case. Army Medical Museum, Photographic Series No. 41.
Not good.	Charpie soaked with permanganate of potash, applied to wound; tonics and stimulants internally.	Died May 23d, 1864, of pyæmia.	Operator, J. H. Thompson, Act. Asst. Surgeon U. S. A.

TABULAR STATEMENT OF THE OPERATIONS OF

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation.	Condition of injured Parts at Time of Operation.
16. Judiciary Square U. S. A. General Hospital, Washington, D. C. 6974.	Alexander Ewing, Private Co. A, 140th Pennsylvania Vols. Age, 30. Admitted May 18, 1864.	Compound comminuted fracture of upper part of left femur, implicating hip-joint. Wilderness, Va., May 13, 1864.	May 19, 1864.	Excision of head of bone below trochanter; an incision of about five inches was made over great trochanter, taking in the wound of entrance.	There was much inflammation and swelling of soft parts.
17. Stanton U. S. A. General Hospital, Washington, D. C. 1035. "Ward" Hospital, Newark, N. J.	Hugh Wright, Private Co. G, 8th New Jersey Vols. Age, 28. Admitted May 25, 1864.	A minié-ball entered the right thigh one inch to the inner side of the femoral artery and about two inches below Poupart's ligament, and passed backward and downward, shattering the neck and trochanter of the femur. The ball lodged behind the bone. Wilderness, Va., May 5, 1864.	May 27, 1864.	Resection of head, neck, and both trochanters of femur; made an incision six inches in length over the trochanter major down tothe bone; extracted the fractured splinters, and removed the head and neck of the femur; found the ball, a minié, lying behind the neck of femur. Sulphuric ether.	An abscess had formed about the seat of fracture; the bone was much comminuted, and many of the fractured splinters were detached; the ball had not been extracted.
18. Mt. Pleasant U. S. A. General Hospital, Washington, D. C. 9897.	John Phelan, Captain Co. A, 73d N. Y. Vols. Age, 22. Admitted May 16, 1864.	Gunshot wound of left thigh, with compound comminuted fracture of neck and upper end of femur. Spottsylvania C. H., Va., May 14, 1864.	June 3, 1864.	Excision of head, neck, and upper end of femur by T incision of five inches over the trochanter, extending down the line of femur.	All motion of the limb accompanied by severe pain.
19. Jarvis U. S. A. General Hospital, Baltimore, Md.	Jason M. Joslyn, Private Co. I, 7th New York Heavy Artillery. Age, 20. Admitted November 28, 1864.	Gunshot fracture of head of right femur by a piece of shell, which entered over the great trochanter, fracturing it and the neck of the femur. Cold Harbor, Va., June 3, 1864.	June 5, 1864.	Excision of the head and two inches of shaft of right femur, through an incision eight inches in length on outer side. The report from Dale Hospital states that the head and six inches of the shaft were removed.	Parts very much swollen.
20. Field Hospital, Ream's Station, Va.	Confederate Private.	Compound comminuted fracture of the neck of the right femur by a conoidal ball. Ream's Station, Va., 1864.	June, 1864.	Removal of the head, neck, and greater portion of the trochanter major of the right femur.	.....

EXCISIONS OF THE HEAD OF THE FEMUR—*Continued.*

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS.
Not favorable.	Patient lived but five days; the wound assumed no healthy action; stimulants and ice to wound; but he gradually sank.	Died May 24th, 1864, from exhaustion from surgical fever.	Operator, J. H. Thompson, Act. Asst. Surgeon U. S. A. The fracture extended into the joint, separating the trochanter from neck and splintering the shaft of bone.
Fair.	He exhibited a great deal of shock, and reacted slowly. May 28th. Pulse frequent and feeble; exhibits a good deal of nervous agitation; has some fever; tongue dry and furred in centre. June 1st. Condition much improved; wound looks well; character of the suppuration good. June 30th. Is doing well.	November 16th, 1864. Recovered. Discharged from service October 6th, 1864, by reason of expiration of term, but unable to travel. Transferred to General Hospital at Newark, N. J., April 15th, 1865. He was in tolerably good health. The limb disposed to abscesses upon any unusual exertion. Left hospital May 6th, 1865.	Operator, George A. Mursick, Asst. Surgeon U. S. Vols. Army Medical Museum, Specimen No. 3375.
Constitution naturally good; very much reduced at time of operation; discharge of pus very free; appetite poor; tongue coated; bowels moved frequently; skin moist; pulse 90 to 100.	Simple dressings of cold water and lint; discharge of pus moderate and healthy; wound looking well; no pain; nourishing diet; tonics and stimulants given freely.	Died June 21st, 1864, of asthenia, consequent from gunshot wound.	Operator, M. C. Mulford, Act. Asst. Surgeon U. S. A. Army Medical Museum, Specimen No. 2618.
Good.	Simple dressings; did well. At date of transfer the parts had entirely healed; the limb was six inches shorter than the other, and could be swung forward and backward, but could not be exercised in lateral or rotary motion.	Furloughed Dec. 21st, 1864; readmitted and transferred, February 28th, 1865, to Worcester, Mass. March 31st, 1865. Patient is in perfect health; parts healed and free from tenderness; limb movable in every direction, and perfectly under control of the muscles; while standing erect on the left foot, and placing the right on a line with the long axis of the leg, he can touch the floor with his toes; more than two inches of the shaft is apparently gone; upper end of femur enlarged, apparently by new osseous growth, to almost twice its normal diameter; has a good false joint, and leg can be made useful hereafter when strengthened by artificial appliances.	Operator, Confederate Surgeon. Transferred from Dale U. S. A. General Hospital to DeCamp U. S. A. General Hospital, August 28th, 1865. Asst. Surgeon Warren Webster's Report proves conclusively that the head of the bone was not removed in this case. The patient is figured in Photographs 106 and 107, A. M M.
.....	Smith's anterior splint was applied after operation.	.....	Report of Asst. Surgeon J. S. Billings, U. S. A., Acting Medical Inspector A. of P.

TABULAR STATEMENT OF THE OPERATIONS OF

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation.	Condition of injured Parts at Time of Operation.
21. Harewood U. S. A. General Hospital, Washington, D. C. 14,050.	Henry Woodworth, Private Co. A, 4th Vermont Volunteers. Age, 18. Admitted May 25, 1864.	Gunshot wound of left thigh, ball passing transversely below the trochanter major, fracturing upper portion of femur and lodging beneath sartorius muscle. Spottsylvania C. H., Va., May 12, 1864.	July 1, 1864.	Excision of head of left femur. Sulphuric ether.	.....
22. Douglas, Washington, D. C.	Peter Boyle, Private Co. D, 59th Massachusetts Vols. Age, 60. Admitted August 3, 1864.	Gunshot wound of left hip, fracturing trochanter. Petersburg, Va., July 30, 1864.	August 5, 1864.	Excision of the head of the left femur. Ether.	The ball had comminuted the neck of the femur; fleshy parts healthy.
23. Field Hospital, 5th Corps.	A. McDonald, Private Co. F, 149th Pennsylvania Vols. Admitted August 20, 1864.	Gunshot fracture of the upper extremity of the femur by a conoidal musket-ball, which lodged in the head of the bone. Weldon Railroad, Va., August 20, 1864.	August 20, 1864.	Excision of the head and neck of the femur, the bone being sawn through the great trochanter; a V-shaped incision was employed. Chloroform.	Acetabulum uninjured; ball impacted in head of the femur.
24. Field Hospital, 5th Corps.	Charles Beard, Private 12th Mississippi Regiment, C. S. A.	Gunshot fracture of upper extremity of femur by a conoidal musket-ball.	August 20, 1864.	Excision of head, neck, and trochanters of the femur; the bone was sawn at the level of the trochanter minor; ball removed. Chloroform.	The ball entered in front, badly shattered the neck of the femur, and lodged in the acetabulum, the lower margin of which was broken off, but no communication existed with the interior of the pelvis.
25. U. S. A. General Hospital, Beverly, N. J.	John Zaborowski, Private Co. H, 7th Connecticut Vols. Age, 33. Admitted August 22, 1864.	Gunshot wound of right thigh, fracturing head of femur; minié-ball entered just below the trochanter major, passing upward and inward, fracturing the neck and injuring the head of the bone. Deep Bottom, Va., August 16, 1864.	Sept. 27, 1864.	Resection of the head and a portion of the trochanter major of the right femur, by an incision four and a half inches in length. Chloroform used. Patient reacted slowly.	Parts in a sloughing condition; great suppurative discharge from wound.

EXCISIONS OF THE HEAD OF THE FEMUR—*Continued.*

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS.
Poor; anæmic; countenance pale; pulse small.	Unfavorable; treatment supporting. Patient did not improve after operation, but rapidly sank.	Died July 2d, 1864; exhaustion.	Operator, Reed B. Bontecou, Surgeon U. S. Vols. Army Medical Museum, Specimen No. 3049.
Patient very old; 60 years; condition poor.	Reacted well after operation, but at night there was sweating with vomiting. Aug. 6th, 1864. Ate a good breakfast, but still cool sweating skin; pulse 128.	Died August 9th, 1864.	Operator, Wm. Thomson, Asst. Surgeon U. S. A. Army Medical Museum, Specimen No. 3593.
Satisfactory.	No bad symptoms followed the operation for two days, and on August 23d the patient was sent to the base hospital at City Point.	Died in less than four days after the operation.	Report of Asst. Surgeon J. S. Billings, Acting Medical Inspector A. of P. Operator, Surgeon Reams, 149th Pennsylvania Vols. Consult also letter of Asst. Surgeon Chas. K. Winne, U.S.A., of Sept. 20th, 1865.
Satisfactory.	Limb dressed in Smith's anterior splint. Aug. 21st. A marked rigor occurred a short time after the operation was completed. On the following day there was retention of the urine and great irritability of the stomach.	Died August 25th, 1864, on the fifth day after the operation.	Report of Asst. Surgeon J. S. Billings, U. S. A., Acting Medical Inspector A. of P. Consult also letter of Asst. Surgeon Chas. K. Winne, U. S. A., of Sept. 20th, 1865. Operator, Surgeon White, Indiana Vols. At the autopsy the wound was found filled with offensive sanious pus, and the sawn surface of the femur was black. The acetabulum was intensely injected.
Patient feeble; pulse 140; appetite wanting; greatly reduced in strength and flesh.	Patient rapidly sinking; stimulants.	Died September 28th, 1864, from exhaustion.	Operator, C. Wagner, Asst. Surgeon U. S. A. Post-mortem revealed nothing worthy of note except slight necrosis of the acetabulum. Army Medical Museum, Specimen No. 3716.

TABULAR STATEMENT OF THE OPERATIONS OF

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation.	Condition of injured Parts at Time of Operation.
26. St. Louis U. S. A. General Hospital, New Orleans, La. 5766.	Hugh Train, Private Co. G, 31st Massachusetts Vols. Age, 22. Admitted February 13, 1865.	Conoidal ball entered anterior surface of middle third of left thigh, ranging upwards, and making exit above left gluteus, fracturing neck of femur. Accidentally, February 1, 1865.	March 24, 1865.	Made an incision four inches in length over the great trochanter; dissected soft parts from bone; divided bone with chain-saw just below trochanter, and removed head of bone without difficulty, teres ligament being softened.	Whole thigh dissected with pus; ulcers in groin; knee drawn over to right and across; shortening, with inversion; pus very unhealthy.
27. Mt. Pleasant U. S. A. General Hospital, Washington, D. C. 17,236.	H. C. Senet, Private Co. F, 122d New York Vols. Age, 27. Admitted April 2, 1865.	Ball entered midway and on a line with anterior-superior spinous process of left ilium and trochanter major, and lodged in the head of the femur. Petersburg, Va., March 27, 1865.	April 4, 1865.	Excision of head of left femur at anatomical neck, and extraction of ball; a T incision was made over trochanter major four by six inches. Ether and chloroform.	Limb looked very healthy, but on examination it was found that the ball had fractured the head of the femur into three pieces and lodged in it.
28. Armory Square U. S. A. General Hospital, Washington, D. C.	D. N. Patterson, Lieutenant Co. E, 45th Virginia (Rebel) Regiment. Admitted April 2, 1865.	Conoidal musket-ball entered behind left trochanter major, comminuted the head, neck, and trochanter of femur, and fractured the acetabulum. Boydton Plank Road, near Petersburg, Va., March 27, 1865.	April 3, 1865.	Excision of head, neck, and trochanters of left femur; about two inches were removed, and the ball extracted. Chloroform.	The misshapen and battered ball was buried in the obturator muscles. Back of the acetabulum a splinter of the os pubis was forced inwards into the pelvic cavity.
29. Douglas General Hospital, Washington, D. C. 6829.	Henry Phillips, Private Co. I, 146th New York Vols. Age, 34. Admitted April 6, 1865.	Gunshot wound over left trochanter, ball lodging in neck of femur. Southside Railroad, Va., April 1, 1865.	April 8, 1865.	Excision of head, neck, and trochanter of left femur. Ether.	Bone not completely fractured; hip-joint opened.
30. Judiciary Square General Hospital, Washington, D. C. 9260.	George M. Spencer, Private Co. B, 2d New York Mounted Rifles. Age, 17. Admitted April 4, 1865.	Gunshot fracture of right femur; ball entered at great trochanter and caused extensive longitudinal splintering of the shaft, which was found subsequently to extend quite to its lower third. Dinwiddie C. H., March 31, 1865.	April 12, 1865.	Excision of head, neck, and trochanters of right femur. Chloroform.	The femur extensively shattered; copious suppuration from wound.

EXCISIONS OF THE HEAD OF THE FEMUR—*Continued.*

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS.
General health bad; night-sweats; tongue clean and moist; appetite good; bowels inclined to be costive.	Wound filled with lint; porter, chicken broth, eggs, stimulants, everything to enable him to sustain the drain upon his system. Felt easier for a few days after the operation.	Died March 30th, 1865. He became very much emaciated.	Operator, A. McMahon, Surgeon U. S. Vols. When admitted, patient stated positively that the surgeon of his regiment had given him chloroform, and examined his wound, and that the bone was not touched. There was no evidence of fracture on admission. He had walked upon the limb. The ball had injured the neck of the bone, and the subsequent caries had caused its destruction.
Patient feverish and fretful, with furred tongue.	Singultus came on immediately after operation, but was arrested; antispasmodics. April 5th. Great tympanitis. April 7th. Well-marked signs of peritonitis; a chill occurred, and lasted half an hour.	Died April 8th, 1865; acute peritonitis.	Operator, H. Allen, Asst. Surgeon U. S. A. Autopsy: Lungs healthy; liver greatly hypertrophied; lower fifth of ilium greatly inflamed and injected; tissues surrounding left hip-joint in a sloughing condition, and infiltrated with fœtid pus, which had burrowed several inches under gluteal muscles; also two inches below lesser trochanter; acetabulum denuded and a slight fracture of upper and posterior border; upper two inches of femur denuded of periosteum. Army Medical Museum, Specimen No. 526.
Very satisfactory.	Did well for two or three days, when hæmorrhage occurred. Hæmorrhage was probably from iliac vein, injured by a sharp splinter of bone.	Died April 7th, 1865.	Operator, D. W. Bliss, Surgeon U. S. Vols. Army Medical Museum, Specimen No. 4048.
Patient was somewhat exhausted, and had considerable fever; pulse and respiration nearly normal.	April 13th. Wound appears healthy; suppurates well; patient perspires freely; pulse 120. April 15th. Pulse 118. April 17th. Pulse 120; respiration 32; slight pleurisy of right side; Diarrhœa set in. April 18th. Respiration 26; pulse 130; much weaker. April 20th. Chill.	Died April 21st, 1865; exhaustion.	Operator, Wm. F. Norris, Asst. Surgeon U. S. A. Autopsy. No evidences of pyæmia found, though strongly suspected before death. Army Medical Museum, Specimen No. 3235.
Irritative fever.	It was ascertained that longitudinal splintering of the femur extended far down the shaft, and amputation at the hip-joint was performed.	Died April 12th, 1865.	Operator, E. Griswold, Surgeon U. S. Vols.

TABULAR STATEMENT OF THE OPERATIONS OF

Hospital and Hospital Number.	Name, Rank, Company, Regiment. Age. Date of Admission to Hospital.	Description and Date of Wound or Injury. On what Occasion received.	Date of Operation.	Operation.	Condition of injured Parts at Time of Operation.
31. St. Louis U. S. A. General Hospital, New Orleans, La. 7643. Marine General Hospital, New Orleans, La.	T. E. Foulke, Private Co. D, 2d Alabama (C. S. A.). Age, 17. Admitted April 15, 1865. Admitted May 26, 1865.	Conoidal ball entered posteriorly at middle third of left thigh; extracted above anterior superior spinous process of left ilium, fracturing upper third of femur, involving trochanter and neck. Fort Blakely, Ala., April 9, 1865.	April 27, 1865.	Excision of two inches of shaft of left femur, including trochanters, neck, and head. Chloroform.	Great comminution; parts surrounding hip-joint filled with unhealthy pus.
32. St. Louis U. S. A. General Hospital, New Orleans, La. 7641.	G. W. Brantley, Private Co. C, 2d Alabama (C. S. A.). Age, 18. Admitted April 15, 1865.	Conoidal ball entered left groin, passing through, fracturing neck of left femur, emerged posteriorly from left gluteus; also gunshot fracture of external condyle of right humerus. Fort Blakely, Ala., April 9, 1865.	April 28, 1865.	Excision of head, neck, and trochanter of left femur; no ligations. Chloroform.	Thigh, groin, and surrounding parts infiltrated by unhealthy pus.

A case is reported by Acting Assistant Surgeon Siebold, U. S. A., in which only a portion of the head of the femur was removed, a ball being at the same time extracted from the acetabulum. The patient, Private Robb, 188th New York Vols., was treated at Point Lookout Hospital, and died four months after the operation.



FIG. 72.—Conoidal ball embedded in the head of femur. *Spec.* 125, A. M. M.

Many other cases occurred in which the operation was admissible, so far as the local lesions were concerned. But the requisites for after-treatment were not attainable in the field hospitals, and when the patients reached the base hospitals, their condition forbade operative interference.

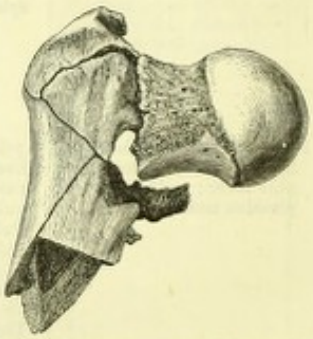


FIG. 73.—Head of femur excised for gunshot injury. *Spec.* 3375, A. M. M.

The annexed engraving of a specimen (No. 125), taken from a patient who died in the Patent Office Hospital, in Washington, in September, 1862, illustrates such cases.

At the Army Medical Museum there are preserved 16 excised heads of femurs, including the specimens from two of the successful cases.

Specimen 3375 exhibits the extensive comminution of the trochanters in Dr. Mursick's successful case. The black object below the neck represents the battered shapeless ball.

EXCISIONS OF THE HEAD OF THE FEMUR—*Concluded.*

Constitutional State of Patient at Time of Operation.	Progress, Treatment, etc.	Result. Cause of Death.	REMARKS.
Very much exhausted from profuse suppuration.	Nourishing diet; two bottles of porter daily, eggs, beef tea, and everything he desired.	Transferred to Marine Hospital, New Orleans, La., May 26th, 1865; doing well. Died June 5th, 1865; exhaustion.	Operator, A. McMahon, Surgeon U. S. Vols. This case was unfavorable for any operation; but as death evidently would otherwise result, the only hope for him was in operation.
Very much exhausted.	Did not rally well; stimulants very freely administered.	Died May 2d, 1865; capillary hæmorrhage.	Operator, A. McMahon, Surgeon U. S. Vols. No operation performed on elbow-joint, as condition of patient would not admit it.

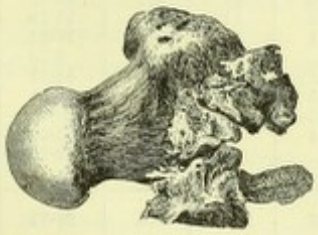


FIG. 74.—Excised head of femur, with callus formation below the trochanters. *Spec.* 1192, A. M. M.

The specimen in Surgeon D. P. Smith's successful case indicates that nature had attempted something in the way of reparation. (Specimen 1192.)

A drawing has been made of the appearance of the limb of the patient who furnished this specimen.* (Surgical Series of Drawings No. 73, A. M. M.)

In Medical Inspector Pineo's case (Specimen 71, A. M. M.), the ball, after shattering the trochanters and neck of the femur, unhappily entered the pelvic cavity.



FIG. 75.—Excised head of femur. *Spec.* 71, A. M. M.

* The following letter, which is quoted in his own language, has lately been received from Mr. Brown:

BVT. LT. COL. GEORGE A. OTIS, *Surgeon U. S. Vols.*

COOPERSVILLE, MICHIGAN, September 26th, 1865.

SIR:—

Yours of the 21st inst. has just come to hand, and I take pleasure in informing you that my general health is good; my leg is improving slowly; the knee remains quite stiff yet, but I think it is better than it was one year ago. I have some control over the movements of the thigh. When standing, can move the leg backwards and forwards, about two and a half feet, and sideways enough to bring the foot across in front of the other foot. Can bear considerable of my weight upon it, but not enough to do away with the use of one crutch yet. Cannot perceive that there is any difference in the length of the limb since I was discharged, as I use the stirrup on the crutch the same as then. There has been no breaking out of abscesses, nor any soreness of any kind since March, 1864, nor since my discharge, to amount to anything. * * * *

Respectfully yours,

(Signed) JOSEPH BROWN,

Late of Co. I, 3d Michigan Vols.

EXCISIONS IN THE CONTINUITY OF THE LONG BONES OF THE EXTREMITIES.—The great surgeons who have done most towards substituting excision for amputation in gunshot injuries of the joints have almost unanimously condemned excisions of the continuity of the long bones in the treatment of gunshot fractures. The surgical histories of the Crimean war, of the Schleswick Holstein campaigns, and of the Indian mutiny, record a few successes in resections of the shafts of the humerus, the tibia, and the bones of the forearm; but this class of operations could scarcely be considered as admitted among the established and approved procedures of surgery. The late war has furnished ample materials for arriving at definite conclusions on this subject, and for determining how far these measures can claim to be included in that true conservatism which has for its first object the saving of life, and refuses to imperil lives in order to save limbs.

These materials are yet to be thoroughly analyzed. So far as examined, their evidence is, on the whole, unfavorable to excisions in the continuity.

A synopsis of the results at present attained is presented in the following table:

Table, giving the Number of Cases of Excisions for Gunshot Injuries in the Continuity of the Bones of the Extremities, from the Commencement of the War to July, 1864, *and the Results as far as ascertained.*

	Died.	Recovered.	Amputations ultimately required.	Result not yet determined.	Total.	Percentage of Mortality in finished cases.
Excisions in the continuity of the Humerus	42	133	7	79	261	24·00
Excisions in the continuity of the Radius	11	93	3	67	174	10·57
Excisions in the continuity of the Ulna	16	100	3	51	170	13·79
Excisions in the continuity of both Radius and Ulna	5	24	1	10	40	17·24
Excisions of the Metacarpal Bones	2	30	...	18	50	6·25
Excisions in the continuity of the Femur	32	6	...	24	62	84·21
Excisions in the continuity of the Tibia	11	48	5	20	84	18·64
Excisions in the continuity of the Fibula	15	60	3	15	93	20·00
Excisions in the continuity of both Tibia and Fibula	1	4	1	2	8	25·00
Excisions of the Metatarsal Bones	5	26	...	2	33	19·23
Totals	140	524	23	288	975	26·71

After excisions of portions of the shaft of the humerus for gunshot fractures, a number of patients have certainly obtained very useful limbs. But the mortality after the operation is 3 per cent. greater than after amputation of the arm. The 52 preparations at the Army Medical Museum, illustrating this resection, indicate the frequency with which it is followed by secondary amputation or a fatal result.

Excision in the continuity of both bones of the forearm has a larger mortality ratio than amputation of the forearm.

The specimens at the Museum and the records afford emphatic arguments against formal excisions of the shaft of the femur. With one exception, the few cases that recovered were those in which, after the removal of detached fragments, the least amount of operative interference had been practised.

The mortality rate after excisions of the tibia and fibula is less than after amputation, as the statistics stand; but the number of cases in which the result is still pending is unusually large.

There have been a few cases in which portions of the lower jaw, the body of the

clavicle, the ribs, or the ilium, have been removed by the gouge or the chain-saw after gunshot injuries. The results are given in the following tables:

Table, exhibiting Results of Cases of Excisions of the Bones of the Face, after Gunshot Fractures.

Number of deaths	3
Number of recoveries	23
Number of cases in which results, as yet, have not been obtained	11
Total number of cases	37

Table, exhibiting Results of Cases of Excisions of the Bones of the Trunk, after Gunshot Fractures.

Number of deaths	7
Number of recoveries	15
Number of cases in which results, as yet, have not been obtained	5
Total number of cases	27

One of the registers of excisions is devoted to the cases of trephining after gunshot injuries of the cranium. The results of this operation have already been alluded to, and are here recapitulated in a tabular form.

Table, exhibiting Results of Cases of Gunshot Fractures of the Skull, in which Trephining was performed.

Number of deaths	60
Number of recoveries	47
Number of cases in which, as yet, results have not been obtained	14
Total number of cases	121

Table, exhibiting Results of Cases of Gunshot Fractures of the Skull, in which Fragments of Bone were extracted.

Number of deaths	61
Number of recoveries	53
Number of cases in which, as yet, results have not been obtained	19
Total number of cases	133

LIGATIONS.

The following table exhibits the number of cases of ligation of the larger arteries, from the beginning of the war to March, 1864:

	Number of cases recovered.	Number of cases died.	Total.	Ratio of Mortality.
Common Carotid	12	37	49	75·51
External Carotid	...	2	2	100·
Subclavian	7	28	35	80·
Axillary	3	21	24	87·50
Brachial	53	11	64	17·18
Radial	12	2	14	14·28
Ulnar	9	2	11	18·18
Common Iliac	...	3	3	100·
Internal Iliac	...	2	2	100·
External Iliac	2	14	16	87·50
Femoral	25	83	108	76·85
Profunda	1	6	7	85·71
Popliteal	4	12	16	75·
Anterior Tibial	11	5	16	31·25
Posterior Tibial	13	6	19	31·57
Peroneal	...	2	2	100·
All others	11	4	15	26·66
Aggregate	163	240	403	....

Of the three cases of ligation of the common iliac, one was performed by Surgeon McKee, U. S. A., on account of secondary hæmorrhage from a branch of the left internal iliac. The hæmorrhage resulted from a gunshot wound of the pelvis, and occurred on the fifteenth and again on the twenty-third day. On the second bleeding, the internal iliac was tied; but the hæmorrhage was not controlled, and the main trunk was secured. The patient survived two days, and the bleeding did not recur. The appearance of the parts is represented in vol. i. p. 5 of Photographs of Surgical Cases, S. G. O., and the preparation is preserved as Specimen No. 3464, A. M. M. The second operation was performed by Acting Assistant Surgeon Isham, U. S. A., for a false consecutive aneurism of the anterior trunk of the right internal iliac, resulting from a bayonet stab through the ischiatic notch. Seven months after the wound was inflicted the rupture of the sac appeared imminent, and the operation was imperative. The patient survived four days. An occluding clot, extending to the bifurcation of the aorta, was found above the ligature. There was no peritonitis. The third operation was done at the Ward Hospital, Newark, New Jersey, for an aneurismal varix, following a stab with a penknife in the left thigh, which opened a communication between the femoral artery and vein. The patient died of peritonitis in five days. The injected vessels constitute Specimen No. 3597, A. M. M., and are represented in Photograph No. 74, A. M. M.

Two cases are recorded of deligation of the internal iliac for secondary hæmorrhage after gunshot wounds. Both terminated fatally.

Of the ligations of the external iliac, 2 recovered. One of them was the case of Private Smith, already related (p. 49), in which amputation at the hip-joint had been previously performed. The second was the case of Sergeant Ziders, Co. I, 53d Pennsylvania Vols., who received a severe flesh wound of the right thigh at Gettysburg, July 3d,

1863, with injury to the femoral artery. There was secondary bleeding, for which the femoral was tied in the wound. Bleeding recurred, and on October 8th, 1863, the external iliac was tied by Acting Assistant Surgeon Adinell M. Hewson, U. S. A. The patient recovered, and was discharged from service May 14th, 1864, the movements of his right leg being impaired by contraction of the muscles.

Of ligations of the subclavian, 35 cases are recorded. In all, the vessel was secured outside of the scaleni. In 16 cases, the operation was on the right, and in 14 on the left side; in 5 cases, the particular vessel is not mentioned. The operation was performed in 13 cases for secondary hæmorrhage after amputation of the shoulder-joint, with 4 recoveries. In 2 cases, it was done for primary, and in 15 for secondary bleeding after gunshot wounds, with injury of the axillary artery, with 2 recoveries. In 2 cases, the operation was performed for axillary aneurism. In 2 cases, with one recovery, it was required by secondary bleeding after excisions of the humerus, and in 1 case it was necessitated by a secondary hæmorrhage after a gunshot wound with injury of the subclavian.

The ligations included in the category of "all others" were of the temporal artery in 3 cases, the occipital in 2, the facial in 2, and intercostal in 2; the internal mammary, the thoracica longa, the gluteal, the superior profunda of the arm, the posterior circumflex branch of the axillary, the right dorsalis pedis, each in 1 case.

The two ligations of intercostals were performed by Assistant Surgeon B. Howard, U. S. A., and Assistant Surgeon W. H. Gardner, U. S. A., according to the plan proposed by the former, of enclosing the rib in the ligature. Dr. Howard's patient died the day after the operation was performed. The other patient recovered.

The new hæmostatic process* recommended by Professor Simpson was adopted in a few cases, with favorable results.

OTHER SURGICAL OPERATIONS.

Four additional registers of operations are kept. In one is recorded the histories of 290 cases of gunshot fractures, in which the primary sequestra of Dupuytren, or detached fragments of bone, have been extracted. Another register contains the histories of 436 cases, in which balls or other foreign bodies have been extracted. Extraneous matters extracted from gunshot wounds have been of great variety, and comprise bits of clothing and accoutrements, fragments of watches, coins, shoe-nails, teeth, etc. A collection of over 400 such bodies is preserved at the Army Medical Museum.

The register of operations for surgical diseases contains the histories of 443 cases, many of which are of great interest. For example, 15 cases of tracheotomy or laryngotomy are recorded, with six recoveries. The operation was done once, with success, in a case of croupal diphtheritis.

Finally, in the "register of operations not included in other categories," 23 cases are recorded of the treatment of wounds of the larger joints by free incisions, or of operations for ununited gunshot fractures.

---

* Acupressure, a New Method of Arresting Surgical Hæmorrhage and of Accelerating the Healing of Wounds. By James Y. Simpson, M.D., F.R.S.E. Edinburgh, 1864. Octavo, pp. xiv., 580.

ON THE MEDICAL STAFF AND THE MATERIA CHIRURGICA.

THE MEDICAL STAFF.

After its organization was fairly completed, the medical staff that served in the late war was composed of a surgeon general, one assistant surgeon general, a medical inspector general, 16 medical inspectors, 170 surgeons and assistant surgeons of the regular army, 362 volunteer staff surgeons and assistant surgeons, 3000 regimental surgeons and assistant surgeons of volunteers, 2500 acting assistant surgeons or physicians serving under contract, and 6 medical storekeepers.

The medical service in the field was organized upon the basis of an independent hospital and ambulance establishment for each division of three brigades. The *personnel* of the division hospital consisted of a surgeon in charge, with an assistant surgeon as executive officer and another assistant surgeon as recorder, an operating staff of three surgeons, aided by three assistant surgeons, and the requisite number of nurses and attendants. The division ambulance train was commanded by a first lieutenant, assisted by a second lieutenant from each brigade. The enlisted men detailed for ambulance duty were a sergeant from each regiment, three privates for each ambulance, and one private for each wagon. The ambulance train consisted of from one to three ambulances for each regiment, squadron, or battery, a medicine wagon for each brigade, and two or more supply wagons. The hospital and ambulance train were under the control of the surgeon in chief of division. The division hospitals were usually located just out of range of artillery fire. Sometimes three or more of the division hospitals were consolidated under the orders of a corps medical director, who was assisted by his inspector, quartermaster, commissary, and chief ambulance officer. The medical officers not employed at the field hospitals accompanied their regiments, and established temporary depots as near as practicable to the line of battle. How faithfully this perilous duty was performed may be inferred from the fact that, during the war, thirty-six medical officers were either killed, or died from wounds received in battle. As soon as practicable, after every engagement, the wounded were transferred from the division or corps hospitals to the base or general hospitals, which at one time were 205 in number. These were under the charge and command of officers of the regular or volunteer staff, who were assisted by acting assistant surgeons, and by officers of the second battalion of the Veteran Reserve Corps.

The organization of the medical staff in the field and in permanent hospitals is very fully discussed, in papers on file in the office, by Colonel Charles S. Tripler, Dr. Jonathan Letterman, and Colonel T. A. McParlin, successively medical directors of the Army of the Potomac; by Colonel G. E. Cooper, medical director of the Army of the Cumberland; by Lieutenant Colonel J. J. Milhau, medical director of the 5th Army Corps; by Surgeon L. W. Read, U. S. Vols., surgeon in chief of the 3d Division 5th Army Corps; by Surgeon T. M. Flandreau, 146th New York Vols., surgeon in chief of brigade, and in the reports of the medical inspectors of military departments.

ON MEANS OF TRANSPORTATION OF THE WOUNDED.

The wounded who were unable to walk were removed beyond the immediate range of musketry on hand-litters. The details for bearers were usually made from the musicians of regiments.

Models of the different patterns of litters that were used are preserved at the Army Medical Museum. In the early part of the war, most of the regiments were supplied with stretchers of the old regulation pattern. It was found that the yoke pieces were frequently lost, and that when the canvas stretcher became damp, the litter was put together with difficulty. A light and convenient pattern, known as the "Halstead litter," was subsequently largely used. Brigadier General Satterlee issued 12,867 of these litters from the purveying depot of New York alone. They were too fragile for the hard usage to which they were subjected.

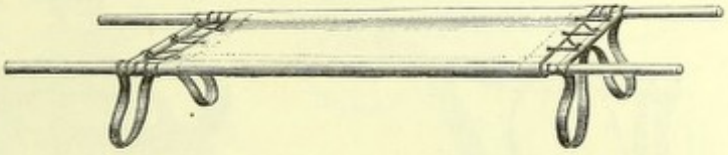


FIG. 76.—Regulation hand-litter.

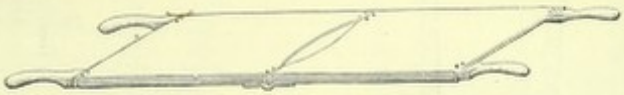


FIG. 77.—Halstead folding hand-litter.

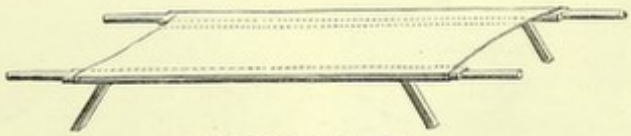


FIG. 78.—Smith's hand-litter.

Another pattern, folding up lengthwise, in which the poles were separated by folding iron braces, was very generally used during the last two years of the war. Colonel C. McDougall issued 5548 of these from the purveying depot in Philadelphia.

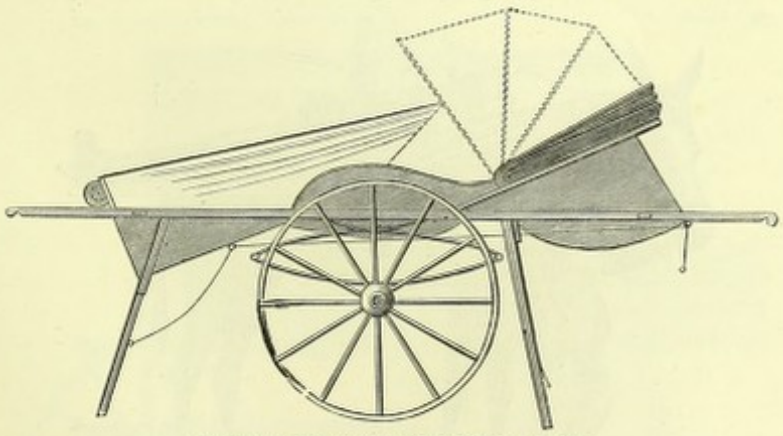


FIG. 79.—Hand-litter-carriage. Scale ½ inch to the foot.

A form of litter on wheels, that had been advantageously employed by the Prussians in the war with the Danes,* was introduced too late to test its utility practically.

* Gurlt, Militär-Chirurgische Fragmente, Berlin, 1865; Neudörfer, Handbuch der Kreigs-Chirurgie, Leipsig, 1864; and Neudörfer, Aus dem feld-ärztlichen Berichter über die Verwundeten in Schleswig, Berlin, 1864.

A few cacolets were issued; but they were not regarded with favor by many surgeons. They were adapted only for men wounded in the upper extremities, and such patients were more comfortably transported in ambulances or baggage wagons

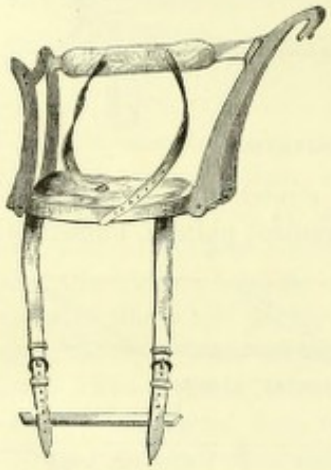


Fig. 80.—Cacolet.



Fig. 81.—Wounded men transported by cacolets.

The horse-litters were also but little used. Altogether, seven or eight hundred of them were supplied to the troops; but they were soon laid aside.

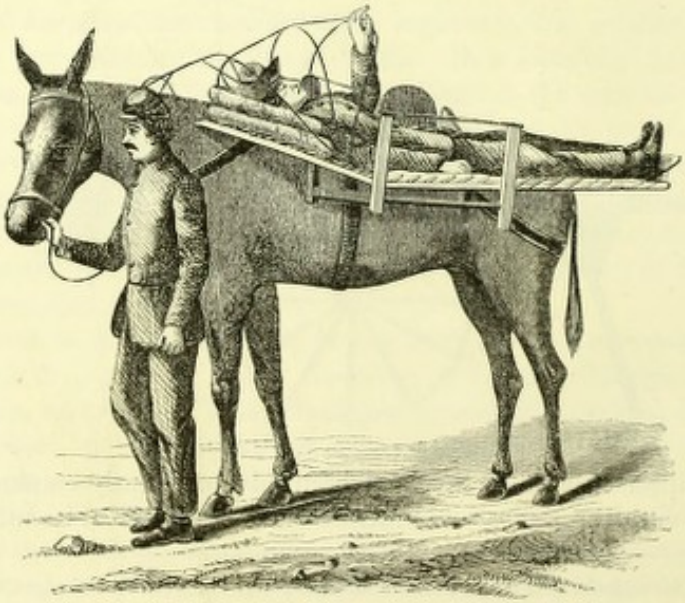


Fig. 82.—Transportation of the wounded by the horse-litter.

At the beginning of the war, the one-horse ambulances, designed by Surgeon General Finley and Surgeon Coolidge, and the four-horse ambulances, designed by Surgeon Tripler, were chiefly employed.

The former were intended to transport two wounded men in a recumbent position. The latter accommodated eight men, lying down. The beds in all of these ambulances were movable, and could be used as hand-litters.

The one-horse ambulances were too frail for the rough roads on which they were

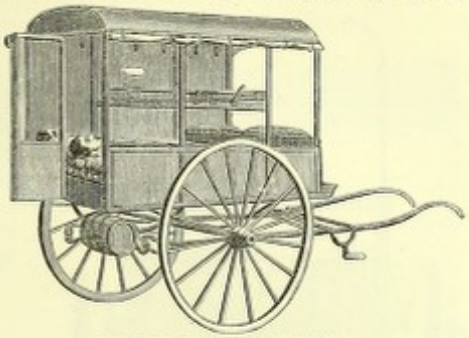


FIG. 83.—The "Coolidge" ambulance.

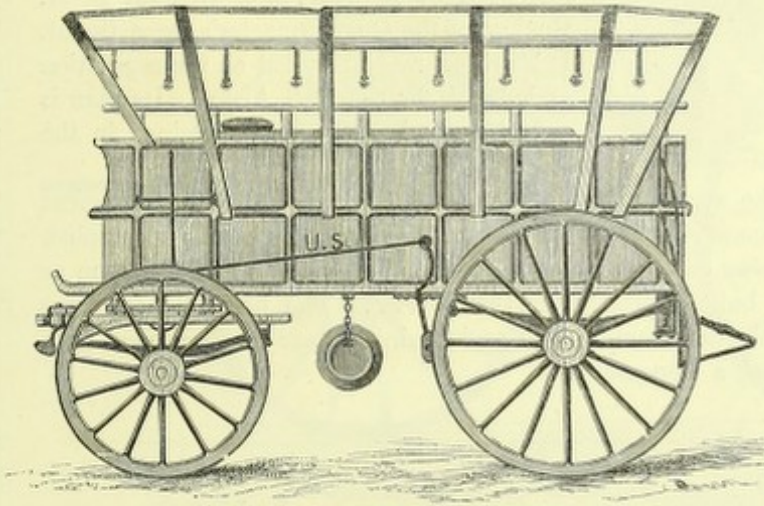


FIG. 84.—Side view of the "Tripler" ambulance.

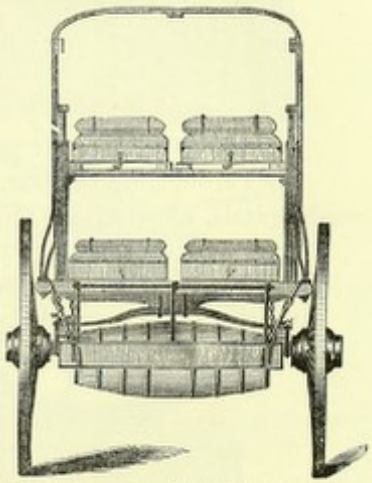


FIG. 85.—Rear view of the "Tripler" ambulance.

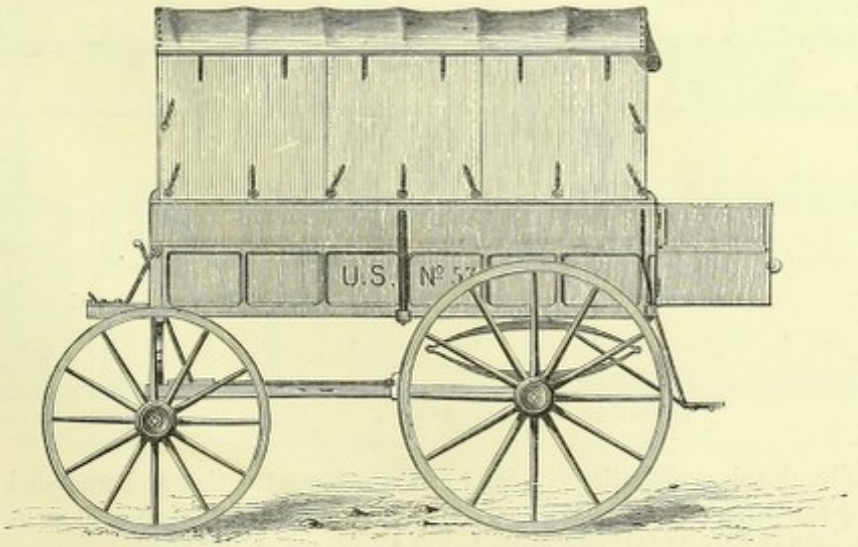


FIG. 86.—Side elevation of the Wheeling or Rosecrans ambulance.

employed, and soon fell into disrepute. The four-horse ambulance rendered good service, but it was very heavy. What is commonly known as the "Wheeling" ambulance, from having been first constructed at Wheeling, Virginia, from a design of General Rosecrans, soon came into very general use. It is drawn by two horses, and carries ten or twelve persons sitting, or two or three sitting and two lying down. It combines lightness and strength.

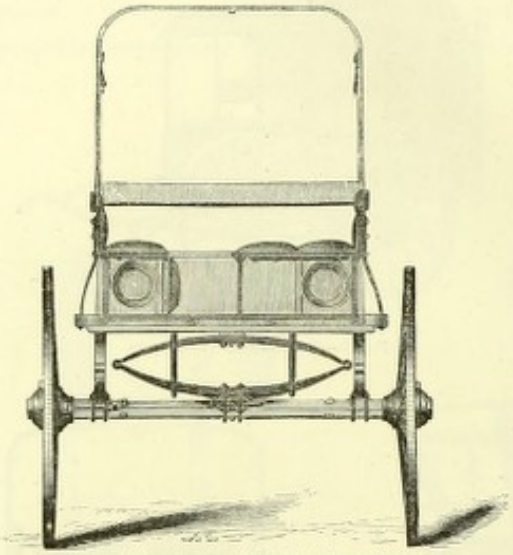


Fig. 87.—Rear elevation of the Wheeling ambulance.

Towards the close of the war, a still better ambulance was constructed from designs furnished by Brevet Major General D. H. Rucker, of the Quartermaster's Department. It has been recommended as the regulation ambulance for the U. S. Army. Its plan is exhibited and sufficiently explained in the accompanying plate.

Throughout the war, the system of rapidly removing the wounded to permanent hospitals, remote from the scene of hostilities, was uniformly adopted. To accomplish this, trains of hospital railway cars were constructed, and steamers were fitted up as hospital transports, or were built expressly for this service. The hospital cars were furnished with movable berths or litters, and in each train one car was provided with facilities for cooking, and with a dispensary.

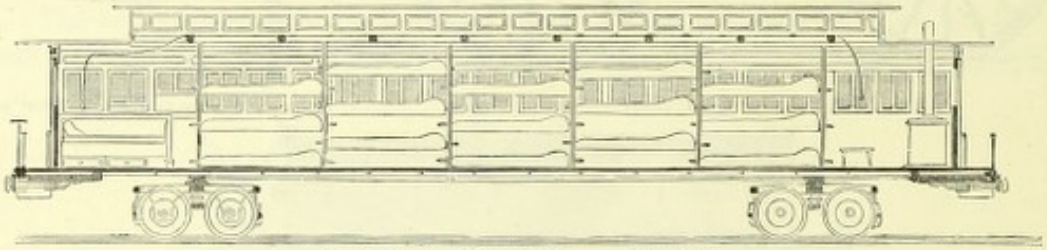


Fig. 88.—U. S. Army Hospital railway car. Side elevation.



Fig. 89.—Hospital railway car. Ground plan.

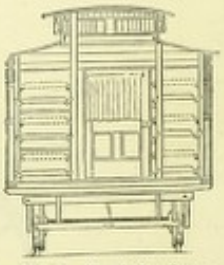
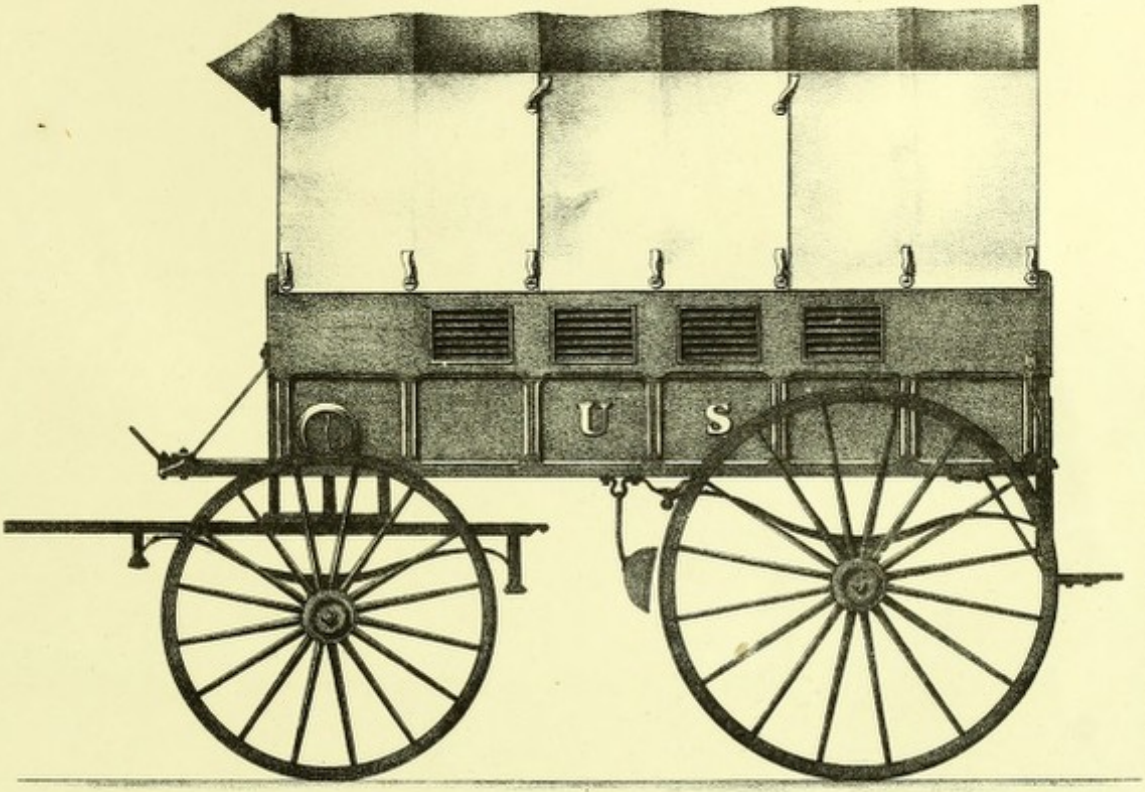
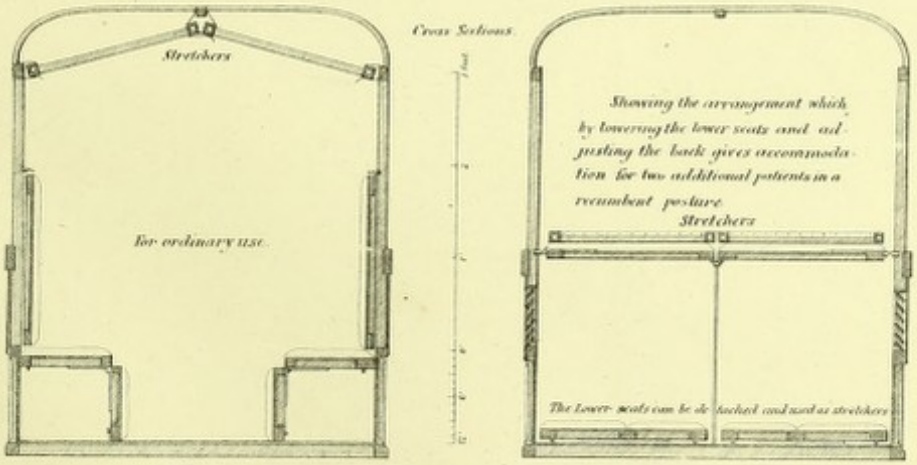


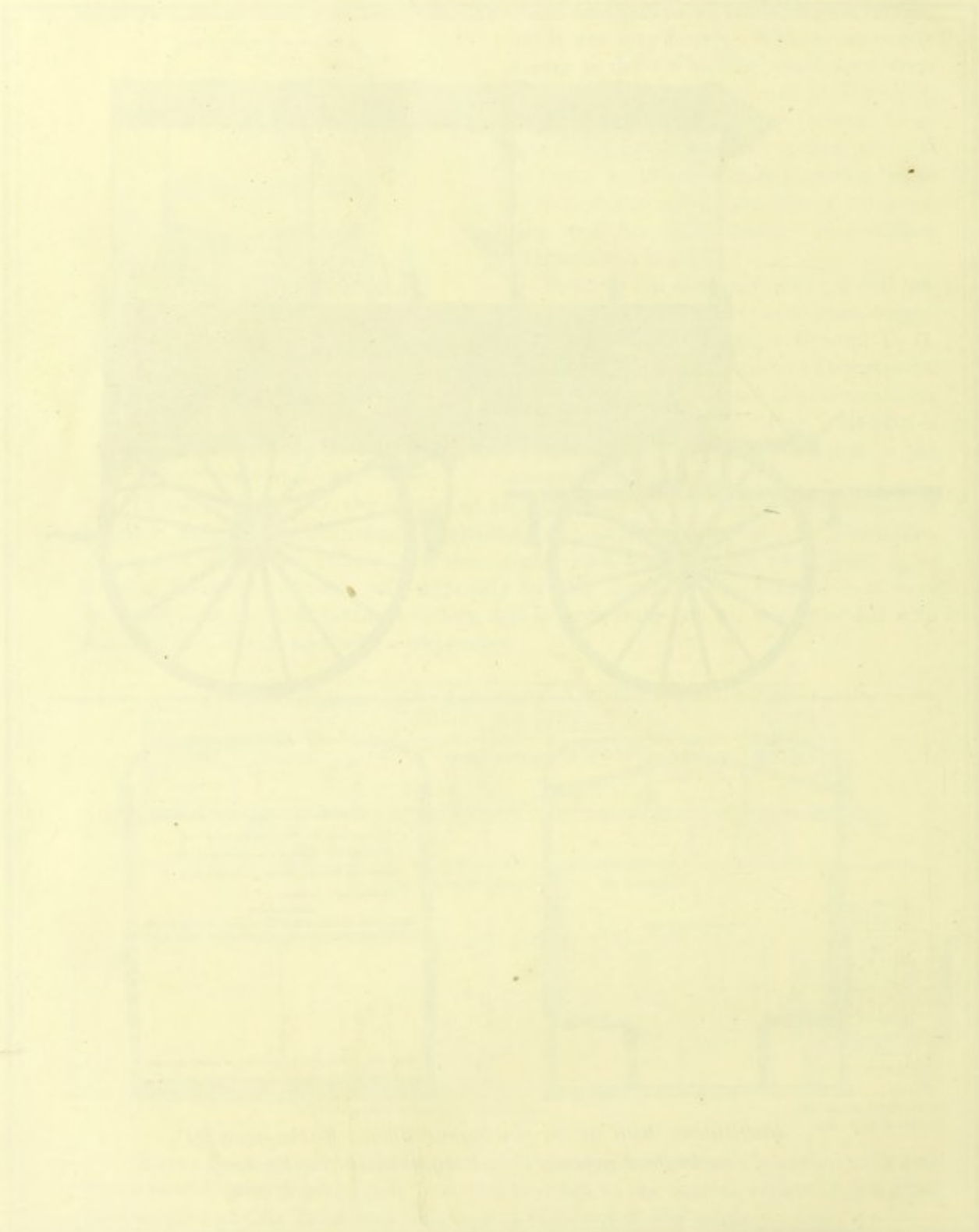
Fig. 90.—Hospital railway car. Rear elevation.

During the siege operations in front of Petersburg, the sick and wounded were conveyed by rail from the hospitals near the trenches to the central avenue of the great base hospital at City Point, and unloaded at the doors of the wards.





Ambulance, built at the Gov. Repair Shops, Washington, D.C. under the direction of Brevet Major General D.H. Rucker, Quartermaster, U.S. Army.

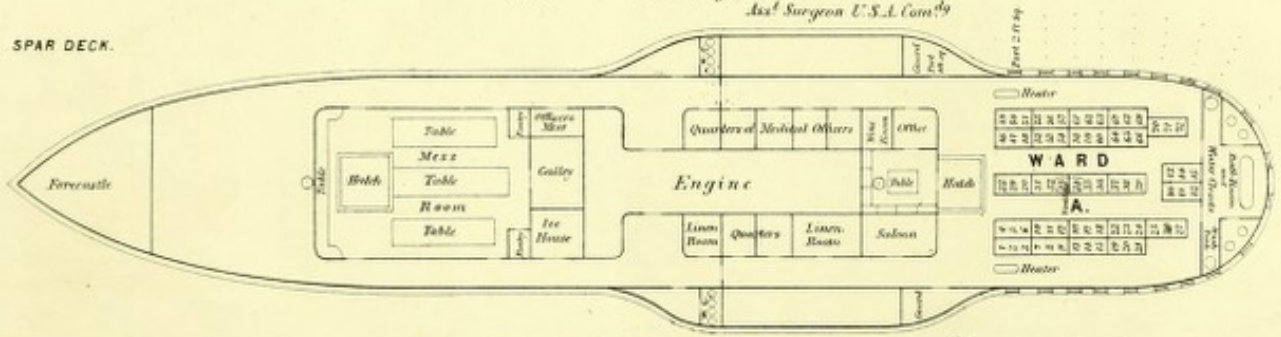


Plan of the Fittings of the U.S. Hospital Transport.

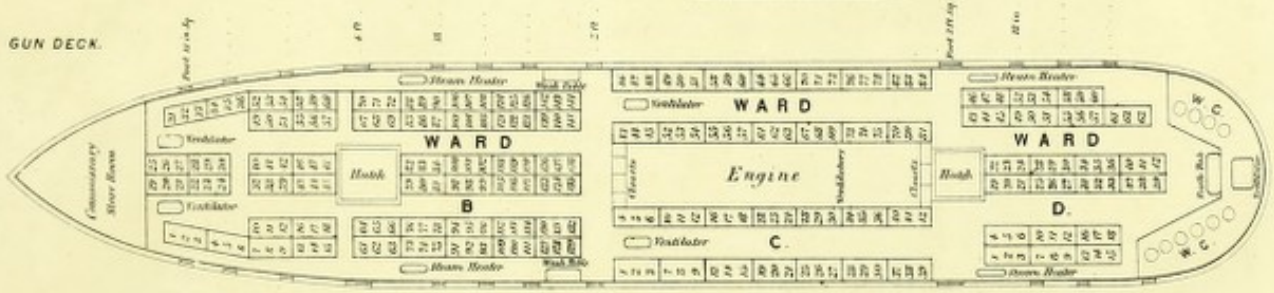
Gen.l J.K.Barnes.

1865. *Brevet Major Thos. McMillen*
Asst. Surgeon U.S.A. Com.dg

SPAR DECK.



GUN DECK.



ORLOP DECK.



Plans and descriptions of the hospital railway trains on the lines between Washington and New York, Chattanooga and Nashville, Marietta and Louisville, are filed in this office.

When the bases of military operations were contiguous to the sea-board or to the great water-courses, the sick and wounded were removed in hospital steamers. The hospital transports on the Atlantic and on the Mississippi and its tributaries formed a large fleet. Ordinary passenger steamers were of necessity employed at first; but ultimately vessels were specially constructed for hospital purposes. The internal arrangement of one of the best of the ocean hospital transports is figured in the accompanying plate. It is a steamer of 1400 tons, 228 feet in length, provided with 477 beds. It was fitted up at New York, under the supervision of Surgeon A. H. Hoff, U. S. Vols.

EQUIPMENT, DRESSINGS, ETC.

At the beginning of the war, each regimental surgeon was provided with the instruments, medicines, and dressings enumerated in the Standard Supply Table.* In action, he was accompanied by a hospital orderly, who carried a knapsack containing a limited supply of anæsthetics, stimulants, anodynes, styptics, and materials for primary dressings. The medicine chest and bulky hospital supplies were transported in wagons of the supply train, and were often inaccessible when most urgently required.

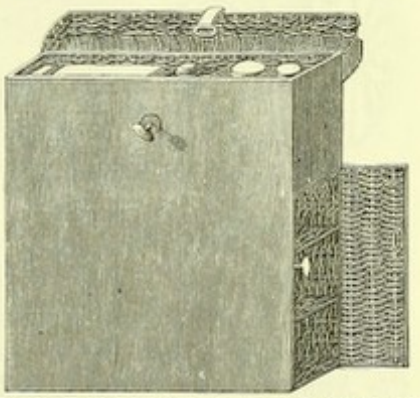


Fig. 91.—Hospital knapsack of wicker-work, covered with enamelled cloth.

To obviate this inconvenience, panniers were provided containing the most necessary medicines, dressings, and surgical appliances.† They were designed to be carried on the backs of pack animals, but they were too heavy to be conveyed in this manner, as were the knapsacks to be borne by men.

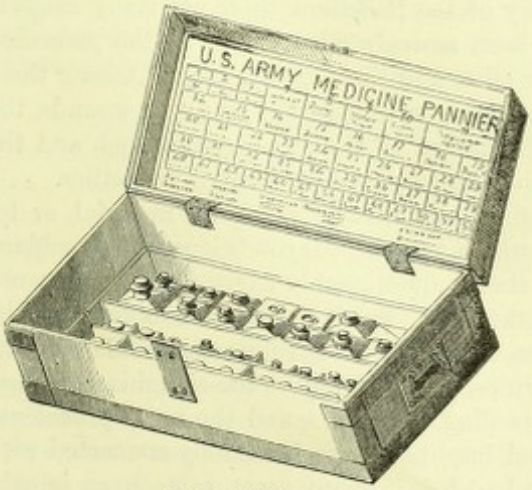


Fig. 92.—Medicine pannier.

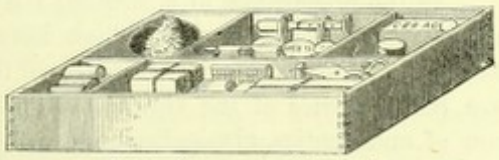


Fig. 93.—Upper tray of medicine pannier.

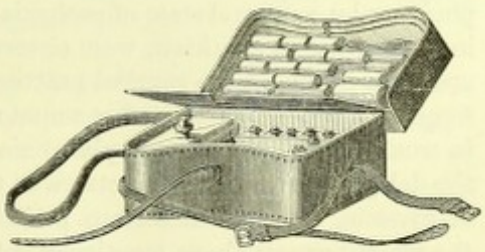


Fig. 94.—Surgeon's field companion.

* Revised Regulations for the Army of the United States, 1861, p. 304.

† The contents of the hospital knapsacks, panniers, medicine chests, instrument cases, etc. are enumerated in Circular No. 12, S. G. O., 1862.

As the organization of the medical staff was perfected, the cumbrous regimental supplies were curtailed. The hospital orderly carried only a light haversack, or "field companion," containing indispensable drugs and dressings.

But while the regimental hospital supplies were restricted, the brigade supplies were augmented. Each brigade was provided with a "medicine wagon," which was furnished not only with drugs, but with an ample provision of stores, dressings, furniture, and appliances, an amputating table, and a limited supply of bedding. The contents of the wagons were continually replenished from the stores of the medical purveyor of the army. The medicine wagons constructed by Autenrieth and Perot were those chiefly employed in the war. A preferable model, recommended by the Medical Department, was adopted during the last year of the war, and was built at the Government workshops. It has been impracticable to prepare an illustration of it in season for this report.

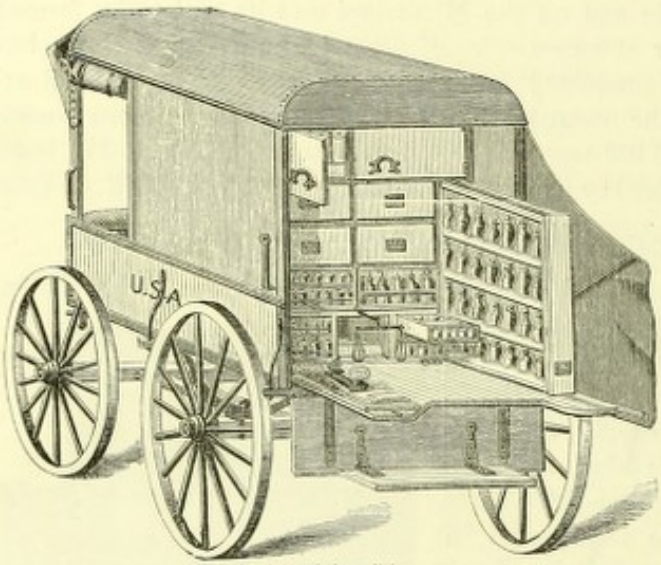


FIG. 9a.—Autenrieth medicine wagon.

Models of a variety of hospital knapsacks, panniers, and wagons are preserved at the Army Medical Museum, with the reports of boards on their respective merits or disadvantages.

CONCLUDING OBSERVATIONS.

In the preparation of a Surgical History of the Rebellion, there are many subjects that would claim attention, which have been scarcely adverted to in the preceding hasty review of the surgical statistics of the office and their illustrations. Among these are the influence of the state of health of the troops upon the result of wounds, the use of anæsthetics, erysipelas, gangrene, the nature of the missiles employed, and the modifications in the character of gunshot injuries produced by modern projectiles.

The complications of injuries by constitutional diseases, scorbutic, malarial, or typhoid, or by a general state of cachexia, in which pathological conditions were combined in unaccustomed synthesis, were elements that unquestionably exerted a vast influence upon the results of the surgical practice of the war. For it cannot be doubted that the frequency of osteomyelitis after amputations, the proneness to suppurative inflammation in wounds of the head and splanchnic cavities, the tendency to the sloughing of flaps, the delay in the union of fractures or the healing of wounds, and the great prevalence of pyæmia, observed at certain periods and localities, were intimately connected with the morbid causes above mentioned, which had led, in many cases, to such an impairment of the general vitality of the men as greatly to diminish their ability to resist the effects of severe injuries. In these relations, therefore, such pathological conditions should not be overlooked in the surgical annals of the war.

ANÆSTHETICS.—There have been consulted, in regard to the employment of anæsthetics, the reports of 23,260 surgical operations performed on the field or in general hospitals. Chloroform was used in 60 per cent. of these operations, ether in 30 per cent., and in 10 per cent. of the cases a mixture of the two was administered. At the general hospitals, the greater safety of ether as an anæsthetic was commonly conceded. It was often employed, and no fatal accident from its use has been reported. In the field operations, chloroform was almost exclusively used. The returns indicate that it was administered in not less than eighty thousand cases. In seven instances, fatal results have been ascribed with apparent fairness to its use. Detailed reports of these unfortunate cases are on file. The following synopsis is derived from them:

CASE I.—A soldier of a North Carolina regiment, a robust, healthy man, after the battle of Hanover Court House, May 29th, 1862, underwent amputation of the thigh. The operation was performed in the open air. He inhaled chloroform very freely. He expired just as the operation was completed. He had lost but little blood. No autopsy was held.—*Report of Surgeon Edwin Bently, U. S. Vols.*

CASE II.—D. Zebriske, Co. I, 12th Alabama Regiment, a prisoner after the battle of Antietam, had a gunshot flesh wound of the hip. A slight incision for the extraction of the ball was made October 19th, 1862, at Hospital No. 5, Frederick, Maryland. Chloroform was carefully administered. The patient expired suddenly. The autopsy threw no light on the cause of death.—*Report of Surgeon H. S. Hewit, U. S. Vols.*

CASE III.—Corporal Ballou, Co. E, 14th Pennsylvania Cavalry, was placed under the influence of chloroform, to undergo amputation of the right index and middle fingers, at Beverly, West Virginia, October 12th, 1862. He died in the midst of the operation. Slight calcareous deposits were found post-mortem about the valves of the heart.—*Report of Surgeon William B. Wynne, 14th Pennsylvania Cavalry.*

CASE IV.—Private Thomas Hamilton, Co. A, 1st Maryland Vols., aged thirty-one years, took chloroform September 3d, 1864, at Patterson Park Hospital, Baltimore, to undergo an operation for necrosis of the carpal bones. The anæsthetic was given with a large admixture of air. Sudden death ensued. The autopsy revealed fibrinous coagula in the auricles. The thoracic viscera were perfectly normal in appearance.—*Report signed by Acting Assistant Surgeons Fay, Cherbonnier, Kemster, and McLetchen.*

CASE V.—Colonel McGilvray, Chief of Artillery of the 10th Army Corps, inhaled two drachms of chloroform, September 4th, 1864, for an excision of a phalanx of the left index finger. He expired suddenly before the operation was commenced. There were no pathological appearances found to indicate the cause of death.—*Report of Surgeon A. B. Clark, U. S. Vols.*

CASE VI.—Private Robert Gormley, Co. I, 7th New York Artillery, died suddenly at McClellan General Hospital, November 29th, 1864, having taken chloroform to submit to an incision in the calf of the right leg for the removal of a ball. There was no autopsy.—*Report signed by Acting Assistant Surgeons Ely and Uhler.*

CASE VII.—Private John Johnson, Co. B, 2d Pennsylvania Heavy Artillery, a patient in Mower General Hospital, near Philadelphia, expired suddenly on May 13th, 1865, while inhaling chloroform preparatory to undergoing a surgical operation.—*Report of Surgeon J. Hopkinson, U. S. Vols.*

ERYSIPELAS.—In the ill-ventilated barracks and private edifices which were sometimes of necessity occupied as hospitals during the earlier period of the war, erysipelas was a frequent visitant. Elaborate reports on its prevalence in the hospitals of Louisville, Nashville, Memphis, and Madison have been transmitted by Surgeon Goldsmith, U. S. Vols., Surgeon Weeks, U. S. Vols., and Surgeon Culbertson, U. S. Vols.

GANGRENE.—The various forms of sloughing, phagedena, and traumatic gangrene, described in systematic authors, were among the complications of wounds that throughout the war often rendered the skill of surgeons abortive, but the ravages of true contagious hospital gangrene were comparatively limited. Voluminous papers on this subject have been contributed. It has been discussed in its clinical relations by Medical Inspector Hamilton, and Surgeons McParlin, Brinton, Goldsmith, Breed, Weeks and Moses, and its pathological anatomy has been investigated by Assistant Surgeons Woodward and Thomson.

MISSILES.—The collection at the Army Medical Museum of over five hundred projectiles extracted from wounds, together with the numerous preparations of fractures and wounded viscera in which the missiles that produced the injuries have been preserved, afford opportunities for the comparison of the various forms of bullets and their effects. During the protracted siege operations in front of Petersburg, an artist of the Museum prepared upon the spot a large number of colored drawings, illustrating with singular fidelity the recent appearance of wounds inflicted at short range by shot and shell. The reports on gunshot wounds have specified the nature of the missile whenever it could be ascertained. From these different sources ample materials are available for the study of the modifications in gunshot wounds resulting from modern improvements in ordnance. The general employment in the late war of cylindro-conoidal projectiles, moving in low trajectories, largely increased the proportion of wounded to the troops engaged, and the frequency of the occurrence of several wounds in the same individuals. The projectiles for small arms chiefly used were those of the Springfield, Enfield, and Austrian rifled muskets. The rebels also used quite largely, for the Enfield rifle, an elongated bullet without grooves.

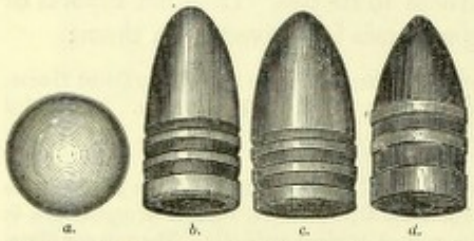


FIG. 96.—*a*. U. S. round musket-ball, calibre 69, weight 387 grains; *b*. Springfield rifled musket-ball, calibre 58, weight 500 grains; *c*. Enfield rifled musket-ball, weight 450 grains; *d*. Austrian rifle-ball, weight 460 grains.

WOUNDED ON THE BATTLE-FIELD.—Surgeon T. H. Squire, 89th New York Vols., has furnished this office with two instructive reports on the wounded that came under his observation during the battle of Antietam and in the engagements before Petersburg. Similar papers on the wounded at Chickamauga have been contributed by Surgeon John C. Norton, U. S. Vols., and Surgeon J. T. Wood, 99th Ohio Vols., and in relation to the wounded at Chattanooga by Surgeon A. McMahon, 64th Ohio Vols., and Surgeon C. H. Walton, 21st Kentucky Vols. Surgeon H. S. Hewit, U. S. Vols., and Surgeon E. Batwell, 14th Michigan Vols., have communicated valuable reports on the wounded in the engagements of the Atlanta campaign. Recorded observations on the primary attention given to the wounded in battle are, from the nature of things, rare, and these important memoirs therefore merit especial recognition.

In conclusion, it has been estimated that it will be possible, by judicious condensation, to include in one large quarto volume the statistics of the graver injuries, as fractures of the extremities and wounds implicating the joints or great cavities, and of the major surgical operations they have involved, the individual cases, their progress and results, being concisely recorded; while a second quarto volume could comprise numerical tables of the less serious injuries, an historical summary, and a discussion of the lessons derived from the statistical records of the war.

I have the honor to be, General,
Very respectfully,
Your obedient servant,

GEORGE A. OTIS,
Brevet Lieut. Col. and Surgeon U. S. Vols.,
In charge of the Division of Surgical Records, S. G. O.,
and Curator of the Army Medical Museum.

SURGEON GENERAL'S OFFICE,
WASHINGTON, D. C,
October 20th, 1865.

BREVET MAJOR GENERAL JOSEPH K. BARNES,
SURGEON GENERAL U. S. ARMY.

GENERAL:—

IN reply to your inquiries as to the nature and extent of the data bearing on the health of the army during the war, which have accumulated in the branch of your office under my charge, and as to how far the labor of digesting this material for publication has advanced, I have the honor to present for your consideration the following statements.

The matter collected is partly statistical, partly pathological. The first category embraces the medical statistics of the several armies and general hospitals. The second consists of a number of memoirs and reports by medical officers on the causes, symptoms, and treatment of the more important camp diseases, of numerous histories of cases and autopsies, of the fine series of medical and microscopical specimens in the Army Medical Museum, and of the results of the pathological studies conducted under my direction on the basis of these collections. In addition, there are a large number of descriptions and plans of general hospitals, of reports on hospital organization, and some other miscellaneous matters.

The object kept steadily in view has been to collect all the information possible with regard to the sickness and mortality of the army during the war, and especially whatever related to the nature and causes of those affections which were the chief occasion of death and disability.

The importance of such a study cannot be overestimated. The happy exemption of our army from serious epidemics, an exemption which, under Providence, was the legitimate and necessary consequence of the liberality of our commissariat and of our medical supplies, is continually quoted in terms of the highest self-congratulation. Indeed, so far as can be judged from other recent wars, and from the careful study of such imperfect information as can be collected with regard to the health of troops prior to the nineteenth century, the mortality of our soldiers from disease has been far less than that of any other army in time of war.

But while our hearts are filled with gratitude at this fortunate result, it should not be forgotten that our losses from disease have, nevertheless, been enormous when contrasted with the usual mortality of men of military ages in time of peace. Not counting those of our soldiers who died while prisoners in the hands of the rebels—not counting those who were discharged for diseases contracted in the service, and who subsequently died at home,—the deaths of our men from disease were far more numerous than all the slain in all the battles, and all the wounded who have since died or are likely yet to die of the injuries received in the struggle. Judging from the statistics of the first two years, which have already been compiled, the mortality from disease

during the war—not counting deaths among prisoners of war or discharged soldiers—was more than five times as great as the mortality of men of the same ages in civil life, and it is not to be disguised that the diseases which produced most mortality were precisely those which are most under the control of hygienic means.

At the commencement of the present struggle, the only important work which could serve to give correct notions as to the nature of the diseases of armies, and the direction to be given to the activity of those whose duty it is to combat them, was the Official Medico-Chirurgical History of the British Army in the Crimean War, laid before Parliament, in two folio volumes. This work refers to a comparatively small number of troops serving in a climate very different from our own, yet its study was of great value in giving direction to our efforts. What was the direction these efforts took—what were the results attained—why our soldiers died, and how this can be best and most economically prevented in future wars—are questions upon which the experience of the present struggle, as recorded in the official reports and documents, can throw a flood of light. Such a publication, therefore, becomes one of the most important duties of the Medical Department of the army; a duty the evasion or neglect of which would be a grave crime against the army of the United States, and against every American citizen who, in future wars, volunteers in the defence of his country.

The character and importance of the material available for such a publication, and the labor yet necessary to complete its preparation for the press, can be best appreciated after a brief description of each of the divisions mentioned at the commencement.

REMARKS ON THE STATISTICAL MATERIAL.

The statistical material embraces a mass of facts with regard to the several armies and general hospitals.

Tables are being prepared for each *army*, showing the monthly number of cases and of deaths from each form of disease or injury. Other tables give the numbers returned to duty, sent to general hospitals, discharged the service for disability, transferred to the Veteran Reserve Corps, died, and remaining at the close of each month.

The tables referring to the *general hospitals* show the number admitted into each hospital monthly and the causes of admission, the number of deaths from each disease or class of wounds, the number returned to duty, transferred to the Veteran Reserve Corps, transferred to other hospitals, discharged the service for disability, and remaining under treatment at the close of the month.

The data furnished by these tables render it possible to calculate ratios illustrating many important matters connected with the laws of the sickness and mortality of armies operating in the United States. By such ratios we shall be enabled to form an intelligent judgment as to the success of the means adopted by the government to pre-

serve the health of our troops, and to compare the results attained with those which have occurred in other armies. The comparative prevalence of those diseases which are known to be preventable, or at least greatly under the influence of hygienic control, will indicate the path in which the further exercise of sanitary precautions should be directed. In fact, the medical history of the past four years, as recorded in the official figures, will be found full of meaning and of manifold suggestion for the future.

It is believed that no one would fail to recognize the importance of medical statistics, if confidence were placed in the data from which they are compiled; but it is often insinuated that these data are, from their nature, unreliable in all medical statistics, and that they are especially uncertain in the statistics of armies in time of war. The causes of error are twofold—on the one hand, mistakes in diagnosis; on the other, negligence, omissions, or falsehoods in the reports.

That errors of both kinds exist, is to be freely admitted. That they are sufficiently numerous and important to rob the medical statistics of our army of their practical value, may be emphatically denied.

Diagnostic errors can be largely eliminated from medical statistics by grouping together those allied affections which are most apt to be confounded. There is probably, for example, no army in the world among whose medical officers a sufficient number of men acquainted with the details of ophthalmic science can be found to give authenticity to its statistics of diseases of the eye, if the form required to be filled embraced the modern classification based upon observations with the ophthalmoscope. This fact, however, does not prevent them from being able to report correctly the total number of diseases of the eye, or even, with considerable accuracy, the proportion of these to be included under the designation "ophthalmia;" and these are practically the most important facts.

Like remarks apply to many similar cases in which there is difficulty in the diagnosis between allied affections; and it becomes therefore one of the most important duties of the medical statistician to group the several diseases together in such a way as to extinguish the greatest possible number of errors of this class.

But the chief cause which disturbs confidence in medico-military statistics is the belief that medical records are imperfectly and carelessly kept, especially in the case of troops in the field. It has been insinuated that their charge is often intrusted to ignorant subordinates, and even, that in extreme cases, no records were kept, and the monthly reports required by law filled up with no other guide than memory. The objection based upon this supposition has been considerably exaggerated in certain quarters, and it is not for a moment believed that medical officers were generally negligent of their duty, or that their reports were not, in the vast majority of instances, based upon records kept according to the best of their abilities. Even during campaigns, when it was impossible to keep the cumbersome books required by the regulations in force at the beginning of the war, surgeons had their pocket memorandum-books, which perfectly sufficed to preserve reliable data for the simple form of report required monthly. It was a knowledge of this fact that led to the issue of the "pocket register and prescription book" at present used by troops in the field. But the most conclusive answer to every objection of this kind is to be found in the character of the reports themselves as they exist in the official files; they contain internal evidence of the care

with which they were prepared, and, it is believed, will compare favorably with any other set of statistical papers in existence.

It is true, indeed, that the duty of making reports was sometimes neglected, and that sometimes they were missing, from the absence of surgeons, the capture of records by the enemy, or the loss of the papers themselves during transmittal; but the deficiencies of this character became progressively less and less numerous and important, and, during the second, third, and fourth years of the war, the number of regiments and detachments not represented was comparatively small.

Deficiencies of this kind are very much to be deplored, but they in no way diminish the value of the reports received for the troops which they represent; and where the troops represented amount to hundreds of thousands, the results have probably a scientific value very nearly as great as would have been possessed by complete reports.

It has been deemed proper to present these considerations, because much has been said by persons unacquainted with statistical science as to the imperfection of the data which it has been possible to collect, and because it is nevertheless earnestly believed that to neglect the study of these data would be gravely prejudicial to the interests of military medicine and surgery in America. The circumstances interfering with the accuracy and completeness of our reports have operated in the case of all former military statistics in like degree, so that the results are fairly comparable; though it cannot be denied that the immense size of the figures in our case, and the consequent more perfect balancing of errors in opposite directions, lead us, on considerations which flow from the mathematical law of probabilities, to place greater confidence in the accuracy and importance of our results than in the figures collected under like circumstances by any other nation.

The statistical tables necessary to present the data collected in a convenient shape for study can, it is hoped, be compressed into one quarto volume. They are now fully prepared for the first and second years of the war. The work on the third is well advanced; while that on the fourth has but recently been commenced.

A few general considerations, based upon the manuscript of the tables for the first two years of the war, will here be presented, to give a general idea of the character and scope of the statistics in question. These considerations will have reference to the mortality rates, the prevalence of disease, and the comparative frequency of the several diseases, especially of those which have caused the chief mortality. A few remarks on the character of the latter affections will also be presented.

MORTALITY RATES.

The mortality of the armies of the United States from disease alone was 48·7 per 1000 of mean strength during the first year of the war, viz., the year ending June 30th, 1862, and 65·2 per 1000 during the second year, viz., that ending June 30th, 1863.*

In obtaining these ratios, the sum of the deaths reported by regiments and detachments, and by the general hospitals, is compared with the mean strength given by the

* The mortality rate here given for the first year of the war differs slightly from that published in Circular No. 15, Surgeon General's Office, September, 1863, the difference resulting in part from corrections made in completing the discussion of the statistics of that year, in part from the incorporation of material not accessible when the original computation was made.

reports as present in the field, in garrison, and in the hospitals. The sick reports furnishing the data employed do not give the deaths among those absent as prisoners of war, on furlough, or deserters; hence the mean strength of those thus absent is not considered in determining the ratios. These absentees may have had a very different mortality rate from that above given. In fact, in the case of those of our men who were absent as prisoners of war, the rate of mortality was terribly greater. An attempt will hereafter be made to estimate this rate on data other than that of the monthly sick reports. Such an attempt, however, would be premature at present. The figures given are therefore to be understood simply as the rate of deaths from disease among that portion of the troops which is represented in the sick reports received at the Surgeon General's Office. How far they may be regarded as applicable to the whole of the army of the United States (excepting always prisoners and absentees), may be inferred from the following considerations:

The reports for the first year are incomplete, still they represent a large part of the troops in every army and in hospitals throughout the country. The reports from troops in the field and in garrison for the first year represent an average strength constantly present during the year of 281,177 men. The reports from the hospitals represent an average strength constantly present of 9759 men. The total strength represented therefore is 290,936 men, among whom there were 14,183 deaths from disease. The average mean strength above given is much smaller than the real average for the year. The number of deaths therefore is less than the real number of deaths; but it is believed that the figures are quite large enough to make it in the highest degree probable that the rate obtained is true, or very nearly true, for the whole army of the United States, excluding always prisoners of war and other absentees.

The reports for the second year were less incomplete than those of the first. They represent an average mean strength in the field and in garrison of 598,821, and an average strength in hospital of 45,687 men. The total strength represented therefore is 644,508, among whom there were 42,010 deaths from disease. These figures are so large that it is to the last degree improbable that the reports of the comparatively small number of troops not represented would have made any perceptible change in the ratio, had it been possible to collect them.

The mortality rates thus obtained, and believed to represent accurately the facts of the case, are much smaller than is usual with armies in time of war. Thus, for example, according to the figures compiled by Assistant Surgeon (now Medical Inspector) R. H. Coolidge, the annual mortality of our troops in the Mexican war from disease alone was 103·8 per 1000. For the British army, during the Crimean war, according to the Parliamentary report, the annual mortality from disease was 232 per 1000. The losses of the French army from disease during the Crimean war were, it is probable, proportionately greater than those of the English army. It is difficult, however, to fix them precisely. In the long-expected volume of Chenu,* now just published, no computed ratios are presented. It is true, monthly statistical tables are given,

* Rapport au Conseil de Santé des Armées sur les Résultats du Service Médico-Chirurgical aux Ambulances de Crimée et aux Hôpitaux Militaires Français en Turquie, pendant la Campagne d'Orient en 1854, '55, '56. Par J. C. Chenu. Paris, 1865.

which contain the number of deaths from disease and the mean strength of the army; but unfortunately, after the first few months, these tables, which are headed "Mouvement des Ambulances de Crimée," do not include the deaths in the general hospitals established by the French in Turkey. Separate tables for each hospital are given, but these consolidate the deaths from wounds with those from disease, under the general designation "Morts," and do not, therefore, render it possible to complete the computation. If, however, from the total mortality given in the report, the killed in battle and the deaths from wounds, as given in the tables on the several individual injuries, be deducted, it will be seen that the deaths from disease alone cannot be much short of 75,000 during the twenty-eight months, while the strength constantly present was about 100,000; this would indicate an annual ratio of over 300 per 1000 of mean strength.

It is thus seen that the losses of our troops from disease during the first half of the recent struggle were proportionately much less than those of the allied armies in the Crimea, or of our own army in the Mexican war; and although the present condition of the statistical work progressing under my direction does not permit me to present mortality rates for the third and fourth years of the war, yet, from the examinations I have thus far made, I am inclined to the belief that the proportion of deaths from disease rather diminished than otherwise during that period.

The mortality of our troops from disease was considerably greater during the second year of the war than during the first. It was also different in the different regions in which the troops operated. For the purposes of this comparison, which will also be made in the case of the several diseases, the United States may be regarded as divided into three great regions, designated severally the Atlantic, the Central, and the Pacific regions.

The Atlantic region will embrace all the slope between the Appalachian range and the sea. It will include the Northeastern and Middle Departments, the Army of the Potomac, the troops in North and South Carolina and in Florida. The Pacific region embraces all that lies west of the Rocky Mountains. It includes California, Oregon, and Washington Territory; to these, New Mexico* has been added, as more allied to this than to the Central region. The Central region embraces all the great basin of the continent between the Appalachian and the Rocky Mountains. It contains the valley of the Mississippi River and its tributaries, and includes the Northern and Northwestern Departments, Western Virginia, Kentucky, Missouri, Arkansas, the Army of the Tennessee, the Army of the Cumberland, and the Department of the Gulf.

The exposures of the troops in each of these regions presented certain well-marked characteristics. In the Pacific region, the conditions approached those of peace. The forces were mainly scattered in numerous small posts, and shared few of the active duties of war. In both the Atlantic and the Central regions, on the other hand, campaigns were conducted on a grand scale. In the Atlantic region were the several coast expeditions—the Army of the Potomac and its great battles; in the Central, the expeditions on the Tennessee and Mississippi Rivers, and conflicts like those of Shiloh and Stone River. One of the chief characteristics of the Central region would appear to

* In the tables given in Circular No. 15, S. G. O., above cited (see note to p. 92), New Mexico was included in the Central region.

have been the extent of territory over which the operations extended and the consequent embarrassment in the transportation of supplies; in addition, it is to be noted that the malarial miasms, under the influence of which intermittent and other malarial fevers are developed, have for many years been known, from the experience of civil life, to be much more intense in the Central region than on the Atlantic slope. As might be expected, therefore, we find the rates of disease and mortality very different in these three regions. Differences also exist between the different parts of each region, which, however, cannot be gone into in a brief paper like the present.

A comparison of the reports from the troops and hospitals in the three great regions shows the mortality rate of the Central region to be the greatest, and that of the Pacific region the least. In the Pacific region, the mortality from disease alone was about 12 per 1000 of mean strength for the first year and 8 for the second, the average for the two years closely corresponding with the rates for young men of military ages in civil life, and with the mortality of the British troops in Great Britain and Ireland, as given in their official reports for 1859, '60, '61, and '62. In the Atlantic region, the rates were nearly 33 for the first year and 41 for the second. In the Central region, 80 for the first year and nearly 90 for the second.

Tables I. and II. present the monthly mortality in each of these regions.

TABLE I.

Monthly Mortality of the Armies of the United States during the year ending June 30th, 1862, expressed in ratio per 1000 of mean strength.

	1861.						1862.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	1·96	2·03	1·77	2·02	2·65	3·20	2·88	2·37	2·50	3·04	3·12	3·35	32·54
Central Region.....	·93	2·96	3·52	4·63	6·25	6·54	8·69	8·78	10·06	6·46	7·10	5·90	80 18
Pacific Region.....	1·72	1·00	1·34	1·43	1·75	1·04	·19	·83	·89	·49	·75	·77	11·65

TABLE II.

Monthly Mortality of the Armies of the United States during the year ending June 30th, 1863, expressed in ratio per 1000 of mean strength.

	1862.						1863.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	3·93	5·69	4·27	4·58	4·52	4·82	3·79	2·96	2·55	2·00	1·25	1·73	41·40
Central Region.....	7·69	6·11	5·72	6·20	8·49	8·30	8·68	9·93	9·14	7·31	5·46	4·94	89·55
Pacific Region	·76	·00	·34	·77	·71	·96	·50	1·01	·32	1·24	·77	1·05	8·38

The monthly reports from which the foregoing rates of mortality from disease were computed give also a certain amount of information as to the mortality from wounds and injuries. The deaths from these causes, reported during the first year of the war, were 4857 out of the strength given above, or seventeen (16·7) per 1000 of mean strength; during the second year, 10,142, or sixteen (15·7) per 1000. These rates, however, by no means represent the real losses from wounds and injuries, since they do not include those slain in battle, or those who died of their wounds while prisoners of war or otherwise absent. To form a correct estimate of the total losses from wounds, I must therefore refer to the Surgical History of the War.

GENERAL PREVALENCE OF DISEASE.

The directions for making the monthly sick reports in the armies of the United States require every man excused from duty, on account of sickness, to appear on the report. The total number taken sick represents thus slight indispositions as well as severe illness, and the figures are therefore much larger than in those armies in which such only are reported as are received into hospital. It follows that the comparative health of the several divisions of our army is to be ascertained rather by considering the monthly number taken sick with serious diseases, such as fever and diarrhœa, than by merely observing the total number of cases reported.

The statistics show the ratio of cases to have been such, during the first two years of the war, that on the average each soldier must have been taken on sick report several times a year. The figures of the second year show a slight diminution in the number of cases. The ratio for the whole army was 2966 per 1000 of mean strength for the first year, 2694 for the second. In the Atlantic region, the number of cases was 2749 per 1000 of mean strength for the first year, 2563 for the second. In the Central region, 3422 for the first year, 2832 for the second. In the Pacific region, 2168 for the first year, 2123 for the second. Tables III. and IV. give the monthly rates for each of these regions.

TABLE III.

Monthly Sickness Rates of the Armies of the United States during the year ending June 30th, 1862, expressed in ratio per 1000 of mean strength.

	1861.						1862.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region....	391·35	372·18	298·26	267·14	255·90	230·99	199·92	183·33	167·25	214·52	208·45	239·75	2748·83
Central Region.....	267·22	378·81	336·66	331·35	304·11	313·51	339·03	254·19	257·07	287·09	259·43	233·73	3421·93
Pacific Region.....	163·15	199·67	197·48	187·10	236·80	153·68	128·99	210·57	193·97	140·77	220·84	187·06	2168·48

TABLE IV.

Monthly Sickness Rates of the Armies of the United States during the year ending June 30th, 1863, expressed by ratio per 1000 of mean strength.

	1862.						1863.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	310·79	250·21	242·82	285·79	239·11	229·10	222·44	181·51	180·50	149·34	163·43	159·10	2563·25
Central Region.....	244·21	220·26	263·22	271·47	262·23	244·14	255·76	236·18	239·26	207·46	192·60	219·32	2831·64
Pacific Region.....	182·43	230·73	211·15	180·10	189·35	166·87	173·39	145·63	152·49	172·23	150·60	183·20	2122·92

At first sight it might appear that these figures represent an extraordinary amount of disease; but if they be compared with those of the published statistics of the United States army in time of peace, it will be found that the effect of the war on the health of the troops is rather in the increased number of serious diseases and the consequent mortality than in the number taken on sick report. The average number taken on sick report annually in time of peace, from 1840 to 1859, was 2558 per 1000.

CONSTANT SICKNESS RATES.

In this connection, the constant sickness rates assume the highest interest, especially to the military authorities. As every regimental sick report contains a separate statement of the number of sick and wounded under treatment at the close of each month, it might be supposed that the sum of these reports would furnish the number sick in the whole army at the close of each month, and that this would give a fair notion of the constant sickness. But the rates thus deduced give no idea of the number "absent sick," and the proportion of sick "absent" or "present" is not uniform, but varies continually. An army lying in winter quarters generally makes provision for most of its sick with it, while on the march all serious cases are sent to the general hospitals at the base of operations; so that constant sickness rates, which do not include those absent in hospital, are of no value. Now, for the early part of the war, it has not been possible to compute reliable constant sickness rates, because very many of the reports received were the old "quarterly" form, and only show the remaining at the end of each quarter, which would hardly give a just idea of the constant rates; moreover, in these quarterly reports the "remaining" were not discriminated into "sick" and "wounded," but given in gross. The figures, therefore, give the constant sickness rates plus the number of wounded under treatment. Subsequently to the period named, however, it is possible to compile quite accurate constant sickness rates from the data of the Surgeon General's Office, by taking the number "remaining" in general hospitals into the count and carefully discriminating "sick" from "wounded."

It might perhaps be hoped that the monthly and tri-monthly returns of the Adjutant General's Office would supply the missing information for the early part of the war,

but this is not the case. These returns are prepared for military, not for medical purposes. The monthly returns represent the number "present sick," but not the number "absent;" and under the head "present sick" (i.e. *on sick report*), they include those who are really "present wounded." The tri-monthly returns, indeed, represent the number "absent sick" as well as those "present sick;" but under the term sick, as in the monthly returns, both sick and wounded are included.

All ratios hitherto compiled, and published unofficially, which purport to be based on the returns in the Adjutant General's Office, are open to this objection, that they include the wounded with the sick, and are therefore to be regarded as wholly valueless in forming a notion of the health of the army. The following table of constant sickness rates extends only from October 1st, 1862, to June 30th, 1863. It compares the health of the troops in the three regions. The figures include only those under treatment for disease, and not those suffering from wounds.

TABLE V.

Constant Sickness Rates for a part of the year ending June 30th, 1863, expressed in ratio per 1000 of mean strength.

		Atlantic Region.	Central Region.	Pacific Region.
1862.	October	123	102	65
	November	134	106	77
	December	118	91	66
1863.	January	112	106	82
	February	108	109	71
	March	93	105	67
	April	79	88	71
	May	81	83	67
	June	104	97	62
	Average rate	106	98	70

The data from which this table was compiled are not as complete in all respects as could be desired: still the rates presented are believed to be close approximations. It will be observed the Atlantic region has a rate slightly higher than the Central, but that in both the rate is about 10 per cent. of the strength. The rate for the Pacific region, 7 per cent., is in striking contrast with the slight mortality of that region.

COMPARATIVE FREQUENCY OF THE SEVERAL DISEASES.

The monthly sick reports of the several regiments, detachments, and garrisons give the number taken sick during the month, and the number of deaths from each of the more important diseases; the reports of the general hospitals give the number of admissions and deaths from each disease. The form employed during the first year of the war differed in arrangement and in some other points from the improved form adopted in the summer of 1862. Among the changes may here especially be mentioned a change in classification and the omission of the designation unclassified—(morbi varii)—the diseases not embraced in the list being directed to be reported as "other diseases," under the

heads of the several orders to which they belong. In compiling the statistical tables for the first year of the war, the material contained in the reports has been rearranged to make its classfication correspond with that adopted for the second and subsequent years.

The classification adopted is, with some slight alterations, that proposed by Dr. Farr, and employed in the reports of the Registrar General of England, and in the annual reports of the British army. The chief points of difference are, that "parasitic diseases" have been made a separate class, instead of being included with "zymotic diseases;" that "diseases of the eye" and "of the ear" are made separate orders of "local diseases," instead of being included with "diseases of the nervous system;" that "developmental diseases" are omitted as having no special applicability to army statistics, and that the class of "wounds, accidents, and injuries" is subdivided in a less elaborate manner than in Farr's classification. To these may be added the minor point that Farr includes rheumatism and tonsillitis among miasmatic diseases, instead of which, in our classification, rheumatism is placed among "constitutional diseases," and tonsillitis with diseases of the digestive organs.

The classification has been adopted as a matter of convenience in grouping the facts, rather than as an expression of any well-considered natural relationship between diseases. Thus, at the very threshold, the question may be raised whether the fundamental notion which furnished the name "zymotic," is not a mere conjecture; but if, without thereby meaning to insist upon the idea of a ferment, we retain the term to indicate certain grave constitutional disorders determined by dietic errors, by inoculation or contagion, by epidemic or endemic influences, or by those groupings of conditions found in camps which act like epidemic influences on many at once, it may be asked whether many of the affections now placed under local diseases ought not to be transferred to this class?

Thus, for example, in the tables of Farr, simple coryza and catarrh, as well as epidemic catarrh, are placed in the first order of zymotic diseases; while acute bronchitis and pneumonia are placed among local diseases. It would appear, however, that all these affections belong in fact to one category, are developed by a like series of conditions, acting with different intensities or in constitutions of different resisting powers; that catarrh stands at one end of the scale, pneumonia at the other; and that, regarded as the expression of more or less exposure to unfavorable climatic influences, the proper place for all these affections is with miasmatic diseases.

Without entering into a further discussion as to the scientific accuracy of the English classification, it may be remarked that one of the arguments most frequently used in its favor is derived from a very different source. It is claimed that the various affections embraced under the class of zymotic diseases are to be regarded as essentially *preventable*, while diathetic, local, developmental, and violent diseases are more or less *inevitable*. The classification therefore has this special advantage for military and political purposes, that the amount of disease which, by proper sanitary precautions, might have been avoided, is kept constantly in view; a consideration which must undoubtedly act as a constant stimulant to sanitary effort. Unfortunately, however, our notions of the causation of disease are not sufficiently accurate to enable us to draw any sharp boundary between preventable and unavoidable affections; and, indeed, if such a

boundary were attempted, it would certainly not correspond with the classification under consideration; a large proportion of the "local" inflammatory affections being conditioned in frequency and severity at least, if not determined, by want of proper clothing and shelter, unnecessary exposure to cold and moisture, and other causes quite as well understood, and certainly more readily modified by hygienic means, than the causes of diphtheria, of enteric fever, or of epidemic cholera. But notwithstanding these critical objections, the English classification appears to be the most convenient and rational hitherto proposed, and, with the slight modifications above mentioned, it has been thought best to employ it.

The following tables give the number of cases and deaths in each of the three great regions for the several classes, orders, and individual diseases during the first and second years of the war. Under the head of "taken sick," in these tables, all cases occurring in the field and in garrison are included, but not the "admissions" into general hospitals; because this would have involved a repetition of cases previously reported in the field or in garrison. Under the head of deaths, however, the deaths in general hospitals are included.

In calculating the ratio of cases to strength in the following tables, then, the strength employed includes only the troops represented in the reports, and this because it was among them only that the cases occurred. In computing the ratio of deaths to strength, however, as already explained under the head of mortality rates, the strength in hospital is included.

The average annual strengths represented in the reports from which the following tables were compiled, are as follows:

For the first year—Atlantic region, 177,899 in field and garrison, 4687 in general hospitals; Central region, 96,583 in field and garrison, 5072 in general hospitals; Pacific region, 6695 in field and garrison,—no general hospitals. For the second year —Atlantic region, 283,703 in field and garrison, 27,802 in general hospitals; Central region, 306,405 in field and garrison, 17,885 in general hospitals; Pacific region, 8713 in field and garrison,—no general hospitals.

These strengths are those employed in computing all the ratios given in this paper.

The six tables now presented are arranged as follows: Table VI. shows the number taken sick and died for each class of disease in each of the three regions, and for the whole army, during the first year of the war. The ratio of cases and deaths to strength, in each region and for the whole army, is also given.

Table VII. contains similar figures for the second year.

Tables VIII. and IX. are arranged in the same manner, and give the number taken sick and died, and the ratio to strength for each order.

Tables X. and XI. contain the number taken sick and died from each individual disease and injury for the two years.

The years spoken of here, and throughout the paper, are congressional fiscal years, beginning on the 1st of July and terminating on the 30th of June following.

TABLE VI.

Summary of Cases and Deaths, by the several Classes of Diseases and Injuries, for the year ending June 30th, 1862.

CLASSES.	Atlantic Region.				Central Region.				Pacific Region.				Total.			
	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.
I. Zymotic diseases.....	249,120	4,032	1400·34	22·08	207,799	5,269	2151·61	51·73	6,561	32	979·99	4·78	463,480	9,333	1648·26	32·08
II. Constitutional diseases	35,777	285	201·11	1·56	15,090	367	156·24	3·61	1,607	14	240·03	2·09	52,474	666	186·62	2·29
III. Parasitic diseases.....	640	.....	3·60	.....	408	.....	4·22	.....	10	...	1·49	.....	1,058	.....	3·76	.....
IV. Local diseases.....	198,951	1,375	1118·34	7·53	105,054	2,341	1087·71	23·03	5,917	26	883·79	3·88	309,922	3,742	1102·23	12·86
V. Wounds and injuries..	27,862	2,410	156·62	13·20	15,149	2,386	156·85	23·47	1,875	61	280·06	9·11	44,886	4,857	159·64	16·69
VI. Unclassified diseases...	4,526	262	25·44	1·43	2,149	175	22·25	1·72	423	5	63·18	0·75	7,098	442	25·24	1·52
Total.....	516,876	8,364	2905·45	45·81	345,649	10,538	3578·78	103·66	16,393	138	2448·54	20·61	878,918	19,040	3125·85	65·44

TABLE VII.

Summary of Cases and Deaths, by the several Classes of Diseases and Injuries, for the year ending June 30th, 1863.

CLASSES.	Atlantic Region.				Central Region.				Pacific Region.				Total.			
	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.
I. Zymotic diseases.....	428,603	9,529	1510·75	30·59	586,329	20,158	1913·58	62·16	10,317	23	1184·09	2·64	1,025,249	29,710	1712·11	46·10
II. Constitutional diseases	62,600	812	220·90	2·61	49,135	1,736	160·26	5·35	1,943	8	223·00	0·92	113,738	2,556	189·94	3·97
III. Parasitic diseases.....	3,103	1	10·94	0·003	4,218	.....	13·77	.....	33	...	3·78	.....	7,354	1	12·28	0·002
IV. Local diseases.....	232,836	2,555	820·70	8·20	227,947	7,146	743·94	22·04	6,204	42	712·04	4·82	466,987	9,743	779·84	15·12
V. Wounds and injuries..	54,431	5,344	191·86	17·16	41,903	4,757	136·76	14·67	2,141	41	245·72	4·71	98,475	10,142	164·45	15·74
Total.....	781,633	18,241	2755·11	58·56	909,532	33,797	2968·40	104·22	20,638	114	2368·64	13·08	1,711,803	52,152	2858·62	80·92

TABLE VIII.

Summary of Cases and Deaths, by the several Orders of Diseases and Injuries, for the year ending June 30th, 1862.

ORDERS.	Atlantic Region.				Central Region.				Pacific Region.				Total.			
	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.
I. 1. Miasmatic Diseases.	231,671	3,989	1302·26	21·85	201,291	5,216	2084·13	51·31	3,755	30	560·87	4·48	436,717	9,235	1553·17	31·74
2. Enthetic Diseases...	15,504	5	87·15	·02	5,786	8	59·91	·08	2,511	...	375·06	.....	23,801	13	84·65	·04
3. Dietic Diseases.....	1,945	38	10·93	·21	722	45	7·47	·44	295	2	44·06	·30	2,962	85	10·53	·30
II. 1. Diathetic Diseases...	33,689	38	189·37	·21	14,094	62	145·93	·61	1,556	6	232·41	·89	49,339	106	175·47	·36
2. Tubercular Diseases	2,088	247	11·74	1·35	996	305	10·31	3·00	51	8	7·62	1·19	3,135	560	11·15	1·92
III. Parasitic Diseases.....	640	.....	3·60	.....	408	.....	4·22	.....	10	...	1·40	.....	1,058	.....	3·76	.....
IV. 1. Diseases of Nervous System.	17,970	232	101·01	1·27	8,844	233	91·57	2·29	461	9	68·86	1·34	27,275	474	97·00	1·63
2. Diseases of the Eye..	5,563	.....	31·27	.....	4,457	1	46·15	·01	356	...	53·17	.....	10,376	1	36·90	·003
3. Diseases of the Ear..	3,263	.....	18·34	.....	1,721	4	17·81	·04	95	...	14·19	.....	5,079	4	18·06	·01
4. Diseases of Organs of Circulation.....	2,231	68	12·54	·37	821	61	8·50	·60	35	4	5·23	·09	3,087	133	10·98	·46
5. Diseases of Respiratory Organs.....	89,875	866	505·20	4·74	48,440	1,797	501·54	17·67	2,058	8	307·39	1·19	140,373	2,671	499·23	9·18
6. Diseases of Digestive Organs.....	61,215	183	344·10	1·00	33,496	225	346·81	2·21	2,202	5	328·90	·75	96,913	413	344·67	1·42
7. Diseases of the Urinary and Genital Organs.....	2,839	22	15·96	·12	1,220	8	12·63	·08	85	...	12·70	.....	4,144	30	14·74	·10
8. Diseases of the Bones and Joints...	359	.....	2·02	.....	188	1	1·95	·01	7	...	1·05	.....	554	1	1·97	·003
9. Diseases of the Integumentary System	15,636	4	87·89	·02	5,867	11	60·75	·11	618	...	92·31	.....	22,121	15	78·67	·05
V. Wounds, Accidents and Injuries.....	27,862	2,410	156·62	13·20	15,149	2,386	156·85	23·47	1,875	61	280·06	9·13	44,886	4,857	159·64	16·69
VI. Unclassified Diseases...	4,526	262	25·44	1·43	2,149	175	22·25	1·72	423	5	63·18	·75	7,098	442	25·24	1·52
Total	516,876	8,364	2905·45	45·81	345,649	10,538	3578·78	103·66	16,293	138	2448·54	20·61	878,918	19,040	3125·85	65·44

TABLE IX.

Summary of Cases and Deaths, by the several Orders of Diseases and Injuries, for the year ending June 30th, 1863.

ORDERS.	Atlantic Region.				Central Region.				Pacific Region.				Total.			
	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.	Taken sick.	Died.	Ratio per 1000 of cases to strength.	Ratio per 1000 of deaths to strength.
I. 1. Miasmatic Diseases.	406,433	9,395	1432·60	30·16	560,637	19,968	1829·72	61·57	6,688	17	767·39	1·95	973,758	29,380	1629·13	45·58
2. Enthetic Diseases....	17,868	13	62·98	·04	20,347	29	66·41	·09	2,793	4	320·56	·46	41,008	46	68·48	·07
3. Dietic Diseases.....	4,302	121	15·16	·39	5,345	161	17·44	·50	836	2	95·95	·23	10,483	284	17·51	·44
II. 1. Diathetic Diseases....	59,046	167	208·13	·54	44,983	301	146·81	·93	1,861	...	213·59	.....	105,890	468	176·83	·73
2. Tubercular Diseases	3,614	645	12·74	2·07	4,152	1,435	13·55	4·43	82	8	9·41	·92	7,848	2,088	13·11	3·24
III. Parasitic Diseases.....	3,163	1	10·94	·003	4,218	.....	13·77	.....	33	...	3·79	.....	7,354	1	12·28	·002
IV. 1. Diseases of the Nervous System.....	25,084	567	88·42	1·82	26,147	917	85·33	2·83	605	7	69·44	·80	51,836	1,491	86·56	2·31
2. Diseases of the Eye.	7,480	.....	26·37	.....	16,294	.....	53·18	.....	527	...	60·50	.....	24,301	.....	40·58	.....
3. Diseases of the Ear.	4,611	2	16·25	·006	5,727	1	18·69	·003	168	...	19·28	.....	10,506	3	17·54	·005
4. Diseases of Organs of Circulation.....	6,018	266	21·21	·85	4,418	320	14·42	·99	70	5	8·03	·57	10,506	591	17·54	·92
5. Diseases of Respiratory Organs	61,636	1,188	217·26	3·81	58,761	4,818	191·78	14·85	881	13	101·11	1·49	121,278	6,019	202·53	9·34
6. Diseases of Digestive Organs.....	96,769	445	341·09	1·43	91,675	914	299·20	2·82	2,906	15	333·52	1·72	191,350	1,374	319·54	2·13
7. Diseases of the Urinary and Genital Organs.....	5,862	63	20·66	·20	5,406	93	17·64	·29	163	2	18·71	·23	11,431	158	19·09	·25
8. Diseases of the Bones and Joints..	1,711	4	6·03	·01	1,351	25	4·41	·08	27	...	3·10	.....	3,089	29	5·16	·05
9. Diseases of Integumentary System....	23,665	20	83·41	·06	18,168	58	59·29	·18	857	...	98·36	.....	42,690	78	71·29	·12
V. Wounds, Accidents and Injuries.....	54,431	5,344	191·86	17·16	41,903	4,757	136·76	14·67	2,141	41	245·72	4·71	98,475	10,142	164·45	15·74
Total.....	781,633	18,241	2755·11	58·56	909,532	33,797	2968·40	104·22	20,638	114	2368·64	13·08	1,711,803	52,152	2858·62	80·92

TABLE X.

Showing the Number of Cases and Deaths, by Individual Diseases and Injuries, for the year ending June 30th, 1862.

LIST OF DISEASES.	Atlantic Region.		Central Region.		Pacific Region.		Total.	
	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.
Class I.—Zymotic Diseases.								
Order I. *Miasmatic Diseases.*								
Typhus Fever	463	101	359	89	2	1	824	191
Yellow Fever	.....	.....	.....	.....	.....	...	.....	.....
Typhoid Fever	12,616	2,736	9,312	2,864	49	8	21,977	5,608
Common Continued Fever	7,645	40	4,008	105	118	1	11,771	146
Remittent Fever	21,792	182	17,934	187	321	1	40,047	370
Quotidian Intermittent Fever	18,145	1	21,622	31	608	...	40,375	32
Tertian Intermittent Fever	13,666	5	12,776	28	308	...	26,750	33
Quartan Intermittent Fever	1,546	3	1,855	1	50	...	3,451	4
Congestive Intermittent Fever	1,500	201	727	160	7	...	2,234	361
Acute Diarrhœa	90,472	40	72,715	187	1,364	...	164,551	227
Chronic Diarrhœa	4,881	52	10,876	440	58	1	15,815	493
Acute Dysentery	18,392	116	13,472	230	373	1	32,237	347
Chronic Dysentery	1,180	30	1,407	94	24	3	2,611	127
Asiatic Cholera	.....	.....	.....	.....	.....	...	.....	.....
Erysipelas	1,309	39	1,292	81	51	1	2,652	121
Small-pox and Varioloid	678	210	464	190	168	12	1,310	412
Measles	10,055	173	11,558	377	63	1	21,676	551
Scarlet Fever	93	7	40	3	.....	...	133	10
Mumps	4,536	2	6,660	7	20	...	11,216	9
Epidemic Catarrh	6,649	2	4,649	3	16	...	11,314	5
Debility	11,670	39	6,529	116	125	...	18,324	155
Other diseases of this order	4,383	10	3,036	23	30	...	7,449	33
Order II. *Euthetic Diseases.*								
Syphilis	6,139	5	1,628	7	1,244	...	9,011	12
Gonorrhœa	7,416	.....	3,185	.....	1,037	...	11,638	.....
Orchitis	1,631	.....	906	.....	185	...	2,722	.....
Stricture of the Urethra	309	.....	56	.....	43	...	408	.....
Serpent-bite	9	.....	11	1	.....	...	20	1
Other diseases of this order	.....	.....	.....	.....	2	...	2	.....
Order III. *Dietic Diseases.*								
Scurvy	933	6	321	3	74	...	1,328	9
Delirium Tremens	426	21	178	35	52	2	656	58
Inebriation	586	11	223	7	169	...	978	18
Class II.—Constitutional Diseases.								
Order I. *Diathetic Diseases.*								
Gout	45	.....	51	.....	.....	...	96	.....
Acute Rheumatism	17,686	7	7,435	19	1,136	3	26,257	29
Chronic Rheumatism	10,204	9	3,701	10	311	...	14,216	19
Lumbago	2,848	2	1,367	.....	74	...	4,289	2
Anæmia	636	8	590	4	3	1	1,229	13
General Dropsy	259	11	491	22	8	1	758	34
Cancer	14	.....	18	4	1	1	33	5
Tumors	360	.....	75	.....	12	...	447	.....
Other diseases of this order	1,637	1	366	3	11	...	2,014	4
Order II. *Tubercular Diseases.*								
Consumption	1,678	243	795	299	35	8	2,508	550
Scrofula	410	4	201	6	16	...	627	10
Class III.—Parasitic Diseases.								
Worms	640	.....	408	.....	10	...	1,058	.....
Carried forward	285,537	4,317	223,297	5,636	8,178	46	517,012	9,999

TABLE X.—*Continued.*

LIST OF DISEASES.	ATLANTIC REGION.		CENTRAL REGION.		PACIFIC REGION.		TOTAL.	
	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.
Brought forward	285,537	4,317	223,297	5,636	8,178	46	517,012	9,999
Class IV.—Local Diseases.								
ORDER I. *Diseases of Nervous System.*								
Apoplexy	124	60	68	58	4	3	196	121
Headache	5,307	1	1,711	.....	116	...	7,134	1
Inflammation of Brain	92	43	57	49	4	2	153	94
St. Vitus Dance	49	1	28	1	1	...	78	2
Epilepsy	843	19	326	18	30	1	1,199	38
Sun-stroke	253	7	163	9	4	1	420	17
Spinal Irritation	271	3	281	5	7	...	559	8
Insanity	162	4	55	4	10	...	227	8
Melancholy	152	1	111	2	3	...	266	3
Inflammation of Membranes of Brain	113	58	51	47	6	...	170	105
Nostalgia	331	1	241	.....	.....	...	572	1
Neuralgia	4,418	.....	2,945	1	183	...	7,546	1
Toothache	4,997	.....	2,449	.....	71	...	7,517	.....
Paralysis	200	10	117	11	13	1	330	22
Other diseases of this order	658	24	241	28	9	1	908	53
ORDER II. *Diseases of Eye.*								
Amaurosis	109	.....	33	.....	5	...	147	.....
Cataract	52	.....	18	.....	1	...	71	.....
Inflammation of Iris	205	.....	66	.....	11	...	282	.....
Night Blindness	97	.....	11	.....	1	...	109	.....
Ophthalmia	4,269	.....	3,969	1	326	...	8,564	1
Inflammation of Retina	66	.....	63	.....	3	...	132	.....
Other diseases of this order	765	.....	297	.....	9	...	1,071	.....
ORDER III. *Diseases of Ear.*								
Earache	1,137	.....	600	.....	34	...	1,771	.....
Inflammation of Internal Ear	913	.....	504	1	43	...	1,460	1
Otorrhœa	926	.....	479	1	5	...	1,410	1
Deafness	182	.....	71	.....	10	...	263	.....
Other diseases of this order	105	.....	67	2	3	...	175	2
ORDER IV. *Diseases of Organs of Circulation.*								
Aneurism	21	2	13	3	1	1	35	6
Angina Pectoris	167	3	55	3	11	...	233	6
Inflammation of Heart	114	11	30	10	5	...	149	21
Inflammation of Endocardium	75	10	34	5	.....	...	109	15
Inflammation of Pericardium	167	20	55	20	3	2	225	42
Inflammation of Veins	36	1	37	2	.....	...	73	3
Varicocele	726	.....	258	.....	4	...	988	.....
Varicose Veins	534	.....	236	1	6	...	776	1
Other diseases of this order	391	21	103	17	5	1	499	39
ORDER V. *Diseases of Respiratory Organs.*								
Asthma	881	4	288	7	1	...	1,170	11
Acute Bronchitis	18,247	48	7,857	54	97	...	26,201	102
Chronic Bronchitis	2,588	21	1,295	15	19	...	3,902	36
Catarrh	53,721	1	28,455	4	1,661	...	83,837	5
Hæmorrhage from Nose	293	1	112	2	1	1	406	4
Hæmorrhage from Lungs	745	13	294	9	13	...	1,052	22
Dropsy of Chest	15	3	8	2	.....	...	23	5
Inflammation of Larynx	1,671	22	885	11	41	1	2,597	34
Inflammation of Pleura	3,023	40	1,964	42	92	2	5,079	84
Inflammation of Lungs	4,582	601	6,366	1,529	113	4	11,061	2,134
Other Diseases of this order	4,109	112	916	122	20	...	5,045	234
ORDER VI. *Diseases of Digestive Organs.*								
Abdominal Dropsy	77	9	69	7	4	...	150	16
Cholera Morbus	2,818	12	1,464	21	26	...	4,308	33
Colic	7,524	3	3,695	8	155	...	11,374	11
Constipation	17,395	1	8,631	4	1,172	...	27,198	5
Dyspepsia	4,265	1	1,719	.....	165	...	6,149	1
Carried forward	436,518	5,509	303,158	7,772	12,705	67	752,381	13,348

TABLE X.—*Concluded.*

LIST OF DISEASES.	Atlantic Region.		Central Region.		Pacific Region.		Total.	
	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.
Brought forward	436,518	5,509	303,158	7,772	12,705	67	752,381	13,348
Order VI. *Diseases of Digestive Organs*—Continued.								
Inflammation of Bowels	455	43	695	48	4	1	1,154	92
Inflammation of Stomach	1,633	15	868	20	55	...	2,556	35
Fistula	263	.....	99	.....	13	...	375	.....
Hæmorrhage from Stomach	137	1	40	2	10	...	187	3
Piles	3,861	.....	1,823	3	89	...	5,773	3
Acute Inflammation of Liver	1,018	9	1,042	12	19	...	2,079	21
Chronic Inflammation of Liver	538	7	585	12	15	2	1,138	21
Hernia	2,516	3	1,259	3	34	...	3,809	6
Jaundice	5,110	9	5,795	31	24	...	10,929	40
Prolapsus Ani	219	.....	121	.....	4	...	344	.....
Inflammation of Peritoneum	161	44	260	23	4	1	425	68
Inflammation of Spleen	98	.....	180	2	3	...	281	2
Inflammation of Tonsils	7,782	5	3,488	3	197	1	11,467	9
Other diseases of this order	5,345	21	1,663	26	209	...	7,217	47
Order VII. *Diseases of Urinary and Genital Organs.*								
Stone and Gravel	56	.....	34	.....	3	...	93	.....
Inflammation of Bladder	258	5	135	.....	8	...	401	5
Diabetes	89	1	35	1	.....	...	124	2
Incontinence of Urine	136	1	33	.....	1	...	170	1
Retention and Difficulty of Urination	641	1	239	.....	8	...	888	1
Inflammation of Kidneys	506	6	410	4	16	...	932	10
Hydrocele and Hæmatocele	194	.....	99	.....	10	...	303	.....
Sarcocele	91	.....	35	.....	1	...	127	.....
Non-Syphilitic Ulcer of Penis	255	.....	66	.....	15	...	336	.....
Other diseases of this order	613	8	134	3	23	...	770	11
Order VIII. *Diseases of Bones and Joints.*								
Anchylosis	67	.....	56	.....	2	...	125	.....
Exostosis	68	.....	41	.....	2	...	111	.....
White Swelling	77	.....	33	1	1	...	111	1
Necrosis	147	.....	58	.....	2	...	207	.....
Order IX. *Diseases of the Integumentary System.*								
Abscess	3,648	1	1,474	6	171	...	5,293	7
Carbuncle	976	.....	198	1	13	...	1,187	1
Whitlow	944	.....	306	.....	48	...	1,298	.....
Boil	2,752	.....	651	.....	132	...	3,535	.....
Skin Diseases	3,111	1	1,961	1	114	...	5,186	2
Ulcers	2,878	2	1,092	3	121	...	4,091	5
Other diseases of this order	1,327	.....	185	.....	19	...	1,531	.....
Class V.—Wounds, Accidents, and Injuries.								
Burns	656	1	292	1	50	...	998	2
Concussion of Brain	81	8	48	8	17	2	146	18
Compression of Brain	25	10	34	6	1	...	60	16
Contusion	4,730	17	1,675	7	494	...	6,899	24
Fracture	761	24	426	24	59	1	1,246	49
Frost-bite	102	1	69	3	19	...	190	4
Dislocation	374	.....	224	.....	40	...	638	.....
Sprain	2,249	.....	717	1	185	...	3,151	1
Incised Wounds	3,178	5	704	11	179	...	4,061	16
Contused and Lacerated Wounds	3,162	48	1,769	64	319	...	5,250	112
Punctured Wounds	1,024	19	317	16	47	2	1,388	37
Gunshot Wounds	9,270	2,205	7,837	2,167	389	49	17,496	4,421
Poisoning	183	11	89	8	21	...	293	19
Suicide	.....	25	.....	15	.....	5	.....	45
Others of this class	2,067	36	948	55	55	2	3,070	93
Unclassified Diseases	4,526	262	2,149	175	423	5	7,098	442
Total	516,876	8,364	345,649	10,538	16,393	138	878,918	19,040

TABLE XI.

Showing the Number of Cases and Deaths, by Individual Diseases and Injuries, for the year ending June 30th, 1863.

LIST OF DISEASES.	Atlantic Region.		Central Region.		Pacific Region.		Total.	
	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.
Class I.—Zymotic Diseases.								
Order I. *Miasmatic Diseases.*								
Typhoid Fever	17,050	4,356	14,218	6,106	106	5	31,374	10,467
Typhus Fever	469	128	424	252	6	1	899	381
Typho-Malarial Fever	12,093	489	10,426	640	133	...	22,652	1,129
Yellow Fever	356	100	.....	.....	.....	...	356	100
Remittent Fever	35,056	339	48,219	828	441	...	83,716	1,167
Quotidian Intermittent Fever	28,968	29	67,087	115	608	...	96,663	144
Tertian Intermittent Fever	22,295	20	57,380	96	378	...	80,053	116
Quartan Intermittent Fever	2,687	5	6,693	73	54	...	9,434	78
Congestive Intermittent Fever	1,098	243	2,728	776	21	1	3,847	1,020
Acute Diarrhœa	175,152	210	197,089	659	1,686	1	373,927	870
Chronic Diarrhœa	28,062	1,974	34,900	5,510	121	4	63,083	7,488
Acute Dysentery	24,597	249	39,637	671	470	2	64,704	922
Chronic Dysentery	3,753	309	4,941	777	53	...	8,747	1,086
Asiatic Cholera	.....	.....	.....	.....	.....	...	.....	.....
Erysipelas	1,996	75	4,512	759	68	1	6,576	835
Small-pox and Varioloid	802	375	1,974	757	46	...	2,822	1,132
Measles	5,106	110	11,217	1,203	22	...	16,345	1,313
Scarlet Fever	115	7	89	19	2	...	206	26
Diphtheria	1,046	143	1,317	136	81	...	2,444	279
Mumps	3,005	13	10,291	17	133	...	13,429	30
Epidemic Catarrh	28,391	3	32,915	21	1,896	...	63,202	24
Other diseases of this order	14,336	218	14,580	553	363	2	29,279	773
Order II. *Esthetic Diseases.*								
Syphilis	6,118	4	6,439	20	1,224	3	13,781	27
Gonorrhœa	9,348	.....	10,982	6	1,302	...	21,632	6
Orchitis	1,537	.....	1,580	3	199	...	3,316	3
Stricture of the Urethra	441	2	279	.....	37	1	757	3
Purulent Ophthalmia	222	.....	878	.....	4	...	1,104	.....
Serpent-bite	9	.....	17	.....	3	...	29	.....
Other diseases of this order	193	7	172	.....	24	...	389	7
Order III. *Dietic Diseases.*								
Scurvy	3,090	36	3,774	53	531	1	7,395	90
Purpura	85	14	217	17	2	...	304	31
Delirium Tremens	314	40	385	70	73	1	772	111
Inebriation	437	11	560	11	224	...	1,221	22
Chronic Alcoholism	101	3	120	7	5	...	226	10
Other diseases of this order	275	17	289	3	1	...	565	20
Class II.—Constitutional Diseases.								
Order I. *Diathetic Diseases.*								
Gout	42	.....	78	.....	6	...	126	.....
Acute Rheumatism	25,723	27	18,887	57	1,067	...	45,677	84
Chronic Rheumatism	26,571	25	18,483	40	704	...	45,758	65
Anæmia	4,596	59	4,746	106	17	...	9,359	165
General Dropsy	725	18	1,564	27	5	...	2,294	45
Cancer	92	4	53	5	5	...	150	9
Tumors	306	2	279	1	23	...	608	3
Dry Gangrene	58	11	7	13	1	...	66	24
Other Diseases of this order	933	21	886	52	33	...	1,852	73
Order II. *Tubercular Diseases.*								
Consumption	2,566	630	2,983	1,402	50	8	5,599	2,040
Scrofula	957	9	1,075	23	32	...	2,064	32
Other diseases of this order	91	6	94	10	.....	...	185	16
Class III.—Parasitic Diseases.								
Itch	2,435	.....	3,790	.....	7	...	6,232	.....
Tape-worm	85	.....	49	.....	6	...	140	.....
Other intestinal worms	550	1	336	.....	20	...	906	1
Other diseases of this order	33	.....	43	.....	.....	...	76	.....
Carried forward	494,366	10,342	639,682	21,894	12,293	31	1,146,341	32,267

TABLE XI.—*Continued.*

LIST OF DISEASES.	Atlantic Region.		Central Region.		Pacific Region.		Total.	
	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.
Brought forward	494,366	10,342	639,682	21,894	12,293	31	1,146,341	32,267
Class IV.—Local Diseases.								
Order I. *Diseases of Nervous System.*								
Apoplexy	170	107	221	146	7	2	398	255
Epilepsy	1,386	44	1,166	61	33	...	2,585	105
Headache	11,059	.....	9,384	.....	202	...	20,645	.....
Insanity	407	8	410	12	14	...	831	20
Inflammation of Brain	175	137	271	307	4	2	450	446
Inflammation of Membranes of Brain	130	69	165	139	2	...	297	208
Inflammation of Spinal Cord	319	10	713	32	5	...	1,037	42
Nostalgia	806	5	1,207	7	3	...	2,016	12
Neuralgia	8,188	2	10,060	6	285	...	18,533	8
Paralysis	561	42	584	57	19	2	1,164	101
Sun-stroke	651	15	547	42	1	...	1,199	57
Other diseases of this order	1,232	128	1,419	108	30	1	2,681	237
Order II. *Diseases of Eye.*								
Amaurosis	280	.....	226	.....	7	...	513	.....
Cataract	106	.....	192	.....	3	...	301	.....
Inflammation of Conjunctiva	5,540	.....	14,490	.....	448	...	20,478	.....
Inflammation of Iris	295	.....	294	.....	30	...	619	.....
Night Blindness	691	.....	451	.....	5	...	1,147	.....
Other diseases of this order	568	.....	641	.....	34	...	1,243	.....
Order III. *Diseases of Ear.*								
Earache	2,454	.....	3,020	.....	47	...	5,521	.....
Inflammation of Internal Ear	537	1	1,000	.....	54	...	1,591	1
Deafness	439	.....	316	.....	20	...	775	.....
Otorrhœa	1,057	1	1,310	1	39	...	2,406	2
Other diseases of this order	124	.....	81	.....	8	...	213	.....
Order IV. *Diseases of Organs of Circulation.*								
Aneurism	50	10	48	10	1	1	99	21
Valvular Disease of Heart	789	97	424	85	4	...	1,217	182
Dropsy from Heart Disease	123	16	109	31	.....	...	232	47
Dropsy of Pericardium	62	14	57	21	.....	...	119	35
Inflammation of Pericardium	279	24	263	71	11	2	553	97
Inflammation of Endocardium	122	15	133	32	4	...	259	47
Inflammation of Veins	58	4	70	2	4	...	132	6
Varicose Veins	2,070	1	1,270	.....	4	...	3,344	1
Varicocele	1,929	.....	1,566	.....	9	...	3,504	.....
Other diseases of this order	536	85	478	68	33	2	1,047	155
Order V. *Diseases of Respiratory Organs.*								
Asthma	1,987	8	1,455	21	26	...	3,468	29
Bronchitis Acuta	29,727	48	20,815	139	257	...	50,799	187
Bronchitis Chronica	4,695	31	4,771	170	52	...	9,518	201
Dropsy of Chest	63	6	128	24	.....	...	191	30
Hæmorrhage from Nose	528	1	478	2	7	...	1,013	3
Inflammation of Larynx	2,822	31	3,011	121	86	...	5,919	152
Inflammation of Lungs	5,894	933	14,450	4,014	122	10	20,466	4,957
Inflammation of Pleura	4,986	37	5,252	130	121	2	10,359	169
Hæmorrhage from Lungs	923	24	1,066	39	27	...	2,016	63
Other diseases of this order	10,011	69	7,335	158	183	1	17,529	228
Order VI. *Diseases of Digestive Organs.*								
Colic	12,195	5	12,094	11	139	2	24,428	18
Constipation	20,720	1	18,630	5	1,408	...	40,758	6
Cholera Morbus	4,010	42	4,553	54	60	...	8,623	96
Cirrhosis of Liver	46	3	67	2	1	...	114	5
Dropsy from Hepatic Disease	569	24	897	50	1	1	1,467	75
Dyspepsia	7,466	4	5,574	6	191	1	13,231	11
Diseases of Pancreas	22	.....	18	.....	15	...	55	.....
Diseases of Spleen	167	2	741	10	4	...	912	12
Fistula in Ano	410	.....	457	5	10	...	877	5
Hernia	5,573	7	4,329	15	75	1	9,977	23
Hæmorrhage from Stomach	150	3	211	5	7	...	368	8
Carried forward	650,523	12,456	798,600	28,113	16,455	61	1,465,578	40,630

TABLE XI.—*Concluded.*

LIST OF DISEASES.	Atlantic Region.		Central Region.		Pacific Region.		Total.	
	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.	Taken sick.	Died.
Brought forward	650,523	12,456	798,600	28,113	16,455	61	1,465,578	40,630
Order VI. *Diseases of Digestive Organs*—Continued.								
Hæmorrhage from Bowels	336	13	407	32	.....	...	743	45
Inflammation of Tonsils	9,680	17	7,751	22	304	...	17,735	39
Inflammation of Stomach	1,532	43	2,141	135	89	...	3,762	178
Inflammation of Bowels	859	92	1,292	176	26	3	2,177	271
Inflammation of Peritoneum	147	62	297	97	102	3	546	162
Acute Inflammation of Liver	1,467	22	2,477	58	52	4	3,996	84
Chronic Inflammation of Liver	1,307	15	2,235	49	48	...	3,590	64
Jaundice	16,853	28	14,702	93	85	...	31,640	121
Piles	10,252	2	9,551	20	229	...	20,032	22
Other diseases of this order	3,008	60	3,251	69	60	...	6,319	129
Order VII. *Diseases of Urinary and Genital Organs.*								
Stone and Gravel	431	.....	430	6	6	...	867	6
Diabetes	158	7	266	11	8	...	432	18
Bright's Disease	298	18	197	19	3	...	498	37
Diseases of Prostate	39	.....	86	1	2	...	127	1
Diseases of Testis	486	.....	397	3	2	...	885	3
Inflammation of Kidneys	1,744	18	1,877	34	20	1	3,641	53
Inflammation of Bladder	602	7	544	9	16	...	1,162	16
Incontinence of Urine	859	.....	419	2	2	...	1,280	2
Hydrocele	256	1	258	.....	8	...	522	1
Other diseases of this order	989	12	932	8	96	1	2,017	21
Order VIII. *Diseases of Bones and Joints.*								
Anchylosis	152	.....	179	.....	7	...	338	.....
Caries	166	1	69	1	1	...	236	2
Inflammation of Joints	756	1	473	3	7	...	1,236	4
Inflammation of Bones	46	.....	42	1	1	...	89	1
Inflammation of Periosteum	252	.....	190	3	1	...	443	3
Necrosis	223	.....	249	16	3	...	475	16
Other diseases of this order	116	2	149	1	7	...	272	3
Order IX. *Diseases of Integumentary System.*								
Abscess	8,665	17	7,624	52	544	...	16,833	69
Boils	8,101	.....	5,307	.....	80	...	13,488	.....
Carbuncle	1,096	1	1,046	2	24	...	2,166	3
Ulcers	206	1	.....	4	.....	...	206	5
Whitlow	1,998	.....	1,300	.....	79	...	3,377	.....
Skin Diseases	3,599	1	2,891	.....	130	...	6,620	1
Class V.—Wounds, Accidents, and Injuries.								
Order I. *Wounds, Accidents, and Injuries.*								
Burns	1,510	6	1,122	29	47	...	2,679	35
Contusions	5,911	15	4,087	19	728	...	10,726	34
Concussion of Brain	109	22	167	38	12	1	288	61
Drowning	.....	50	.....	69	.....	4	.....	123
Dislocation	424	2	432	1	35	...	891	3
Simple Fractures	743	15	807	28	68	...	1,618	43
Compound Fractures	105	78	190	54	.....	...	295	132
Gunshot Wounds	31,165	4,782	24,559	3,946	210	27	55,974	8,755
Incised Wounds	3,595	6	1,759	75	182	...	5,536	81
Lacerated Wounds	1,591	39	2,335	222	321	1	4,247	262
Punctured Wounds	803	54	770	54	47	1	1,620	109
Poisoning	461	10	346	15	50	...	857	25
Asphyxia	8	4	23	1	.....	...	31	5
Sprains	5,972	.....	3,730	.....	293	...	9,995	.....
Other accidents and injuries	2,033	204	1,534	138	148	5	3,715	347
Order II. *Homicide*	.....	12	.....	13	.....	1	.....	26
Order III. *Suicide*	*1	39	*2	48	.....	1	*3	88
Order IV. *Execution of Sentence*	.....	6	.....	7	.....	...	.....	13
Total	781,633	18,241	909,532	33,797	20,638	114	1,711,803	52,152

* Attempted.

In order to facilitate the appreciation of the foregoing tables, a few considerations, derived partly from the statistical facts, partly from contributed papers and from pathological observations conducted in this branch of the office, are presented with regard to some of the more important affections.

CAMP FEVER—(TYPHO-MALARIAL FEVER).

On account of the great mortality resulting from it, camp fever has been, during the two years under consideration, the most important of the diseases of the army.

Under the general designation of Camp Fever, all those cases are here included which were reported, during the first year of the war, under the heads of Typhus, Typhoid, Common Continued, and Remittent Fevers, and, during the second year, under the heads of Typhus, Typhoid, Typho-Malarial, and Remittent.

This grouping is by no means intended to express a doubt as to the propriety of regarding typhus, typhoid or enteric and remittent fevers as distinct affections. The enteric lesion characteristic of typhoid fever enables a ready distinction to be effected between it and a genuine typhus or a true remittent, on the autopsy at least. But as the diseases have occurred in our army during the present war, the phenomena of these two affections have continually complicated each other in the same patient: so that, in fact, the enteric fevers have broken out among men campaigning in a malarial region, with constitutions more or less thoroughly impregnated with the malarial poison; the remittents among soldiers, peculiarly prone by their exposures and mode of life to enteric disease; and both have occurred, almost without exception, in men whose health has been more or less modified by camp diet, and who were therefore suffering in some degree from a condition best characterized as the scorbutic taint.

These three modifying conditions or tendencies, each of which, acting alone, might produce simple enteric fever, periodic fever, or scurvy, when acting simultaneously produce mixed types of disease that vary infinitely in accordance with the predominance of one or another of the three sets of determining conditions. For these variable resulting fevers I proposed the general name of Typho-Malarial Fever, which, in June, 1862, was, at my suggestion, adopted in the statistical nomenclature of the monthly reports of sick and wounded.

Typho-malarial fever is then the most important and frequent of the diseases included here under the head of CAMP FEVER, and its several varieties embrace the great majority of the continued fevers of the army. Undoubtedly cases of simple enteric and simple remittent fevers did occur, especially among recruits not yet brought under camp influences, and among the attendants in hospitals or others not exposed to them. It would be difficult to state the real frequency of such uncomplicated cases, and when the extreme diversity of opinion existing among physicians on the subject of fevers is considered, it will be understood that the number of cases reported as Typhoid and Remittent Fevers are, to a great extent, to be regarded simply as those in which the typhoid or the paroxysmal phenomena predominated.

Using then the term Camp Fever in the broad sense above indicated, the following statistical facts may be presented:

The whole number of cases during the first year of the war was 74,619, the deaths

6315; during the second year, 138,641 cases and 13,144 deaths,—the total for the two years being 213,260 cases and 19,459 deaths.

The distribution among the several affections included in the statistical reports is shown in Table XII.

TABLE XII.

Number of Cases and Deaths, from the several forms of Camp Fever, during the first two years of the war.

	Year ending June 30, 1862.		Year ending June 30, 1863.	
	Taken sick.	Died.	Taken sick.	Died.
Typhus	824	191	899	381
Typhoid	21,977	5,608	31,374	10,467
Typho-Malarial	.....	.....	22,652	1,129
Common Continued	11,771	146	.....	.....
Remittent	40,047	370	83,716	1,167
Total	74,619	6,315	138,641	13,144

The ratio of cases and deaths to strength is very similar for both years. In a general way, it may be said that each year about one-quarter of the men suffered from some form of the fever, and that the deaths amounted to about two per cent. of the strength. The whole number of deaths from these fevers during the first year was nearly one-half the total mortality from disease; during the second year, owing to the increased mortality from other diseases, and especially from diarrhœa and dysentery, only about one-third the total mortality from disease, though still maintaining nearly the same ratio to strength.

The ratio of cases and deaths to strength for each year, and for the average of the two years, is shown in the following table:

TABLE XIII.

Total Number of Cases and Deaths from Camp Fever for the first two years of the war, with the annual ratio per 1000 *of mean strength.*

	Taken sick.	Died.	Annual ratio of cases per 1000 of mean strength.	Annual ratio of deaths per 1000 of mean strength.
Year ending June 30, 1862	74,619	6,315	265·45	21·71
Year ending June 30, 1863	138,641	13,144	231·52	20·39
For the two years	213,260	19,459	242·34	20·80

A comparison of the reports from the three great regions shows camp fever to have been far more frequent in the Atlantic and Central regions than in the Pacific. In the Atlantic region, during both years, the number of cases was somewhat less than one-fourth the strength; the deaths for each year about seventeen per 1000 of strength.

In the Central region, the ratio of both cases and deaths was much greater during the first year than the second. During the first, the cases amounted to nearly one-third the strength; the deaths to about thirty-two per 1000 of strength. During the second year, the cases were somewhat less than one-fourth the strength; the deaths twenty-four per 1000 of strength. In the Pacific region, the cases for each year amounted only to between seventy and eighty per 1000 of strength; the deaths somewhat over one per 1000 during the first year, somewhat less than one per 1000 during the second. These relations are here presented in detail.

TABLE XIV.

Number of Cases and Deaths from Camp Fever in each of the three regions.

	Year ending June 30, 1862.				Year ending June 30, 1863.			
	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.
Atlantic Region	42,516	3,059	238·99	16·75	64,668	5,312	227·94	17·05
Central Region	31,613	3,245	327·31	31·92	73,287	7,826	239·16	24·13
Pacific Region	490	11	73·19	1·64	686	6	78·74	0·69
Total	74,619	6,315	265·38	21·71	138,641	13,144	231·52	20·39

The modifying influence of region on the mortality is shown still more strikingly when, instead of comparing the deaths with strength, they are compared with the number of cases. It is then seen that the disease is not only more frequent, but more fatal in proportion to the number of cases, in the Central region than in the Atlantic, and in this more than in the Pacific. In the Central region there was one death to every 9·7 cases for the first year; one for every 9·3 for the second. In the Atlantic region one to 14 cases for the first year; one to 12 for the second. In the Pacific region, as there were but eleven deaths in the first year and six in the second, much importance cannot be attached to its ratios. The relationship of deaths to cases for each year and region is shown in the following table:

TABLE XV.

Relation between Cases and Deaths of Camp Fever.

	Year ending June 30, 1862.		Year ending June 30, 1863.		Annual Average for the two Years.	
	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.
Atlantic Region	71·95	13·90	82·14	12·17	78·10	12·80
Central Region	102·65	9·74	106·79	9·36	105·54	9·48
Pacific Region	22·57	44·31	8·75	114·29	14·46	69·16
Total	84·63	11·82	94·81	10·55	91·25	10 96

A comparison of the monthly ratios of cases to strength in each region indicates the autumnal character of many of these fevers, and confirms the idea of a malarial element in their causation, as already indicated. In fact, the season wave for camp fever during the first year of the war is similar in many respects to that of the intermittent fevers, the malarial origin of which is universally admitted. During the second year, the season wave, which in other respects is similar, is somewhat masked by the large figures for July and August in the Atlantic and Central regions. How far this deviation is due to the character of the campaigns of the great armies in these regions and the location in which they operated, is a question the discussion of which must be postponed for the present.

Tables XVI. and XVII. give the monthly ratio of cases to strength in each of the three regions for the first and second years of the war.

TABLE XVI.

Monthly Rates of Camp Fever in the Armies of the United States during the year ending June 30th, 1862, expressed in ratio per 1000 of mean strength.

	1861.						1862.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region.....	8·30	18·78	25·60	27·64	27·88	19·74	13·85	13·81	10·99	17·42	24·88	27·07	238·99
Central Region.....	16·87	38·26	39·98	37·60	36·25	26·89	23·28	18·59	16·97	23·96	29·33	27·79	327·31
Pacific Region.....	1·72	5·31	5·35	6·67	4·31	4·90	2·15	3·45	6·34	9·19	20·44	12·59	73·19

TABLE XVII.

Monthly Rates of Camp Fever in the Armies of the United States during the year ending June 30th, 1863, expressed in ratio per 1000 of mean strength.

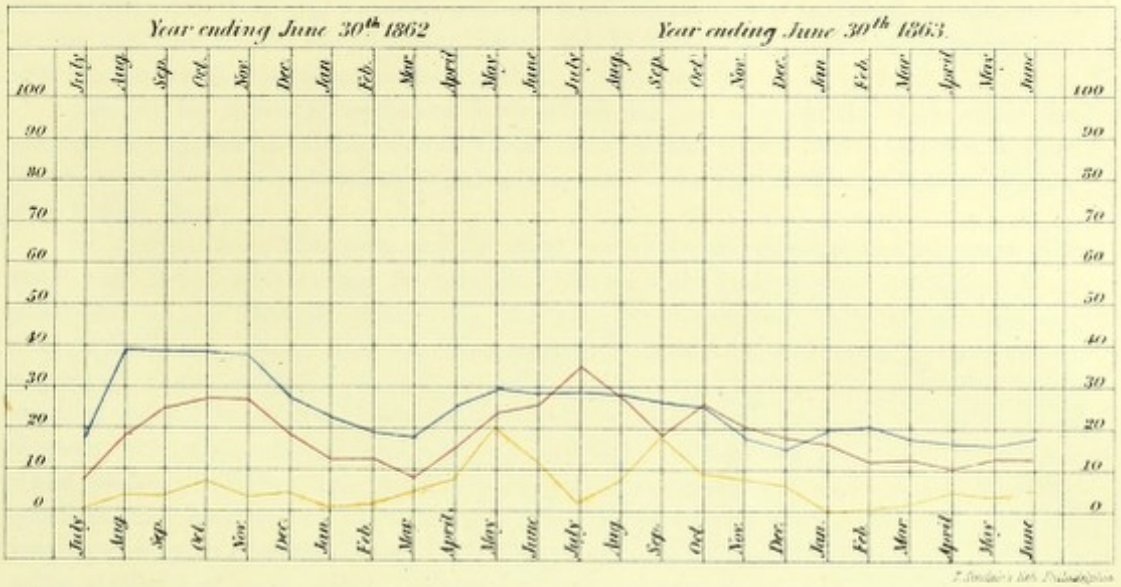
	1862.						1863.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region.....	36·20	28·59	19·54	27·67	21·72	18·51	17·61	14·32	14·06	12·29	13·87	14·87	227·94
Central Region.....	28·18	27·18	24·81	24·14	19·24	16·94	18·77	20·16	19·23	16·83	16·74	18·76	239·18
Pacific Region.....	4·21	9·45	18·92	9·83	9·19	6·74	2·29	1·91	2·79	5·09	4·19	5·85	78·74

The upper diagram of the plate facing this page represents the monthly fluctuations indicated in these tables.

Materials for an elaborate discussion of the subject of camp fever have been collected, and a careful investigation of its pathological anatomy has been conducted under my direction at the Army Medical Museum. The space to which it has been thought best to limit this paper does not, however, permit the presentation of further

Diagram shewing the Monthly rates of Camp Fever

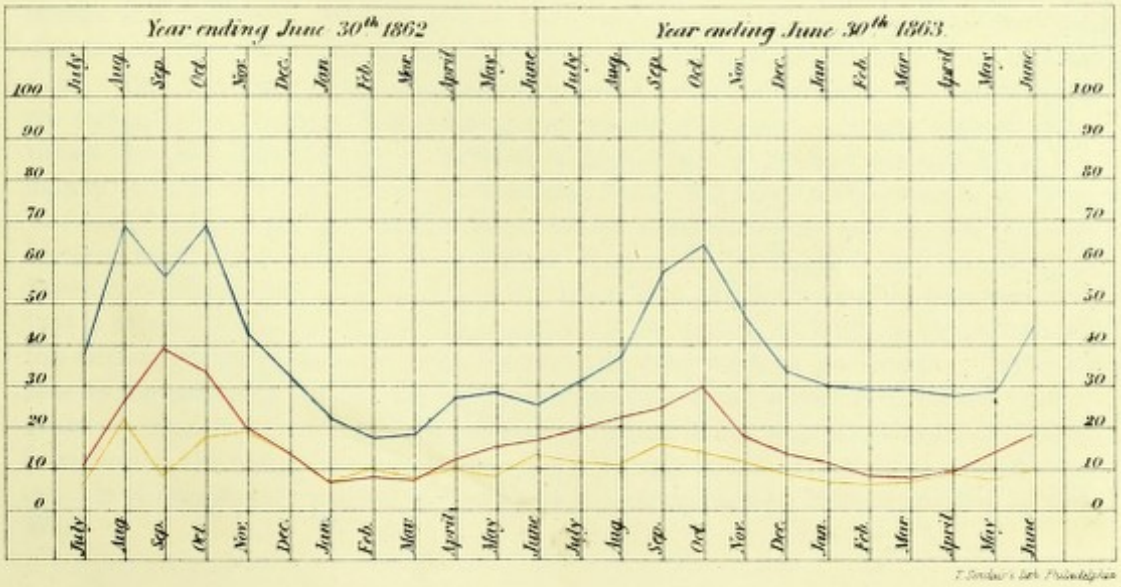
Atlantic Region. Central Region. Pacific Region.



T. Sinclair's Lith. Philadelphia

Diagram shewing the Monthly rates of Intermittent Fever

Atlantic Region. Central Region. Pacific Region.



T. Sinclair's Lith. Philadelphia

details than the foregoing remarks, and the brief sketch of the pathological specimens of the affection now in the Museum, which will be given in the account of the medical and microscopical sections of that collection.

Besides the forms of continued fever which may be properly included under the general designation of Camp Fever, three other forms, which have occurred during the war, deserve a brief mention in this place, viz.: True Typhus Fever, Spotted Fever, and Yellow Fever.

Of typhus fever, 824 cases and 191 deaths are reported during the first year; 899 cases and 381 deaths during the second. There is evidence, however, which will be presented in the Medical History of the War, that many of these cases were not true typhus, but rather cases of typho-malarial, or of ordinary enteric fever of an adynamic character, with strongly marked typhous symptoms, or complicated with scurvy; congestive intermittents occurring in scorbutic patients, and perhaps other diseases, were also occasionally diagnosed as typhus. These facts led me for a long while to doubt whether true typhus fever had ever occurred in our army during the rebellion, and inclined me to look upon the few hundred cases above quoted as belonging chiefly to typho-malarial fever; they have therefore been included in the foregoing statistics of camp fever. Subsequent facts, however, have been brought to my knowledge, which induce me to admit the occasional occurrence of a limited number of cases of true typhus, in connection with overcrowded and ill-policed camps, and especially in the case of those of our soldiers who were detained as prisoners in the enemy's hands.

Spotted fever, called also cerebro-spinal meningitis, attracted attention chiefly at a period later than that embraced in the present paper. Large numbers of cases, autopsies and other interesting materials on this subject have been contributed, with the mere mention of which I must here content myself.

Yellow fever, from which the army wholly escaped during the first year of the war, made its appearance at Key West, Florida, in July, 1862, and subsequently at Hilton Head, South Carolina. The outbreak was limited to a few hundred cases and the deaths to a hundred. In both places, there was the most decisive evidence that the disease was imported in consequence of the neglect or violation of quarantine regulations. The fear that yellow fever would prove a terrible obstacle to the operation of our troops in the Southern States has proved wholly unfounded. It may here be mentioned that the only subsequent outbreak of importance which has occurred up to the date of writing was the epidemic at Newbern, North Carolina, in the summer of 1864. But even here the mortality, so far as our troops were concerned, was limited to a few hundred men. In the case of this outbreak, Surgeon D. W. Hand, U. S. Vols., Medical Director of the Department, expresses the belief that the fever was not imported, but that it originated on the spot in consequence of the neglect of hygienic precaution by the citizens of the place and by the refugees who had made it an asylum. There is now in the possession of this office a most interesting set of papers, contributed by surgeons who were eye-witnesses, giving the whole history of the several outbreaks of yellow fever during the war, with descriptions of the disease, of the treatment employed, etc. etc. It is proposed to publish these papers in extenso in the Medical History of the War.

INTERMITTENT FEVER.

The several forms of intermittent fever played a conspicuous part among the diseases of the army, as might indeed have been anticipated, from a consideration of the frequency of these affections in the United States. They were not the source of any very great mortality; nevertheless the malarial influence, of which the frequency of these simple manifestations may be regarded as the measure, played a part in so many more serious and more fatal affections, that the rate of the occurrence of intermittents assumes a high significance in the appreciation of the comparative mortality of the several regions.

Intermittent fevers were reported under the several heads of Quotidian, Tertian, Quartan, and Congestive. The total number of all forms reported was 72,810 during the first year, 189,997 during the second; making a total during the two years of 262,807 cases reported. The mortality, however, was extremely small, with the exception of the so-called congestive form—(the Pernicious Fever of Dr. Wood). The whole number of deaths, including this more fatal variety, was 430 during the first year and 1358 during the second, or 1788 during the two years. Excluding the congestive cases, the mortality of the other varieties was but 407 deaths for the two years, or one death to every 631 cases. It has not, however, been thought proper to omit these cases, as, after all, in the present state of our knowledge they are to be regarded simply as extremely intense cases of intermittent fever, and are therefore a proper element to be included in considering the mortality of this affection. Embracing them in the computation, it will be found that there was one death to every 147 cases during the two years. It may be remarked, however, that possibly a certain number of cases of spotted fever and of cerebro-spinal meningitis may have been erroneously included under the head of Congestive Fever.

The following table shows the number of cases and deaths reported from each variety of intermittent fever. It will be seen that, according to the reports, Quotidian was somewhat the most frequent form, next comes the Tertian: the Quartan is comparatively rare, the Congestive still rarer.

TABLE XVIII.

Number of Cases and Deaths from the several forms of Intermittent Fever during the first two years of the war.

	Year ending June 30, 1862.		Year ending June 30, 1863.	
	Taken sick.	Died.	Taken sick.	Died.
Quotidian Intermittent	40,375	32	96,663	144
Tertian Intermittent	26,750	33	80,053	116
Quartan Intermittent	3,451	4	9,434	78
Congestive Intermittent	2,234	361	3,847	1,020
Total	72,810	430	189,997	1,358

Intermittent fever was more frequent during the second year than the first. In both, however, the total number of cases during the year amounted to considerably more than one-fourth of the strength. The mortality for the first year was a little over one per 1000 of strength, for the second a little over two per 1000.

TABLE XIX.

Total Number of Cases and Deaths from Intermittent Fever for the first two years of the war, with the annual ratio per 1000 *of mean strength.*

	Taken sick.	Died.	Annual ratio of cases per 1000 of mean strength.	Annual ratio of deaths per 1000 of mean strength.
Year ending June 30, 1862	72,810	430	258·95	1·15
Year ending June 30, 1863	189,997	1,358	317·29	2·11
For the two years	262,807	1,788	298·64	1·91

Intermittent fever was more frequent and fatal in the Central than in the Atlantic, and in this than in the Pacific region. In the Pacific region, there were no deaths during the first year and but one during the second. In the Atlantic region, the deaths were somewhat over one per 1000 of strength the first year, somewhat less than one per 1000 during the second; while in the Central region, the deaths were somewhat over two per 1000 during the first year, somewhat over three per 1000 during the second. These relations are exhibited in detail in Table XX.

TABLE XX.

Number of Cases and Deaths from Intermittent Fever in each of the three regions.

	Year ending June 30, 1862.				Year ending June 30, 1863.			
	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.
Atlantic Region	34,857	210	195·94	1·15	55,048	297	194·03	0·95
Central Region	36,980	220	382·88	2·16	133,888	1,060	436·96	3·27
Pacific Region	973	000	145·33	0·00	1,061	1	121·77	0·11
Total	72,810	430	258·95	1·48	189,997	1,358	317·29	2·11

The proportion of deaths to cases was slightly greater in the Central than in the Atlantic region, especially during the second year. In the Pacific region, for the two years, the proportion was over two thousand cases to each death.

TABLE XXI.

Relation between Cases and Deaths of Intermittent Fever.

	Year ending June 30, 1862.		Year ending June 30, 1863.		Annual Average for the two Years.	
	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.
Atlantic Region	6·02	166·11	5·39	185·53	5·64	177·30
Central Region	6·22	160·77	7·91	126·42	7·49	133·51
Pacific Region	0·00	000·00	0·94	1063·83	0·49	2040·82
Total	5·91	169·20	7·20	138·89	6·80	147·06

The influence of season on the frequency of the disease is shown in Tables XXII. and XXIII. It will be seen that intermittents occur at all seasons of the year, but that they are most frequent in the latter portion of the summer, and during the autumn months. In the Atlantic region, the maximum was attained in September during the first year, in October during the second; in the Central region, in August and October during the first year, October during the second; in the Pacific region, in August during the first year and September during the second.

The curve formed by the monthly ratios in each region is an autumnal one, and, on the whole, September and October would appear to be the months of greatest frequency. To appreciate fully, however, the effects of season, it would be necessary to study the detailed statistics of the several armies in each region, with their location and exposures, which is out of the question in a brief pamphlet. Full materials for such a comparison are in course of compilation.

The lower diagram of the plate facing page 112 represents these fluctuations, and may be advantageously compared with the diagram showing the monthly rates of camp fever, which occupies the upper part of the same plate and is constructed on the same scale.

TABLE XXII.

Monthly Rates of Intermittent Fever in the Armies of the United States during the year ending June 30th, 1862, expressed in ratio per 1000 of mean strength.

	1861.						1862.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	10·97	27·96	39·32	34·46	22·08	14·08	7·87	8·43	7·00	12·01	15·25	16·88	195·94
Central Region	39·19	66·93	56·46	66·77	42·13	30·60	21·37	17·37	19·07	27·68	28·09	26·25	382·88
Pacific Region	6·46	21·56	9·36	17·17	18·99	13·54	7·29	10·20	8·87	10·01	8·72	12·97	145·33

TABLE XXIII.

Monthly Rates of Intermittent Fever in the Armies of the United States during the year ending June 30th, 1863, expressed in ratio per 1000 of mean strength.

	1862.						1863.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	20·12	22·85	25·40	30·98	19·35	13·67	11·54	8·74	9·39	10·48	15·37	19·16	194·03
Central Region	31·39	36·33	56·85	63·05	45·59	33·38	28·46	26·93	29·25	28·37	29·20	44·02	436·96
Pacific Region	11·87	12·51	15·86	13·91	11·19	8·67	8·27	5·94	7·39	8·94	8·26	9·90	121·77

Before passing from the subject of intermittents, a word may be said with regard to some other manifestations of malarial poisoning, and especially with regard to *jaundice*.

Besides developing intermittent fever and complicating other diseases, such as camp fever and diarrhœa, the malarial influence manifests itself with considerable frequency among troops exposed to its action by the development of a peculiar form of anæmia, which may be designated Chronic Malarial Poisoning. This condition, attended usually with enlargement of the spleen and frequently with an increase in the number of the white corpuscles of the blood, manifests itself externally by languor, feebleness, and pallor, attended commonly with neuralgic pains, and, as it actually occurred among our troops, often complicated by slight scorbutic symptoms. Attacks of fever, pneumonia, or other acute diseases occurring among patients in this condition are peculiarly apt to prove fatal. A yellowish complexion is a frequent phenomenon in the form of anæmia here referred to, and often amounts to decided jaundice.

Mild epidemics of jaundice, running a course of from two to six or eight weeks, and usually terminating in recovery, have also been of frequent occurrence among our troops in malarial regions. That this form of the affection also stands related to the malarial poison, is shown by the fact that, as a general rule, it was most common in those localities in which intermittents were most frequent. In Tables X. and XI. jaundice will be found reported among diseases of the digestive organs. The number of cases reported during the first year was 10,929, during the second year 31,640, making in all 42,569 cases. The deaths were only 40 during the first year and 121 during the second, or 161 in all, which is but one death in 264 cases. Of the large number of cases reported, only 24 during the first year and 85 during the second occurred in the Pacific region; none of these cases died.

DIARRHŒA AND DYSENTERY.

These disorders were reported under the four heads—Acute Diarrhœa, Chronic Diarrhœa, Acute Dysentery, and Chronic Dysentery. The words diarrhœa and dysentery were somewhat loosely used during the war. The disease most generally called Chronic Diarrhœa was, in fact, usually an affection of the large intestine, which was thickened, softened, and often ulcerated. The term dysentery would have been more

exact, and was bestowed by many surgeons on the same affection which others called diarrhœa. Hence it has been thought advisable, in considering the figures, to group together all cases reported under these heads.

The extreme frequency of diarrhœa and dysentery makes it most important to understand these disorders. They constitute more than one-fourth of all the cases of disease reported during the period under consideration. The annual number of cases for the whole army was greater than three-fourths of the mean strength, and next, after camp fever, they were the chief cause of mortality from disease. The total number of cases reported during the first year was 215,214, with 1194 deaths; during the second year 510,461 cases and 10,366 deaths—the total, 725,675 cases and 11,560 deaths. It will be seen that the proportionate mortality of the second year is by far the greatest, showing the prevalence of cases of a more formidable type.

The following table presents the number of cases and deaths as actually reported under each of the heads above mentioned:

TABLE XXIV.

Number of Cases and Deaths from the several forms of Diarrhœa and Dysentery during the first two years of the war.

	Year ending June 30, 1862.		Year ending June 30, 1863.	
	Taken sick.	Died.	Taken sick.	Died.
Acute Diarrhœa	164,551	227	373,927	870
Chronic Diarrhœa	15,815	493	63,083	7,488
Acute Dysentery	32,237	347	64,704	922
Chronic Dysentery	2,611	127	8,747	1,086
Total	215,214	1,194	510,461	10,366

Taking the total of these several forms, it will be seen the ratio of cases was 765 per 1000 of mean strength during the first year and 852 per 1000 for the second; so that considerably more than three-fourths of the whole strength was attacked each year. The mortality was 4 per 1000 of strength during the first year and 16 during the second; the disease being just four times more fatal during the second year than the first.

TABLE XXV.

Total Number of Cases and Deaths from Diarrhœa and Dysentery for the first two years of the war, and the annual ratio per 1000 of mean strength.

	Total sick.	Died.	Annual ratio of cases per 1000 of mean strength.	Annual ratio of deaths per 1000 of mean strength.
Year ending June 30, 1862	215,214	1,194	765·40	4·10
Year ending June 30, 1863	510,461	10,366	852·44	16·08
For the two years	725,675	11,560	824·63	12·36

The greatly increased mortality during the second year will be at once understood if the acute cases of diarrhœa and dysentery, as given in Table XXIV., are added together for each year and their mortality compared with that of the chronic cases. Of acute diarrhœa and dysentery, 196,788 cases and 574 deaths were reported during the first year, 438,631 cases and 1792 deaths during the second; the mortality being one death to every 331 cases in the first year and one to every 245 in the second. It appears, therefore, that the acute forms remained comparatively mild. Of chronic diarrhœa and dysentery, there were 18,426 cases and 620 deaths during the first year, 71,830 cases and 8574 deaths during the second; the mortality increasing, therefore, from one death in every 30 cases for the first year to one in every 8 for the second.

This increased mortality, which shows that the chronic forms assumed a more formidable type during the second year, becomes at once intelligible on the presumption that a certain length of time is required before the influences to which a soldier is exposed culminate in chronic diarrhœa. Indeed, individual experience shows that the same soldier has frequently, perhaps usually, repeated attacks of acute diarrhœa, which terminate in temporary recovery, and which, of course, are each reported as a separate case, before the more serious and continuous disorder sets in, on which the term "chronic" is usually bestowed.

Like camp fever and intermittents, diarrhœa and dysentery were most frequent in the Central region; less so in the Atlantic, and least in the Pacific region. In the Central region, the cases were more numerous than the strength during the first year and nearly equal to the strength during the second; in the Atlantic, they were more than half the strength during the first year and more than three-quarters during the second; in the Pacific region, during each year somewhat over one-quarter the strength. The differences between the ratio of mortality to strength in the three regions was still more striking: in the Central region, the mortality was 9 per 1000 of mean strength during the first year, 23 per 1000 during the second; in the Atlantic, 1 per 1000 during the first year, 9 per 1000 during the second; in the Pacific region, less than 1 per 1000 during each year.

TABLE XXVI.

Number of Cases and Deaths from Diarrhœa and Dysentery in each of the three regions.

	Year ending June 30, 1862.				Year ending June 30, 1863.			
	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.
Atlantic Region	114,925	238	646·01	1·30	231,564	2,742	816·22	8·80
Central Region	98,470	951	1019·54	9·36	276,567	7,617	902·62	23·49
Pacific Region	1,819	5	271·10	0·75	2,330	7	267·42	0·80
Total	215,214	1,194	765·40	4·10	510,461	10,366	852·44	16·08

The ratio of deaths to cases shows the influence of region in a striking manner.

TABLE XXVII.

Relation between Cases and Deaths of Diarrhœa and Dysentery.

	Year ending June 30, 1862.		Year ending June 30, 1863.		Annual Average for the two Years.	
	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.
Atlantic Region	2·07	483·09	11·84	84·46	8·60	116·28
Central Region	9·66	103·52	27·54	36·31	22·85	43·77
Pacific Region	2·75	363·64	3·00	333·33	2·89	346·02
Total	5·55	180·18	20·31	49·24	15·93	62·77

If now we consider the influence of *season* in each of the regions, it will be found that diarrhœa and dysentery were by far most frequent in the summer and autumnal months. In the Atlantic region, the greatest monthly ratio was during July, 1861, after which it diminished through the fall and winter, but again increased from March to June, 1862; July, 1862, was the maximum month for the second year. The cases greatly diminished in August—after the Army of the Potomac had withdrawn from the Peninsula to near Washington; but increased in September, and attained a second maximum in October, which is the month in which intermittents were most frequent in this region; it then diminished steadily till April, 1863, increasing again in May and June. In the Central region, the maximum month is August, 1861, after which there is a gradual diminution till December; an increase in January, 1862; a falling off in February, and a great increase in March and April. The monthly ratio became gradually less during May, June, July, and August, but increased considerably in September, after which it gradually diminished until January, 1863, when it increased again, and made subsequently but slight fluctuations. On the Pacific coast, the disease was most frequent during the summer and autumnal months. The following tables give the rates, and the upper diagram of the plate facing this page represents them to the eye:

TABLE XXVIII.

Monthly Rates of Diarrhœa and Dysentery in the Armies of the United States during the year ending June 30th, 1862, expressed in ratio per 1000 of mean strength.

	1861.						1862.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	168·23	116·29	70·80	62·66	46·06	28·54	23·20	22·20	35 22	67·20	70·92	87·06	646·01
Central Region	93·06	139·99	97·94	94·68	70 91	63·34	71·87	55·53	70·73	107·12	97·99	83·78	1019·54
Pacific Region	28·41	40·96	29·63	27·03	30·85	13·54	10·74	16·54	18·13	16 57	22·93	35·82	271·70

Diagram shewing the Monthly rates of Diarrhœa and Dysentery.

Atlantic Region. Central Region. Pacific Region.

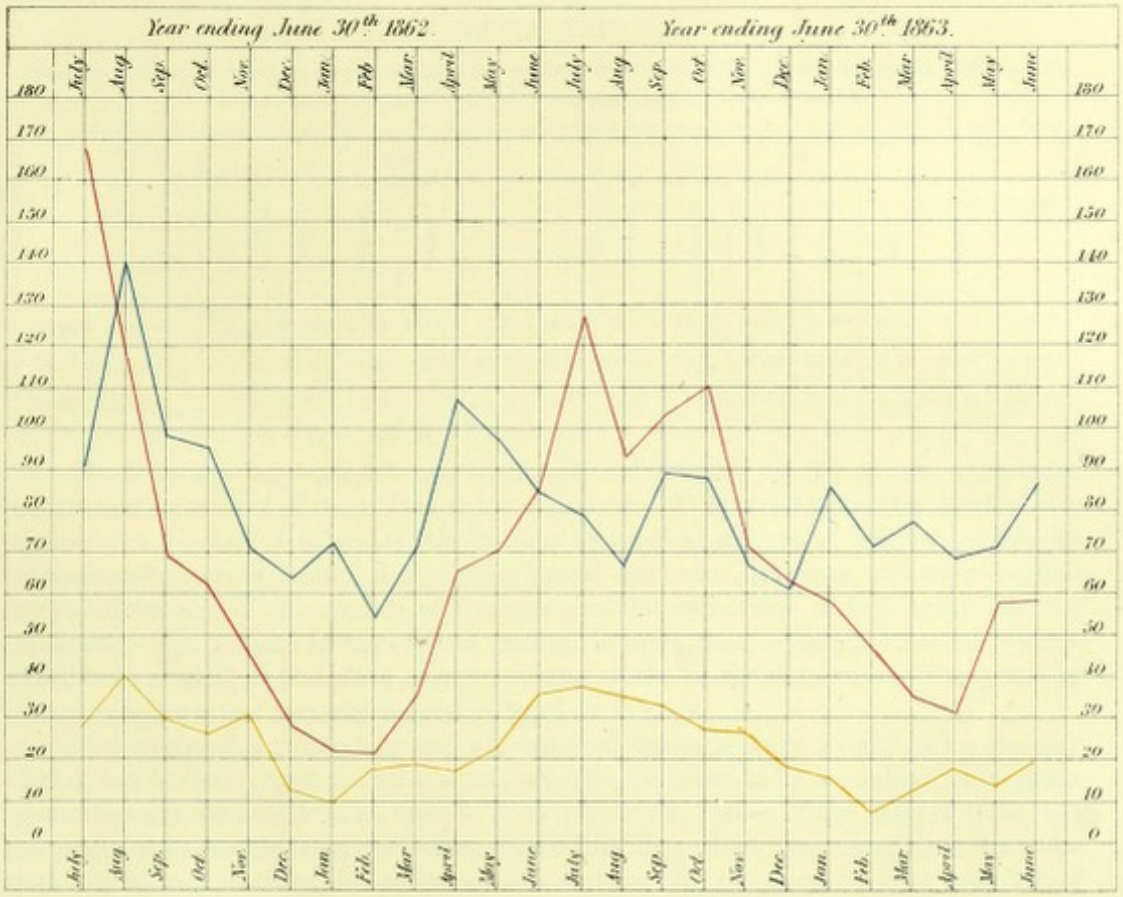


Diagram shewing the Monthly rates of Inflammatory affections of the Respiratory Organs

Atlantic Region. Central Region. Pacific Region.

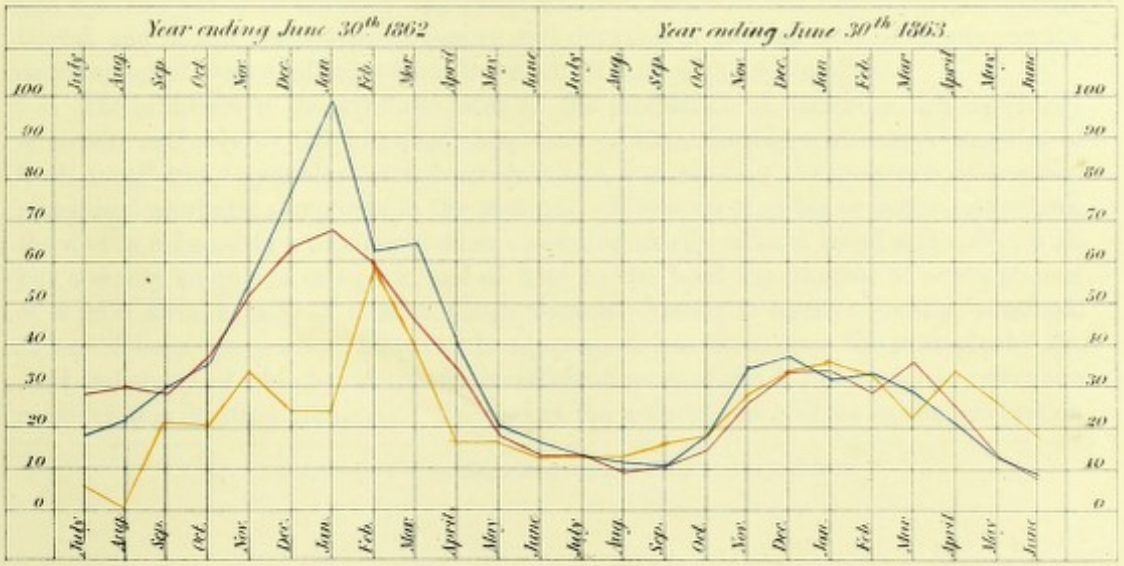


TABLE XXIX.

Monthly Rates of Diarrhœa and Dysentery in the Armies of the United States during the year ending June 30th, 1863, expressed in ratio per 1000 of mean strength.

	1862.						1863.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	129·56	94·40	105·00	111·22	73·47	63·64	58·50	45·52	38·57	31·85	58·02	59·96	816·22
Central Region	79·76	67·64	88·45	86·93	66·27	60·03	84·54	70·84	76·73	67·86	71·48	86·36	902·62
Pacific Region	38·43	36·21	33·53	28·38	26·97	18·66	14·65	7·55	12·54	18·38	15·09	21·16	267·42

Much interesting material has been collected bearing on the causes, symptoms, nature and treatment of these formidable affections. This consists, besides detailed statistics, of a number of papers on the subject by medical officers, of numerous histories of cases and accounts of autopsies, of pathological specimens, drawings, and microscopical preparations, and of the records of microscopical investigations in the Army Medical Museum. The subject is one of such general interest that, although it is utterly impossible to present in this place even an outline of the material collected, it may not be amiss to make a few remarks suggested by these studies.

The origin of the diarrhœa and dysentery of troops is to be sought in no one condition, but in the co-operation of several, each of which should be the subject of hygienic precautions, if the health of an army is to be preserved. Some of the chief of these, but assuredly not the only ones, are the scorbutic taint dependent upon camp diet, the malarial influences operating in certain seasons and regions, the overcrowding and filth of camps and barracks, the heat of summer, the exhaustion and fatigue of campaigns, and the use of water containing saline or organic impurities. Whether there has ever existed, in addition to these intelligible conditions, any specific causative momentum deserving the designation of epidemic influence, is a grave question which receives no affirmative reply from any experience reported during this war. The causation of *chronic* diarrhœa and dysentery is to be found in the long-continued action of the influences above mentioned, and in the consequent frequency and duration of attacks, but not in any specific cause or set of causes different from those which induce the acute form.

The influence of the scorbutic taint in the production of diarrhœa and dysentery is shown not only by the increased frequency of these disorders whenever supplies of fresh meat and vegetables have been deficient, but also by the presence of readily-recognized scorbutic symptoms in the patients. When, on marches or active campaigns, the diet is reduced to a minimum, often consisting chiefly of hard bread and coffee, with but a scanty supply of salt pork, and of beef on the hoof, the number of acute attacks of a mild form, as also of attacks which become chronic, is always greatly increased. It would be a grave error, however, to suppose, as has been done for example by Dr. J. H. Salisbury, of Ohio,* that this is the efficient cause of the disorder, and to reject the consideration of other momenta. To neglect the influence of climate in the production

* Annual Report of the Surgeon General of Ohio for the year 1864.

of the disease, for example, would be almost as unfortunate as to neglect the consideration of diet.

The influence of climate, in this connection, is abundantly proved by the detailed statistics of individual armies and localities, too voluminous to be presented in this place, but which will appear in the official volumes. It is also worthy of note that the month of the greatest prevalence of diarrhœa and dysentery in any army is often also the month of the greatest prevalence of intermittent fever. But since it is not possible, in campaigning in malarial countries, to avoid exposure to malaria, the chief interest here attaches to the connection of climate with treatment. This connection is of such a nature, that the number of recoveries bears a direct relation to the latitude of the climate in which the patients are treated and to its freedom from malaria. Passing by the figures of the first year of the war, during which the deaths from chronic diarrhœa and dysentery were comparatively few, the second year gives the following results, which are of especial significance.

During the second year of the war, the proportion of deaths from chronic diarrhœa and chronic dysentery in the general hospitals of New England was one to every forty-nine (48·8) patients admitted for these disorders; in the general hospitals of New York City and State, including the hospital at Newark, New Jersey, one to every nineteen (18·7) cases; in the general hospitals of Philadelphia and at other places in Pennsylvania and Delaware, one to every fifteen cases; in the general hospitals of Maryland and the District of Columbia, including those of Washington, Georgetown, Alexandria, Frederick, Baltimore, Annapolis, etc., one to every eleven cases (11·4); in the general hospitals at Fortress Monroe and on the coast of North and South Carolina, one to every seven cases (7·1).

The mortality was greater in the Central region of the continent, but the relative influence of latitude was still observed. In the general hospitals of Ohio, Indiana, Illinois, Iowa, Missouri, Kansas and Kentucky, including those at Cincinnati, Louisville and St. Louis, the mortality was one death to every nine (8·53) cases; in those of Tennessee, Northern Mississippi and Arkansas, including among others the hospitals of Nashville, Memphis and Helena, one in five (5·4); in the hospitals of Louisiana, including New Orleans and Baton Rouge, one in four.

Nor will a separate consideration of the mortality from these affections in the hospitals of the great cities on the Mississippi River be less instructive. In the hospitals of Keokuk, Ia., the mortality was one in nine cases (9·1); in St. Louis, one in five (5·2); in Cairo, one in four (3·98); in Memphis, one in five (5·4); and at New Orleans, somewhat less than one in five (4·7). The extreme mortality, it may be noted, is not at the point farthest south, but at Cairo, situated on the alluvial peninsula formed by the junction of the Mississippi and Ohio Rivers, where, as is well known, most intense malarial influences prevail.

It is impossible to escape the conviction, based upon the foregoing observations, that a change of climate is one of the most important elements in the treatment of these diseases. The value of such a change, familiarly known to those surgeons of our army who had enjoyed the experience of the Mexican war, did not escape the attention of the Surgeon General's Office; and throughout the war, patients suffering from the fevers and bowel affections of southern latitudes were, as far as the exigencies of

the service would permit, transferred to the North. In October, 1863, Surgeon C. McDougall, Medical Director of the Department of the East, recommended the transfer of patients suffering from chronic diarrhœa in the Atlantic region to the hospitals in the State of Vermont, where the freedom from malaria and the fine mountain air would, it was hoped, afford the most favorable results. The experiment was tried, as far as practicable, and with much success. In the West, also, such cases were sent, as far as possible, to hospitals in high northern regions, as at Keokuk, Ia., Madison, Wis., Chicago, Detroit, etc. etc. It was never possible to give the full benefit of climatic influences to all those patients who needed it; but the Medical Department was fully alive to the advantages to be derived from this source, and availed itself of them as far as, at the time, with a full knowledge of all the circumstances of the case, it was believed to be practicable.

Papers have been contributed by various surgeons, detailing the history, symptoms, and treatment of numerous cases of diarrhœa and dysentery. These reports, properly elaborated, will be a most important contribution to our knowledge of those diseases. An analysis which should do justice to them is quite out of the question in the present paper; but a few salient points, in connection with the chronic form, will be briefly touched upon.

The most common and characteristic chronic form, as already intimated, was anatomically a chronic ulcerative colitis, occasionally an entero-colitis. Designated correctly chronic dysentery by many surgeons, it was most generally known as chronic diarrhœa, or chronic camp diarrhœa; and it is to this form that the few remarks here offered are limited. Among its most striking phenomena may be mentioned the usual absence of fever throughout the greater part of its course, the progressive and ultimately often extreme emaciation, the dry, harsh condition of the skin, and the presence of complicating phenomena of malarial and scorbutic nature. The frequent complication of the disease with camp fever is also notable. Sometimes the attack of fever begins the disorder, and diarrhœa is left subsequently as a result. Often, however, camp fever occurs in patients who have already long suffered from chronic flux. In fatal cases of either variety, the anatomical lesions characteristic of diarrhœa are found variously combined with those of camp fever, as will be seen in the brief description of the specimens of this sort in the Museum, which is given in a subsequent paragraph.

Chronic flux, unaccompanied by camp fever, may run its course to its own natural termination in extreme emaciation, with death from debility and exhaustion; or, as perhaps happens more frequently, terminate at an earlier period, in consequence of the occurrence of some disastrous complication. Often, for example, after the disease has lasted a long time without fever, the stools varying from two or three to twenty or more daily, the patient still walking about and suffering little pain, acute dysenteric symptoms set in with fever, delirium, abdominal tenderness, tormina, tenesmus, rapid sinking and death in a few days. An autopsy shows the colon, which is more or less ulcerated according to the previous duration and severity of the flux, to be coated with a yellowish or greenish-yellow, sometimes brownish-yellow, pseudo-membrane, which often extends also through the small intestines. The nature of this pseudo-membrane has been made the subject of careful investigation in the Museum, and the examination of a large number of cases leaves no doubt on the matter. It is simply the croupous lymph, pseudo-plastic lymph, caco-plastic lymph, or false membrane

of medical writers. The examination by the microscope of properly prepared sections shows it to be composed of innumerable round cells (lymph cells, pus cells), held together by an adhesive granular matrix more or less resembling coagulated fibrin. With such sections, there is no difficulty in tracing the origin of this membrane to a rapid multiplication of the epithelial cells and superficial connective tissue corpuscles of the diseased mucous membrane. The condition thus described is not always fatal, tubular casts of false membrane having been found in the stools of patients, with the above-described symptoms, who have subsequently recovered.

Another grave complication is diphtheria, with the formation of a similar false membrane in the fauces and respiratory passages. The membrane does not differ from that formed in ordinary diphtheria in civil life. The Museum contains several fine specimens. I have made a careful examination of the false membrane in a number of cases of this sort. It is anatomically similar to the false membrane of the intestine, and its origin is as readily traced to the epithelium of the mucous membrane, the connective tissue of which is, however, less frequently involved in the cell multiplication. The early stage of the diphtheritic affection, in these cases, is often associated with œdema of the glottis, which sometimes suddenly proves fatal before the formation of the false membrane. It may be mentioned in this place, that œdema of the glottis, with or without the formation of a diphtheritic false membrane, has been a not unfrequent mode of death in cases of protracted suffering from gunshot wounds. Other fatal complications of common occurrence in chronic diarrhœa are pneumonia, congestion of the lungs, serous apoplexy, Bright's disease of the kidneys, etc. etc.

An interesting complication which has several times been brought to my notice in autopsies is the formation of metastatic foci, generally in the liver, but sometimes also in the lungs and spleen. These foci precisely resemble those which occur in pyæmia after gunshot wounds. I have met them in the bodies of men dead of diarrhœa, who had received no wound or injury, but who had extensive ulceration of the colon. These are the only cases in which, with propriety, "*embolism*" can be spoken of as a complication of chronic diarrhœa. The heart clots (death polypi), observed in the autopsies of this disease, differ in no respect from those so frequently occurring in patients dead of the most diverse affections, and even, under certain circumstances, in animals killed by violence; and all the evidence which careful investigation has hitherto accumulated on the subject is in favor of the opinion that they are formed during the death agony—consequences and not causes of the fatal issue. Ordinary abscesses of the liver, sometimes of great size, were not very rare, and a number of illustrative specimens have been received at the Museum.

Considerable interest attaches to the examination of the fæces in chronic diarrhœa, and especially to their examination with the microscope. The naked eye at once recognizes as a prominent fact the presence in the stools of undigested portions of the food, the characters of which are often but little altered. This, however, is also frequent in ordinary acute diarrhœa, and is simply an expression of diminished digestive power. In the case of soldiers in the field using hard bread as a part of the ration, lumps of this article but little altered by their passage through the alimentary canal are very commonly present. The most various substances derived from the food are frequently observed; the microscopic appearances of some of them being well calcu-

lated to deceive the unwary pathologist, especially if he attempts the microscopical study of the excreta without a prior knowledge of the minute structure of the articles of diet likely to be encountered. Besides such undigested fragments, mucus, blood and pus, in variable quantities, are commonly met, with excess, deficiency, or absence of the products of the intestinal transformation of the hepatic secretions. For the recognition of blood and pus, when they exist in small quantity, the microscope is necessary; in large amounts they can be recognized by the naked eye. Especial significance is to be attached to the presence of pus, which, in moderate quantities, can be recognized in a vast number of cases, probably in all those in which there are ulcers of any size in the colon. Of course, it may happen that though pus exists, its corpuscles have been destroyed by the peculiar form of putrefaction which the intestinal contents sometimes undergo; for, coincident with the diminished activity of the digestive processes, forms of fermentation and even of putrefaction occur, which are not usually met with in the healthy human body. The frequent occurrence in the stools of torula cells, indicative of the setting up of fermentation among the saccharine and starchy elements of the undigested food, has been mentioned by Dr. Salisbury in the paper before referred to. This quite accords with my own observations; but the account given in his paper of the presence of other "algoid forms," etc. is I presume, based upon some misinterpretation.

For a brief statement of some facts as to the pathological anatomy of this disease, see subsequent remarks on the specimens in the Museum.

The papers above referred to contain also much interesting detail as to the *treatment* of these affections, which cannot be here introduced on account of its bulk. A few remarks may, however, be made in reference to the chronic variety. In this form, the two most important elements of treatment would appear to be diet and climate. The diet should be antiscorbutic. Fresh meat and broth made from it, eggs, milk, oysters, etc. are of the greatest value; but fresh vegetables also exercise a favorable influence. If the disease remains obstinate under this diet and suitable medication, the patient should be transported to a non-malarial northern locality. As to medication, the whole range of vegetable and mineral tonics, astringents and alteratives have been employed with variable success. Among the remedies which have been brought into extensive use in this country for the first time during the present war, I may briefly mention subnitrate of bismuth, strychnia and arsenic.

Subnitrate of bismuth is perhaps the most generally available of these articles. The first paper published on its use in camp diarrhœa was that of Acting Assistant Surgeon J. B. Trask,* who recommended it in both the acute and chronic forms. Dr. Trask advised the bismuth to be given daily in one large dose of from one to four scruples, which he regarded as more efficacious than its use in divided doses. He was very sanguine as to its success in all cases in which the patient was not actually dying when the treatment was commenced. He says: "In not a case of the two hundred and seventy treated at Finley Hospital during the period named, and by this agent, was there a failure in promptly and radically arresting the disease, when given in the quan-

* Report on the Treatment of Acute and Chronic Diarrhœa with Subnitrate of Bismuth at Camp Downey, California, and Finley Hospital, Washington, D. C., by J. B. Trask, M.D., Acting Assistant Surgeon U. S. A. San Francisco, 1863.

tities and time as stated." In September, 1863, Surgeon T. Rush Spencer, U. S. Vols., made an official report on the use of the remedy in seventy-six cases, sixty of which were chronic and sixteen acute. Seventy-one of these cases were cured and five still under treatment at the date of his report. The treatment in the successful cases lasted from one to eight days. Influenced by these and other reports, I myself tried the remedy quite extensively, and was cognizant of its use in a large number of cases of both acute and chronic diarrhœa. It generally showed itself a most valuable agent. In a few cases, however, tormina, tenesmus, and other dysenteric phenomena, with an aggravation of all the symptoms, followed its use, and in a very considerable proportion of the severe chronic cases it appeared to be wholly without effect. The subsequent experience of many surgeons in the field and in hospital gave similar results; so that while it must be admitted to be a quite useful remedy, especially when given in large doses, the extravagant expectations which were at first entertained with regard to it by some must be abandoned.

Strychnia was also extensively used by some surgeons. It was given in the form of sulphate, or as extract of nux vomica. Very generally it was combined with quinine, or with quinine and iron, and proved valuable in many atonic and paralytic conditions of the bowels, but was far from being of general availability in the treatment of severe chronic cases.

Arsenic in pill, or in the form of Fowler's solution, was more frequently useful, and by some surgeons this remedy was regarded almost as a specific. So far as I have been able to learn, it was chiefly available in cases complicated with chronic malarial poisoning. The utter failure of these, or indeed any therapeutic agents, to command general confidence, or to come into general use, will serve to show how subordinate their effect is to be regarded to that of proper dietic and climatic conditions.

Asiatic cholera did not make its appearance during the war, nor was any similar affection of a severe type frequent. The whole number of deaths from cholera morbus was 33 during the first year and 96 during the second.

SMALL-POX.

From a very early period in the war the attention of the Medical Bureau was directed to the subject of vaccination, and strenuous efforts were made to render this method of protection universal. That these efforts were to a great extent successful, is shown by the comparatively small number of cases reported: 1310 cases of small-pox and varioloid were reported during the first year and 2822 during the second—making a total of 4132; the deaths were 412 during the first year and 1132 during the second—being 1544 in all. According to these figures, the mortality would be one death to about every three (2·67) cases. Since, however, a certain number of cases of variolous disease originated in the general hospitals themselves, and upon the statistical system employed the deaths from among these cases would be included in the above figures, it is probable that the ratio of deaths to cases thus obtained is somewhat too high. If, however, the experience of some of the larger small-pox hospitals, in which it is known that the cases received were treated to their termination, be compared, it will be found that the mortality shown in their reports closely approximates the above. Thus, in the two

largest establishments of the kind, the Small-pox Hospital at St. Louis, Missouri, and that at Washington, D. C., the total number of cases of small-pox and varioloid treated during the two years was 2319; the number of deaths 597, or one in four (3·88) cases.

A considerable amount of material is on file concerning the frequency and fatality of variolous disease among those who have been vaccinated, as compared with the unprotected, and on other matters of interest connected with this subject. Most of this material belongs, however, to a period subsequent to that referred to in this paper. I will only mention here the occurrence in many instances, especially in the Central region, of foul or gangrenous ulcers as an accident attendant upon vaccination. The earliest cases of the sort referred to in the official reports occurred in the latter part of 1863 in the District of the Frontier, and are reported by Surgeon George H. Hubbard, U. S. Vols., Medical Director of the district. They were supposed to be caused by the accidental admixture of syphilitic matter with the virus employed. Other cases subsequently occurred in Missouri, the Northern Department, Kentucky, Tennessee, etc., and were made the subject of careful inquiry by Colonel C. S. Tripler, Medical Director of the Northern Department, and other surgeons. The opinion generally arrived at was, that they were the expression of scorbutic or other cachectic conditions of the patients, and not due to any poisonous admixture with the vaccine virus; and it was frequently observed that the same scab which had produced a number of successful vaccinations would, in other men vaccinated at the same time, produce the ulcers referred to. An exceedingly interesting paper which illustrates this point, as observed in a number of cases among citizens at Horicon, Wisconsin, has been contributed by Surgeon Howard Culbertson, U. S. Vols. The subject is one which deserves a full discussion hereafter.

CAMP MEASLES.

Epidemic measles was one of the characteristic affections of the war. It occurred chiefly in regiments recently raised, and among recruits, and appeared to be due wholly to the incidental exposure of men brought up in rural districts who had hitherto escaped the contagion: 21,676 cases and 551 deaths were reported during the first year of the war, 16,345 cases and 1313 deaths during the second; but there is reason to believe that the actual number of cases was considerably greater, since it is well known that the disease frequently prevailed epidemically in new regiments, after the men began to come together in the State to which they belonged, but before they were mustered into the service of the United States, and therefore before their medical officers began to report to the Surgeon General's Office. The disease resembled ordinary measles in adults, except when aggravated by the effects of crowd poisoning or other depressing influences. The direct mortality was not great, being only one death to every twenty cases, but tedious catarrh, pneumonia, and pleuro-pneumonia were frequent sequelæ; and a part of the mortality from these affections was due indirectly to measles.

EPIDEMIC MUMPS.

Another affection, which prevailed extensively, was Epidemic Mumps (parotitis). It occurred both as an independent affection and as a complication of other diseases. It was seldom fatal. During the first year 11,216 cases and 9 deaths were reported; during

the second 13,429 cases and 30 deaths. The inflammation of the gland seldom terminated in abscess, except in those cases which occurred as complications of camp fever. Metastasis to the testicle was not unfrequent. The disease appeared to spread by contagion, affecting almost exclusively those who had never previously suffered.

INFLAMMATORY DISEASES OF THE RESPIRATORY ORGANS.

The last of the miasmatic group of zymotic affections on which remarks will here be made is Epidemic Catarrh, of which 11,314 cases and 5 deaths were reported during the first year, and 63,202 cases and 24 deaths during the second. Considerable confusion, however, appears to have existed as to the precise signification and limits of the terms Catarrh, Epidemic Catarrh, and Acute Bronchitis; precisely similar cases being reported by different surgeons under each of these heads. It appears probable, moreover, that the causes determining inflammatory affections of the several portions of the respiratory apparatus are intimately allied, the total number of cases representing the effect of exposure to unfavorable climatic influences, such as cold, dampness, etc.; while the mortality is determined partly by the intensity of the cause, partly by the hygienic surroundings and constitutional condition of the patients. Influenced by these and other reasons, it has been considered advisable to bring together into a single group all the disorders of this class. This group will be designated *Inflammatory Diseases of the Respiratory Organs*, and will include all the cases reported as Epidemic Catarrh, Catarrh, Acute and Chronic Bronchitis, Laryngitis, Pleurisy, and Pneumonia.

The whole number of the cases of this group reported during the first year of the war was 143,991 cases and 2400 deaths; during the second year, 160,263 cases and 5690 deaths—making a total for the two years of 304,254 cases and 8090 deaths. These cases were distributed among the several affections included in the group, as shown in the following table:

TABLE XXX.

Number of Cases and Deaths from Inflammatory Diseases of the Respiratory Organs during the first two years of the war.

	Year ending June 30, 1862.		Year ending June 30, 1863.	
	Taken sick.	Died.	Taken sick.	Died.
Catarrh	83,837	5	.....	.....
Epidemic Catarrh	11,314	5	63,202	24
Laryngitis	2,597	34	5,919	152
Acute Bronchitis	26,201	102	50,799	187
Chronic Bronchitis	3,902	36	9,518	201
Pleurisy	5,079	84	10,359	169
Pneumonia	11,061	2,134	20,466	4,957
Total spoken of as Inflammatory Diseases of the Respiratory Organs	143,991	2,400	160,263	5,690

The total number of cases during the first year amounted to more than one-half the mean strength; during the second year, however, to not much more than one-quarter of the strength. The deaths were between 8 and 9 per 1000 of strength during each year.

TABLE XXXI.

Total Number of Cases and Deaths from Inflammatory Diseases of the Respiratory Organs for the first two years of the war, with the annual ratio per 1000 of mean strength.

	Taken sick.	Died.	Annual ratio of cases per 1000 of mean strength.	Annual ratio of deaths per 1000 of mean strength.
Year ending June 30, 1862	143,991	2,400	512·10	8·25
Year ending June 30, 1863	160,263	5,690	267·63	8·83
For the two years	304,254	8,090	345·74	8·65

It will thus be seen that the ratio of cases to strength during the second year is only about one-half that during the first while the ratio of deaths to strength is about the same; so that while the proportionate number of cases greatly diminished during the second year, their comparative fatality increased and the proportion of mortality to strength remained about the same. The greater prevalence of slight cases during the first year thus indicated is probably to be attributed, to a certain extent at least, to the large number of men taken suddenly, during the fall and winter, from the shelter and comforts of civil life and subjected to the exposure of camps. The greater number of cases of measles during the first year is also undoubtedly connected with the greater prevalence of catarrhal cases.

Unlike camp fever and diarrhœa, the inflammatory affections of the respiratory organs occurred with nearly equal frequency in the three regions, the only exception being in the case of the Pacific region, which suffered somewhat less than the others during the first year, somewhat more during the second. The proportion of mortality to strength, however, followed the same general law as the other important camp diseases, being most frequent in the Central and least so in the Pacific region. In the Central region it was 16 per 1000 of strength during the first year, 14 during the second; in the Atlantic about 4 per 1000 of strength during both years; in the Pacific about 1 per 1000 during both. Table XXXII. gives the details.

TABLE XXXII.

Number of Cases and Deaths from Inflammatory Diseases of the Respiratory Organs in each of the three regions.

	Year ending June 30, 1862.				Year ending June 30, 1863.			
	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.	Taken sick.	Died.	Ratio per 1000 of mean strength taken sick.	Ratio per 1000 of mean strength died.
Atlantic Region	90,481	735	508·61	4·03	76,515	1,083	269·67	3·48
Central Region	51,471	1,658	532·92	16·31	81,214	4,595	265·05	14·17
Pacific Region	2,039	7	304·56	1·04	2,534	12	290·83	1·38
Total	143,991	2,400	512·10	8·25	160,263	5,690	267·63	8·83

The proportion of deaths to cases was likewise greater in the Central than in the Atlantic, and in this than in the Pacific region, and, as already intimated, it was greater during the second year than during the first. In the Atlantic region there was one death to every 123 cases during the first year, one to every 71 during the second; in the Central region one to every 31 cases during the first year, one to every 18 during the second; in the Pacific region one to every 291 cases during the first year, one to every 211 during the second. The average for all regions and both years was one death to every 38 cases.

TABLE XXXIII.

Relation between Cases and Deaths of Inflammatory Diseases of the Respiratory Organs.

	Year ending June 30, 1862.		Year ending June 30, 1863.		Annual Average for the two Years.	
	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.	Ratio of deaths per 1000 cases.	Number of cases to each death.
Atlantic Region	8·15	122·70	14·15	70·67	10·91	91·66
Central Region	32·21	31·05	56·58	17·67	47·13	21·22
Pacific Region	3·44	290·70	4·74	210·97	4·15	240·96
Total	16·70	59·88	35·50	28·17	26·62	37·57

The effect of season on the development of these diseases is indicated, as might be expected, by the occurrence of the greatest number of cases during the winter. On the Atlantic coast the number of cases taken sick each month gradually increased from July, 1861, to January, 1862, after which it diminished to August, 1862, increased till December, and then diminished through 1863 till the close of the fiscal year in June, with the exception of an irregular increase in March. In the Central region the disease pursued an essentially parallel wave, and this was the case during the second year in the Pacific region. In the Pacific region during the first year, however, the wave was less regular. The following tables exhibit these relationships in detail:

TABLE XXXIV.

*Monthly Rates of Inflammatory Diseases of the Respiratory Organs in the Armies of the United States during the year ending June 30th, 1862, expressed in ratio per 1000 of mean strength.**

	1861.						1862.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	27·06	29·17	28·32	35·75	52·95	64·32	67·17	59·64	44·51	32·73	17·86	13·27	506·86
Central Region	16·83	21·41	30·45	35·37	53·40	75·89	98·29	62·92	63·37	38·37	19·87	15·38	532·92
Pacific Region	7·53	1·01	22·18	21·46	32·73	23·86	24·38	56·80	40·44	15·75	17·45	12·19	304·56

* The Table of Catarrhal Affections published for this year in the Circular of September 8, 1863, before alluded to, did not include Pneumonia or Pleurisy, and hence differs considerably from the above.

TABLE XXXV.

Monthly Rates of Inflammatory Affections of the Respiratory Organs in the Armies of the United States during the year ending June 30th, 1863, expressed in ratio per 1000 of mean strength.

	1862.						1863.						For the year.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic Region	13·46	9·37	10·34	13·87	24·55	32·82	33·12	28·13	35·19	24·51	12·44	7·21	269·70
Central Region.....	12·01	10·03	10·14	17·07	33·10	35·03	30·75	32·34	28·30	20·49	11·29	8·28	265·05
Pacific Region.....	12·63	13·18	16·65	18·66	27·67	32·99	35·38	31·10	22·72	32·66	25·78	18·00	290·83

The rates contained in the foregoing tables are presented also in the lower diagram of the plate opposite page 120, where they may be instructively contrasted with the course of diarrhœa and dysentery.

A reference to Table XXX. will show that by far the greatest number of deaths from the inflammatory affections of the respiratory organs were reported under the head of Pneumonia. Out of a total of 8090 deaths from respiratory affections, 7091 are reported as due to this cause. It might perhaps be claimed that this mortality is too great, on account of a certain number of cases of fatal pleurisy and bronchitis having been erroneously included. But the same deficient knowledge of auscultation and percussion which would lead to this error, would produce also an error in the opposite direction, and cause the slight cases of pneumonia to be reported as bronchitis. While then it is possible that the ratio of deaths from pneumonia to strength is somewhat too great, the probabilities are in favor of the approximative correctness of the proportion of deaths to cases; and this proportion is so great, as compared with the results in modern civil hospitals, as to direct attention to the general want of success which appears to have attended the treatment of this disorder. The experience of the two years gives a mortality of one death to every seven (6·8) cases in the Atlantic region and one to every four (3·8) in the Central, as is shown in the following table:

TABLE XXXVI.

Ratio of Deaths from Pneumonia to Cases in the three regions.

	First Year.			Second Year.			For the two Years.		
	Cases.	Deaths.	Number of cases to each death.	Cases.	Deaths.	Number of cases to each death.	Cases.	Deaths.	Number of cases to each death.
Atlantic Region.....	4,582	601	7·6	5,894	933	6·3	10,476	1,534	6·8
Central Region.....	6,366	1,529	4·2	14,450	4,014	3·6	20,816	5,543	3·8
Pacific Region	113	4	28·3	122	10	12·2	235	14	16·8
Total	11,061	2,134	5·1	20,466	4,957	4·1	31,527	7,091	4·4

The great proportion of deaths to cases thus indicated was undoubtedly connected to a certain extent with the character of the disorder. The two chief types to which, as far as can be learned, the majority of the cases belonged, were Typhoid Pneumonia and Adynamic Pleuro-Pneumonia; the first characterized in fatal cases by the condition of the lung designated Splenization, the second, besides the lung lesion, by the presence on the pleura of considerable masses of yellow opaque lymph, with fluid in the pleural cavity.

Both these forms occurred in a large number of cases as sequelæ to measles, or intercurrent affections in the course of chronic diarrhœa and chronic malarial poisoning. In many instances, moreover, what was called pneumonia proved, on the autopsy, to be camp fever, in which the usual intestinal lesions were associated with congestion of the lungs, with capillary bronchitis, or with pneumonia: of course these circumstances would lead to the expectation of a greater mortality than is found among uncomplicated cases occurring in civil practice. The mortality from pneumonia in the British army in the Crimea was still greater than our own figures, being one death to every 3·6 cases.

A considerable amount of valuable material has been contributed on the symptoms, post-mortem appearances, and treatment of this disorder, a careful analysis of which will be presented at the proper time. With regard to treatment, it may be stated that the use of alcoholic stimulants, supporting diet, quinine in large doses, and the expectant plan found numerous advocates, as well as opium, ipecacuanha, veratrum viride, antimony, cupping, and mercurials. The attempt to appreciate these methods must be postponed for the present.

CERTAIN OTHER DISEASES.

The most important affections reported under the head of *Enthetic Diseases* were the several forms of venereal. The reports give separate figures for syphilis, gonorrhœa, orchitis, and stricture of the urethra. The latter two affections being gonorrhœal sequelæ, may be grouped under the head of Gonorrhœa. Of syphilis, there were 9011 cases and 12 deaths during the first year; 13,781 cases and 27 deaths during the second—total, 22,792 cases and 39 deaths. Of gonorrhœa and its sequelæ, 14,768 cases and no deaths during the first year; 25,705 cases and 12 deaths during the second—total, 40,473 cases and 12 deaths. The number of cases of all kinds of venereal was 23,779 for the first year and 39,486 for the second, being 85 cases per 1000 of strength for the first year and 66 per 1000 for the second. The ratio of venereal to the total amount of disease was one case of venereal to every 35 taken sick during the first year; one to every 41 taken sick during the second.

If these figures be compared with the experience of other armies, we cannot fail to congratulate ourselves on the comparative exemption of our troops from these loathsome affections. The published statistics of the English army, for example, show that in 1859 there were 422 admissions to hospital for venereal among every 1000 men serving in the United Kingdom; in 1860, 369 per 1000; in 1861, 354, and in 1862, 330—being thus between one-third and one-half the whole number of admissions to hospital. It may be thought, perhaps, that the active occupations of a war carried on in an ex-

tensive and comparatively thinly-populated country will account for this difference in our favor; but the published statistics of the United States army from 1840 to 1859 give a mean annual rate of only 99 cases of venereal per 1000 of mean strength during that period; and this, though larger than the rates above given for the first two years of the war, is less than one-third of the most favorable rate above quoted from the English statistics.

When the frequency of venereal among the troops of the three regions is made the subject of comparison, it is found that in the Atlantic region the rate was 87 cases per 1000 of strength for the first year, 61 for the second; in the Central region, 60 per 1000 for the first year, 63 for the second; in the Pacific region rates are, however, attained which closely approximate those of the English army, viz.: 375 per 1000 for the first year and 317 for the second.

TABLE XXXVII.

Prevalence of Syphilis and Gonorrhœa in the several regions.

	Year ending June 30, 1862.								Year ending June 30, 1863.							
	Atlantic region.		Central region.		Pacific region.		Total.		Atlantic region.		Central region.		Pacific region.		Total.	
	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.	Cases.	Ratio per 1000 of mean strength.
Syphilis	6,139	34·51	1,628	10·86	1,244	185·81	9,011	32·05	6,118	21·56	6,439	21·01	1,224	140·48	13,781	23·03
Gonorrhœa and its sequelæ	9,356	52·59	4,147	42·94	1,265	188·95	14,768	52·52	11,326	39·92	12,841	41·91	1,538	176·52	25,705	42·93
Total	15,495	87·10	5,775	59·79	2,509	374·76	23,779	84·57	17,444	61·49	19,280	62·92	2,762	317·00	39,486	65·94

The annual rate of venereal in the Pacific region, as given in this table, is greater than that deducible from the published statistics of eighteen years of peace. But even during that period it was about twice as great as in the rest of the army.

Among the documents connected with syphilis which have been received for publication, may be mentioned certain interesting papers with regard to the attempts made by the military authorities in the Cities of Nashville and Memphis to limit the spread of syphilis among the troops stationed near those places, by regulating prostitution after the plan practised by the French government in Paris—a plan which is reported to have produced the most salutary results in both places.

Under the head of *Dietic Diseases*, the chief affections included are scurvy and the abuse of alcohol. As to the latter of these causes of disease, the activity of the campaigns, and the stringent regulations very generally enforced with regard to sutlers, reduced the frequency of intoxication to a comparatively low figure in the large armies of the Atlantic and Central regions.

During the first year, 656 cases of delirium tremens and 978 cases of drunkenness (ebrietas) are reported—drunkenness here including only those cases in which, in consequence of the debauch, the man was obliged to go on sick report; during the second year, 772 cases of delirium tremens, 1221 of drunkenness, and 226 of chronic alcohol-

ism were reported. This would give a ratio of 6 cases of all kinds per 1000 of mean strength for the first year; 4 per 1000 for the second. It is worthy of remark that the proportional number of cases was much greater on the Pacific coast, where the conditions of peace being more nearly approximated to, the men must of course have had more opportunity and more leisure for debauch. In the Atlantic region, the ratio of cases from the abuse of alcohol was 6 per 1000 of mean strength for the first year of the war; 3 for the second. In the Central region, 4 per 1000 for both years; while in the Pacific region it was 33 per 1000 for the first year and 35 for the second.

The amount of SCURVY reported was comparatively small: 1328 cases and 9 deaths for the first year; 7395 cases and 90 deaths for the second. To this may probably be added the greater part of the 304 cases and 31 deaths of purpura reported during the second year. This extremely small number of cases of scurvy is unparalleled in the history of armies, being but 5 per 1000 of mean strength for the first year and 13 for the second. It undoubtedly stands related to the quantity and comparatively good quality of the army ration,—to the immense supplies of antiscorbutics, of medical stores and comforts issued to the men by the Government, and to the large pay of the private soldier, which is very many times greater than in any other army in the world, and which, in part at least, was often spent at the sutler's on pickles, apples, pies containing dried fruit, etc. From all these sources, ours have undoubtedly been the best-fed soldiers in the world; and besides all this, they received at various times and localities, stores collected and distributed by several benevolent and patriotic associations, whose supplies, though of course comparatively small when contrasted with those of the Government, were yet of considerable value in aiding to form the sum total of the soldiers' resources.

Still it is not claimed that the alimentation of our troops was all that could have been desired; for recognizable scurvy existed to a limited extent, and a scorbutic taint, more or less pronounced, was a prominent phenomenon in most of the diseases of the war. The open question of the army ration, and of its possible economical improvement, is one of great importance, which will not be here discussed. That some alteration is needed, cannot be denied.

The scorbutic taint manifested itself very generally in the form of rheumatic pains in the back and limbs, associated with the scorbutic clay-like appearance of the skin, sometimes even with sponginess of the gums, much more rarely with petechiæ, scorbutic discolorations about the flexure of the knee, etc.

Most of the physicians called upon to treat these cases, having had in their previous private practice little experience with scurvy, reported them as rheumatism, lumbago, or neuralgia. It is by no means insinuated that all the cases reported under these heads were of a scorbutic nature. Many of malarial neuralgia and many of malingering were thus reported. Undoubtedly also a great deal of true rheumatism existed; certainly, however, the latter affection formed but a small part of the enormous number of rheumatic cases reported. During the first year of the war 26,257 cases of acute rheumatism, 14,216 of chronic, and 4289 of lumbago were reported, making a total of 44,762 rheumatic cases; during the second year 45,677 cases of acute rheumatism, 45,758 of chronic, making 91,435 rheumatic cases; of neuralgia, 7546 during the first year, 18,533 during the second. The sum is 162,276 cases of rheuma-

tism and neuralgia for the two years, being 186 per 1000 of mean strength for the first year; 184 for the second. How many of these were rightly named? What proportion of them were in fact, as a vast number unquestionably were, simply the outward manifestation of incipient scurvy? What proportion of malingerers was there among those lame backs which were so common? These are questions which, unfortunately, cannot be answered with any approach to precision from our statistics, but in connection with which there exists some valuable material for future discussion.

Under the head of *Tubercular Disease*, the most important is pulmonary consumption, the number of cases of which, however, was not great: 2508 cases and 550 deaths are reported during the first year; 5599 cases and 2040 deaths during the second—being 8·9 cases per 1000 of mean strength for the first year; 9·3 for the second. The deaths were one to every 4·5 cases during the first year; one to every 2·7 during the second. In the British troops in the United Kingdom, the number of cases of pulmonary consumption reported in 1861 was 9 per 1000 of mean strength; in 1862, 10 per 1000; the deaths for both years, one in every three cases.

Space does not permit further or more extended comments in this direction. It is trusted, however, that enough has been said to give an idea of the scope and character of the statistical work in progress. The figures hitherto presented refer wholly to the white troops of our army. Separate statistical tables are projected for our *colored troops* and for *the prisoners of war* in our military prisons. Good data for these tables are on file. Elaborate tables are also being prepared on the subject of *discharges from service on surgeon's certificate of disability;* these are reported by name to the Surgeon General's Office, with the cause specified in each case, so that data exist for a complete and trustworthy discussion of the subject.

DISCHARGES ON SURGEON'S CERTIFICATE OF DISABILITY.

The monthly reports of sick and wounded from hospitals, garrisons, and troops in the field contain in the general summary a statement of the number of soldiers discharged the service during the month on surgeon's certificate of disability. On the reverse of the report, a nominal list is given setting forth, precisely as in the case of deaths, the name, company, regiment, date of discharge, and nature of disability in each case. From these nominal lists, the number of discharges for disability and the nature of the disabilities can be computed with great accuracy.

The various duties devolving upon this branch of the office during the progress of the war were such that it was not possible, until a few months since, to attempt the reduction of this voluminous material; and although the work is now fairly under way, the figures for the second year of the war could not be completed in time for the present publication. The statistical tables here offered, therefore, are limited to the first year. The total number of men reported to the Surgeon General's Office as having been discharged the service on surgeon's certificate of disability during the year ending June 30th, 1862, was 28,620, or 98·3 per 1000 of mean strength. Of this number, 1937 were discharged for wounds and injuries, and 26,683, or 91·7 per 1000, for disease. These discharges were apportioned as follows among the several States:

TABLE XXXVIII.

Showing the Number of Men discharged the Service for Diseases and Wounds, during the year ending June 30th, 1862, for each State.

State.	Discharged for disease.	Discharged for wounds and injuries.	State.	Discharged for disease.	Discharged for wounds and injuries.
Maine	1,119	59	Brought forward	22,164	1,500
New Hampshire	509	27	Wisconsin	1,095	59
Vermont	370	27	Iowa	1,050	111
Massachusetts	1,825	143	Minnesota	179	30
Connecticut	387	16	Missouri	796	62
Rhode Island	194	13	Kentucky	330	14
New York	7,051	441	Arkansas	1	.....
New Jersey	401	46	Kansas	115	32
Pennsylvania	3,160	169	Nebraska	59	4
Delaware	73	4	Colorado	4	1
Maryland	85	1	New Mexico	4	3
District of Columbia	6	1	California	33	1
Virginia	125	10	Oregon	3	.....
Ohio	2,317	142	Washington Territory	2	.....
Indiana	1,638	166	Regulars	754	114
Illinois	1,719	182	Miscellaneous	94	6
Michigan	1,185	53			
Carried forward	22,164	1,500	Total	26,683	1,937

It will be extremely interesting to compute the ratio of discharges per 1000 of strength actually in service from each State, but the above table has been too recently constructed to afford time for the necessary comparisons, which, moreover, will be still more instructive when the tables for the remaining years of the war are completed.

The following tables show the number of discharges from the several classes, orders, and individual diseases and injuries. They may be instructively compared with Tables VI. VIII. and X., the last columns of which give the total taken sick and died for the same year. In making the comparison it must be remembered that the column "taken sick" in the tables referred to does not include secondary affections or sequelæ.

TABLE XXXIX.

Showing the Number of Discharges for Disability by Classes of Diseases and Injuries, for the year ending June 30th, 1862.

Class.		Number discharged.
I.	Zymotic Diseases	5,194
II.	Constitutional Diseases	7,298
III.	Parasitic Diseases	000
IV.	Local Diseases	9,904
V.	Wounds, Accidents, and Injuries	1,937
VI.	Developmental Diseases	678
	Unclassified and cause not stated	3,609
	Total	28,620

TABLE XL.

Showing the Number of Discharges for Disability by Orders of Diseases and Injuries, for the year ending June 30th, 1862.

Class.	Order.		Number discharged.
I.	1	Miasmatic Diseases	4,645
	2	Enthetic Diseases	518
	3	Dietic Diseases	31
II.	1	Diathetic Diseases	3,960
	2	Tubercular Diseases	3,338
IV.	1	Diseases of the Nervous System	1,480
	2	Diseases of the Eye	529
	3	Diseases of the Ear	319
	4	Diseases of the Organs of Circulation	1,410
	5	Diseases of the Respiratory Organs	1,764
	6	Diseases of the Digestive Organs	3,011
	7	Diseases of the Urinary and Genital Organs	377
	8	Diseases of the Bones and Joints	660
	9	Diseases of the Integumentary System	354
V.	.....	Wounds, Accidents, and Injuries	1,937
VI.	.....	Developmental Diseases	678
.....	.....	Unclassified and cause not stated	3,609
		Total	28,620

TABLE XLI.

Showing the Number of Discharges for Disability by Individual Diseases, during the year ending June 30th, 1862.

LIST OF DISEASES.	Number discharged.
Class I.—Zymotic Diseases.	
ORDER I. *Miasmatic Diseases.*	
Typhoid Fever	258
Remittent Fever	70
Intermittent Fever	56
Diarrhœa	865
Dysentery	118
Erysipelas	17
Small-pox	12
Varioloid	13
Measles	81
Diphtheria	4
Debility	3,139
Other diseases of this order	12
ORDER II. *Enthetic Diseases.*	
Syphilis	399
Gonorrhœa	9
Orchitis	49
Stricture of the Urethra	60
Other diseases of this order	1
ORDER III. *Dietic Diseases.*	
Scurvy	7
Delirium Tremens	4
Inebriation	20
Carried forward	5,194

LIST OF DISEASES.	Number discharged.
Brought forward	5,194
Class II.—Constitutional Diseases.	
ORDER I. *Diathetic Diseases.*	
Gout	4
Rheumatism	3,585
Anæmia	42
Cancer	5
Tumors	40
Obesity	2
Marasmus	6
Dropsy	237
Other diseases of this order	39
ORDER II. *Tubercular Diseases.*	
Consumption	3,161
Scrofula	177
Class IV.—Local Diseases.	
ORDER I. *Diseases of Nervous System.*	
Apoplexy	1
Epilepsy	669
Headache	8
Insanity	246
Inflammation of the Brain	25
Carried forward	13,441

TABLE XLI.—*Concluded.*

LIST OF DISEASES.	Number discharged.
Brought forward	13,441
ORDER I. *Diseases of Nervous System*—Continued.	
Nostalgia	8
Neuralgia	39
Paralysis	252
Sun-stroke	21
Chorea	18
Other diseases of this order	193
ORDER II. *Diseases of Eye.*	
Amaurosis	109
Ophthalmia	139
Other diseases of this order	281
ORDER III. *Diseases of Ear.*	
Deafness	260
Otalgia	3
Otorrhœa	1
Other diseases of this order	55
ORDER IV. *Diseases of Organs of Circulation.*	
Heart Diseases	824
Varicose Veins	299
Varicocele	287
ORDER V. *Diseases of Respiratory Organs.*	
Asthma	244
Bronchitis	803
Aphonia	42
Inflammation of the Larynx	27
Inflammation of the Lungs	253
Inflammation of the Pleura	97
Hæmorrhage from the Lungs	151
Other diseases of this order	147
ORDER VI. *Diseases of Digestive Organs.*	
Colic	3
Constipation	2
Dyspepsia	69
Diseases of the Spleen	13
Fistula in Ano	82
Hernia	2,300
Prolapsus ani	38
Hæmorrhage from the Bowels	2
Inflammation of the Tonsils	1
Inflammation of the Stomach	37
Inflammation of the Bowels	21
Inflammation of the Peritoneum	14
Inflammation of the Liver	136
Jaundice	17
Piles	215
Loss of Teeth	37
Other diseases of this order	24
Carried forward	21,005

LIST OF DISEASES.	Number discharged.
Brought forward	21,005
ORDER VII. *Diseases of Urinary and Genital Organs.*	
Diabetes	13
Diseases of Testis	7
Gravel	8
Inflammation of the Kidneys	112
Inflammation of the Bladder	5
Incontinence of Urine	36
Bright's Disease	33
Other diseases of this order	163
ORDER VIII. *Diseases of Bones and Joints.*	
Anchylosis	199
Caries	25
Inflammation of Joints	93
Inflammation of Bones	1
Inflammation of Periosteum	20
Necrosis	161
Exostosis	22
Diseases of Spine	39
Other diseases of this order	100
ORDER IX. *Diseases of Integumentary System.*	
Abscess	39
Ulcers	268
Skin Diseases	35
Other diseases of this order	12
Class V.—Wounds, Accidents, and Injuries.	
Burns and Scalds	3
Contusions	69
Concussion of the Brain	2
Sprains	57
Dislocations	103
Frost-bite	10
Fractures	277
Gunshot Wounds	825
Incised Wounds	37
Lacerated Wounds	3
Wounds (unspecified)	179
Amputations	85
Other accidents and injuries	287
Class VI.—Developmental Diseases.	
Atrophy	25
Hypertrophy	9
Deformities	238
Old Age	274
Under Age	128
Feebleness	4
Unclassified and cause not stated	3,609
Total	28,620

An inspection of Table XLI. shows that the diseases from which the greatest number of discharges were reported were: Rheumatism, 3585; Consumption, 3161; Debility, 3139; Hernia, 2300; Diarrhœa, 865; Heart Diseases, 824; Bronchitis, 803; and Epilepsy, 669. It will be perceived that the discharges reported under these headings constitute over two-thirds of those discharges for disease the causes of which are specified in the reports. The large proportion of discharges indicated by these

figures would appear to justify some of the criticisms that have been made on the manner in which recruits were examined and discharges granted during the early part of the war. It certainly cannot be denied that these criticisms had a certain foundation, and that many men found their way into the service who were either physically disqualified at the time, or whose constitutions were so feeble from youth, age, or predisposition to disease, that they soon broke down under the labors and exposures of actual campaigns. But when it is considered with what haste it was necessary to organize those large armies, this fact ceases to be surprising, and it becomes rather a matter of wonder that the discharges for disease should be represented by a figure no greater than nine per cent. of the strength. It is also to be remarked that it is well known that numbers of those who were discharged for curable diseases recovered and re-enlisted; so that while the humane policy of releasing promptly from military restraint those who were not likely to recover if they continued in service was doubtless the means of saving thousands of lives, it is probable that the army rather gained than lost in actual strength by this liberality.

The statistics of the several drafts and of the Veteran Reserve Corps belong to the Bureau of the Provost Marshal General.*

ARMY MEDICAL MUSEUM.

Besides the statistical material and the documents accompanying it, such as the reports of medical directors of armies, etc. etc., much valuable material of a strictly pathological nature has been collected. To this category belong numerous valuable memoirs on subjects connected with the leading diseases of the troops, histories of cases, autopsies, etc., and the work done in connection with the Army Medical Museum. The portions of this institution under my charge are the medical and microscopical collections.

The *Medical Series* of the Museum, which is still growing, consists at present of about 700 specimens, chiefly wet preparations preserved in alcohol. Each preparation, after careful dissection, in order that the lesion to be exhibited may be as clearly displayed as possible, is suspended in alcohol from a glass hook in the stopper of a fine glass jar. The jar has tied on its neck a parchment label, with the number of the preparation, and the name of the lesion shown. Besides a number of miscellaneous pathological preparations, the Museum contains good collections on valvular disease of the heart,

* For interesting information on this subject, reference may be made to the published reports of the Provost Marshal General for 1864 and 1865.

diphtheria, pleurisy and pleuro-pneumonia, camp fever, and camp diarrhœa and dysentery. A collection illustrating the diseases of the freedmen has lately been commenced, and promises to be of considerable interest. The manuscript catalogue, containing the description of these specimens and the histories of the cases, occupies 350 pages folio.

A few words may be said with reference to the specimens illustrative of fever and diarrhœa. The series illustrative of *camp fever* consists of about 160 specimens, chiefly preparations exhibiting the condition of the intestine in this form of disease. The pieces have been mounted upon frames of glass rod, and suspended in alcohol, so that they can be viewed by either reflected or transmitted light. The specimens in this series are arranged in several groups.

In the first, the characteristic lesion is enlargement of the solitary follicles of the small intestine, and especially of the ileum. Thickening of Peyer's patches may be quite absent, or may be present to a variable extent. All degrees of enlargement have been noticed, from the slightest change to cases in which the follicle attains the size of a pea. The most characteristic specimens may be thus described: In the fresh intestine, as received at the Museum, the ileum presents patches of deep congestion of variable extent; the solitary follicles, enlarged to the size of large pin-heads, are frequently black with pigment deposits. The Peyer's patches, sometimes quite healthy, are more generally the seat of pigment deposits in the individual follicles composing the patch, which appears of a gray color, dotted over with blackish points, presenting a resemblance to the freshly-shaven chin. The name "shaven-beard appearance" has been quite currently bestowed upon this condition. In other cases, the Peyer's patches are somewhat thickened, and occasionally as much so as in ordinary cases of enteric fever. In the preparations, as preserved in the Museum, the color of the piece, including that of the pigment deposit, gradually disappears. The enlarged solitary follicles, and the alterations in the Peyer's patches, are, however, well preserved. The solitary follicles are not ulcerated in these cases, except rarely some of the largest, which may present a minute point of ulceration on the apex. The form of fever from which these specimens are obtained is that which attracted attention in 1862, under the designation of Chickahominy Fever, but which, before and since, has prevailed whenever our armies have operated in malarial regions. It is a continued fever, which presents also a more or less decidedly remittent type, at the beginning at least. It is accompanied by diarrhœa and abdominal tenderness, but usually without tympanites. Cerebral and pulmonary complications are common, as in ordinary enteric fever. Enlargement of the spleen is frequent, and often excessive. The fever usually lasts from three to five weeks, and terminates in a lingering and protracted convalescence. This variety I have proposed to designate as the Malarial form of Typho-Malarial Fever.

The second group of specimens are less numerous, and represents, so far as I have been able to learn, a rarer form of disease. As first received at the Museum, the ileum presents intense reddish-black patches of congestion, which sometimes extend throughout its whole length. The patches of Peyer are converted into livid, blackish, pulp-like sloughs, which are often remarkable for their size and fungoid appearance. Petechia-like blotches in the mucous membrane of the colon, the small intestine, and the stomach are of frequent occurrence. Similar discolorations are at times observed in other organs. The cadaver often presents petechiæ on the external surface of the body and scorbutic

alterations of the mouth. During life, these cases are marked by the extremely adynamic character of the symptoms, by petechiæ, at times even by the characteristic scorbutic lesions of the mouth, by hæmorrhage from the bowels, and other hæmorrhages which complicate the disorder and often prove fatal. The specimens preserved in the Museum, although they have lost their color, show satisfactorily the pulpy slough-like transformation of Peyer's patches. This variety I have proposed to designate the Scorbutic form of Typho-Malarial Fever. It occurred chiefly at times when other scorbutic diseases were prevailing among the troops.

Specimens of the third group are quite identical with those obtained from the typhoid or enteric fever of civil life, and the cases in many instances are undoubtedly that affection in its ordinary form. As it occurred among the troops, however, the course of the disease was so generally more or less modified by the influence on the soldier of malaria, or of the scorbutic taint, or both, that I have proposed to indicate such cases as the Enteric variety of Typho-Malarial Fever.

Besides these groups, there is a fine series of preparations showing the several forms of ulceration left by the softening and destruction of the patches and solitary glands in each of the varieties, the different methods of perforation, of cicatrization, etc.

A few brief abstracts of cases, selected from the foregoing series, are here presented in illustration, especial prominence being given to the conditions observed in the autopsies:

Private C——, 61st New York Vols., was admitted to Satterlee Hospital, West Philadelphia, Pa., July 10th, 1862, from the Army of the Potomac, then on the Peninsula. His disease was registered Typhoid Fever. He died August 24th, 1862. Autopsy, August 25th: Organs generally healthy, except that the solitary glands were thickened, and both these and Peyer's glands of a black color, resembling the bluish-black of tattooing. The surrounding parts of the mucous membrane were pale and devoid of anything like congestion. No. 270, Medical Series, is a piece of the ileum, showing numerous solitary glands the size of large pin-heads, and a Peyer's patch, which is not perceptibly diseased. The whole ileum was received at the Museum in alcohol, and none of the Peyer's patches were prominent. Contributed by Prof. J. Leidy, then Acting Asst. Surgeon U. S. A.

Private D——, 17th U. S. Infantry, was admitted to Satterlee Hospital, West Philadelphia, Pa., August 10th, 1862, from the Army of the Potomac. His disease was registered Typhus Fever. He died August 22d. Autopsy: Age about twenty-two; body moderately emaciated; ecchymoses on the surface of the trunk. There were a number of minute ulcers in the lesser curvature of the stomach; the ileum was congested in patches; most of Peyer's glands were healthy, a few of them slightly thickened, but none ulcerated; the solitary glands were enlarged; the colon was slate-colored, with patches of congestion, a number of spots of ecchymosis, and in the descending portion a few small ulcers. Nos. 273 to 276, Medical Series, are successive portions of the ileum, showing the enlarged solitary follicles and a few slightly-thickened Peyer's patches. No. 272 is the stomach, with minute ulcers in the lesser curvature. Contributed by Prof. J. Leidy.

Private B——, 7th Maine Vols., was admitted to Satterlee Hospital, West Philadelphia, August 10th, 1862, from the Army of the Potomac. His disease was registered Diarrhœa. He died October 8th. Autopsy: Age about twenty-seven years; body much emaciated; skin ecchymosed. There was continuous congestion throughout the small intestine, which was most intense in its lower part; the ileum was of a deep maroon color; Peyer's glands were not perceptibly altered; the solitary glands numerous and conspicuous from enlargement; the ascending colon was also congested, and presented a few spots of ecchymosis with pigment in some of its solitary follicles. Nos. 237 and 238, Medical Series, are successive portions of the ileum of this patient; each presents a normal Peyer's patch and a number of enlarged solitary follicles. Contributed by Prof. J. Leidy.

Private W——, 20th Michigan Vols., was admitted to Satterlee Hospital, West Philadelphia, December 13th, 1862, from the Army of the Potomac. His disease was registered Diarrhœa. He died December 26th, 1862. Autopsy, December 27th: Age about twenty-two years. Body rather emaciated; spots of purpura on the trunk; recent pleurisy on both sides, most marked on the right; pneumonia in the lower lobes of both lungs; bronchitis; liver and spleen enlarged; moderate congestion diffused throughout ileum and colon; enlargement of the solitary glands in lower part of ileum; Peyer's glands reddened; slight enlargement of the solitary follicles of large intestine. Nos. 107 and 108, Medical Series, are successive portions of ileum, No. 108 taken from just above the ileo-cœcal valve;

both exhibit well-marked enlargement of the solitary follicles, many of which are as large as bird-shot. Each piece exhibits a Peyer's patch, in which, in the alcoholic specimens, nothing abnormal is visible. No. 109, Medical Series, is the enlarged spleen of this patient, 7½ inches long, 5 wide by 3 thick. Contributed by Prof. J. Leidy.

Corporal S——, 9th Wisconsin Vols., was admitted to Satterlee Hospital, West Philadelphia, December 16th, 1862, from the Army of the Potomac. His disease was registered Diarrhœa. He died December 24th. Autopsy the same afternoon: Age about thirty years; cadaver rather emaciated; spots of purpura on chest and abdomen; lobular pneumonia in lower lobes of both lungs; the inflamed portions numerous, from the size of a marble to that of a walnut, and in a state of gray hepatization; bronchitis; stomach much contracted; patches of congestion in small intestines; Peyer's patches congested and dark red in color, with, however, only the slightest degree of thickening in some of the lowest of them; the solitary glands looked like yellow mustard-seeds sprinkled on a red ground; large intestine streaked with ash color and dark red, and with purpura-like spots of ecchymosis. Nos. 93 to 98, Medical Series, are successive portions of the ileum of this patient. As preserved in the Museum, Peyer's patches are not perceptibly diseased, except the large patch in No. 98, which was taken from just above the ileo-cœcal valve, and which is slightly thickened. The solitary follicles in all the pieces are enlarged to the size of mustard-seeds. Contributed by Prof. J. Leidy.

Private D——, 100th Pennsylvania Vols., aged eighteen, was admitted to Carver Hospital, Washington, D. C., July 5th, 1864, from hospital at City Point, Va. He was considerably emaciated; his tongue thickly coated; pulse rapid and feeble; there was headache, anorexia, and diarrhœa; the left parotid gland was swollen and painful. July 15th. The parotitis has terminated in suppuration; the abscess was opened to-day; the febrile symptoms continue; there are distinct remissions during the forenoon of each day; persistent diarrhœa. July 22d. Patient has grown gradually worse; the integument over the parotid has sloughed; diarrhœa continues; there is deafness and low delirium, especially at night; the remissions have not been so distinct for the last few days; died this evening. Autopsy: Emaciation; lungs congested; heart pale and flabby; Peyer's patches congested, but not thickened; the solitary follicles of the ileum considerably enlarged; several very minute ulcers in the vermiform appendix and the ascending colon. Nos. 385, 386, and 387, Medical Series, are successive portions of the ileum, showing marked enlargement of the solitary follicles. Peyer's patches are not perceptibly diseased. Contributed by Acting Assistant Surgeon O. P. Sweet.

Private V——, 126th Ohio Vols., was admitted to Carver Hospital, Washington, D. C., from Field Hospital, Army of the Potomac, July 4th, 1864. He was much emaciated, and suffering from symptoms resembling typhoid fever. Tongue coated with thick, dry, brown fur, teeth with dark sordes; tympanites; petechiæ on abdomen and chest; the diarrhœa was severe, but the stools feculent; the patient at first improved, but July 25th the diarrhœa began to grow worse and delirium set in; death July 30th. Autopsy: Old pleuritic adhesions on both sides; two ounces of serum in pericardium; liver large and pale; spleen large and firm; the solitary follicles of small intestine enlarged to the size of large pin-heads; Peyer's patches congested, but not thickened; the colon thin, presenting a number of ulcers, which, in the descending colon, were large and irregular. No. 416, Medical Series, is a portion of the ileum of this patient, taken from just above the ileo-cœcal valve, showing pin-head enlargement of the solitary follicles. The whole ileum (preserved in alcohol) was received at the Museum. No disease of Peyer's patches was visible. Nos. 417 and 418, Medical Series, are from the transverse and descending colon, and present a number of irregular ulcers. Contributed by Acting Assistant Surgeon O. P. Sweet.

Private W——, 7th Western Virginia Vol. Cav., aged nineteen, was admitted to Carver Hospital, Washington, D. C., from the Army of Western Virginia, August 21st, 1864. He was considerably emaciated, and had been sick for some time with fever, diarrhœa, and vomiting. When admitted, he appeared exhausted; his pulse was frequent and feeble; he had slight diarrhœa and incessant vomiting; under treatment, the vomiting disappeared, and the diarrhœa greatly improved, but he remained in a typhoid condition, and died August 25th. Autopsy: Hypostatic congestion of posterior part of lungs; the right side of heart contained a large fibrinous clot; the ileum presented patches of congestion, with enlargement of the solitary follicles; there were numerous ulcers of Peyer's patches, which, however, presented this peculiarity, that three, four, or more small oval ulcers, a few lines in diameter, were seated in each patch, but the remaining portions were nearly normal. This condition is well shown in the portions preserved in the Museum, Nos. 407 and 408, Medical Series. In the colon, the solitary follicles were the seat of pigment deposits. Contributed by Acting Assistant Surgeon O. P. Sweet.

Private C—— was admitted to Hospital No. 3, Alexandria, Va., from the Field Hospital at City Point, November 30th, 1864. He was in an extremely typhoid condition, with sordes about the mouth, muttering delirium, petechial spots on the surface, and hæmorrhage from the nostrils and bowels. He died December 3d. Autopsy: Peyer's patches converted into black, pultaceous sloughs; the solitary follicles enlarged, near the ileo-cœcal valve some of them ulcerated; a few small ulcers in the cœcum. No. 468, Medical Series, is the lower part of the ileum, which well exhibits the sloughs described. After nearly a year's immersion in alcohol, they have not yet lost their dark color. Contributed by Acting Assistant Surgeon W. Miner.

Private F——, 42d Massachusetts Vols., was admitted to Hospital No. 3, Alexandria, Va., October 29th, 1864. He was taken sick about a week before with a decided chill, followed by hot skin, severe headache, thirst, and diarrhœa; has had no epistaxis or tympanites; is wakeful, with hot skin, pulse 120, thirst, scanty urine, coated dry

tongue, and some bronchial irritation. November 12th. Improved under treatment until this morning; his respiration is now hurried; there is a renewal of all the febrile symptoms, more cough, and dark flushed cheeks, but none of the physical signs of pneumonia. November 15th. Better. November 16th. Feeble, skin cool. November 17th. Bilious vomiting several times last night; some pain in the epigastric region; no tympanites; pulse feeble; the stomach continues irritable, with frequent vomiting, the matters vomited resembling coffee-grounds towards the last; death at 8 P.M. Autopsy: Not much emaciation; intestines glued together with pasty yellow lymph; abdominal cavity contained two pints of yellow turbid fluid, with fæcal odor; a perforation about ½ of an inch in diameter near middle of ileum; Peyer's glands much enlarged; spleen enlarged and softened. No. 439, Medical Series, is a piece of the ileum of this patient, presenting two deep typhoid ulcers quite like those encountered in ordinary enteric fever. One of the ulcers has perforated, and the peritoneal surface of the piece is coated with pseudo-membrane. Contributed by Surgeon E. Bentley, U. S. Vols.

The series illustrative of diarrhœa and dysentery consists of over 200 specimens, grouped as follows:

The first group embraces the examples of follicular ulceration of the colon. The specimens present all the transition forms of simple enlargement of the solitary follicles of the colon, the rupture of the same, and the formation of punched-out ulcers of moderate size. The colon is usually more or less thickened, the thickening, in some cases, amounting to a quarter of an inch. The ulcers are usually rounded or oval, extending nearly or quite to the muscular coat, and looking much as if they had been cut out with a punch; when received fresh at the Museum, the appearances varied with the stage of the process. In the few cases in which the solitary follicles were simply enlarged, without ulceration, the intestine was seldom thickened. It was often normal in color; sometimes, however, slate or ash colored; sometimes it presented patches of congestion. The enlarged solitary follicles were often the seat of pigment deposits; sometimes also an areola of pigment, deposited in and among the glands of Lieberkühn, surrounded the enlarged and blackened solitary follicles. These patients had generally died of some other disease, as of camp fever supervening upon the diarrhœa, with lesions of the small intestine—of gunshot wounds, etc. In the more serious cases of diarrhœa, the colon was more or less thickened, and presented punched-out ulcers which had originated in the solitary follicles. The colon was then seldom normal in its color. Sometimes it was red, reddish brown, or reddish black; at other times greenish, slate, or ash colored; at others, again, unnaturally pale. Its texture, when cut into, was sometimes tough and lardaceous; sometimes it was softened. The ulcers usually presented a grayish or yellowish-gray base. They were sometimes filled with mucus, at other times contained pus. In the majority of the cases of this class, the small intestine was not involved, unless camp fever had existed as a complication.

In the second group of cases, the follicular ulcers have extended until, in extreme instances, the greater part of the mucous membrane of the colon is destroyed by the vast erosions thus produced. The follicular ulcers usually extend by burrowing in the submucous connective tissue; in this way, in some of the specimens, several of these ulcers communicate with each other in the submucous tissue, though still retaining distinct orifices. The mucous layer containing the glands of Lieberkühn, undermined by the extension of the ulcer, not unfrequently hangs in shreds like a fringe from its edge; the undermined portion being occasionally destroyed by ulceration, but more frequently perishing by sloughing. In such specimens, when received fresh at the Museum, the mucous membrane was generally of a dark-red, brownish, greenish-brown, or slate color. The ulcers presented yellowish-brown or yellowish bases, often with blackish or brown

sloughs adhering to their surface or edges. It would appear that this second group of cases represents simply a more advanced stage of the disease shown in the first group; and that the conditions determining the degree of ulceration are the duration of the disorder on the one hand, on the other, the constitutional condition of the patients; those who labored under the scorbutic taint, or who were otherwise brought to an extremely adynamic condition, presenting the most extensive ulcers.

In the third group, the cases present more or less ulceration of the bowel, similar to that seen in the first and second group; but, in addition, the surface of the gut is more or less coated with a yellowish or greenish-yellow pseudo-membranous layer, like that observed in the air-passages in diphtheria. This condition is generally the result of an acute dysenteric process supervening upon a previous diarrhœa of long standing. The appearances of the gut, when fresh, are masked by the plastered layer of greenish-yellow or yellowish pseudo-membrane which coats its surface.

The fourth group includes those cases in which the small intestine is diseased as well as the large. Most of these are examples of the complications of diarrhœa with camp fever, and the lesions in the small intestine are therefore similar to the lesions already described as existing in fever cases. In some instances the history of the case shows fever to have been the primary disorder, from which, however, the patient never wholly convalesced, but finally succumbed to the diarrhœa which supervened. In other cases, the fever occurred after the patient had suffered from diarrhœa for months. The character of the lesions in the small intestine and colon usually corresponds to this history.

But besides these cases, in which the affection of the small intestine is evidently the result of fever, the Museum contains several specimens in which, from the character of the lesion, it must be inferred that the affection of the small intestine is simply an extension of the disease upwards from the colon. In these cases, the ileum is more or less thickened,—the thickening being greatest near the ileo-cœcal valve. The thickened ileum presents ulcers of variable size, which appear, as a rule, to have their origin in the solitary follicles, and not in the patches of Peyer.

The fifth group embraces tubercular ulceration of the bowels. The ulcers are more characteristic in the small intestine than in the large; but both small and large intestines are usually affected. The patients have tubercles in the lungs; cheesy transformation of the mesenteric glands; at times, other tubercular lesions. In the small intestine, Peyer's patches appear to determine the position of the ulcers, which are usually irregular ovals, with their long diameter transverse to the gut, as has been observed in tubercular ulceration of the bowels in civil practice. Frequently also small tubercles can be seen on the peritoneal surface of the piece opposite the ulcers. Of this condition, fine specimens exist in the Museum. With this lesion of the small intestine, thickening and ulceration of the colon are associated. The ulcers are quite similar always to some one of the forms above described. Usually they are extensive and deep, the colon being much thickened. I have not been able to satisfy myself that they originate in tubercular deposits. On the contrary, they seem quite like the colon ulcers of other patients from the same command who have no tubercular disease whatever. Besides the foregoing groups, there are specimens of perforating ulcers of the colon, cicatrices of colon ulcers, etc. etc.

Abstracts of a few cases are here very briefly presented in illustration of the foregoing series:

Private R——, 4th Iowa Cavalry, was admitted to Hospital No. 3, Vicksburg, Miss., October 10th, 1863. He had suffered from diarrhœa for nine months previous to his decease. The attack began as dysentery, with frequent bloody stools, which, in a day or two, greatly diminished in number, becoming mucoid and gelatinous. After five weeks, the disease assumed the characters of chronic diarrhœa, which continued till his admission; the dysenteric symptoms, however, recurring from time to time. He died November 17th. Autopsy: A few calcareous tubercles and cicatrices at the apex of each lung; patches of congestion in small intestine; at the lower end of the ileum a few of Peyer's glands were slightly prominent; cœcum of a deep red color, its mucous coat softened; the rest of the colon much thickened, cutting like cartilage, pale, with livid spots or stains, and presenting great numbers of small punched-out follicular ulcers; spleen small. Nos. 119 to 123, Medical Series, are successive portions of the colon, which show very well its thickness and the follicular ulcers. Contributed by Surgeon George F. French, U. S. Vols.

Private B——, 5th Illinois Cavalry, aged twenty-one, was admitted to Hospital No. 3, Vicksburg, Miss., October 10th, 1863. Has been sick eight months. His disease began with an attack of intermittent fever, which was succeeded by dysentery for a few days, when the stools became watery, and the complaint assumed the character of chronic diarrhœa, which it retained, with occasional dysenteric symptoms, until the date of his admission. Death, November 19th. Autopsy: Old pleuritic adhesions; patches of congestion in small intestine; solitary glands enlarged to the size of small shot; Peyer's glands healthy; cœcum inflamed; descending colon and rectum extensively ulcerated. No. 145, Medical Series, is a piece of the ileum, with enlarged solitary follicles. No. 146, of the ulcerated colon. Contributed by Surgeon George F. French, U. S. Vols.

Private C——, 2d Battalion, Veteran Reserve Corps, on duty at the Fairfax Seminary Hospital, near Alexandria, Va., applied for treatment August 6th, 1864. He stated that he had suffered from frequent attacks of diarrhœa during the previous six months. He was pale and sallow, with furred tongue, quick pulse, and dry skin. The stools were from ten to fifteen daily, consisting of thin frothy mucus mixed with blood. He died November 25th. Autopsy: Small intestine normal; colon extensively ulcerated, and coated with a dark-colored pseudo-membrane, which hung in shreds from the edges of the ulcers. Nos. 383 and 384, Medical Series, are successive portions of the colon, exhibiting the conditions described. Contributed by Assistant Surgeon H. Allen, U. S. A.

Private M——, 108th New York Vols., was admitted to Douglas Hospital, Washington, D. C., February 13th, 1863. Had been taken sick in the Army of the Potomac, and was brought from Aquia Creek in a very feeble condition. He was greatly emaciated, pulse 110, tongue red, stools frequent and liquid. He gradually sank, the abdomen became tender and tympanitic, and he died March 20th. Autopsy: Pleuritic adhesions of lower lobe of right lung; nutmeg liver; patches of inflammatory congestion in small intestine; the colon thickened, with numerous large ulcers; the remainder of its mucous surface plastered with pseudo-membrane. Nos. 288 and 289, Medical Series, are successive portions of the colon in this case. Contributed by Assistant Surgeon William Thomson, U. S. A.

Private McD——, 39th Massachusetts Vols., was admitted to Douglas Hospital, Washington, D. C., from the Army of the Potomac, September 9th, 1864. He had suffered from frequent attacks of diarrhœa during the summer, and had also had intermittent fever. For three weeks prior to his admission, he had been in field hospital. On admission, he was emaciated and feeble; conjunctiva yellow; tongue furred; pulse 80; abdomen flat and tender, especially over the course of the colon; frequent stools; slight cough. Death, September 30th. Autopsy: Pleuritic adhesions on both sides; peritonitis; the pelvic cavity filled with thin pus; the viscera coated with patches of yellow lymph; small intestine normal; large intestine greatly thickened, with extensive irregular ulcers. No. 400, Medical Series, is a portion of the colon of this patient. Contributed by Assistant Surgeon W. F. Norris, U. S. A.

Private S——, 2d New York Heavy Artillery, was admitted to Douglas Hospital, Washington, D. C., from the Army of the Potomac, September 9th, 1864, with chronic diarrhœa. At the time of his admission, he was much emaciated, with jaundice and frequent bilious vomiting. Abdomen flat and tender; stupor; low delirium; involuntary stools; and death on the 17th. Autopsy by Assistant Surgeon E. Curtis, U. S. A.: Emaciation; jaundice; thoracic organs healthy; small intestine normal; mucous membrane of colon greatly thickened, with large irregular ragged ulcers; a perforation the size of a dime in the caput coli; peritoneal adhesions, principally between right lobe of liver and colon; numerous metastatic foci in liver, especially in right lobe. No. 448, Medical Series, is a piece of the ulcerated colon. No. 449, a section of the liver. The small yellow foci scattered through the liver consisted of granular matter and the debris of normal tissue, but contained no pus. The condition was similar to what is often observed in pyæmia due to gunshot wounds. Contributed by Assistant Surgeon W. F. Norris, U. S. A.

Corporal C——, 160th Pennsylvania Vols., æt. twenty-four, was admitted to Columbian College Hospital, Washington, D. C., October 30th, 1864, for chronic diarrhœa. There was great emaciation, frequent pulse, and five or six loose stools daily. November 11th. Attention was drawn to a dry cough at night, with frequency of respiration. Death, November 18th. Autopsy: A large abscess was found in upper part of right lobe of liver. It had burst through the diaphragm into right pleural cavity, which contained a gallon of sero-pus. The fifth, sixth, and seventh ribs on this side were denuded of periosteum by the burrowing of the pus. The lower parts of the ileum and colon

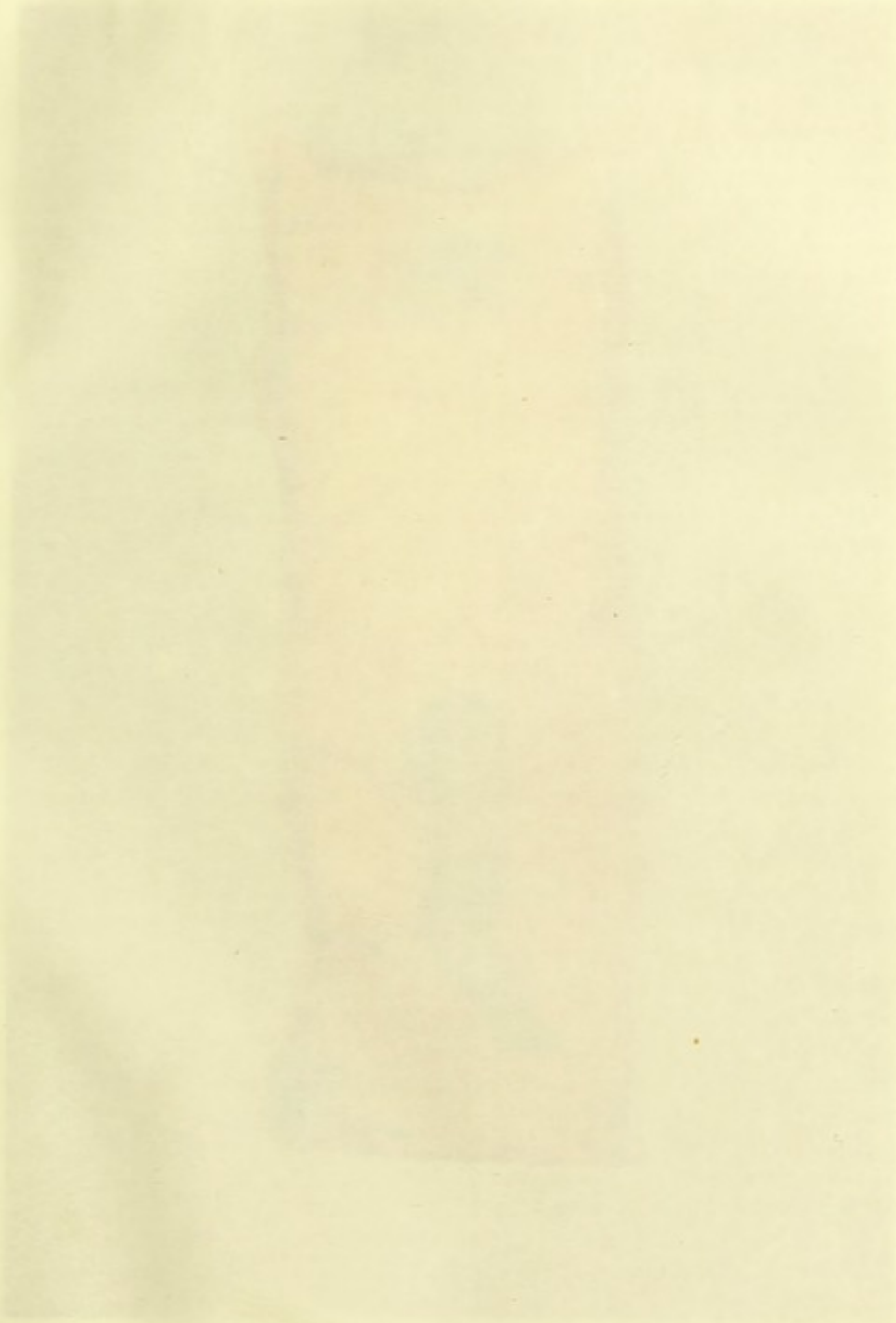
were thickened, with follicular ulcers, and coated with patches of pseudo-membrane. The mesenteric glands enlarged. No. 435, Medical Series, is a portion of the liver in this case, exhibiting the abscess cavity. Nos. 436 and 437 are successive portions of the ulcerated colon. No. 434, the collapsed right lung, coated with pseudo-membrane. No. 435, the seventh rib of the same side, its inner surface denuded of periosteum, and presenting several new formations of bone. Contributed by Surgeon Thomas Crosby, U. S. Vols.

Private R——, 1st Regt. Veteran Reserve Corps, aged forty-one, was admitted to the Post Hospital, Fort McHenry, Md., September 30th, 1865. He had suffered from chronic diarrhœa for several months, and was much emaciated; stools, from eight to ten daily. October 18th. He complained of a violent pain, which appeared to have its seat in the kidneys. Death, October 21st. Autopsy: Hypostatic congestion of the posterior parts of both lungs; four ounces of bloody serum in right pleural cavity; the right lobe of the liver, adherent to the abdominal walls, presented three abscesses, each containing about four ounces of thick flaky pus; spleen very large and soft; colon ulcerated from one extremity to the other; some of the ulcers very large, and penetrating to the muscular coat. No. 668, Medical Series, is the liver from this case. Contributed by Brevet Major De Witt C. Peters, Assistant Surgeon U. S. A.

The arrival of recent specimens at the Museum has afforded good opportunities for making drawings representing the appearance of the preparations immediately after their removal from the body. Accordingly a series of careful water-color drawings has been made, which show most of the typical forms of camp diseases. The drawings are the work of Mr. Hermann Faber, and are faithful to the minutest detail. Some experiments have been made which show that they can be reproduced with reasonable fidelity by chromo-lithography.

The chromo-lithograph here presented will, it is hoped, give an idea of the capabilities of this kind of illustration. (See plate opposite.) It represents a portion of intestine, taken from near the middle of the ileum, of a patient who died in the Third Division General Hospital, Alexandria, Virginia, December 11th, 1864. His disease is given in the mortality report of the hospital as typhoid fever. He stated on admission, however, that he had suffered from diarrhœa for several months before the febrile symptoms set in. On the autopsy, the ileum was found to present considerable vascularity, with patches of congestion. The solitary follicles were enlarged to the size of pin-heads. The patches of Peyer slightly thickened, with pigment deposits, giving them the shaven-beard appearance. There were a few small ulcers of the solitary follicles near the ileo-cœcal valve. The colon was thickened, with numerous follicular ulcers, especially in the cœcum and sigmoid flexure. In the transverse colon, several of the ulcers were in the different stages of cicatrization. The portion of ileum here represented is No. 465 in the Medical Series of the Museum. No. 466 is a portion of the transverse colon, showing the cicatrizing ulcers. This case belongs to the class in which typho-malarial fever supervenes in the course of chronic diarrhœa. The drawing here presented is equally characteristic of the uncomplicated cases of the malarial form of this fever. The plate represents the portion of ileum slit up along its mesenteric attachment, and spread out for examination. The blush of congestion in the lower part of the piece, the injected condition of the vessels, the pin-head tumors formed by the enlarged solitary follicles, the shaven-beard appearance of the small Peyer's patch near the top of the piece, and of the larger one near the bottom, are all shown with reasonable accuracy. It is desired to publish in the Medical History of the War about thirty plates, in this style, to illustrate the most important phases of the anatomical lesions in camp fevers and camp diarrhœa.

The *Microscopical Series* of the Museum consists already of about 1400 specimens, of which 400 have been obtained by purchase and the rest have been prepared





H. Faber pinx.t

ILEUM IN MALARIAL FORM

OF

TYPHO-MALARIAL FEVER

in the Museum. The Microscopical series grew out of the attempt to conduct exact investigations into the minute anatomical changes characteristic of the several camp diseases, and especially of fever and diarrhœa. The great mortality of these affections has already been intimated, and the vast practical importance of the present study will therefore be at once understood, when it is recollected that no intelligent efforts to prevent or cure diseases can be made without a reasonable comprehension of their nature, and that this must rest as a basis upon a just knowledge of their pathological anatomy. Unfortunately, in the United States, pathological anatomy is but little studied, and especially the application of the microscope to this branch of investigation has not received the attention it deserves, so that there appeared little probability that an exact study of the pathological anatomy of our camp diseases would be attempted, if it were not undertaken in the Army Medical Museum, and it became an imperative duty to make an effort in this direction. The result of this effort is the microscopical series, which, although small when contrasted with some of the European collections, is the only considerable micro-pathological collection in the United States.

The majority of the specimens thus far placed in the cabinet are sections illustrative of the normal histology of the intestines, and of the changes they undergo in fever and diarrhœa; but the actual number of specimens preserved indicates only a small part of the work done. Investigations have been continually made into pathological processes, in which want of time and of a sufficient number of assistants have not permitted the preservation of specimens. And this branch of the Museum has also been frequently consulted in questions of adulterations, etc. requiring microscopical investigation for their solution; a duty of considerable importance, which, of itself alone, would more than repay the trifling cost of the establishment of this branch of the Museum.

The greater number of the preparations hitherto made in the microscopical branch of the Museum are the work of Brevet Captain Edward Curtis, Assistant Surgeon U.S.A., whose patience and dexterity are deserving of high praise, and to whose intelligent assistance I owe much of the success attained in this direction. In addition, Acting Assistant Surgeon J. C. W. Kennon, who has recently been assigned as an assistant in this branch of the Museum, is preparing a series of very beautiful minute injections, which will form an important part of the collection. It would be wholly impossible to present here a detailed account of the results arrived at by the microscopical work performed. This must be postponed to its appropriate place, in the discussion of the pathological anatomy of our camp diseases in the Medical History of the War. It may, however, be noted, as a matter of interest, that the general results attained are not only of value in connection with camp diseases, but have an important bearing on the general comprehension of normal structure and of morbid action, as must in fact be the case with all studies honestly and earnestly directed to any one series of pathological lesions. In a general way, it may be said that the results of the investigations made in the Museum accord, in many respects, with the ideas of the modern Berlin school of pathological anatomy, are contradictory of the doctrine of exudation, taught so generally in the older medical text-books in use in this country, and at variance also in several particulars with the views of Dr. Lionel Beale, lately so favorably received in England.

The best means of making the results of our microscopical studies available for the information of medical men in America has exercised my most serious thought. Much can be done by good drawings executed with the aid of the camera lucida. Some valuable work in this direction has been executed by Mr. H. Faber, the artist before referred to. Such drawings, however, have always attached to them more or less suspicion of being in part at least ideal; and for this reason numerous attempts have already been made, both in Europe and America, to photograph objects as seen with the microscope. Among the experiments in this country, I may especially mention those of Prof. O. N. Rood, of Columbia College, New York, of Mr. L. M. Rutherfurd, of the same city, and of Dr. J. Dean, of Boston. The first two of these gentlemen directed their attention to test objects, and have obtained results which show the practicability of the idea. Dr. Dean has recently published a paper on the anatomy of the spinal cord, illustrated with photo-lithographs from micro-photographs of sections seen with low powers. This is the first attempt made in America to reproduce micro-photographs by photo-lithography, a method which, if successful with high powers, would be highly satisfactory, since no doubt could be entertained as to the fidelity of the picture. It was therefore resolved to attempt the photographic reproduction of the microscopical preparations necessary for the comprehension of the subjects under consideration, and, after some preliminary experiments made at the Douglas Hospital by Brevet Major W. Thomson, Assistant Surgeon U. S. A., on preparations furnished by the Museum, the necessary apparatus was constructed, and Assistant Surgeon E. Curtis was directed to undertake the labor of preparing the necessary illustrations. The task was by no means an easy one. The subject of micro-photography is comparatively new, and the processes still require much improvement. On the whole, however, the results attained by Dr. Curtis have exceeded the expectations formed when the experiment was undertaken, and justify the hope that they will eventuate in the satisfactory preparation of all the illustrations required.

With low powers, no serious obstacle was encountered in obtaining excellent photographs of properly selected preparations. The higher powers offered difficulties, most of which, however, have been overcome. In experimenting with the higher powers, the lined diatomaceæ were selected as test objects on account of their definite and well-known structure. With these the utmost success has been realized. A photograph of Gyrosigma angulatum (Navicula angulata) has been obtained, for example, magnified about 7000 diameters, in which the hexagons appear of the same size and nearly as distinct as in the cut, which was made by transferring to wood a tracing from the original photograph. In fact, any of the markings on diatoms that are visible with the microscope can be photographed with the utmost clearness and ease, and the time has arrived when the inability to photograph alleged markings will throw doubts on the correctness of the observers who have supposed they saw them.

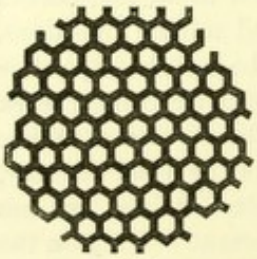


FIG. 1.

The plan employed in the photographic work, hitherto executed with high powers, is as follows: The direct rays of the sun, reflected in a constant direction from the mirror of a Silbermann's heliostat (loaned for the purpose by the Coast Survey), are condensed by a large lens upon the plane mirror of the microscope, whence they are

reflected through the achromatic condenser in the usual way. Before reaching the achromatic condenser, however, the rays pass through a cell containing a solution of the ammonio-sulphate of copper of sufficient density to absorb nearly all the rays except those at the violet end of the spectrum.* The light used, therefore, is essentially monochromatic, and contains, with enough illumination for agreeable vision, the greater part of the actinic force of the sun's rays. The heating rays being chiefly at the other extremity of the spectrum are of course excluded, and great actinic force is obtained, therefore, without any danger to the preparations or the balsam cementing of the object-glasses. The object-glass employed in the photograph of Gyrosigma above alluded to was a one-eighth of an inch, by W. Wales & Co., of Fort Lee, New Jersey. This glass is so constructed as to bring the actinic rays to a focus. At the bottom of the draw-tube was placed an achromatic concave lens—the amplifier of Tolles (of Canastota, N. Y.), and an ordinary medium eye-piece completed the optical apparatus. The eye-piece extremity of the microscope was thrust into one end of a long camera box, the connection made light-tight by means of a black silk hood, and the image, received on a piece of plate glass, observed by means of a focussing glass, while the focal adjustments were made. As with the very long camera used, the arm of the observer cannot reach the milled head of the fine adjustment of the microscope, this head was grooved, and connected by a band with a grooved wheel at the end of a long steel rod, the other extremity of which is near the observer, who, by means of it, can focus accurately with any required length of camera. There is nothing peculiar in the chemicals employed, and, with ordinary collodion, and the high power above spoken of, from thirty to forty seconds' exposure was quite sufficient.

Of the foregoing devices, most importance is to be attached to the employment of monochromatic light (the violet end of the spectrum), and the use of an object-glass constructed with special reference to the actinic rays. Both these points were suggested to me by Mr. L. W. Rutherfurd, of New York, so well known by his connection with telescopic photography, who has thought much, and made many satisfactory experiments in this direction. I believe, however, that the apparatus, as above described, loses some of its advantages by the use of the eye-piece, which I propose to substitute by a lens of proper magnifying power, corrected, like the object-glass, in such a way as to bring to a focus the actinic rays. Such a lens is now in process of construction for further experiment.

The pathological photographs hitherto satisfactorily executed in the Museum have chiefly been made with moderate magnifying powers, twelve to fifty diameters, though some experiments with higher powers justify me in the belief that with the improvements above described, all that is desired in this direction can be attained. Among these experiments, I may particularly mention a view, magnified about four hundred diameters, of the polygonal cells and flat cholesterin tables of a cholesteatoma, which was found on the inner surface of the frontal bone of a soldier who died of epilepsy in the neighborhood of Washington.

---

* Einleitung in die Höhere Optik, von Dr. August Beer. Braunschweig, 1853, p. 48.

For the preservation of these photographs for study, glass positives have been printed, and mounted with a piece of ground glass behind them to serve as a background. These are held between the eye and the light, and present, when thus examined, a faithful image of the field of the microscope in every particular except color.

To render these photographs available for the general illustration of the subjects to which they refer, especially of the minute pathological anatomy of camp diseases, it was attempted to reproduce them by photo-lithography, instead of copying them by any other method of drawing or engraving. After trial, however, I was reluctantly obliged to conclude that, in its present undeveloped condition, photo-lithography is inadequate to represent the objects in question, which are among the most delicate and beautiful within the range of microscopical observation, and all the details of which are fully preserved in the photographs. Although I much regret this failure, and am not without hopes that, at an early day, improvements in heliographic methods of lithographing or engraving will give a process adequate to copying even the most difficult photographs, I regret it the less because I have been fortunate enough to find in Mr. H. Faber, the artist already mentioned, an engraver perfectly competent to make faithful copies of the photographs to be reproduced. As an illustration of what may be expected in this direction, I present on the opposite page the reproduction of a photograph of a perpendicular section of ulcerated colon, from the form of Chronic Diarrhœa or Dysentery described on page 143. The blood-vessels were not injected in preparing this section. The picture is not exaggerated, and is a good representation of the original photograph, which, with the specimen, is preserved in the Army Medical Museum, where both can be seen by any one desirous of comparing them with the engraving. The

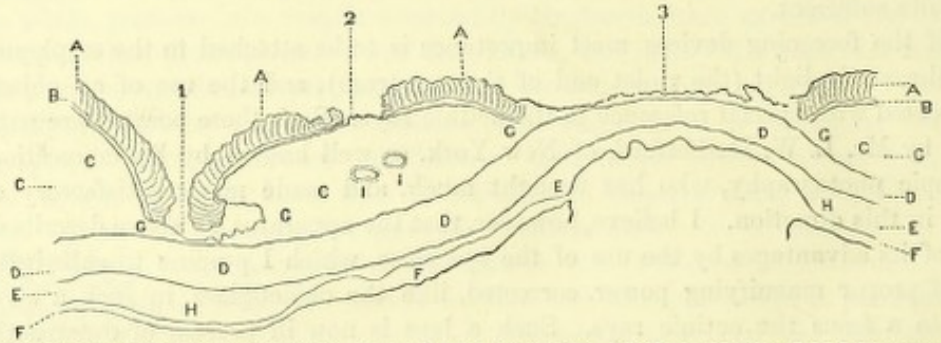
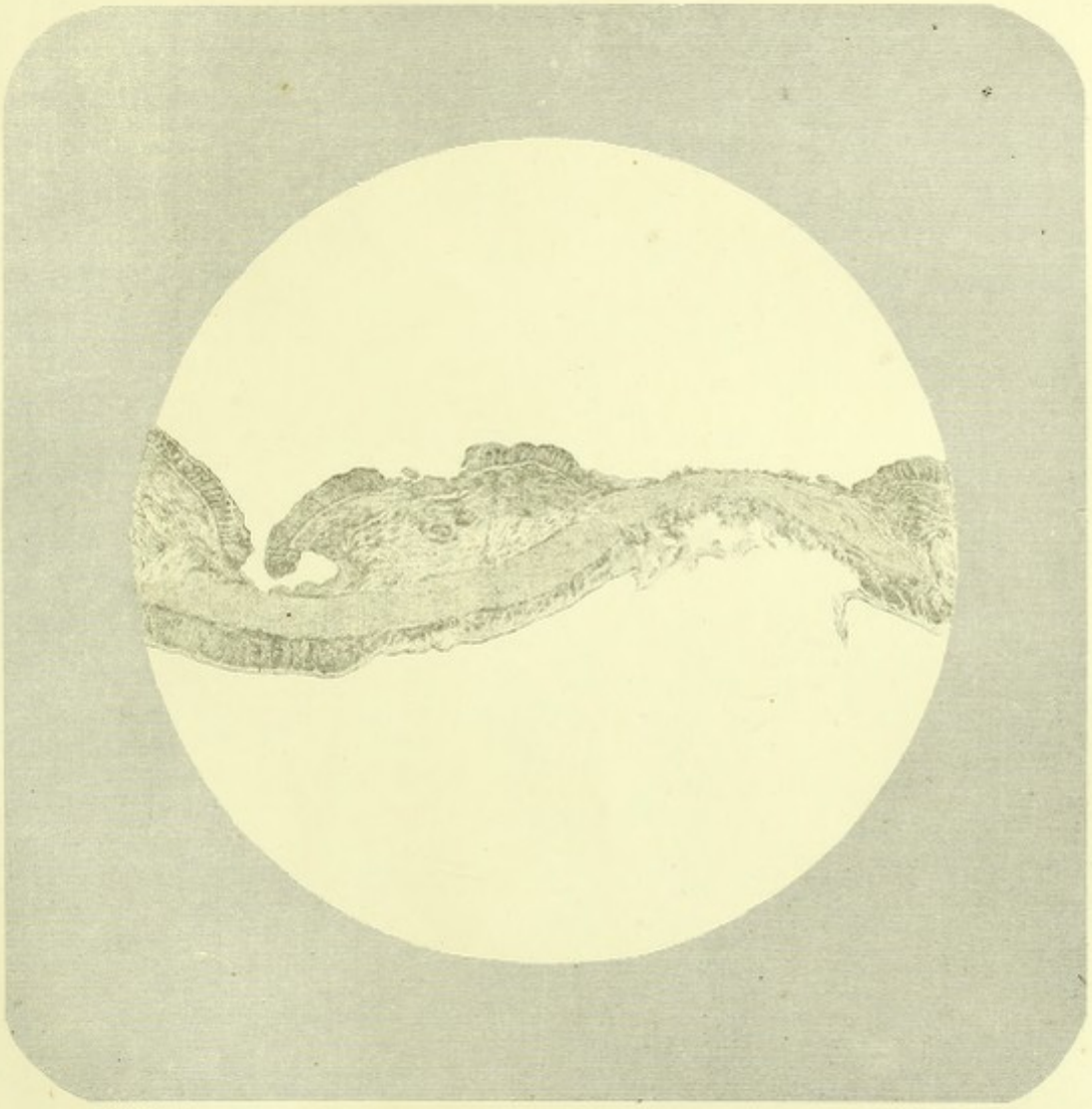


FIG. 2.—Outline of the plate on opposite page. A A A A. Follicles of Lieberkühn. B B. Muscle of Brücke. C C C C. Submucous connective tissue. D D D D. Circular muscle of the colon. E E E. Longitudinal muscle, cut transversely; at H H, two of the longitudinal bands of this layer. F F F. Peritoneal layer. G G G G. Points of very active cell multiplication. I I. An artery and vein cut through transversely. 1. A deep follicular ulcer, extending to the muscular layer. 2. A small superficial ulcer, which has penetrated to the submucous connective tissue. 3. An ulcer of greater size, penetrating nearly to the muscular layer, which is covered with granulations.

wood-cut here introduced gives an outline of the plate opposite, and is lettered for the purposes of description. The section was cut perpendicularly through the colon transversely to its length, and presents three points of ulceration, marked 1, 2, 3 in the figure.

To render this representation more intelligible, it may be remarked that two forms of ulceration have been observed in the colon in these cases of Chronic Diarrhœa. In the first, the process begins in the closed follicles; in the second, in the intestinal epithelium or the glandular layer. In the first form, the closed follicles enlarge by multiplication of their cellular elements till they project as little tumors above the surface, as shown in Fig. 3, in which [1] is the enlarged solitary follicle. This figure is





PERPENDICULAR SECTION OF

ULCERATED COLON - CHRONIC CAMP DIARRHOEA.

CUT TRANSVERSELY

an outline transferred to wood from a tracing of the original photograph, which is quite as beautiful and detailed as that represented in the plate. It is lettered like Fig. 2. The tumor, having enlarged to a certain extent, ruptures, its cellular elements escape, and a minute ulcer is formed, as shown in Fig. 4, in which [1] is the ruptured follicle with the minute ulcer; the letters represent the same parts as in the two previous figures. The cells or corpuscles of the connective tissue surrounding the enlarged follicle now multiply, and the ulcer spreads by the superficial cells floating off into the intestinal cavity, while a new base is continually formed by the multiplication of the subjacent cells.

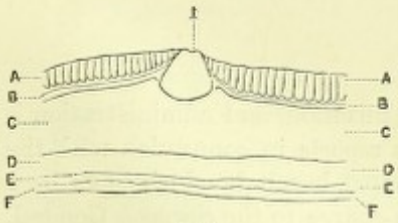


FIG. 3.

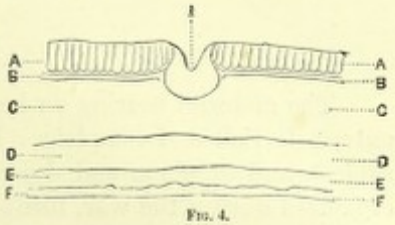


FIG. 4.

If the plate be carefully observed (especially with a lens), it will be noticed that the connective tissue layer presents a finely granular aspect, in which each granule corresponds to what, with a higher power, is recognized as a connective tissue cell or corpuscle. In the neighborhood of the edges or base of any of the ulcers, it will be seen that these corpuscles are more numerous, giving the tissue a more granular aspect. Whether the corpuscles in question are true cells, with distinct cell walls, as argued by Virchow and the Berlin school, or mere masses of germinal matter without distinct parietes, as Beale would have us believe, is a question which cannot here be entered upon, on account of the space necessary to explain and justify the views entertained. In either case, it must be admitted that it is through the multiplication of these corpuscles by division that the greater number of elements is produced, and not by the equivocal generation of new cells, as has been so generally held. The Museum contains preparations which illustrate all the stages of this multiplication, and it is believed that these can be satisfactorily photographed for the Medical History of the War. The multiplication of the cells or corpuscles of the submucous connective tissue is accompanied by the marked thickening of the intestine so common in the disease under consideration. The ulcers shown at the right and left of the section represented in the plate (and in Fig. 2, [1] and [3]) show different stages of the excavation thus produced.

The second form of ulceration begins by an abrasion or denudation of epithelium at some point which does not correspond to the position of a solitary follicle. The follicles of Lieberkühn are next destroyed, and the ulcer spreads in the connective tissue by the process which has just been described. The central ulcer of the plate (Fig. 2, [2]) is of this variety. Such ulcers are much rarer than those of the first kind, and probably are always secondary to them. It is not possible to go into further details in this direction at present, but it is hoped that a careful and fully illustrated account of the minute anatomy of these diseases will be presented to the medical profession in the Medical History of the War.

HOSPITAL ORGANIZATION AND CONSTRUCTION.

The material bearing on hospital construction, organization, and administration is extremely rich and complete. It consists of numerous reports in connection with the subject, and of plans and descriptions of all the principal hospitals which have been organized during the war, furnished by the surgeons-in-charge to the Surgeon General, or by the medical inspectors to the Medical Inspector General. In addition, the records of the general hospitals in existence during the war have been turned in to the Surgeon General's Office.

From this lavish material, it will be possible to prepare a complete and faithful history of the hospital system and of its transformations, both as to construction and administration. Such a history will be of inestimable value in future wars, and is full of most important applications to the hospitals of civil life. Never before, in the history of the world, was so vast a system of hospitals brought into existence in so short a time. Never before were such establishments, in time of war, so little crowded or so liberally supplied. They differed, too, from the hospitals of other nations, in being under the command of medical officers. Instead of placing at the head of establishments, intended for the treatment of disease and wounds, officers of the line, who, whatever their other accomplishments, could not be expected to understand the requirements of medical science, and who, with the best intentions in the world, might seriously embarrass the action of the surgeon, as was sadly the case in the Crimean war, and has been since in the English hospitals, our Government, with a wiser discretion, made the surgeon the commandant of the hospital, and thus, while holding him responsible for the results of its management, put it into his power to do much to make those results favorable. The medical staff can point with pride to the consequences of this liberal course. Never before, in the history of the world, has the mortality in military hospitals been so small, and never have such establishments so completely escaped from diseases generated within their walls.

The hospital buildings used in the beginning, and on occasions of emergency throughout the war, had been erected for other purposes; public buildings, schoolhouses, churches, hotels, warehouses, factories, and private dwellings being fitted up, as circumstances required. But gradually wooden pavilions, erected for the purpose, came into extensive use, and ultimately the majority of the general hospitals belonged to this class. The introduction of these pavilion hospitals was not the work of any one man. Originally suggested by European experience, they were erected in all parts of the country, under the direction of various medical officers, some by order of the Surgeon General, others by the authority of local commanders. The necessities of the service and increasing experience suggested numerous alterations from time to time, and it was not until the summer of 1864 that a circular order was issued directing uniformity in certain essential points. To trace out this gradual evolution of hospital construction is, of course, out of the question here; but as the Circular of July 20th, 1864, gives in a few words an idea of the system as fully developed, it is here reproduced:

WAR DEPARTMENT, July 20th, 1864.

The following instructions are promulgated for the information of officers charged with the construction of general hospitals, and will be deviated from only in cases of imperative necessity: Buildings will not be taken or occupied for hospital purposes until after full examination and approval by a medical inspector, or other officer of the Medical Corps detailed for this purpose; and all alterations will be made in accordance with plans submitted by him and approved by the Surgeon General.

E. M. STANTON,
Secretary of War.

Site.—The site of the hospital should be a well-drained plain, with a sub-soil of gravel, and sufficiently extensive to accommodate the buildings. The situation should be elevated; as remote as possible from marshes or other sources of malaria, and must have a convenient supply of pure water.

Plan.—General hospitals will be constructed on the principle of detached pavilions, each ward being in a separate building, with beds for sixty patients. Besides the wards, there will be detached buildings for each of the following purposes: General Administration Building, Dining-Room and Kitchen for Patients, Dining-Room and Kitchen for Officers, Laundry, Commissary and Quartermaster's Store-House, Knapsack-House, Guard-House, Dead-House, Quarters for Female Nurses, Chapel, Operating-Room, and Stable. The wards, administration building, kitchens, dining-rooms, and chapel are to be connected by covered walks which will have floors, but no sides.

No general plan for the arrangement of the buildings can be directed, as the varying character and dimensions of sites render an uniform adherence to any one impracticable. Wards may be arranged "en echelon" in two converging lines, forming a V,—in this case, the administration building should be at the apex of the V, the other buildings between the wings; or as radii from the periphery of a circle, ellipse, or rounded oblong,—in this case, the administration building should be one of the radii, the other buildings within the enclosure; or parallel to each other,—in this case, the administration building should be in the centre of the row, the other buildings in the rear. Other plans may be rendered necessary by the special features of the ground. In any case, the important points to be observed are, to place the buildings far enough apart (at least thirty feet should intervene between two parallel buildings), and to locate them in such a manner that no one shall interfere with the ventilation of another. It is preferable to locate the wards so that the long diameter may run north and south, or nearly so.

Each *ward* will be a ridge-ventilated pavilion one hundred and eighty-seven by twenty four (187×24) feet. At each extremity, two small rooms nine by eleven (9×11) feet, one on each side of a passage, six (6) feet wide, will be partitioned off. The space remaining for patients will be one hundred and sixty-five by twenty-four (165×24) feet (see Figure 5, A), which gives the location of the beds and position of the doors and windows. The small rooms are occupied as follows: Figure 5, *a*, chief nurse; *b*, closet for medicines, etc.; *c*, bath-room; *d*, closet for close stools. Figure 6 is the side elevation.

The wards will be fourteen (14) feet high from floor to eaves—the pitch of the roof to vary in accordance to the materials composing it. The floor to be elevated at least eighteen (18) inches from the soil, with free ventilation beneath it. A ward thus constructed will accommodate sixty (60) patients, allowing more than one thousand (1000) cubic feet of air-space to each. The number of wards will be regulated by the number of patients the hospital is intended to accommodate. A hospital of twelve hundred (1200) beds will require twenty (20) wards.

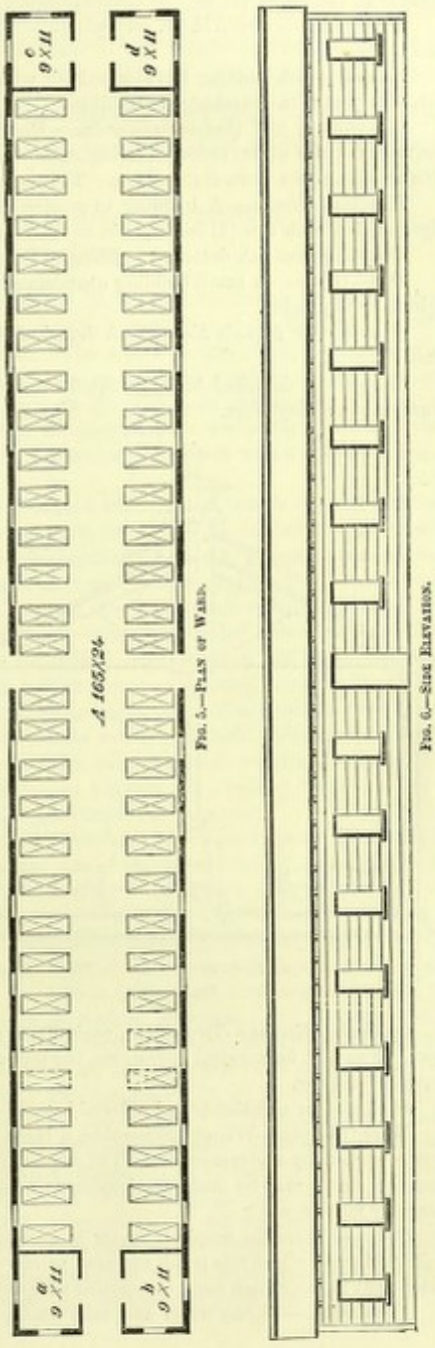


FIG. 5.—PLAN OF WARD.

FIG. 6.—SIDE ELEVATION.

Administration Building.—For a hospital of six to twelve hundred (600 to 1200) beds, this will be a ridge-ventilated building, thirty-eight by one hundred and thirty-two (38×132) feet, and two stories high; the first fourteen (14) and the second twelve (12) feet high in the clear. This building contains the general office, office of surgeon in charge, linen and store rooms, dispensary, chaplain's office, lodging rooms for officers, etc.

Dining-Room and Kitchen for Patients.—The dining-room will be a ridge-ventilated building, large enough to seat a number equal to two-thirds the number of beds. The most convenient form is a long parallelogram, into which the kitchen opens in the centre of the long side. The kitchen will be divided into two unequal parts—the larger for the preparation of ordinary diet, the smaller for the extra diet—the cooking in both to be done on ranges. Where there is an engine, steam may be advantageously used for boiling.

Dining-Room and Kitchen for Officers.—A small building for this purpose will be situated near the administration building.

Laundry.—A building two stories high, with lodging for the laundresses on the second floor. The roof should be flat, with posts for stretching clothes-lines.

Commissary and Quartermaster Store-Room.—A small two-story building, furnished with boxes and shelves for the various parts of the ration,—having an ice-house connected with it for the preservation of meats and other perishable articles, and a room for clothing. The second story to contain lodging-rooms for the cooks.

Knapsack-House.—A building to receive the effects of the patients while in hospital. It will contain as many pigeon-holes, each two (2) feet square, as there are beds in the hospital.

Guard-House.—A detached building to lodge the guard, with a guard-room for prisoners.

Dead-House.—A small building containing two apartments, located so as not to be observed from the wards, and lighted by sky-lights.

Quarters for Female Nurses.—A detached building containing lodging-rooms, dining-room, and kitchen for the female nurses.

Chapel.—A detached building, fitted for the purpose of religious services, so arranged as to be used also as a library and reading-room.

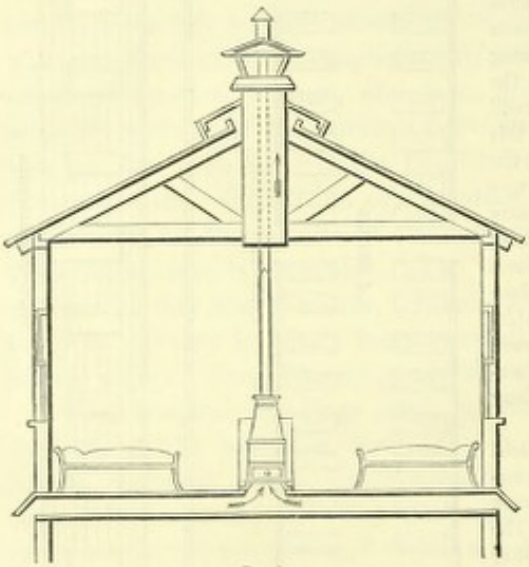


FIG. 8.

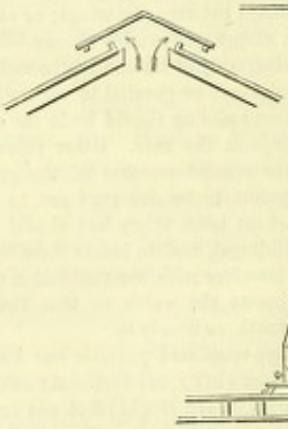


FIG. 7.

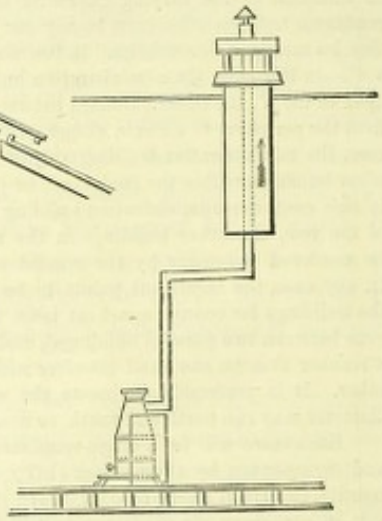


FIG. 9.

Operating-Rooms.—Two rooms, each fifteen (15) feet square; one well lighted by sky-lights, the other by windows. The first for surgical operations, the second for discharge-boards, etc. It should be situated near the administration building.

Stable.—For ambulance and officers' horses.

Water Supply.—Where practicable, a large tank will be erected and kept supplied from wells or springs by pumps worked by a steam-engine. The engine, if possible, will be situated near the kitchen and laundry, in which case the steam may be made serviceable in cooking, and the power may be employed in working the washing and mangling machines.

Sinks.—Where the supply of water is adequate, water-closets may be constructed in one of the small rooms in each ward; but where this is not the case, privies will be built at a convenient distance from the wards, furnished with water-tight boxes, which must be emptied every night.

Ventilation.—During warm and mild weather the wards will be ventilated by the ridge (Figure 7), but during

winter the ridge will be closed (Figure 8), and ventilation by shafts substituted. Four stoves will be allowed to a ward, each partly surrounded by a jacket of zinc or sheet-iron, with an air-box opening beneath it to furnish the supply of fresh air. At eight (8) feet from the stove will be a shaft, properly capped, through which the stove-pipe will ascend. Figure 8 gives a section and Figure 9 a side view of the arrangement. The shaft should be eighteen (18) inches square, and should not come below the tie-beams.

A conception of the character and extent of the large pavilion hospitals can be perhaps still better obtained from a description of some one of them than from the foregoing circular. A description of the Lincoln Hospital, one of the hospitals of Washington, D. C., is therefore here presented. This hospital was constructed in the latter part of 1862, and first occupied in January, 1863. The original plans for its construction were furnished to the Surgeon General's Office by the writer of this paper. Several modifications and improvements were, however, subsequently made by the successive surgeons in charge.

The following description was furnished by Brevet Lieutenant Colonel J. C. McKee, Surgeon U. S. A., for a long time surgeon in charge.

Lincoln Hospital, Washington, D. C., is located about a mile east of the Capitol Building. Its site is a gently-undulating, uncultivated plain, without shade-trees. East and south of the hospital, the plain declines towards the Eastern Branch of the Potomac, which is about half a mile distant. The soil is a light sandy loam, resting on a deep stratum of gravel. The hospital covers an area of thirty acres of ground, and consists of twenty detached pavilion wards, arranged en echelon in the shape of the letter V, the apex of which looks westwardly. The administration building is at the apex of the V. The buildings for kitchen, dining-rooms, etc. are in the space between the two sides of the letter. The whole is surrounded by a picket-fence, five feet high, between which and the wards is a wide road for ambulances. (See Figure 10 and the plate opposite to it.)

The *Wards* are pavilion barracks, built of rough boards, white-washed, with roofs of boards covered with tarred paper; they are twenty (20) in number, ten on each wing. Each ward is 187 feet by 24, 16 feet to the eaves and 20 to the ridge, at which there is the usual ridge-ventilation the whole length of the ward. They are plastered on the inside for about eight feet above the floor. At the west end of each are four rooms, occupying fifteen feet in length. These are used for clothing, baths, nurses, and sinks. Each ward contains thirty-four windows and four doors, one at each end and two in the middle, opposite each other. Four ventilating gratings, at regular distances in the floor of the ward, communicate by wooden flues under the floor with the air outside, thus giving a full supply of fresh air whenever the weather requires the doors and windows to be closed. With sixty-two patients, there are 72 square feet of floor and 1447 cubic feet of air-space for each. Thirty-one beds are arranged on each side, with a chair and bed-side table between each pair. An avenue of eleven feet is left between the two rows of beds. The wards are lighted at night by kerosene lamps, and heated by stoves in winter. On the inner side of the two wings of the hospital, and running the whole length of each, is a raised covered walk or corridor, on which is laid a railway track two feet wide and 2156 feet long. Box-cars convey the food from the main and extra kitchens to each ward.

The *Administration Building*, at the apex of the triangle, is 184 by 38 feet, 22 feet to the ridge and 16 to the eaves. A hall, 8 feet wide, runs the entire length of the first floor. On the left side of the hall are the following rooms: office of surgeon in charge, 14 by 14; office of military assistant, 11 by 14 (employs two clerks); principal office, 56 by 14 (employs fourteen clerks); printing-office, 19 by 14 (employs two men); quartermaster's store-room for clothing, etc., 44 by 14 (employs two clerks); wardmaster's room, 13½ by 14; bath-room, 4½ by 14; post-office, 7 by 14 (employs a postmaster and assistant). On the other side of the hall, and on the right of the entrance door, are the office of the officer of the day, 15 by 14; office of the officer of the guard, 11 by 14 (four clerks); office of surgical records, 11 by 14 (one clerk); private office of surgeon in charge, 12½ by 14; office of medical inspector, 11 by 14; linen-room, 66 by 14,—all washed clothing and bed-linen is sent from the laundry to this room, and thence distributed to the different wardmasters; one clerk and four women are employed here, the latter in mending, etc. The medical store-room, 11 by 14, adjoins the dispensary, and is used for storing supplies. The dispensary, 25 by 14, usually employs four men; the medicines for the whole hospital are compounded here, under the charge of a hospital steward. Lastly, the laboratory, which adjoins the dispensary, is 22 by 14 feet, used for preparing tinctures, ointments, plasters, etc.

On the second floor of the Administration Building is the Knapsack-Room, 111 by 37 feet. The effects, accoutrements, etc. of the patients coming into hospital are deposited in this room for safe keeping. It employs two men, who receive the articles deposited, issue tickets for the same, credit them to depositors, and deliver them when the patients leave. There are 2184 boxes, arranged in parallel rows, reaching from the floor to the ceiling. Adjoining the Knapsack-Room is the extra-duty men's room, 50 by 37 feet, used as a sleeping-room by the men employed on extra duty, and a clerks' room, 25 by 23 feet, used by the clerks of the principal office for the same purpose.

Within the triangle, formed by the two wings, and east of the administration building, is the *Tank*, resting upon a platform 25 feet high, and holding 12,000 gallons of water. It is supplied from a well under the engine-room, and the water forced into it by the engine, which drives the machinery of the laundry. This tank supplies each ward with water by means of pipes. There are four other wells in the enclosure, used for drinking and culinary purposes.

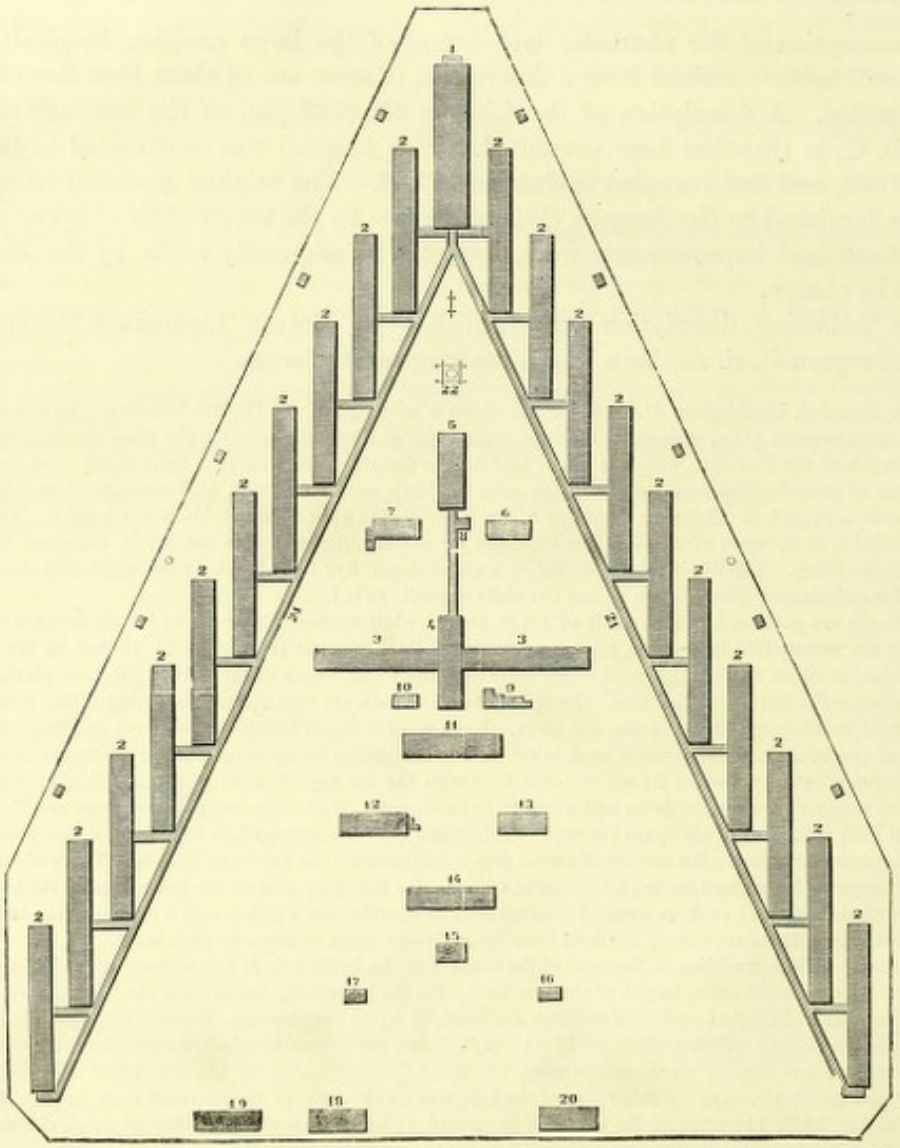
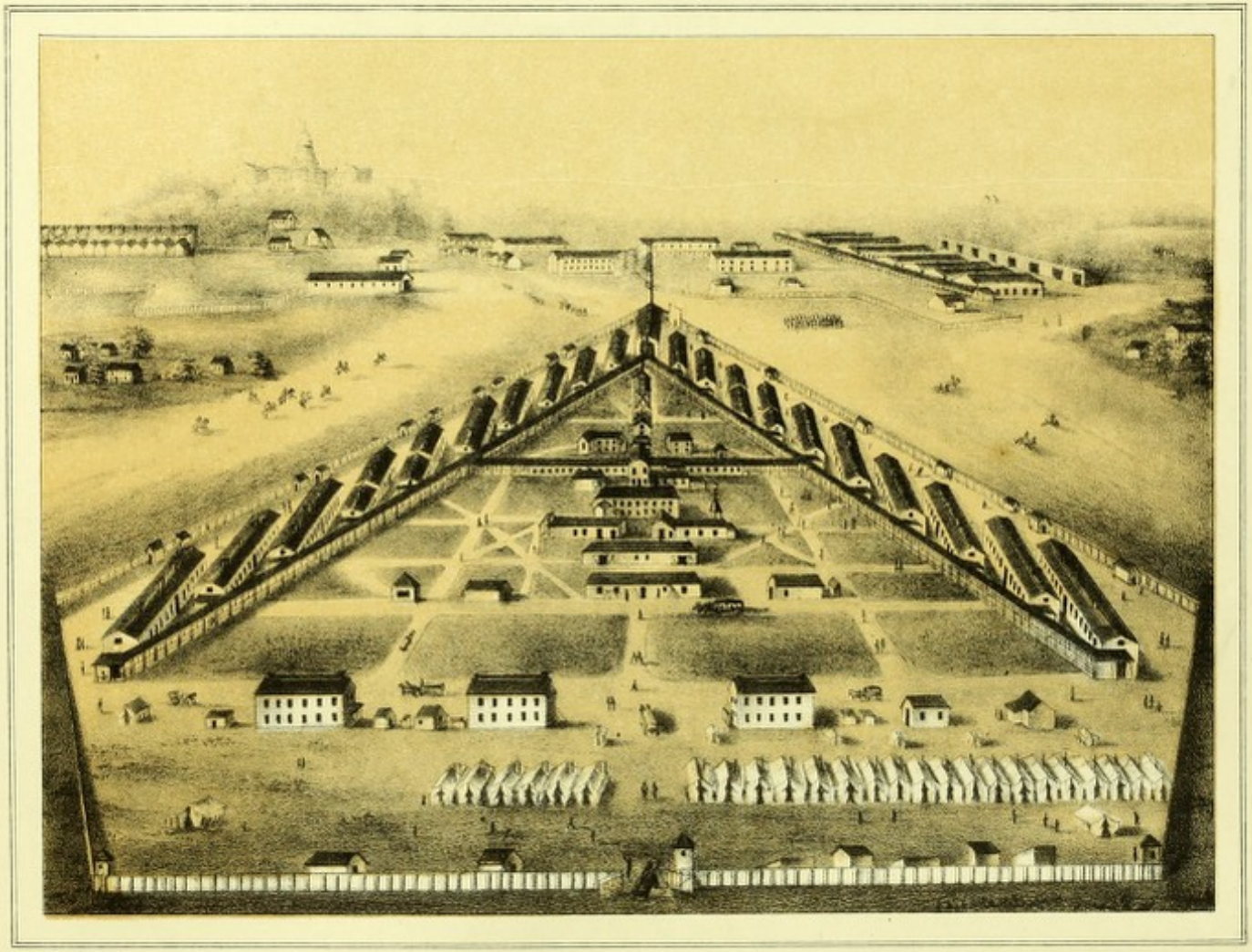


Fig. 10.—Ground Plan of Lincoln General Hospital, Washington, D.C. Scale, 200 feet to the inch. 1. Administration building. 2 2 2 2. Wards. 3 3. Dining-rooms. 4. Kitchen. 5. Laundry. 6. Stewards' quarters. 7. Sisters' quarters. 8. Engine-house. 9. Meat-house. 10. Coal-house. 11. Commissary building. 12. Sutler. 13. Chapel. 14. Stable. 15. Freedmen's quarters. 16. Guard-house. 17. Dead-house. 18. Barracks for guard. 19 20. Officers' quarters. 21. Covered way. 22. Tank. The tents shown in the plate are not represented in this plan.

Twenty yards east of the tank is the *Laundry*, 61 by 24 feet. The building runs east and west, is two stories high, and has a platform for drying clothes on the roof. Seven men and twelve women are employed in its various departments. The washing is done by steam-power, as is also the drying and ironing. The average wash is 5000 pieces daily—has been pushed to 7000. On the first floor of the laundry is the washing apparatus, consisting of a mangle, steam-boiler, revolving drum for wringing, rinsing-boxes, roller and ironing-table; on the second floor is the steam drying-room, 36 by 12½ feet. This is in addition to the drying arrangements on the roof. Separated by a partition from the laundry on the first floor, is a sleeping-room for women, 22 by 24 feet; a kitchen for the same, 9½ by 17; a dining-room, 9½ by 18. The engine is in a building adjoining the laundry on the east; it is of six-horse power, and



BIRDS EYE VIEW OF

LINCOLN GENERAL HOSPITAL, WASHINGTON, D. C.

SEEN FROM THE REAR

employs one engineer and an assistant. It supplies power for the tank as well as for the laundry. The well which supplies the tank is 40 feet deep, with usually 4 feet of water; its diameter is 6 feet. The steam pump can raise 2000 gallons of water per hour.

The building for *Sisters' Quarters* is 23 by 51 feet, with a wing 16 by 28, forming a letter "L." It is divided into chapel, sitting-room, kitchen, etc. Twenty-eight Sisters of Charity were on duty, and I must bear evidence to their efficiency and superiority as nurses. The extra-diet kitchen is under the care of a sister, and one is detailed by the superior for each ward. They administer medicine, diet, and stimulants, are under the orders of the ward surgeon, and are responsible to him alone. They have been beloved and respected by the men.

The *Stewards' Quarters* are 18 feet north of the engine-room, are two stories high—contain dining-room, kitchen, sleeping-rooms, etc. Five stewards generally occupied this building.

The *Operating-Room* is 25 feet east of the engine-room. It is 17 feet square, and lighted by a sky-light on the north side of the roof. A revolving-table is in the centre of the room; also a cupboard for instruments, sponges, microscope, etc., with a sink in the northwest corner. The Examining-Room adjoining it is 17 feet 7 inches square, and communicates by a door with the operating-room.

The *Extra-Diet Kitchen* is under the same roof with the general kitchen. It is 18 by 24 feet—has in it a Harrison's European range, 8 feet front, 3 feet 6 inches deep. A room 18 by 12 feet adjoins on the south. This kitchen is under the supervision of a sister, who is generally assisted by from four to six men.

The *Main Kitchen* is 77 by 24 feet. It contains a cooking-range, 28 feet 10 inches long and 3 feet 2 inches wide; also three of "Peters' and Johnson's bake-ovens or roasters," two boilers for tea and coffee, each with a capacity of 120 gallons, five boilers or cauldrons for soup or hash (60 gallons each), and two for heating water (one 60 gallons, the other 22 gallons). Full diet is prepared here for all the men in the hospital.

On either side of the kitchen, opening from it north and south, are the *Dining-Rooms*, each 146 by 24 feet, with three tables running the whole length of each, capable of seating in all 860 men. At the distal end of each room a door opens on a corridor and raised walk, so that the patients are protected from the weather in coming to their meals. Cars, with cans fitted in them, are run around the corridors to the several wards with the food for those unable to come to the dining-room.

On the northwest corner of the kitchen is a room 30 feet long, 14 feet wide, and 10 feet high, used for washing dishes, roasting coffee, etc. From 40 to 50 men are usually employed in the various departments of the kitchen.

Opposite the centre of the northern dining-room, and distant to the west 30 feet, is the *Fire-Engine and Hose House*, 26 by 20 feet—contains one fire-engine, three hose-carriages carrying 1850 feet of hose, 34 ladders, 22 hooks, 278 axes, and 300 buckets.

Thirteen feet south of the kitchen is the *Meat-Shop*, 14½ by 23. In its centre is an ice-box, 3½ by 14½ and 4 feet deep, lined with zinc. The allowance of ice per day is one pound for each man.

East of the kitchen, and connected by a covered way, is the *Commissary Building*, which is two stories high,—the upper story is used to lodge attendants; the lower story, used for commissary store-room, is 82 by 23½, and is under a commissary steward. In the northeastern corner is the liquor-room, 8½ by 13, heavily planked and secured against marauders. All liquor is issued here on the orders of the ward surgeons. The vegetable-room is in the northwestern corner, and is 9 by 13½. An office, 9 by 15½, adjoins the liquor-room. The books and accounts are kept in this office. The store-room is provided with a counter 52½ feet long, and gives employment to one steward, one clerk, and two men. At the southern end is the bread-room, 14½ by 23, which employs two men cutting bread for the tables. Adjoining, on the east, is the bakery, 14 by 23½. The oven is 10 by 16 feet.

The *Chapel* is situated 63 feet east of the commissary building. It is a structure shaped like the letter "T," one story in height, with a cupola on top. The main building is 24 by 78 feet. The northern end is used during the week as a reading-room. The left wing, 18 by 26 feet, is used as a library; it contains 3000 volumes, contributed to the hospital from various sources. The right wing is the same size, and is used as a school for the freedmen employed in the hospital, who are instructed by two female teachers.

Twenty-four feet south of the chapel is the *Sutler's Store*, 24 by 68. The *Stables*, 25 by 101 feet, are 72 east of the sutler's shop; they contain 18 horses, 3 wagons, 3 ambulances, 3 carts and 1 night-cart. Thirteen men are employed as hostlers, drivers, etc. One hundred and twenty-one feet northeast of the stables is the *Guard-House*, 15 by 47 and one story high. South of this is the *Oil-Room* and *Freedmen's Quarters*, 29 by 69 feet. The oil and lamp room are in the northern part. Kerosene oil was used in lighting the whole hospital, and all the lamps were filled and trimmed in this room. A corporal and two men were employed. Ninety-one feet southeast of the oil-room is the *Dead-House*, 15 by 40 feet. It is divided into two rooms—the northern one used in making post-mortem examinations, and the southern for plaster-casts, etc. Thirty-two feet south of this room is the *Photographic Gallery*, 16 by 24 feet. An operator is employed at $100 per month, paid from the slush fund. Surgical cases, pathological specimens, etc. are taken; also likenesses of all men discharged on surgeon's certificate of disability, as a guard against fraud. On the base line of the triangle are the *Medical Officers' Quarters*, 63 by 24 and two stories in height; also, in the same line, the quarters for the *Veteran Reserve Corps*, a building two stories high, with an outside entrance-stairway to the second floor. Ninety feet further back, 100 hospital tents are pitched, placed four end to end, on substantial frames, with floors raised from the ground and a door at each end of the frame. The sides of these tents were always easily raised, and gave the best of

ventilation; hence I selected some of them as gangrene wards, and, I think, with the very best results. In winter, each ward was heated by two stoves, with pipes running to a shaft in the centre. Each ward of four tents contained 20 beds. The length of the fence around the hospital is 1458 yards. The distance of the fence from the tents at the base of the triangle is 124 feet. Sinks were arranged around the whole line of fence. They had movable boxes, which were regularly emptied and limed. Policing was done by a gang of about 20 freedmen. The hospital could accommodate 1240 patients in the 20 barrack wards. Its total capacity in January, 1865, was 2575 beds, including those in tents and the branch barracks, a short distance off.

This hospital was opened December 23d, 1862, and closed August 22d, 1865. During this period the movements of patients were as follows:

	Admitted.			Returned from furlough and desertion.	Aggregate.	Results.						
	Sick.	Wounded.	Total.			Returned to duty and mustered out.	Sent to General Hospital.	Furloughed.	Transferred to Veteran Reserve Corps.	Discharged.	Deserted.	Died.
White Troops	12,391	7,837	20,228	3,565	23,793	7,191	9,411	4,400	392	1,053	286	1,060
Colored Troops	13	5	18	.....	18	.....	18	.....	.....	.....	.....	.....
Prisoners of War	174	959	1,133	.....	1,133	.....	924	.....	.....	45	3	161
Total	12,578	8,801	21,379	3,565	24,944	7,191	10,353	4,400	392	1,098	289	1,221

Deducting those sent to general hospital as cases not terminated, and considering that furloughed and deserted amounted to 4686, while only 3565 of these are reported as returned from furlough and desertion, we shall have the following statistics for the terminated cases of white troops treated:

Total to be accounted for, excluding those sent to other hospitals	10,817	.....
Returned to duty	.....	6,339
Mustered out of service at the close of the war	.....	852
Loss by desertion and failure to return from furlough	.....	1,121
Discharged for disability	.....	1,053
Transferred to Veteran Reserve Corps	.....	392
Died	.....	1,060
	10,817	10,817

These figures represent excellent results, but they are not more favorable than the general statistics of all the hospitals. Making proper corrections for transfers from hospital to hospital, there were over a million of patients treated in the general hospitals during the four years of the war, and the mortality, including both that from disease and that from wounds, was but one death to every twelve patients, or about 8 per cent.

Harewood Hospital, Washington, D. C., was constructed on a plan quite similar to that of Lincoln Hospital. The Hampton General Hospital, near Fortress Monroe, was also composed of wards arranged en echelon in the form of a V, but not overlapping

each other, as those of the two foregoing hospitals did. The hospital at Point Lookout, Maryland, at Jeffersonville, Indiana, and the Sedgwick Hospital, at Greenville, near New Orleans, La., may be mentioned as examples of constructions in which the pavilion wards radiated from a circular covered way. An idea of this form of construction can be obtained from the following brief account of the latter hospital, abstracted from the Inspection Report of Medical Inspector E. P. Vollum, U. S. A., dated July 10th, 1865:

Sedgwick Hospital is situated at Greenville, La., about seven miles above New Orleans, on the east bank of the Mississippi River. The site is flat, and drains back from the river into the swamp lands lying between the Mississippi River and Lake Pontchartrain. The soil is a rich, black alluvium. The grounds embrace about 30 acres, which have been for many years under cultivation as a plantation. At present, there is a fine vegetable garden sufficient for all the wants of the hospital. A large part of the premises is shaded by splendid groves of live-oak, pecans, and

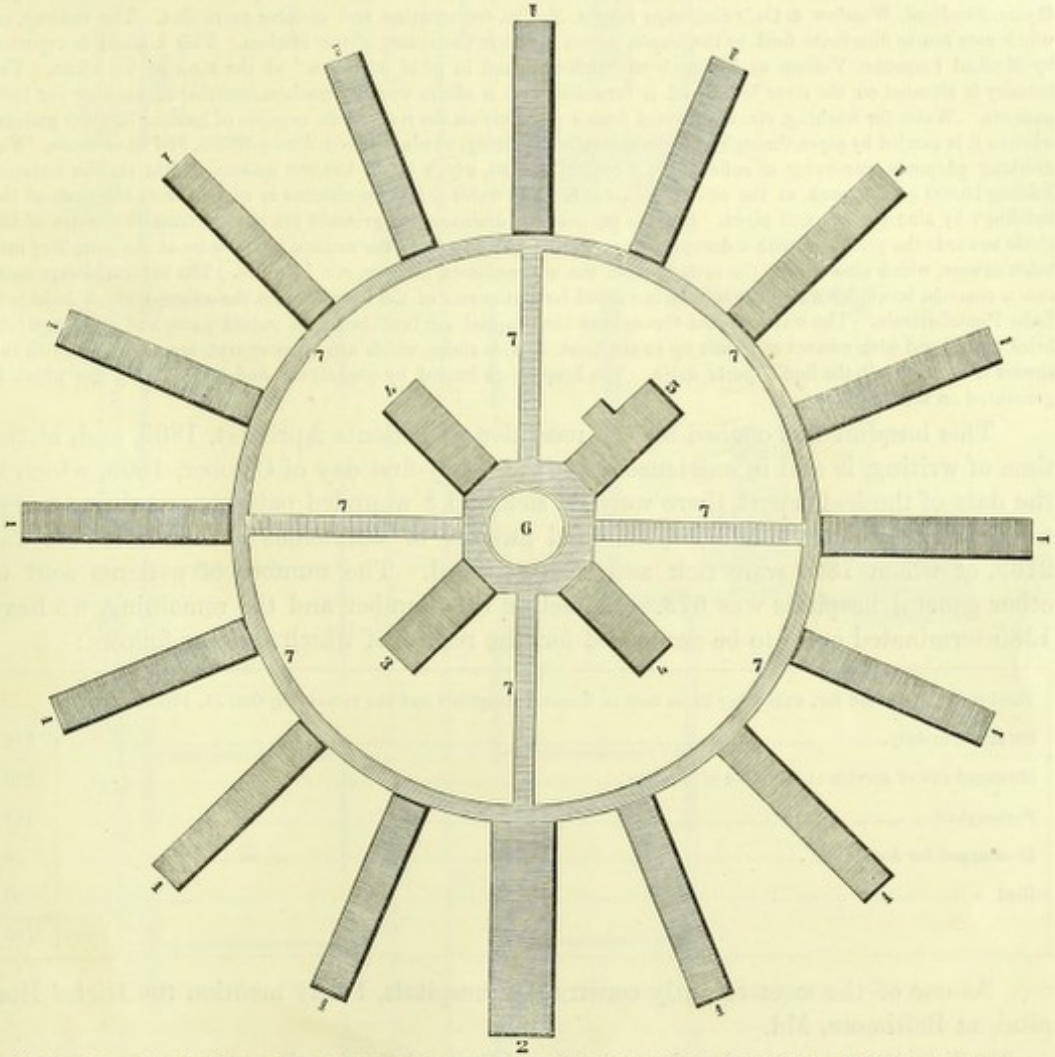


FIG. 11.—GROUND PLAN OF SEDGWICK GENERAL HOSPITAL, GREENVILLE, LA. Scale, 120 feet to the inch. 1 1 1 1. Wards. 2. Administration building. 3. Guard-house, knapsack-room, and store-house. 4 4. Dining-rooms. 5. Kitchen. 6. Cistern. 7. Covered ways, through which a railway runs with hand-cars for carrying food to the wards.

oranges, with crape myrtles and the flowering shrubs peculiar to the latitude. The hospital is approached from the river front by a substantial road, and shell-roads and walks connect the several buildings and wind among the groves. The hospital is composed of fifteen one-storied pavilion wards, each 145 by 24 feet, and an administration building, 145 by

40, radiating from the periphery of a circular covered way, in the centre of which are the buildings for kitchens, etc. etc. The arrangement is shown in Figure 11, in which the part towards the bottom of the page is that facing the river front.

Outside the circle, at convenient distances, are detached buildings for chapel, cooks' and nurses' quarters, laundry, gas-house, bake-house, dead-house, reservoir, and stables. All these buildings are constructed of boards, set upright and battened; the roofs shingled, and open at the ridge for ventilation. They are raised 3 feet above the ground on brick piers. The covered way which connects them is twelve feet wide. The ward pavilions have two small rooms partitioned off at each end, leaving a space in the centre, 115 by 24 feet, available for patients. There are two beds between each pair of windows, as in the plan figured on page 153, but the number of beds is less—40 to each ward. The dimensions allow about 69 square feet of floor and 1200 cubic feet of air-space to each patient. Three of the small rooms mentioned are occupied as sleeping apartments for nurses. The fourth, which is one of those at the outer extremity of each ward, is divided into bath-room and water-closet. The administration building is two stories high, and contains the office, dispensary, officers' reception, lodging, and dining rooms, etc. etc. The hospital kitchen is shown in Figure 12, which explains its arrangement. The building is 80 by 30 feet. There is a patent steam cooking apparatus with boilers, etc., and a carving-table, the pans of which are kept warm by steam. There is also one of Myers, Sandford, Winslow & Co.'s challenge ranges, No. 10, for roasting and cooking extra diet. The railway, on which cars run to distribute food to the wards, passes through the centre of the kitchen. This kitchen is reported by Medical Inspector Vollum as having been "sufficient and in good condition" at the time of his visits. The laundry is situated on the river bank, and is furnished with a steam washing-machine, capable of washing for 1500 patients. Water for washing, etc. is obtained from a reservoir on the river bank, capable of holding 320,000 gallons, whence it is carried by pipes through the administration building, wards, kitchen, dining-rooms, and dead-house. For drinking purposes, rain-water is collected in a central cistern, which holds 150,000 gallons, and in smaller cisterns, holding 10,000 gallons each, at the end of each ward. The water for these cisterns is carried from the roofs of the buildings by zinc gutters and pipes. For the purposes of drainage, the grounds are graded from the centre of the circle towards the periphery with a descent of one inch to every 10 feet; the surface water flows at the periphery into brick sewers, which also receive the sewage from the water-closets, kitchen, etc. by pipes. The several sewers unite into a common trunk, by which the sewage is carried far to the rear of the hospital into the swamps which drain into Lake Pontchartrain. The water-closets throughout the hospital are furnished with patent pans, and discharge into brick sinks lined with cement and built up to the floor. These sinks, which are of some size, are connected with the sewers into which all the liquid parts drain. The hospital is heated by coal-stoves, and lighted with gas which is generated on the premises.

This hospital was opened for the reception of patients April 1st, 1865, and, at the time of writing, is still in existence. On the thirty-first day of October, 1865, which is the date of the last report, there were 97 sick and 8 wounded patients remaining under treatment. Prior to that date, the total number of admissions of white soldiers was 2163, of whom 1869 were sick and 474 wounded. The number of patients sent to other general hospitals was 673. Deducting this number and the remaining, we have 1385 terminated cases to be accounted for, the results of which were as follows:

Total to be accounted for, excluding those sent to General Hospitals and the remaining Oct. 31, 1865....	1385	.....
Returned to duty.....	.....	848
Mustered out of service at the close of the war.....	.....	210
Furloughed.....	.....	181
Discharged for disability.....	.....	56
Died	.....	90
	1385	1385

As one of the most recently constructed hospitals, I may mention the Hicks' Hospital, at Baltimore, Md.

The Hicks' Hospital is situated on the continuation of Townsend Street in the western suburbs of Baltimore, near the city boundary. It was opened for the reception of patients June 9th, 1865, and is therefore one of the most recently constructed hospitals. The plan was essentially the circular one already described, but many important improvements and additions were devised by Surgeon Thomas Sim, U. S. Vols., under whose supervision the details of the plan were prepared. The original design contemplated a circular hospital, built on the War Department

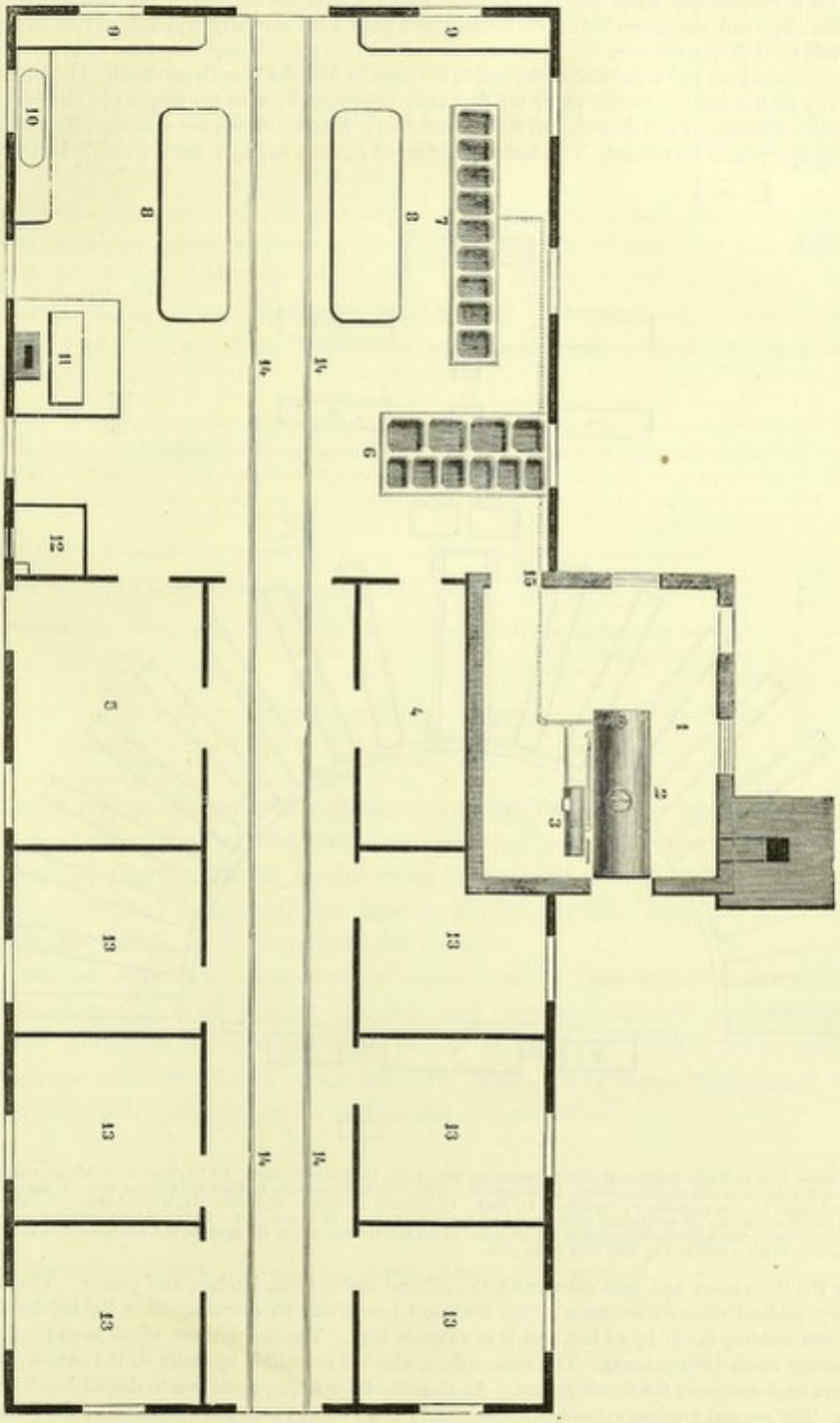


FIG. 12.—GROUND PLAN OF THE KITCHEN OF SENOWICK HOSPITAL. Scale, 10 feet to the inch. 1. Engine-house. 2. Boiler. 3. Engine and pump. 4 and 5. Store-rooms. 6. Boiling kettles. 7. Carving-table. 8 8. Tables for the delivery of food. 9 9. Shelves. 10. Sink for washing dishes. 11. Extra diet and roasting range. 12. Garbage-box. 13 13 13 13 13. Rooms for cooks. 14. Railroad, on which run hand-cars to carry the food to the wards. 15. Steam-pipe to heat kettles and carving-table.

plan, with thirty-six radiating pavilion wards, each to accommodate 60 patients. The approach of the end of the war, however, prevented this from being executed, and the hospital, as completed, is a semicircle, in which the wards radiate from a covered way, as in Figure 13. It is, however, both on account of the substantial character of the wooden buildings and the numerous conveniences which have been carefully supplied, one of the most complete of the hospitals built during the war.

The wards are built and ventilated as directed in the circular from the War Department. The administration building is 132 by 38 feet and two stories high; the first story contains offices for the surgeon in charge, executive officer, quartermaster, commissary and their clerks; it also contains the hospital library and printing-office. On the second floor are sleeping apartments for officers. This building is flanked on each end by a smaller one, 70 by 28 feet, one of which

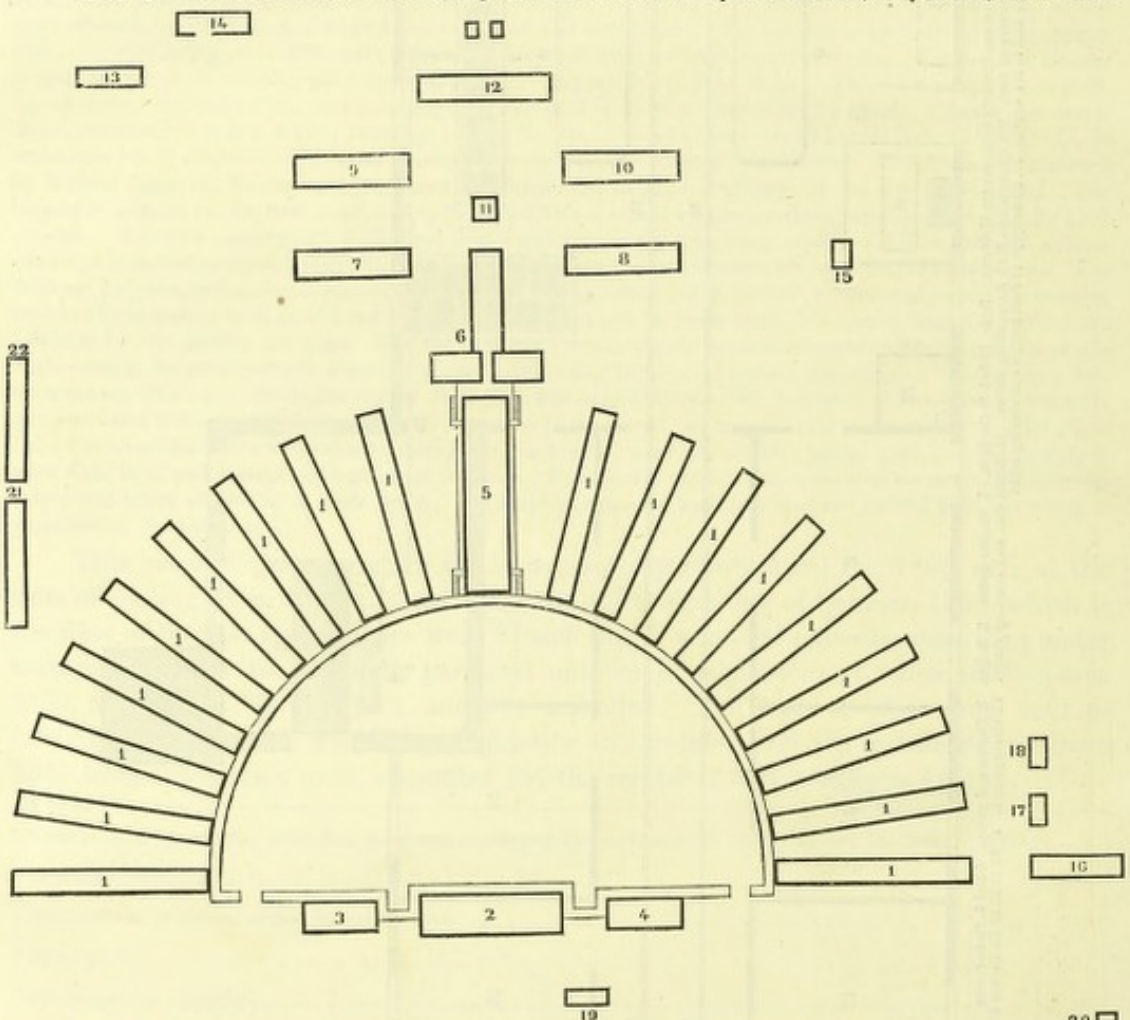


FIG. 13.—GROUND PLAN OF HICKS' GENERAL HOSPITAL, BALTIMORE, MD. Scale, 180 feet to the inch. 1 1 1 1. Wards. 2. Administration building. 3. Linen-room, etc. 4. Dispensary and operating-room. 5. Dining-hall. 6. Kitchen and laundry. 7. Ward for detailed men. 8. Knapsack-room. 9. Commissary store-house. 10. Quartermaster's store-house. 11. Tank. 12. Quarters for guard. 13. Stable. 14. Wagon-house. 15. Sutler. 16. Stewards' quarters. 17 18. Officers' houses (of which, also, there are several not in the figure). 19. Guard-room. 20. Guard-house, near entrance gate. 21. Workshop. 22. Contagion ward: this is farther distant than is represented in the figure. The wards, dining-room, and administration building are connected by a covered way, which is indicated by faint lines in the plan.

contains the linen-room and post-office, with the officers' dining-room, kitchen, and pantry. The other contains the dispensary, medical store-rooms, room of the discharge board, and an operating-room lighted by a sky-light. The dining-room building is 187 by 48 feet, and is two stories high. The dining-room, which is on the first floor, is capable of seating about 1200 patients. The second floor, which is accessible by stairs on the outside, is occupied by the chapel and by dormitories for female nurses. At the end of the dining-room is a T-shaped building for kitchen and laundry. The general kitchen, extra-diet kitchen, and bakery occupy separate apartments; the former two each contain a suitable range and steam fixtures, the latter two bake-ovens. The laundry has a separate room for drying by steam, and immediately adjoins the engine-room, which is at the extremity of the building. There are, besides the foregoing, separate buildings for knapsack-room, quartermaster's store-house, commissary store-house, quarters for

detailed men, barracks for guard, workshop, contagion ward, dead-house, stewards' quarters, and quarters for married officers. The buildings are plastered inside, are lighted by gas, to be warmed in the winter by stoves, and receive their water supply by pipes from the city water-works, besides which there is a tank for the purpose of keeping a stock of water constantly on hand in case of fire. For the purpose of extinguishing fire, there is abundant hose to fit the steam-pump. There are also water-buckets, axes, etc. At the distal end of each ward is a lavatory and bath-room and a water-closet. Each bath-room has in it a small stove, on which is a boiler for the supply of hot water. In the water-closets the excretions are received in troughs, into which a stream of water runs, and which are emptied by withdrawing a plug several times daily. They discharge into sewers constructed for the purpose, which carry all offensive matters entirely away from the hospital. A very beautiful model of the hospital in holly-wood has been presented to the Army Medical Museum by Surgeon Sim.

This hospital was opened for patients June 9th, 1865; and the total number of white soldiers received prior to November 30th, 1865, which was the last report up to the date of writing, was 1247, of whom 984 were sick and 263 wounded. Of these, 366 were transferred to other general hospitals, and 120 remained under treatment at the date of the last report. The number of terminated cases, therefore, was 761, who are thus accounted for:

Total to be accounted for, excluding those transferred to other hospitals and those remaining at date of last report	761	.....
Returned to duty	.....	131
Mustered out of service at the close of the war	.....	443
Loss by desertion and failure to return from furlough	.....	52
Discharged for disability	.....	89
Transferred to Veteran Reserve Corps	.....	2
Died	.....	44
	761	761

Besides the above, 280 colored soldiers were admitted, of whom 15 died.

All the hospitals hitherto described were situated near the base of military operations, and received therefore more severe cases than those at a distance. As an example of the more distant hospitals, the figures of the Lovell Hospital, at Portsmouth Grove, Narraganset Bay, R. I., may here be given.

This hospital, which is composed of twenty-eight fine wooden pavilion wards, situated on a tongue of land jutting out into the bay, was opened in July, 1862, and closed October 10th, 1865. During this period it received 11,696 white soldiers, of whom 8491 were sick and 3205 wounded. Of these, 2461 were transferred to other hospitals, leaving 9235 patients to be accounted for, as follows:

Total to be accounted for, excluding those sent to other hospitals	9235	.....
Returned to duty	.....	4386
Mustered out at the close of the war	.....	875
Loss by desertion and failure to return from furlough	.....	961
Discharged for disability	.....	2021
Transferred to Veteran Reserve Corps	.....	716
Died	.....	276
	9235	9235

On comparing the statistical reports of the hospitals in various parts of the country, we are struck by the fact that the number returned to duty and the ratio of deaths to terminated cases were greater in those hospitals which were nearest the seat of war. On the other hand, the number discharged the service for disability and transferred to the Veteran Reserve Corps was greater in the more distant ones. These facts, which naturally result from the reception of acute cases into the nearest hospitals and the frequent transfers thence to the more distant ones, must be remembered in all comparisons made between the results of treatment in different institutions. To give an idea of the vast extent of hospital accommodations demanded, the following list of general hospitals in existence in September, 1864, is here presented. The hospital system had at that time attained its maximum extent, there being 202 general hospitals and 136,894 beds for patients. The number of beds was gradually reduced till January, 1865, when there were 121,000, and about this number was kept on foot to the close of the war.

Hospitals in the Atlantic Region, September, 1864.

No.	Name.	Locality.	Beds.
	Department of the East.		
1	David's Island	New York Harbor	3,000
2	Fort Columbus	New York Harbor	100
3	Ladies' Home	New York City	400
4	St. Joseph's	Central Park, N. Y.	333
5	Newark	Newark, N. J.	927
6	Lovell	Portsmouth Grove, R. I.	1,644
7	Knight	New Haven, Conn.	1,121
8	Brattleboro'	Brattleboro', Vt.	1,097
9	Marine	Burlington, Vt.	250
10	Mason	Boston, Mass.	60
11	Buffalo	Buffalo, N. Y.	150
12	McDougall	Fort Schuyler, N. Y. Harbor	1,328
13	Augusta	Augusta, Me.	1,052
14	Grant	Willets' Point, N. Y. Harbor	1,172
15	Skan	Montpelier, Vt.	462
16	Albany	Albany, N. Y.	560
17	Elmira	Elmira, N. Y.	300
18	Rochester	Rochester, N. Y.	608
19	Officers'	Bedloe's Island, N. Y. Harbor	80
20	New York City	New York City	151
21	Jews'	New York City	50
22	Brooklyn City	Brooklyn City, N. Y.	100
23	Sisters of Charity	Buffalo, N. Y.	200
24	Readville	Readville, Mass.	910
	Department of the Susquehanna.		
1	McClellan	Philadelphia, Pa.	1,841
2	Turner's Lane	Philadelphia, Pa.	310
3	Convalescent	Philadelphia, Pa.	805
4	Satterlee	Philadelphia, Pa.	3,519
5	Mower	Philadelphia, Pa.	3,326
6	Cuyler	Germantown, Pa.	700
7	Christian Street	Philadelphia, Pa.	299
8	South Street	Philadelphia, Pa.	270
9	Citizen's Volunteer	Philadelphia, Pa.	250
10	Summit House	Philadelphia, Pa.	1,204
11	York	York, Pa.	2,200
12	Haddington	Philadelphia, Pa.	1,225
13	Islington	Philadelphia, Pa.	60
14	Officers'	Camac Woods, Pa.	64
15	U. S. General	Pittsburg, Pa.	723
16	Broad Street	Philadelphia, Pa.	527
17	Chester	Chester, Pa.	1,167
18	Beverly	Beverly, N. J.	1,460
19	White Hall	White Hall, Pa.	1,573
	Middle Department.		
1	National Hotel	Baltimore, Md.	460
2	Newton University	Baltimore, Md.	200
3	Convalescent	Baltimore, Md.	1,200
4	Jarvis	Baltimore, Md.	1,380
5	West's Buildings	Baltimore, Md.	425
6	Division No. 1	Annapolis, Md.	1,117
7	Division No. 2	Annapolis, Md.	661
8	Annapolis Junction	Annapolis Junction	290
	Carried forward		43,051

No.	Name.	Locality.	Beds.
	Brought forward		43,051
	Middle Department—Continued.		
9	Tilton	Wilmington, Del.	352
10	McKim's Mansion	Baltimore, Md.	300
11	Officers'	Annapolis, Md.	400
12	Camp Parole	Annapolis, Md.	2,000
	Department of Washington.		
1	Armory Square	Washington, D. C.	1,000
2	Augur	Near Alexandria, Va.	671
3	Carver	Washington, D. C.	1,300
4	Campbell	Washington, D. C.	1,000
5	Columbian	Washington, D. C.	844
6	Douglas	Washington, D. C.	400
7	Ricord	Washington, D. C.	120
8	1st Division	Alexandria, Va.	1,295
9	2d Division	Alexandria, Va.	1,000
10	3d Division	Alexandria, Va.	1,500
11	Emory	Washington, D. C.	900
12	Finley	Washington, D. C.	1,061
13	Fairfax Seminary	Virginia	936
14	Harewood	Washington, D. C.	2,000
15	Judiciary Square	Washington, D. C.	510
16	Kalorama	Washington, D. C.	434
17	Lincoln	Washington, D. C.	2,575
18	Mount Pleasant	Washington, D. C.	2,000
19	Seminary	Georgetown, D. C.	123
20	Stone	Washington, D. C.	170
21	Freedman	Washington, D. C.	98
22	Stanton	Washington, D. C.	420
23	U. S. General	Point Lookout, Md.	1,000
24	Louverture	Alexandria, Va.	500
25	Claremont	Alexandria, Va.	164
26	Giesboro'	Giesboro' D. C.	535
	Department of Virginia and North Carolina.		
1	U. S. General	Near Fort Monroe, Va.	3,570
2	Balfour	Portsmouth, Va.	850
3	Foster	Newbern, N. C.	475
4	U. S. General	Beaufort, N. C.	230
5	Mansfield	Morehead City, N. C.	300
	Department of the South.		
1	Division No. 1	Beaufort, S. C.	295
2	Division No. 2	Beaufort, S. C.	440
3	U. S. General	Hilton Head, S. C.	600
4	U. S. General	Jacksonville, Fla.	174
5	Officers'	Beaufort, S. C.	20
6	Conot	St. Augustine, Fla.	133
7	Field	Marietta, Ga.	2,115
	Total Atlantic Region		78,560

Hospitals in the Central Region, September, 1864.

No.	Name.	Locality.	Beds.
	Northern Department.		
1	Seminary	Columbus, Ohio	223
2	U. S. General	Camp Chase, Ohio	214
3	U. S. General	Cleveland, Ohio	300
4	Dennison	Camp Dennison, Ohio	2,500
5	West End	Cincinnati, Ohio	120
6	Washington Park	Cincinnati, Ohio	150
7	Marine	Cincinnati, Ohio	122
8	U. S. General	Evansville, Ind.	650
9	Madison	Madison, Ind.	2,095
10	U. S. General	Indianapolis, Ind.	256
11	Desmarres	Chicago, Ill.	150
12	Marine	Chicago, Ill.	110
13	U. S. General	Camp Butler, Ill.	450
14	U. S. General	Quincy, Ill.	478
15	St. Mary's	Detroit, Mich.	400
16	U. S. General	Gallipolis, Ohio	800
17	Main Street	Covington, Ky.	300
18	Seminary	Covington, Ky.	218
19	Grant, Officers'	Cincinnati, Ohio	50
	Department of the Northwest.		
1	Harvey	Madison, Wis.	586
2	U. S. General	Keokuk, Iowa	1,350
3	U. S. General	Davenport, Iowa	200
	Department of Western Virginia.		
1	Frederick	Frederick, Md.	1,276
2	Cumberland	Cumberland, Md.	1,191
3	Parkersburg	Parkersburg, West Va.	418
4	Grafton	Grafton, West Va.	267
	Department of the Ohio.		
1	Clay	Louisville, Ky.	970
2	Brown	Louisville, Ky.	1,000
3	Eruptive	Louisville, Ky.	348
4	U. S. General	New Albany, Ind.	1,228
5	Ohio	New Albany, Ind.	300
6	Jefferson	Jeffersonville, Ind.	2,802
7	No. 16	Jeffersonville, Ind.	110
8	Nelson	Camp Nelson, Ky.	500
9	Nelson (Eruptive)	Camp Nelson, Ky.	100
10	Convalescent	Camp Nelson, Ky.	600
11	U. S. General	Lexington, Ky.	463
12	U. S. General	Bowling Green, Ky.	128
13	U. S. General	Ashland, Ky.	275
14	Corps d'Afrique	New Albany, Ind.	82
15	Totten	Louisville, Ky.	1,150
16	Joe Holt	Jeffersonville, Ind.	1,350
17	U. S. General	Knoxville, Tenn.	1,347
18	Officers'	Knoxville, Tenn.	54
19	Holston	Knoxville, Tenn.	656
20	Officers'	Louisville, Ky.	33
21	Branch "A"	Bowling Green, Ky.	88
22	Branch "B"	Bowling Green, Ky.	40
	Department of the Missouri.		
1	Marine	St. Louis, Mo.	208
2	Small-pox	St. Louis, Mo.	235
3	U. S. General	Benton Barracks, Mo.	575
4	U. S. General	Jefferson Barracks, Mo.	1,700
5	U. S. General	Jefferson City, Mo.	134
6	U. S. General	Springfield, Mo.	200
7	U. S. General	Rolla, Mo.	120
8	U. S. General	Kansas City, Mo.	100
9	Prison	St. Louis, Mo.	300
	Carried forward		32,170

No.	Name.	Locality.	Beds.
	Brought forward		32,170
	Department of Kansas.		
1	U. S. General	Leavenworth, Kansas	240
2	U. S. General	Fort Scott, Kansas	148
	Department of the Arkansas.		
1	U. S. General	Little Rock, Ark.	797
2	U. S. General	Fort Smith, Ark.	325
3	Colored Ward	Little Rock, Ark.	24
4	Officers'	Little Rock, Ark.	129
5	U. S. General	Helena, Ark.	100
	Department of the Tennessee.		
1	Overton	Memphis, Tenn.	450
2	Gayoso	Memphis, Tenn.	400
3	Adams'	Memphis, Tenn.	500
4	Officers'	Memphis, Tenn.	100
5	Old State (Pest)	Memphis, Tenn.	200
6	Washington	Memphis, Tenn.	400
7	Webster	Memphis, Tenn.	500
8	U. S. General	Mound City, Ill.	636
9	Pest	Near Vicksburg, Miss.	147
10	U. S. General No. 2	Vicksburg, Miss.	200
11	U. S. General No. 3	Vicksburg, Miss.	300
12	U. S. General	Natchez, Miss.	144
13	Jackson	Memphis, Tenn.	300
	Department of the Cumberland.		
1	U. S. General No. 1	Nashville, Tenn.	900
2	U. S. General No. 2	Nashville, Tenn.	665
3	U. S. General No. 3	Nashville, Tenn.	600
4	U. S. General No. 8	Nashville, Tenn.	540
5	U. S. General No. 11	Nashville, Tenn.	720
6	U. S. General No. 15	Nashville, Tenn.	280
7	U. S. General No. 16	Nashville, Tenn.	176
8	U. S. General No. 17	Nashville, Tenn.	180
9	U. S. General No. 19	Nashville, Tenn.	629
10	Cumberland	Nashville, Tenn.	2,400
11	Field	Bridgeport, Ala.	408
12	U. S. General	Gallatin, Tenn.	168
13	U. S. General	Murfreesboro', Tenn.	720
14	U. S. General	Tullahoma, Tenn.	160
15	U. S. General No. 1	Chattanooga, Tenn.	672
16	U. S. General No. 2	Chattanooga, Tenn.	1,131
17	Field	Chattanooga, Tenn.	1,247
18	U. S. General No. 14	Nashville, Tenn.	750
19	Sherman	Nashville, Tenn.	439
20	U. S. General	Lookout Mountain, Tenn.	800
21	Officers'	Lookout Mountain, Tenn.	250
22	Provisional	Chattanooga, Tenn.	100
	Department of the Gulf.		
1	St. James	New Orleans, La.	300
2	University	New Orleans, La.	600
3	Marine	New Orleans, La.	800
4	U. S. Barracks	New Orleans, La.	1,200
5	St. Louis	New Orleans, La.	500
6	Charity	New Orleans, La.	650
7	U. S. Convalescent	Baton Rouge, La.	400
8	Corps d'Afrique	New Orleans, La.	1,700
	Total Central Region		58,266

Hospitals in the Pacific Region, September, 1864.

No.	Name.	Locality.	Beds.
1	Wright	Presidio, San Francisco, Cal.	40
2	Barnes	Benicia Barracks, Cal.	28

RECAPITULATION.

Atlantic Region	93	Hospitals.	78,560 Beds.
Central Region	167	"	58,266 "
Pacific Region	2	"	68 "
Total	262	"	136,894 "

In addition to hospital construction, it is important that the system of hospital administration should be faithfully described. The hospital fund and its management, the slush fund, hospital cooking and diet tables, nurses, the question of female nurses, the hospital records and reports, are all subjects on which there are abundant data for a complete historical investigation.

In the foregoing remarks, my intention has been simply to give an idea of the nature and extent of the data for a Medical History of the War to be found in the part of the office under my direction. Many matters of interest have not been touched upon, for a full discussion of which abundant material exists; as, for example, the comparative health of the colored troops, of the prisoners of war held by us, of those of our own men who were unfortunate enough to fall into the hands of the rebels, etc. Moreover, there is much material in other branches of the Surgeon General's Office the consideration of which is necessary to a full understanding of the medical administration of the army.

In conclusion, I may express the opinion that, with the utmost brevity and care, it may be hoped to digest the material above sketched, not including surgical cases, into three quarto volumes, of about the size of the volumes of the Medical Statistics heretofore published. The prominent subjects in these volumes would be the medical statistics of the several armies, with the principal facts in their medical histories; the medical statistics of the several general hospitals, with descriptions of their construction and administration, illustrated by a sufficient number of ground plans and perspective views to give a just idea of them; and lastly, an account of the causes, history, symptoms, pathology, and treatment of the principal diseases of the troops, based upon statistical facts, contributed papers, histories of cases and autopsies, and observations made in the medical and microscopical sections of the Museum. This part of the work it is proposed to illustrate with such colored plates of morbid conditions and representations of the microscopical anatomy of the chief diseases as may be necessary to preserve, for the future study of medical men, a faithful account of the costly experience of the Medical Department during the war. Of the subjects thus indicated, about one-half of the statistical matter is compiled, and most of the material required for the remaining portion of the work is collected, and can be prepared for the press with reasonable rapidity. Almost all the necessary drawings are made, and ready for the lithographer; a large number of the wood-cuts are actually executed, and the material for the microscopical illustrations is in a forward condition.

I have the honor to be,
Very respectfully,
Your obedient servant,

J. J. WOODWARD,
Assistant Surgeon and Brevet Major U. S. A.,
In charge of the Record and Pension Division, Surgeon General's Office,
and of the Medical Section, Army Medical Museum.