

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES

TO THE

TWO HOUSES OF CONGRESS,

AT

THE COMMENCEMENT OF THE FIRST SESSION

OF

THE THIRTY-FOURTH CONGRESS.

DECEMBER 31, 1855.—Read, and ordered that the usual number of the message and documents be printed; and that 15,000 copies of the message and accompanying documents, in addition to the usual number, be printed for the use of the Senate by the printer of the Senate for the last Congress, at rates not exceeding those established by existing laws.

Resolved, That two hundred additional copies of the President's message and the accompanying documents be printed for the use of each of the Secretaries of State, Treasury, Interior, War, and Navy Departments, the Attorney General, and the Postmaster General.

Resolved, That five hundred additional copies of the annual reports of the Secretaries of the Treasury, Interior, War, and Navy Departments, and Postmaster General, be printed for the use of those departments respectively.

PART II.

WASHINGTON:

PRINTED BY BEVERLEY TUCKER.

1855.

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REPORT OF THE SECRETARY OF THE
TREASURY

RECEIPTS OF THE TREASURY

For the year ending June 30, 1891

By the Secretary of the Treasury

Washington, D. C.

1891

Printed by the Government Printing Office

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REPORT OF THE SECRETARY OF WAR.

WAR DEPARTMENT,
Washington, December 3, 1855.

SIR: I have the honor to submit the following report of the operations of the army for the past year, and to lay before you the reports of the heads of the several bureaux of the War Department, and communications from other officers of the army.

The authorized strength of the army (as now posted) is 17,867 officers and men; but the accompanying tables, prepared in the Adjutant General's office, show that, at the date of the latest returns, the actual strength was 15,752. The recruiting service is now progressing satisfactorily, however, and it is believed that in a few months the disparity between the authorized and actual strength of the army, 2,115, will be nearly overcome. The number of enlistments made during the twelve months ending September 30, was 10,546. The number of persons offering to enlist, and who were refused on account of minority and unfitness for service, was 20,522. The number of casualties in the army, by deaths, discharges, and desertions, during the same period, was 5,500.

The very numerous applications for the discharge of minors, so many of which have succeeded within the past year, renders necessary that some steps should be taken to check the growing evil, and the serious expense to which the government is thereby subjected. The regulations are sufficiently stringent on the subject of the enlistment of minors; but recruiting officers are frequently deceived by the appearance of the recruit, and the false representations respecting his true age. In cases where deceptions of this character have been practised, the contract should be considered binding, or the recruit should be required, at the time of enlisting, to swear that he is either of full age, or, being a minor, that he has neither parent nor guardian. A modification, to this extent, of the existing law respecting the discharge of minors, (5th section of the act of September 28, 1850,) would, it is believed, lessen the impositions which are now practised, and protect the government from no inconsiderable loss.

The general distribution of the troops remains, for the most part, as indicated in the last annual report. Among the changes of most importance are the following: The four additional regiments authorized by the act of March 3, 1855, have been recruited and organized. Seven companies of the 1st cavalry have recently returned from an expedition into the Sioux country, and the regiment will winter at Fort Leavenworth, where it will be in position for ulterior operations in the

spring. The 2d cavalry has been sent to the department of Texas, to replace the six companies of the 2d dragoons transferred to the department of the West. The 9th infantry, (riflemen,) designed for service in the department of the Pacific, has been embodied at Fort Monroe, and held under instruction preparatory to a campaign which it was proposed it should undertake as soon as the season would permit, through the Indians on the headwaters of the Missouri and tributaries of the Columbia river, from which exhibition of our power among those remote tribes it was expected a beneficial influence over them would result. But, in accordance with the necessity communicated by a letter from Gen. Wool, commanding the department of the Pacific, dated November 3, and this day received at the War Department, that regiment will be diverted from the proposed campaign by the overland route, and be despatched, with the least delay, by way of the Isthmus, to reinforce the command engaged in the suppression of Indian hostilities in Oregon.

The 10th infantry, (riflemen) with the exception of one company attached to the Sioux expedition, has been ordered to the military stations on the Upper Mississippi. A portion of this regiment, when the season admits, will be employed to establish a post on the Red river of the North, near the northern boundary of Minnesota, agreeably to an act passed at the last session of Congress, appropriating \$5,000, a sum altogether inadequate for that object. Six companies of the 2d infantry have taken post at Fort Pierre, on the Upper Missouri. Continued Indian difficulties on the Oregon route have rendered it necessary to retain in the department of the West the 6th infantry, which regiment it was contemplated to send to the Pacific coast.

Efforts are still in progress for the removal of the remnant of the Seminole tribe from Florida. The troops there have been kept actively employed in exploring the country by land and water, and in opening roads. By these means much important information respecting the territory in possession of the Indians has been gained, which will greatly facilitate future operations. All intercourse with these Indians has been strictly prohibited, and it is believed that they have not in any instance passed the line of observation occupied by the troops.

In the departments of the West, Texas, New Mexico, and the Pacific, Indian hostilities have been of frequent occurrence.

For the purpose of chastising the Sioux Indians implicated in the massacre of a detachment of United States troops in August of last year, and to protect from Indian incursions the western frontiers of Nebraska and Kansas, and the emigrant routes leading from the Missouri river to the west, a military force was sent into the country inhabited by the Sioux late in the summer, under the command of Brevet Brigadier General Harney. On the 3d of September, that officer, with a portion of his command, engaged a party of the Brulé band of the Sioux nation, and after a short conflict, completely routed them. Eighty-six Indians were killed, and a large number taken prisoners. The papers and property captured, leave no doubt that this band was concerned in the massacre of the detachment above referred to, as well

as in the murders and depredations committed upon emigrants, and in the robbery of the public mail.

In the departments of Texas, New Mexico, and the Pacific, military expeditions have been sent against the Indians guilty of outrages upon the persons and property of the frontier inhabitants and emigrants within those sections of country, and in several cases summary punishment has been inflicted by the troops upon the offending tribes.

The details of these operations will be found in the papers accompanying this report.

The mail steamer just arrived at New York has brought advices from the department of the Pacific to November 5, by which I regret to learn that Indian hostilities of a much more serious character than the difficulties in that department referred to above, or than, from the official reports previously received, there had been reason to apprehend, have occurred in the Territories of Oregon and Washington. The letters of the governor of the Territory, of October 24, and of the commanding general of the department of the Pacific, of November 3, of which copies are herewith submitted, furnish the only official information on the subject in the possession of this department. It will be perceived that, to meet the emergency, the governor has ordered out a mounted volunteer force of seventeen companies, or about 1,200 men.

The department, at this distance, and in the absence of more definite information, especially in regard to the extent of the combination among the hostile tribes, cannot judge what volunteer reinforcements to the regular troops may be necessary. This is a matter which must be necessarily left to the military commander in the department of the Pacific, who has repaired to the theatre of hostilities. His presence there will obviate difficulties which might otherwise arise on the subject of rank and command between officers of the volunteers and regular forces.

The alacrity with which the volunteers have responded to the call of Governor Curry, gives assurance that their aid will be as efficient as it has been prompt; and it is hoped that their continuance in the military service, to the great interruption of their ordinary pursuits, will be limited to the shortest possible duration, by the arrival of reinforcements which have been ordered to the regular troops of that department.

From a recent report of the commanding general of the department of New Mexico, it appears that all the Indian tribes within his command have concluded treaties with the governor of the Territory, and retired to the limits assigned them.

Service in Indian campaigns, though little calculated to excite the military ardor of the soldier, is attended by equal hazard, and even by greater privation than belongs to warfare with a civilized foe. The gallantry, zeal, and devotion of both officers and men have been repeatedly, within the last year, put to the severest test, and they have, on all such occasions, equalled the anticipations which past conduct warranted, and have renewed their claim to the gratitude of those whose flag they bear, and in whose service they have suffered.

The unusual extent of the operations above detailed has necessarily

caused large expenditures, which must exceed the appropriations made for the ordinary wants of the military service; an incident to which appropriations made upon estimates prepared so long in advance are always subject.

My attention has recently been called to the practice, in the settlement of accounts at the treasury, of charging sums due in past years to the current appropriations. It is deemed preferable that the settlement of old accounts should be provided for by appropriations for arrearages, and that the practice above referred to be checked; since, so long as it prevails, the appropriations for current expenses must prove insufficient, and deficiency bills be the necessary consequence.

In my last report I suggested several measures which I deemed necessary to preserve and increase the efficiency of the army.

The principal of these was a revision of the laws regulating rank and command, and those fixing the organization of the army. In relation to the evils then shown to be inherent in the present system, I need only say that additional experience has demonstrated their existence more clearly, while it has given no reason to distrust the advantages which were hoped from the changes indicated. That the right of command should follow rank by one certain and determinate rule; that officers who hold commissions which entitle them to the command of troops should not, at an early period of service, be placed permanently in positions on the staff which afford no opportunity for increasing military knowledge, or confirming military habits; that troops organized, equipped, and necessarily employed for the same service, should not be divided into different arms; that those serving on foot with regimental organization, and bearing muskets or rifles, should not be divided into artillery and infantry, nor mounted men, armed and equipped alike, be divided into dragoons and cavalry; that engineers should not be divided into two corps, with a nominal distinction of engineers and topographical engineers, though their acquirements, capability, and duties are so entirely alike, that it has been found necessary to adopt an arbitrary rule assigning to each a part of the duties of both;—these propositions are the basis of the principal recommendations submitted in my last report. They appear too clear to me to need to be enforced by argument, and I hope that the evils which the bare statement of the facts expose will not be suffered to exist after the subject shall have secured the considerate attention of Congress.

A measure scarcely inferior in importance to those which relate to rank, command, and organization, is that which has in view to increase the efficiency of the army by retiring from active service those officers who are no longer capable of fulfilling its requirements; but as their profession affords little opportunity for attention to personal interests, and as the very low rate of compensation allowed for their services indicates that it was fixed in connexion with the idea of a permanent tenure, it would scarcely seem to be just abruptly to discharge them without any provision for the future. Nor would such course be consistent with the gratitude due to those who, amid the dangers and privations of military life, have been disabled by many years of faithful

service, or by wounds received in battle. As, however, the claims of individuals must always be subservient to the public good, so nothing can justify a system which retains men in office for which they have become disqualified. When age, wounds, or other casualties of service have stripped an officer of the power to discharge the duties of a station which in earlier life he adorned, a just consideration for his own fame, and a due regard for the public welfare, demand that he should give place to one whose mental and physical activity is equal to the station, and who, stimulated by early promotion, would not fail to emulate the honorable fame of him whom he succeeds.

As one of the recommendations intimately connected with this subject, I have to renew that made in my former reports for an increase of the compensation of army officers, and a revision of the laws respecting their allowances.

That this measure has failed heretofore to secure the attention which is, in my opinion, due to it, I attribute to the misconceptions which are general, as to the amount of the pay and emoluments of a great majority of officers in active service. In the present condition of the laws regulating the pay and allowances of officers, some may, under certain circumstances, receive much larger allowances than others, and indeed more than the nature of the service justifies; and these, which are but exceptional cases, have given rise to a general impression that the compensation of the officers is much higher than it actually is. Perhaps the error would have been less prevalent were it not that their compensation is made up of many items, which vary according to circumstances, and render it difficult to compute the amount in all cases with certainty; but whenever the subject shall be fully considered, the result will, I am confident, show that the officers of the army are, on the average, less liberally compensated than those who pursue any other occupation demanding equal capacity and acquirements.

I also renew the recommendation that the provisions of the act of August 4, 1854, increasing the pay of the rank and file of the army, be extended to all enlisted men, some few of whom are, by the military signification of the words used in that statute, excluded from the benefits that were probably intended for all who come under military obligations by enlistment.

I commend to consideration the representations of the Surgeon General respecting the necessity for an increase of the medical corps. Such increase is required in consequence of the subdivision of our troops; and as the want of medical officers renders necessary the employment of citizen physicians, often at a higher compensation than that of a surgeon of the army, the new appointments would be attended with no additional expense. I therefore recommend the adoption of the measure.

I concur with the Quartermaster General in recommending the addition of five military storekeepers to his department. At present there is but a single depot of clothing and camp and garrison equipment; and as the supplies for the whole army have to be despatched therefrom to each company, the distribution can only be made at long

intervals, and consequently in large quantities, so that the companies are embarrassed in their movements, and the expense of transportation is increased by the large amount of stores which they have to take with them. With five depots, properly located, the distribution could be made more frequently, and in small quantities; the troops would thus be less encumbered with baggage, and the expense of their movements would be diminished.

By the seventh section of an act in addition to the several acts for the establishment and regulation of the Treasury, War, and Navy Departments, approved May 1, 1820, it is provided that no land shall be purchased on account of the United States, except under a law authorizing such purchase. Although the steady progress of our frontier westward, and the advance of our military posts with it, has rendered it frequently necessary to abandon old sites and occupy new ones, the prohibition to purchase land has not until recently been the cause of much embarrassment, since the troops were operating in territories where nearly all the land was already the property of the government. In Texas, however, the case is different; there, this government owns no land except such as it may have acquired by purchase for specific objects, and the greater number of our military posts stand upon the property of private persons or of the State. Embarrassments have arisen from this cause, and I have therefore to recommend that the act above cited be so amended as to permit this department, under such limitations as Congress may deem proper, to purchase such land as may be required for the sites of military posts.

I have again to ask attention to the necessity of legislation to authorize this department to sell useless military sites. Two statutes have been enacted for this purpose, but neither, according to the contemporaneous construction given them, is applicable to the largest class of cases that now embarrasses the department. According to that construction, the act of March 3, 1819, (3 Stat., 520) applies only to sites then in the possession of the United States, and that of April 28, 1828, (4 Stat., 264) applies only to lands conveyed to the United States for military purposes, neither including reservations from the public domain which were not occupied as military sites on the 3d of March, 1819. Owing to this omission, when the troops find it necessary to abandon a post of this description, the department cannot sell the land upon which the buildings and improvements of the abandoned post are located, but can only sell the buildings, to be torn down and removed, and of course the price obtained bears no proportion to their value. I hope that authority will be given the department, in such cases, to sell a portion of the land with the buildings, and use the proceeds for the establishment of new posts in such advanced positions as it may be necessary for the troops to occupy.

In transmitting the annual report of the Board of Commissioners of the Military Asylum for the past year, I take occasion to transmit also their reports for three preceding years, which were made annually to this department, pursuant to regulations, but which have not been heretofore forwarded.

The view which these reports give of the results of the institution,

does not fulfil the anticipations which were entertained at the time of its establishment. Although early means were taken to give notice of their rights to all entitled to the benefits of the asylum, by orders published to the army, and by hand-bills sent to every post office in the United States, yet the aggregate number of inmates of the several branches of the asylum was, at the dates of the respective annual reports, 50, 73, 77, and 87; in addition to the last number, six men having families were receiving relief, without being quartered at the asylum. In the mean time, the treasurer's accounts show that the net receipts were \$490,140 17; that the cost of sites, buildings, furniture, stock, &c., was \$280,183 75; and that the amount of current expenses was \$91,314 19. If to the current expenses of the several branches there be added interest on the cost of buildings, &c., the average cost of maintaining each inmate will be found to exceed \$500; an expense so great as to indicate the propriety of seeking some proper mode of effecting a reduction.

The buildings on the site near Washington city, with the addition thereto, now far advanced towards completion, will probably afford accommodation for one hundred and fifty men; a number greater than that which, judging from the past rate of increase, will seek admission into the asylum for many years to come.

The branch which was established, in 1852, at East Pascagoula, Mississippi, has been already discontinued, and the same measure is deemed desirable with regard to that at Harrodsburg, Kentucky. This branch was founded at a heavy charge upon the asylum fund, and is maintained at an expense much exceeding the advantages conferred upon the disabled soldier; but as it was established in consequence of the provisions of law contained in the army appropriation acts of August 31, 1852, section 18, and of March 3, 1853, section 14, the propriety of declaratory legislation in the case is suggested.

I would again call attention to the propriety of additional legislation which shall place the widows and orphans of the officers and soldiers of the army on an equality with those of the officers and sailors of the navy.

I also again invite attention to the necessity of legislative provision for the more prompt settlement of the accounts of disbursing officers, by intrusting to a single accounting officer the audit of the whole, instead of requiring disbursing officers to render accounts to two auditors, as at present. The confusion and embarrassment consequent upon the division of duties, involving injurious delays in final settlement, have heretofore been brought to the attention of Congress, and it is hoped that the evils represented will not be suffered to exist much longer.

Under the appropriation made at the last session for the importation of camels, an officer of the army, and one of the navy, have been directed to proceed to the East to obtain animals of the different breeds most likely to be useful in our climate. By the kindness of the Secretary of the Navy, a storeship destined for the Mediterranean with naval supplies was placed at the disposal of this department, to bring in a return cargo of camels and dromedaries; and from the last report received from the officer charged with the execution of the commission

it is expected that as many of those animals as the vessel will transport will be shipped for the United States in February next. Recent inquiries respecting the use of these animals in the Crimea, confirm me in the belief that they will be found highly valuable in the military service in our country.

For detailed information respecting the Military Academy, I refer to the reports of the Chief Engineer and of the board of visitors, herewith transmitted, which exhibit a satisfactory view of the condition of that institution. I concur in the recommendations of the former, for the establishment of a new professorship, in order that the chaplain may be relieved of the duties of professor of ethics and English studies; for the appointment of an instructor of cavalry; and for the allowance of light artillery pay to the instructor of artillery.

The act of March 16, 1802, requires that the corps of engineers be stationed at West Point, and constitute the Military Academy; and that the principal engineer, and in his absence the next in rank, shall superintend the said academy. By this act the cadets were made part of the corps, and the whole number of officers and cadets was limited to twenty. Under subsequent legislation the number of cadets has been increased nearly thirty-fold; and owing to this extension of the academy, and to the demand for the services of engineers in the field and on permanent works, the affairs of the academy are mainly administered by professors holding no military commissions, and officers detailed from the army generally. Thus the post has long ceased to be exclusively an engineer station as originally contemplated; and the Chief Engineer himself, under the act establishing an engineer bureau in this department, has been stationed at Washington. I therefore recommend such revision of the act in question as will render its provisions consistent with the changes introduced by subsequent legislation, and the necessities of the service.

The seacoast defences have, during the past year, been steadily pressed towards completion, to the extent of the means granted by Congress for that purpose. In no part of our military system is the exercise of wise foresight more necessary than in the prosecution of these works; and I recommend to favorable consideration the remarks of the Chief Engineer upon this subject.

The preparation of the armament for these works is in advance of the construction.

The recommendation heretofore made for an appropriation to commence the fortification of Ship island is renewed. The importance of this work as connected with the defence of the approaches to New Orleans, and the command of the inner channel of communication between the Mississippi river and Mobile harbor, has been augmented both by the increased value of that navigation in time of peace, and by the introduction of light-draught war steamers, which would render this approach still more available for the operations of an enemy, than when, in 1814, it was selected as the line of a hostile descent.

The physical geography of the vast region drained by the Columbia river, indicates that at some day a great city must arise at the point which shall become its commercial entrepôt. Attention has been here-

tofore called to the necessity of fortifying the entrance to the Columbia river, and I would again commend it to attention and favorable consideration.

For information in regard to the operations of the Ordnance department, I refer to the accompanying report of the Colonel of Ordnance; taking occasion to renew the recommendations I have heretofore made for an appropriation for arsenals in Texas and New Mexico, and on the North Pacific coast in Oregon or Washington Territory, as may be found most advisable; also for a national armory for the fabrication of cannon and projectiles. My views in regard to the expediency of these measures, as heretofore given, remain unchanged; the reasons then advanced in support of the recommendations remain in full force, and are referred to instead of being repeated here.

At the national armories, the manufacture of smooth-bored arms has been brought to a close. New models for all small-arms have been adopted upon the rifle principle, and embracing the improvements described in my last report, and it is expected that the armories will be at work upon the new arms before the close of the year.

In the mean time, the improved ammunition, to which mainly is due the increased range recently obtained by small-arms, has been issued to troops bearing grooved arms, and its use in actual service has fully realized all the advantages that were anticipated.

Among the new models for small-arms is a pistol of increased length of barrel, furnished with an attachment to the stock which may be instantly applied, and which converts it into a carbine. Should this prove as valuable in actual service as the experiments made now indicate, no difference will be needed between the arms and equipments of dragoons and those of light cavalry; but the whole, armed with this weapon, will be rendered in celerity of movement equal to light cavalry, and in combat as efficient as heavy dragoons. It is thought that this arm will be found also well adapted to the use of sappers and miners, of men working in the trenches, and of light artillery men.

Under provisions made last year for the purchase of breech-loading rifles, many samples of this weapon have been examined, and a number of various patterns purchased and placed in the hands of troops for trial in the field. It is deemed indispensable to subject them to this test before adopting any as a standard weapon.

The distribution of arms to the militia of the several States for the current year has been made according to representation in Congress, as prescribed by the 7th section of the army appropriation act, approved March 3, 1855. In fixing the quota of the District of Columbia and the Territories, which by the act is left to the discretion of the Executive, it was determined that the District and the Territories should receive the quota of States having the least representation in Congress. That provision of the act which required this department to equalize, as far as practicable, the number of arms distributed to the States, was executed by issuing from the United States arsenals to each State and Territory which had received less than 2,000 stand, so many arms as would bring their supply up to that number.

Arrangements have been made to convert arms of the old model,

issued to the States when desired by them, into rifled arms of the new model, with percussion lock and primer attached—the expense of the alteration to be charged to the States and deducted from their several quotas of the appropriation for the annual supply of arms.

Under the appropriation made at the last session, editions of cavalry and light infantry tactics have been procured for the militia, and are in course of distribution.

At the last session of Congress, an act was passed directing the Secretary of War to cause to be constructed, on a site to be selected by the President of the United States, a suitable building for the care and preservation of the ordnance and arms and accoutrements of the volunteers and militia of the District of Columbia, and for the care and preservation of the military trophies of the revolutionary and other wars, and for the deposit of newly invented and model arms for the military service; for which purpose the sum of \$30,000 was appropriated. In the execution of this act, a site was selected, and a plan and specifications conformable to the means granted prepared, and bids for the work duly invited by public advertisement.

A contract has been entered into, but at so late a period that no progress has been made in the construction of the building.

The work upon the military roads in the Territory of Minnesota has generally made satisfactory progress. Those in Utah, Washington, and Oregon, for which appropriations were made last year, have been completed according to the plans adopted. Those for which appropriations were made at the last session, in Kansas, Nebraska, Washington, Oregon, and New Mexico, have not yet been put under construction. No report has yet been received of the completion of the necessary preliminary surveys.

The survey of the northwestern lakes has been prosecuted with skill and energy. The several parties employed on this work have been almost exclusively engaged, during the past season, in Lakes Michigan and Superior, and the St. Mary's river. A large area has been surveyed, more than a thousand buoys have been located to mark dangerous reefs and shoals, and materials have been gathered for the minute and reliable charts so necessary to the navigation of those inland seas.

The appropriations for river and harbor improvements have, with few exceptions, been exhausted or reduced so low as not to be effective for future operations. Snag and dredge boats are usually built out of appropriations for special works, and when, therefore, the fund is expended, it has been deemed proper to sell such boats, machinery, and materials, and apply the proceeds to the benefit of the work for which the money was appropriated. The rapid deterioration and constant expense attendant on the preservation of boats, does not permit that they should be kept beyond a short period on the contingency of future appropriations being made. Under these circumstances and for these reasons the snag-boats on the western rivers have been sold, and the amounts drawn for the construction, equipment, and repair of those boats, from the appropriations for the respective rivers, were thus made available for the improvements to which they belonged. And a like course, under like circumstances, will have to be adopted in relation to

the dredge-boats on the northern lakes, and coast of the Atlantic and Gulf of Mexico.

Under the authority given in the army appropriation act of August 4, 1854, sec. 5, to use the appropriation for the removal of the Red River raft, in such way as would secure navigation in and around said raft, an examination of the obstructions and surrounding locality was instituted, and a plan adopted to secure navigation around the greater part of the raft, through Dooley's bayou, and an agent with the necessary machinery is employed in its execution.

Reference is made to the documents accompanying the report from the topographical bureau, for the progress made on the improvement of western rivers and lake harbors, the construction of military roads, and the survey of the Florida canal, and to the report of the Chief Engineer for the work on the Atlantic and Gulf harbors and rivers.

The reports of the officers employed under the appropriations made for explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi river to the Pacific ocean were submitted to Congress on the 27th of February last, with a report from this department, giving a general sketch of the country over which they extended, a recapitulation of their results, and a comparison of their distinguishing characteristics; from which it was concluded that of the routes examined, the most practicable and economical was that of the thirty-second parallel. A report is herewith submitted from the officer in this department charged with the revision of the work of the several parties, and I refer to it for additional information derived from materials collected, on a further examination of them by himself, and the several officers who made the particular surveys, as well as for the results of explorations carried on during the past year.

When the report was made, in February last, many of the maps, drawings, and scientific papers, intended to form part of the report, and which could only be prepared after an elaborate examination of the materials collected, had not been completed for want of time, and it became necessary to substitute hastily prepared drawings and preliminary reports. This was particularly the case with regard to the work on the route of the thirty-fifth parallel. A minute examination of the material collected in that survey has resulted in showing the route more practicable than it was at first represented to be, and in reducing to nearly one-half the original estimates of the officer in charge of the survey, which indeed seemed, when they were submitted, to be extravagant, and were noted in the report from this department as probably excessive.

Another feature of interest developed in the course of the further examination of the work on the route of the thirty-second parallel is, that the Colorado desert, which is traversed by the route for a distance of 133 miles, and which, in the report referred to, was noted as consisting of a soil that needed only water to render it highly productive, is, in fact, the delta of the Colorado river, and, according to barometric levels, is so much lower than that stream as to be easily irrigated from it. Thus there is every reason to believe 4,500 square miles of soil of

great fertility, of which nearly one-half is in our territory, may be brought into cultivation in one unbroken tract along the route.

Under the appropriation made at the last session for the continuation of these surveys and other purposes, three parties have been in the field during the past season.

One of these was directed to make examinations connected with the routes of the 32d and 35th parallels. This survey has greatly improved the aspect of the former route by changing the line for nearly half the distance between the Rio Grande and the Pimas villages on the Gila river from barren ground to cultivable valleys, and entirely avoiding a *jornada* of eighty miles, which occurs in that section; also by the discovery of an eminently practicable route through cultivable country from the plains of Los Angeles, along the coast and through the Salinas valley, to San Francisco. The connexion originally proposed between these points was by way of the valley of San Joaquin and the Great Basin.

The attention of this party was also directed to an examination into the practicability of procuring water along certain parts of the route where it is now deficient. The report shows that it may be obtained by common wells at distances of about twenty miles.

From the result of this exploration, moreover, it appears practicable to obtain, at a small expense, a good wagon road, supplied with water by common wells, from the Rio Grande down the San Pedro and Gila and across the Colorado desert. Such a road would be of great advantage in military operations, would facilitate the transportation of the mail across that country, and relieve emigrants pursuing that route from much of the difficulty and suffering which they now encounter.

A second party was charged with the duty of testing the practicability of procuring water by artesian wells on the Llano Estacado, an arid plain which has been heretofore described as a desert. The experiment has so far demonstrated its practicability as to leave little doubt of its final success; it will be continued, however, until the problem shall have been fully solved.

The examinations into the feasibility of causing subterranean streams to flow upon the surface from artesian wells, though undertaken in connexion with the practicability of a railroad, if they should prove entirely successful, will have a value beyond their connexion with that object in the reclamation of a region which is now a waste, and its adaptation to the pastoral, and, perhaps, the agricultural uses of man.

The third party was directed to conduct an exploration from the Sacramento to the Columbia river, with a view to ascertain the practicability of a route to connect the valleys of those rivers. The officer in charge has reported the successful completion of the duty, but has not given details. The same officer has been directed to make a reconnaissance of the Sierra Nevada in the vicinity of the head branches of Carson river.

The prosecution of instrumental surveys, accompanied by investigations into many branches of physical science simultaneously over lines of such length, and embracing such an extent of latitude, is a work of greater magnitude than any of the kind hitherto undertaken

by any nation; and its results have not only proved commensurate with the amount of work done, but possess a value peculiar to the scale on which it has been conducted, as affording a basis for the determination of some questions of science which no number of smaller and detached explorations could have furnished. Should means be granted pursuant to the estimate in the report referred to, for continuing these explorations, I have every confidence that the expenditure will be well repaid by these contributions to our knowledge of the interior of the country.

The facts developed by these surveys, added to other information which we possess, suggest some considerations of great interest with regard to our territory on the Pacific. They exhibit it as a narrow slope of an average width of less than one hundred and fifty miles of cultivable land, skirting the ocean for a distance of one thousand miles; rich in those mineral productions which are tempting even beyond their value, and which would be most readily turned to the use of an invader; drained by two rivers of wide-spread branches, and with sea-ports lying so directly upon the ocean that a hostile fleet could commence an attack upon any one of them within a few hours after being descried from land; or, if fortified against attack, so few in number that comparatively few ships would suffice to blockade them.

This territory is not more remote from the principal European States than from those parts of our own country whence it would derive its military supplies, and some of those States have colonies and possessions on the Pacific which would greatly facilitate their operations against it. With these advantages, and those which the attacking force always has, of choice of time and place, an enemy possessing a considerable military marine could, with comparatively little cost to himself, subject us to enormous expenses, in giving to our Pacific frontier that protection which it is the duty of the general government to afford.

In the first years of a war with any great maritime power, the communication by sea could not be relied upon for the transportation of supplies from the Atlantic to the Pacific States. Our naval peace establishment would not furnish adequate convoys for the number of storeships which it would be necessary to employ, and storeships alone laden with supplies could not undertake a voyage of twenty thousand miles, passing numerous neutral ports, where an enemy's armed vessels, even of the smallest size, might lie in wait to intercept them.

The only line of communication, then, would be overland; and by this it would be impracticable, with any means heretofore used, to furnish the amount of supplies required for the defence of the Pacific frontier. At the present prices over the best part of this route the expense of land transportation alone for the annual supplies of provisions, clothing, camp equipage, and ammunition for such an army as it would be necessary to maintain there, would exceed \$20,000,000; and to maintain troops and carry on defensive operations under those circumstances, the expense per man would be six times greater than it is now: the land transportation of each field twelve-pounder, with a due supply of ammunition for one year, would cost \$2,500; of each 24-pounder and ammunition, \$9,000; and of a seacoast gun and ammu-

nition, \$12,000. The transportation of ammunition for a year for 1,000 seacoast guns would cost \$10,000,000. But the expense of transportation would be vastly increased by a war; and at the rates that were paid on the northern frontier during the last war with Great Britain, the above estimates would be trebled. The time required for the overland journey would be from four to six months. In point of fact, however, supplies for such an army could not be transported across the continent. On the arid and barren belts to be crossed, the limited quantities of water and grass would soon be exhausted by the numerous draught animals required for heavy trains, and over such distances forage could not be carried for their subsistence.

On the other hand, the enemy would send out his supplies at from one-seventh to one-twentieth the above rates, and in less time—perhaps in one-fourth the time—if he should obtain command of the isthmus routes.

Any reliance, therefore, upon furnishing that part of our frontier with means of defence from the Atlantic and interior States, after the commencement of hostilities, would be vain, and the next resource would be to accumulate there such amount of stores and supplies as would suffice during the continuance of the contest, or until we could obtain command of the sea. Assigning but a moderate limit to this period, the expense would yet be enormous. The fortifications, depots, and storehouses, would necessarily be on the largest scale, and the cost of placing supplies there for five years would amount to nearly one hundred millions of dollars.

In many respects, the cost during peace would be equivalent to that during war. The perishable character of many articles would render it perhaps impracticable to put provisions in depot for such a length of time; and in any case, there would be deterioration amounting to some millions of dollars per year.

These considerations, and others of a strictly military character, cause the department to examine with interest all projects promising the accomplishment of a railroad communication between the navigable waters of the Mississippi and those of the Pacific ocean. As military operations depend in a greater degree upon rapidity and certainty of movement than upon any other circumstance, the introduction of railway transportation has greatly improved the means of defending our Atlantic and inland frontiers; and to give us a sense of security from attack upon the most exposed portion of our territory, it is requisite that the facility of railroad transportation should be extended to the Pacific coast. Were such a road completed, our Pacific coast, instead of being further removed in time, and less accessible to us than to an enemy, would be brought within a few days of easy communication, and the cost of supplying an army there, instead of being many times greater to us than to him, would be about equal. We would be relieved of the necessity of accumulating large supplies on that coast, to waste, perhaps, through long years of peace; and we could feel entire confidence that, let war come when and with whom it may, before a hostile expedition could reach that exposed frontier, an ample force could be placed there to repel any attempt at invasion.

From the results of the surveys authorized by Congress, we derive at least the assurance that the work is practicable; and may dismiss the apprehensions which, previously, we could not but entertain as to the possibility of defending our Pacific territory through a long war with a powerful maritime enemy.

The judgment which may be formed as to the prospect of its completion, must control our future plans for the military defence of that frontier; and any plan for the purpose which should leave that consideration out of view, would be as imperfect as if it should disregard all those other resources with which commerce and art aid the operations of armies.

Whether we shall depend on private capital and enterprise alone for the early establishment of railroad communication, or shall promote its construction by such aid as the general government may constitutionally give; whether we shall rely on the continuance of peace until the increase of the population and resources of the Pacific States shall render them independent of aid from those of the Atlantic slope and Mississippi valley, or whether we shall adopt the extensive system of defence above referred to, are questions of public policy which belongs to Congress to decide.

Beyond the direct employment of such a road for military purposes, it has other relations to all the great interests of our confederacy, political, commercial, and social, the prosperity of which essentially contributes to the common defence. Of these it is not my purpose to treat, further than to point to the additional resources which it would develop, and the increase of population which must attend upon giving such facility of communication to a country so tempting to enterprise, much of which having most valuable products, is beyond reach of market.

I refer to the reports of the officer in charge of the Capitol and Post Office extensions for detailed information in regard to those works. The progress of the former has been seriously retarded in consequence of deficiency in the supply of marble for the exterior. The work is, however, so far advanced, that the interior finish must now be considered. The original plan and estimate was for a finish similar to that of the main building; but this style would not be a fair sample of the present state of architectural skill, and it is supposed would not fulfil the wish of Congress; it has, therefore, been thought proper to have prepared for inspection specimens of encaustic tiling, instead of brick and sandstone, for the floor; of painting instead of whitewashing for the walls and ceilings: these and other contemplated improvements, not included in the original plan and estimate, may be introduced to a greater or less extent as Congress may provide. Modifications have already been made, such as the introduction of ornamental iron ceilings in the principal rooms, the substitution of iron for wood in the frames for the roofs and the doors and windows of the basement story, an increased thickness of the marble in the walls specially provided for by law, and a costly and extensive corridor required by the plan, but not contained in the original estimate.

At the last session, Congress adopted a plan and made an appropriation for a new dome to the Capitol. No estimate of the cost of the work had been submitted, nor has any yet been prepared. In fact, at that time only the exterior had been studied, and a sketch made showing the general effect of the whole building as completed. The study of the details has since been entered into, and I refer to the report of the officer in charge for a narrative of his operations, as well as for a full description of the contemplated structure, which promises to be an object of rare architectural beauty. The resources exhibited in the machinery designed to raise the enormous masses of iron composing the dome, and to place them accurately in their elevated positions, reflect the highest credit upon the capacity and skill as an engineer of the officer in charge of the work.

Notwithstanding a very unhealthy season, the work on the aqueduct designed to supply this city with water has been prosecuted successfully, and to the extent of the means appropriated; a large appropriation will be asked, in order to realize the benefits of this great enterprise as early and as economically as possible. Should the appropriation be granted at an early period in the session, the operations can be continuously carried on; but if it should be delayed until the usual period of making the annual appropriations, the spring—the most favorable season for work—will be lost, and the operation be again subjected to interruptions resulting from the autumnal diseases which prevail in the locality.

I have the honor to be, very respectfully, your obedient servant,
JEFF'N DAVIS,
Secretary of War.

The PRESIDENT OF THE UNITED STATES.

Compendium of the Report of the Secretary of War.

Authorized strength of the army 17,867 officers and men; actual strength 15,752; it is believed that in a few months the disparity will be overcome. The number of enlistments for the past year, ending September 30, was 10,546. The applications for discharges on account of minority have been so frequent and successful, that legislative interposition is called for. The four new regiments created by the last Congress have been organized and put into service. Changes have been made in the distribution of troops since last report. Efforts are still in progress for the removal of the Seminoles from Florida. Indian hostilities have occurred in the departments of the West, Texas, New Mexico, and the Pacific, and measures have been taken to chastise the hostile tribes. Recent information has been received of more serious difficulties with the Indians in the department of the Pacific. Treaties of peace have been made with all the Indian tribes in New Mexico. The conduct of the troops in the arduous services in the Indian campaigns has fully equalled the anticipations which past conduct warranted. On account of these Indian difficulties, the expenditures for

the army will probably exceed the appropriations, especially as current appropriations are applied to payment of deficiencies of former years.

Revision of laws regulating rank and command, and organization of the army; retired list; increase of pay; modification of the act increasing pay of rank and file of the army, that its benefits shall extend to all enlisted men; increase of medical corps; appointment of additional storekeepers for the Quartermaster's department; amendment of act prohibiting purchase of land for military sites; an act authorizing the sale of sites of abandoned military stations; recommends Military Asylum—branch at Washington progresses towards completion; branch at East Pascagoula has been abandoned, and the discontinuance of the branch at Harrodsburg, Kentucky, is recommended. The anticipations entertained at the establishment of this institution have not been fulfilled.

Widows and orphans of officers and soldiers of the army should be provided for, as those of officers and sailors in the navy.

For the more prompt settlement of accounts with the treasury, it is recommended that a single accounting officer audit the whole instead of requiring disbursing officers to render accounts to two auditors.

An officer has proceeded to the East in a government vessel to procure camels, and it is expected that a number of these animals will be shipped in February next.

The Military Academy is in a satisfactory condition; appointment of a professor in ethics, and an instructor of cavalry, and increase of pay of instructor of artillery, recommended. Also revision of the law requiring the corps of engineers to be stationed at West Point recommended.

The seacoast defences have been steadily pressed towards completion; fortification of Ship island and of the entrance of Columbia river recommended.

Appropriations for arsenals in Texas, New Mexico, and the north Pacific coast, in Oregon or Washington Territory, and a national armory for the fabrication of cannon and projectiles, recommended. Manufacture of smooth-bored arms has been brought to a close; new models for all small-arms on the rifle principle have been adopted; improved ammunition has been issued, and its use resulted advantageously; model of a new pistol has been experimented upon, and given satisfaction; arrangements have been made for converting arms of old model into rifles of the new model. Distribution of arms and editions of cavalry and light infantry tactics have been made to the militia.

Site has been selected, and contract made for a building for preserving the ordnance and accoutrements of the militia of the District of Columbia, and trophies of the revolutionary and other wars.

Military roads in the western territories have generally made satisfactory progress. The survey of the northwestern lakes has been prosecuted with zeal and energy. Appropriations for river and harbor improvements have been nearly exhausted.

Pacific Railroad.—The routes of the 35th and 32d parallels have been greatly improved; favorable features of the Colorado Desert

developed; practicability of artesian wells on the Llano Estacado has been determined; exploration of the country between the valleys of the Sacramento and Columbia rivers has been successfully made; and a reconnaissance of the Sierra Nevada near the sources of Carson river has been ordered. These surveys have been carried on, on a scale exceeding anything of the kind previously undertaken by any nation, and its results have been of a most beneficial character. They have developed important facts respecting the defence of our Pacific territory. The proximity of the Pacific coast to European States, and distance from parts of ours whence it would draw military supplies, give great advantage to an attacking force. Our naval peace establishment is inadequate to protect store-ships transporting supplies by water, and communication at present by overland route is impracticable. In time of war it would be impossible to transport supplies from the Atlantic and interior States, and the expense of keeping supplies in time of peace would be enormous. These and other military considerations cause the department to examine with great interest all projects for connecting the Atlantic and Pacific by railroad; and future plans for the military defence of the Pacific frontier is dependent upon the construction of the road. Beyond military considerations the railroad has relations to the great political, commercial, and social interests of our confederacy.

The progress of the Capitol extension has been seriously retarded by deficiency in supply of marble. In the interior great improvements have been suggested in the style and finish. Reference is made to the report of the officer in charge of the work for a full description of the new dome. The work on the aqueduct has been successfully prosecuted to the extent of the means appropriated, and an early appropriation is asked to continue the work in the spring.

Abstract of the annual report of the Quartermaster General for the fiscal year ending on the 30th of June, 1855.

Total accountability of the department.....	\$6,093,790 99
Total accounted for.....	5,170,175 13
Balance to be accounted for.....	923,615 86

Accounts are still due from twenty officers, whose joint accountability is \$67,953 20.

One of them is now in Washington preparing his accounts.

Of the sum unaccounted for, \$105,000, though remitted within the fiscal year, was not received until after its close.

Balance unaccounted for distributed among one hundred and eighty-eight officers and agents, applicable to the payment of outstanding claims and to the service of the present year.

Supplies due from the department have been promptly furnished.

Total paid for forage, fuel, straw, and stationery, \$1,185,710 59.

For horses for dragoons, cavalry, &c., \$89,669. For incidental expenses, \$402,842 64. For barracks and quarters, viz: rents, \$113,595 55; construction and repairs, \$377,179 68. For mileage or transportation of officers, \$116,198 04. For transportation of every description, \$1,989,858 30.

Transportation has been furnished for all supplies required for the army—troops operating in the field—for more than five thousand recruits, and for numerous bodies of troops that have changed stations.

Clothing and camp and garrison equipage due to the troops, and required for the depots, have been provided. The sum paid for labor and materials on accounts accruing within the year was \$368,163 78, and on accounts accruing in previous years \$274,066 30; in addition to which, \$21,486 25 over the amount received for sales of clothing, &c., was applied to the settlement of paymasters' accounts at the treasury, for payments made to soldiers for clothing undrawn.

The increase of the army required additional accommodations in Kansas and Nebraska.

Quarters for officers and soldiers, and stables for the horses of six companies, were commenced at Fort Riley, and for ten companies of mounted troops at Fort Leavenworth.

A new post established in the Sioux country, to be occupied by six companies of infantry and four companies of cavalry. The season being advanced when the measure became necessary, Fort Pierre, fourteen hundred miles above St. Louis, was purchased from the American Fur Company; two steamers purchased, and six chartered to transport the infantry and supplies to enable the troops to winter there. Owing to low water in the Missouri, the movement was tedious and expensive. The lack of forage may compel the commander to winter the cavalry horses lower down.

The expenditures for forage and transportation last year exceeded the appropriations, and the excess will be a charge on the appropriation of the present year. This, with the extensive movements of troops in the States of Texas and California, and the Territories of New Mexico, Oregon, Washington, Kansas, and Nebraska, on account of the disturbed state of the Indians, will cause the appropriations for those items, and perhaps others, to fall far short of the wants of the service or the year.

A large appropriation for deficiencies will be required to enable us to meet the wants of the service to the close of the year.

When the estimates were presented for this year, difficulties with the Indians, and particularly with the Sioux, were not contemplated nor apprehended. Those estimates were minimum estimates.

Expenditures for forage and transportation depend upon the circumstances of the service as they occur, and cannot be controlled by any department. They cannot be much reduced while the troops operate upon so extensive a theatre, and in a country so difficult of access, and with so few resources as our new Territories possess. Our small army covers more ground, and its operations are more extended, than the armies of all the nations of continental Europe, west of Russia, inclu-

ding all the colonies of those nations, in addition to their European territories.

No army in Europe can keep the field a single week, fifty miles from the seacoast, unless it obtain the greater part of its supplies by daily contributions upon the country in which it operates, while our troops operate for months many hundred miles from the sources of supply, and in portions of country with no other resources than a scanty crop of wild grass.

To retain our vast territories, and successfully defend them, there is only one measure by which the expense can be materially reduced: that is, to adopt a system of railroad communication in our exposed territories outside of the States. Such a system is required not only for the economy and efficiency of our Indian operations and frontier defence, but to secure us from European combination and aggression.

Our resources would be better applied thus than in building up steam corporations on the ocean, on the silly pretext of strengthening our navy for war.

Naval power depends not upon ships, but on seamen to man them. Having more seamen than any other nation, we have more real naval power. To make that power effective, we have only to apply the volunteer system on the ocean as we have applied it on land.

The route to Fort Yuma is by land in part, and by water entirely within the Territory of Mexico. The supplies on these routes are liable to be seized by the Mexican authorities. Either a direct communication should be made within our own territory, or the permission of Mexico be obtained to use those routes, and to establish a depot on the Gulf of California.

The surveys of the topographical officers show a portion of the route across the desert to Fort Yuma to be seventy feet below the surface of the Gulf of California, while the Colorado, at the fort, is thirty-three feet higher than that surface. Would it not be sound policy to submerge the desert from the Colorado, and convert thus a barren waste into a navigable lake?

An appropriation of from two to three hundred thousand dollars recommended, to purchase materials for clothing and other military supplies to meet sudden losses and unforeseen contingencies.

An extra pay, equal to that allowed to assistant commissaries, recommended to be allowed to officers compelled to perform duties in the Quartermaster's department. More than a hundred are constantly employed who do not belong to the department.

Recommended that soldiers acting as clerks in the different staff departments be paid as mechanics—they are now paid as laborers—and that the pay of ordnance sergeants be increased five dollars per month.

Difficulty as well as expense attends the renting of land for military sites in Texas and New Mexico. It is recommended that the Secretary of War be authorized by law to purchase all sites necessary, and that officers of all grades be prohibited from erecting any but the most temporary buildings on the lands of private individuals; and then

only on the condition that the public have the right to remove the buildings when the posts shall be abandoned.

TH. S. JESUP,

Quartermaster General.

QUARTERMASTER GENERAL'S OFFICE,

Washington city, December 1, 1855.

A compendium of the annual report of the Commissary General of Subsistence, made to the Secretary of War, in October, 1855.

The army, during the past year, has been supplied with subsistence by contract and by purchase.

The contracts made in 1854 expired in June, 1855.

No contracts were made for the year ending June 30, 1856, the bids received being but few, and very high.

When possible, supplies were procured in the vicinity of the posts.

Notwithstanding the active operations of the army, and the wide distribution of the troops, it is believed that they were abundantly supplied, with few exceptions, with excellent provisions.

Issues were made to Indians, to the Mexican boundary commission, and to parties of the Pacific railroad, on their paying the cost of the same to the United States.

A comparison of the solar evaporated salt of Syracuse with Turk's Island salt, in preserving pork, being brought to a conclusion, exhibits but little difference in their preservative qualities; it establishes the fact that the solar salt discolours the surface of the pork.

In obedience to instructions, advertisements have been issued inviting proposals for subsistence for the army during the year 1856-'57, at the posts in Texas, New Mexico, California, and Oregon.

These posts being distant, the contracts for them will necessarily include the cost of transportation—an expense heretofore borne by the Quartermaster's department—and will increase the expenses of this department to that extent.

My estimate shows a reasonable increase to meet that expense.

The accounts of the officers disbursing in this department were generally faithfully rendered.

Solicits the attention of the Secretary of War, after thirty-seven years' experience, to the system of contracts, so far as this department is concerned, and recommends that Congress repeal the 7th section of the act approved April 14, 1818.

Compendium of the report of the Chief Engineer.

The importance of pressing forward the construction of the permanent fortifications designed for the several points of our coast, which has so often been urged by the Engineer department, has been partic-

ularly illustrated by the events of the last year or two. From them the lessons have been taught us :

1st. That efficient fortifications, against such attacks as we are exposed to, cannot be improvised; that they are the work of time and labor.

2d. That great expeditions, greater than had ever been seen before, organized from the preparations accumulated during a long peace, may be swiftly despatched to the most distant lands. Our conclusion is, that we should use our time of peace to prepare to receive them.

3d. If we rely on duly prepared fortifications, we shall have a sure reliance.

4th. While great objects must be provided with such defences that they can resist the greatest expeditions, all objects that can tempt an enemy's cupidity must have protection proportionate to their value. The defensive works now existing at our various posts and harbors must be put in perfect order *for use*, and so maintained. And there are some points of great importance, for which nothing has yet been undertaken, and which should receive the earliest attention of Congress.

Operations have been advanced during the past year, at the various forts for which provision was made by law, with vigor and fidelity. Should the favor of Congress continue to be directed to our defences a few years more, all our most important positions will be strongly guarded, and we may go into war, if it comes upon us, confident that our frontiers are secure from devastation and insult, and feeling that our navy, not needed to watch our harbors, is free to traverse all seas in search of our foes, and our armies at liberty, in due measure, to attack our enemies as well as defend our own soil.

The Military Academy continues to afford its annual supply of able and accomplished officers for our army. No great or radical changes are proposed or desired in this valuable institution. Minor matters of detail present themselves from time to time, as to which modifications of value may be made. Such are carried into execution where the means are within our control; and where legislative action is considered necessary, the favor of Congress is appealed to, with confidence that it will not be withheld.

As to works of internal improvement, most of the appropriations have been applied to the objects specified in the laws. Some are still in course of expenditure; a few have, from various causes, been introduced. No estimates are presented for the further prosecution of existing works, or for the commencement of new ones.

Work on the Washington aqueduct has been conducted, in spite of an unhealthy season, quite to the extent that the appropriation would justify. Such a grant is asked for the coming year, as will, while promoting economy in the operations, conduce to an early realization of the benefits of this important work.

The number of officers in the corps of engineers has been decreasing for several years past. The labors and responsibilities of the corps are heavy and increasing. Provision for an increase of numbers is urged, on the grounds of its necessity, both on account of the *proper*

and the *economical* discharge of those duties which pertain strictly and exclusively to it. Assistance is now procured by employing the best aid that can be devised from the walks of civil life; but this assistance costs more than the officers proposed to be added, is much less efficient, and is liable to be withdrawn at any moment.

An additional company of engineer soldiers is also needed to perform the duties which are constantly expected and asked of the small number of these troops now authorized.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, December 5, 1855.

SIR: A resolution of the Senate of February 28, 1855, states "that the President be requested to cause to be laid before the Senate, at the commencement of the next session, with the annual reports of the heads of departments and the accompanying reports of the chiefs of bureaus, an abstract or compendium of said last-named reports," &c., &c.

With a view of making the report from this office as short as practicable, I have said but little from myself, and adopted as an appendix the reports from the several officers in command in the field. The duty, therefore, to be performed, is an abstract of this appendix. I find it not without difficulty, as these officers use but few words in reporting their operations, and the danger is, in making an abstract, that valuable ideas will be omitted. I have, however, endeavored to fulfil the direction, and hope that, before legislation be adopted, the appendix will be read, as doing more justice to the officers and their views. Attempt has not been made to abstract the reports and plans of the Board of Engineers, which form a part of my report.

I have the honor to be, sir, very respectfully, your obedient servant,
J. J. ABERT,
Col. Corps Top. Eng.

HON. JEFFERSON DAVIS,
Secretary of War.

*Epitome of the annual report from the bureau of topographical engineers,
prepared under a resolution of the Senate of February 28, 1855.*

Annual report, according to orders and usage.

Only estimates submitted, are for surveys.

Five steam dredge-boats on the lakes, with accessory discharging scows, required to be taken care of. Should either be sold, or means be appropriated for their preservation?

Some means desired to condemn private property when occupied for United States roads.

The new steamer for the survey of the lakes to be completed in May.

Sends the reports of subordinates as an appendix to the office annual report.

1st. Appendix A, from Captain Macomb: survey of the lakes.

Since last annual report, occupied in office labors until season for work in the field.

Computations made of the astronomical station on Round island completed. Details of topography and hydrography of the greater part of the Beaver islands, and of main land twenty miles north of the same.

Survey indebted to Professor G. B. Airy, of the Royal Observatory, in furnishing corresponding observations for longitude, before referred to, of Round island.

Assistants Hearing, Mueller, Bigheim, A. Williams, and Penny, were (except Williams) occupied in drawing maps of the St. Mary's, and drawings exhibiting obstructions to the navigation of said river.

Lieutenant Rose his chief assistant in plotting off-shore work of the previous season.

In the survey, (of 1855,) command divided into five parties; one of these under himself.

Party under Lieutenant Raynolds sent to south shore of Lake Superior, to commence at Ontonagon and to work eastward. His work will furnish harbor charts and material for the general chart of Lake Superior, and to do such other work on that lake as could be done this season.

Occupied two days in placing buoys on three dangerous reefs at west end of Lake Superior. The several parties commenced operations in May; also engaged in the survey of the United States lands on Mackinaw island. Information promptly furnished from surveyor general's office at Detroit. Has extended general work over four hundred miles of area north and west of the Beaver islands. Five new shoals discovered; four of them surveyed—two of them dangerous, six and a half feet of water upon them; the other two, three fathoms over them. Main triangulation also extended westward to cover work, and made arrangements for extension of triangulation southward.

Reef as heretofore marked, and some other dangerous passes in usual commercial routes, with tripods and buoys, to give notice, before charts can be published. In these duties has been aided by J. A. Potter and O. N. Chaffee.

Lieutenant Raynolds's party has executed minute surveys of port of Ontonagon and vicinity, embracing upwards of one hundred square miles. He has since been engaged at Eagle harbor, Eagle river, and intervening coast, and also about twenty miles of dangerous coast off Kewena Point. Unexpected difficulties encountered about Eagle harbor and Eagle river; lines had to be opened through woods. Coast rocky and dangerous, and delayed the party. Could land only when water was smooth. Coast reconnoitred; points selected commanding views of Port Royal. Lieutenant Raynolds aided by Mueller, Henry, J. Wallace, and G. Wallace.

Lieutenant Rose and party, on the survey of the St. Mary's, has completed details of secondary triangulation, with topography and

hydrography of section above the Sault; has extended the work around Point Iroquois, to include about ten miles of the coast of the southeasterly bay of Lake Superior. His assistants, Pinney, Penny, and Lieutenant A. Rose.

Assistant Hearing has completed hydrography, topography, and secondary triangulation of Beam island. The same kind of work on north shore of Lake Michigan, upon which now occupied. Assisted by Forster, Bigheim, and O'Brien.

Assistant Lampson furnished the details of shore work and minute hydrography and secondary triangulation of the remaining islands (four) of the Beam group, then placed on the northwest coast of Lake Michigan; also engaged in connecting the work of previous seasons by a coast survey of ten miles; after work to make surveys on Mackinaw island, as before mentioned. Assistants, H. Gilman, B. Williams.

By abstracts of reports of this season, (date of report September 29, 1855,) two parties yet to be heard from.

Abstract of work by Captain Macomb's party on board the steamer Surveyor, season of 1855.

- 3 triangulation stations built.
- 2 triangulation stations repaired.
- 2,198 soundings remote from shore.
- 382 sextant angles for locating soundings.
- 284 angles measured with theodolite.
- 3 water stations on distant reefs.
- 2 miles of line opened through woods.
- 50 buoys located and $4\frac{1}{2}$ miles of levelling run.

Abstract of work by Lieutenant Raynolds's party to end of August, 1855.

- 17 triangulation stations built.
- 263 sounding stations built.
- 18,679 soundings made, some of them ten miles from land.
- 3,831 theodolite angles.
- 768 sextant angles.
- 223 buoys located.
- $32\frac{1}{2}$ miles of shore line chained.
- 26 miles of shore line sketched.
- 144 compass readings for magnetic variation.
- 6 observations for azimuth.
- 10 observations for time.
- 150 observations on stars for latitude, (with zenith telescope.)
- 134 theodolite pointings for azimuth.
- 17 miles of line cut through woods.
- 44 stakes located as guides in sounding.
- 8 tripod water stations put out.
- 48 observations for time, and placing transit in meridian.
- 38 culminations for longitude, (9 of moon and 29 of stars.)
- 4 eclipses of Jupiter's satellites observed.

- 5 sets of observations for value of micrometer zenith telescope.
- 143 declinations of stars computed.
- 32 computations for latitude.
- 7 transits of stars for collimation.
- 39 stakes located for sketching.

Abstract of work by the party of Lieutenant G. W. Rose in the river St. Mary's, season of 1855.

- 82 triangulation stations built.
- 335 sounding stations built.
- 2 tripod water stations.
- 437 buoys located.
- 20½ miles of shore line run.
- 22 miles of levelling.
- 51 miles of sketching.
- 3 miles of meandering of streams.
- 2 miles of line of sight cut.
- 4,238 feet of distance accurately measured with rods for two bases.
- 11,463 theodolite readings.
- 151 sextant angles.
- 46,890 casts of the lead.
- 5 observations on Polaris for meridian.

Abstract of work by the party of Assistant W. H. Harding to end of August, 1855.

- 5 triangulation stations built.
- 127 sounding stations built.
- 81 buoys located.
- 19,164 soundings taken.
- 42½ miles of shore line run.
- 13¼ miles of roads surveyed.
- 3,262 theodolite readings.
- 7 sextant angles.
- 77 level sights.
- 166 compass bearings, (for variation.)

Abstract of work done by the party of Assistant G. W. Lamson for the season of 1855.

- 8 triangulation stations built.
- 43 sounding stations built.
- 2 tripod water stations put out.
- 26,774 soundings made.
- 1,321 theodolite angles measured.
- 699 sextant angles measured.
- 218 buoys located.
- 26½ miles of shore line run.
- 1½ miles of line of sight cleared.
- 59 compass bearings for magnetic variation.

45 angles measured by repetition.
1½ miles of meandering of streams.

As the several parties during this season, now drawing to a close, were engaged at points widely distant from each other, of necessity duties of superintending much extended. Propriety of a good triangulation over a large portion of Lake Superior; and of connecting work at Straits of Mackinaw with that of Lake Superior. Has erected many primary stations for the connection; engaged in selecting points for secondary stations. A good prospect for determining exact position of Stannard's rock; a dangerous rock, on which a beacon should be placed.

Great anxiety to have the lake charts among lake navigators, and for further results; demands for the charts will increase.

Considerations stated induce him to ask for increased force, and an increased annual appropriation.

Estimate submitted as follows:

Estimate of funds required for the survey of the north and northwestern lakes, (including Lake Superior) for the year ending June 30, 1857.

PARTY ON THE NEW SURVEYING STEAMER (NOW BUILDING.)

1 assistant, at \$4 per day, 6 months, 183 days	\$732 00
1 assistant, at \$3 50 per day, 6 months, 183 days.....	640 00
1 assistant, at \$2 50 per day, 6 months, 183 days.....	457 50
1 chief mate, sailing-master, at \$2 per day, 6 months, 183 days.....	366 00
1 second mate, at \$1 50 per day, 6 months, 183 days.....	274 50
1 first engineer, at \$2 per day, 6 months, 183 days.....	366 00
1 second engineer, at \$1 50 per day, 6 months, 183 days.....	274 50
1 carpenter, at \$1 50 per day, 6 months, 183 days.....	274 50
1 steward, at \$1 per day, 6 months, 183 days.	183 00
1 assistant to steward, at 83 cents per day, 6 months, 183 days.....	151 89
1 cook, at \$1 per day, 6 months, 183 days....	183 00
20 men, (boats' crews,) at 70 cents each per day, 6 months, 183 days.....	2,462 00
3 firemen and coal-heavers, at 83 cents each per day, 6 months, 183 days.....	455 67
1 leadsman, at \$1 per day, 6 months, 183 days.	183 00
400 tons coal, at \$6 per ton.....	2,400 00
Supplies of party for six months.....	3,000 00

Total for six months..... \$12,403 06

PARTY ON STEAMER SURVEYOR.

1 assistant, at \$3 50 per day, 6 months, 183 days.....	\$640 50
1 assistant, at \$2 50 per day, 6 months, 183 days.....	457 50
1 chief mate, at \$2 per day, 6 months, 183 days.....	366 00
1 second mate, at \$1 50 per day, 6 months, 183 days.....	274 50
1 first engineer, at \$2 per day, 6 months, 183 days.....	366 00
1 second engineer, at \$1 50 per day, 6 months, 183 days.....	274 50
1 carpenter, at \$1 50 per day, 6 months, 183 days.....	274 50
1 steward, at \$1 per day, 6 months, 183 days.....	183 00
1 assistant to steward, at 83 cents per day, 6 months, 183 days.....	151 89
1 cook, at \$1 per day, 6 months, 183 days....	183 00
3 firemen and coal-heavers, at 83 cents each per day, 6 months, 183 days.....	455 67
1 leadsman, \$1 per day, 6 months, 183 days..	183 00
15 men, (boats' crews,) at 70 cents each per day, 6 months, 183 days.....	1,921 50
200 tons coal, at \$6 per ton.....	1,200 00
Supplies for party.....	2,500 00
Total for six months.....	\$9,431 56

SHORE PARTY FOR ONE MONTH.

1 assistant, at \$3 50 per day, 30 days	\$105 00
1 assistant, at \$3 per day, 30 days.	90 00
2 assistants, at \$2 each per day, 30 days.....	120 00
1 foreman, at \$1 50 per day, 30 days	45 00
1 assistant foreman, at \$1 25 per day, 30 days.....	37 50
1 cook, at \$1 25 per day, 30 days.	37 50
1 steward, at \$1 per day, 30 days.	30 00
4 leadsmen, at 90 cents each per day, 30 days.....	108 00
4 chainmen, at 80 cents each per day, 30 days.....	96 00
28 boatmen, (4 crews,) at 70 cents each per day, 30 days.....	588 00
Subsistence	650 00
Each party for one month...	1,907 00

Six months each party.....	\$11,442 00
Transportation of party and supplies.....	800 00
Tents and camp equipage.....	600 00
3 barges for each party, at \$275 each.....	825 00
Each shore party, total expense.....	13,267 00
7 parties in the field.....	\$95,669 00

ASTRONOMICAL PARTY.

1 chief astronomer, at \$6 per day, 183 days..	1,098 00
1 assistant astronomer, at \$3 per day, 183 days.	549 00
1 time-keeper, at \$2 per day, 183 days.....	366 00
1 cook, at \$1 per day, 183 days.....	183 00
7 men, (1 boat's crew,) at 70 cents each per day, 183 days.....	896 00
Subsistence	975 00
Transportation and camp equipage.....	600 00
Total for astronomical party.....	4,667
Allowances to 5 officers of topographical engineers for quar- ters, transportation, &c	2,200 00
Pay of computer and draughtsman, at \$4 per day.....	1,460 00
Office-rent and fuel.....	600 00
Steamers in ordinary six months	4,500 00
7 assistants in office during winter, at \$3 50 per day.....	4,352 00
7 assistants, (including one for astronomical party,) at \$3 per day.....	3,722 00
8 assistants in office, at \$2 per day	2,912 00
	141,916 62
For contingencies, such as transportation of boats, smiths' work, lumber, timber, spike, iron, buoy-rope, anchors, paints, oils, leather, stationery, drawing-paper, &c., ten per cent. on the above.....	14,191 66
For additional instruments.....	4,000 00
Repairs of steamer Surveyor, new deck-beams of iron, new decks of best southern pine, and rebuilding upper works.....	12,500 00
Total amount of estimate	172,608 28

The next, Appendix B, is the report of Lieutenant Colonel Long on "Western River Improvements."

Until 30th June served at Washington on the Board of Engineers for Lake Harbors and Western Rivers. Ordered to relieve Colonel Johnston on present duties 28th March.

Duties of the board duly reported.

Mode of relieving Colonel Johnston duly reported.

From the records turned over to him, reports the condition and progress of the work prior to September 22, 1854, exhibited in Colonel Johnston's report of that date, and in a subsequent report of 20th October. Sale of the large twin snag-boats; proceeds of sale duly accounted for. The other snag-boats, Nos. 3, 4, and 5, and dredge-boats Nos. 1 and 2, also directed to be sold. Sale postponed.

Since sale of boats, progress of operations limited to rapids of the Mississippi. Progress and condition of this work exhibited in two reports and printed.

During the winter months the superintendent's attention directed to precautionary measures, and to the preservation of public property.

From these premises gives a statement of his operations since relieving Col. Johnston.

His expenditures since relieving Col. Johnston are as follows:

Objects of expenditures.	Amount expended.	Unexpended balance.
1. W. R. improvements at large.....	\$5,033 17	\$38 24
2. Improvement of Mississippi river.....	201 89	5,043 51
3. Improvement of Missouri river.....	460 07	1,574 94
4. Improvement of Arkansas river.....	16,509 15	1,911 65
5. Construction, repairs, custody, &c. of craft.....	4,964 35	23,041 18
6. Mississippi Delta survey.....	1,901 20	40,208 10
7. Survey of Falls of Ohio.....	812 00	(due ag't) 93
8. Improvement of Ohio, including Cumberland dam.....	2,985 23	1,706 78
9. Improvement of Illinois river.....	9,787 16	9,449 77
10. Improvement of rapids of Mississippi.....		55,550 57
11. Improvement of harbor of Dubuque.....	3,308 23	1,760 79
12. Amount from sale of two mud scows at Dubuque.....		350 00
Amount.....		149,415 53
13. To the amount of unexpended balance as above, may be added amount of proceeds from sale of Sevier, payable on 1st of November next.....		6,050 00
		146,665 53
Deduct item 7, overpaid.....		
Total of unexpended balances.....		146,664 60

Statement of his operations in 2d quarter of 1855.

Continued the manner of administration of his predecessor; functionaries retained as before, till circumstances made changes necessary.

Fuller's report and survey of Cumberland dam added to his report.

Efforts made on the Arkansas; interrupted by floods; sent agent to Little Rock to procure funds and settle claims for 1st quarter 1855; also, instructed to inquire into the condition of the Arkansas; his report added.

Captain Duval's report exhibits the following results:

Work done during 2d quarter of 1855.

Snags raised, reduced, and removed from channel.....	289
Logs, &c., cut on bars and shores	1,931
Impending trees felled	472
Stumps and roots blasted	3
Total of obstructions reduced.....	<u>2,695</u>

Above work through about one hundred and ten miles; nothing could be done higher up, water too low; river still falling—boat had to descend; officers and crew paid off and discharged; all which set forth in report added to his.

Other duties occupied his attention during April, May, and June; these reported as follows:

1st. The adjustment of accounts, drafts, &c., in relation to the public funds transferred to my credit by Lieutenant Colonel Johnston. All results of this character have been exhibited in connexion with my accounts for the 2d quarter of the current year.

2d. The contract with Swan & Co. for the improvement of the rapids of the Mississippi having been abandoned, measures for re-letting the work were instituted, and resulted in a new contract with J. H. Hager for the further prosecution of the improvement at a charge of \$9 per cubic yard. For more particular information on this subject, I take leave to refer to the instructions of the superintendent to Agent Floyd, dated on the 16th of April, and to the annual report of the agent, dated August 20, 1855. (See Appendix, Docs. Nos. 6 and 7.)

3d. Project of the superintendent, dated April 23d, setting forth sundry objects and purposes to which his attention might properly be directed on a tour of inspection proposed to be undertaken at an early date in May. (See Appendix, Doc. No. 8.)

4th. Various duties relating to the improvement of Red river, to the removal of the instruments pertaining to the survey of the Mississippi delta from Carrollton, La., to Louisville, Ky., for stowage and safe-keeping; to the adjustment of sundry outstanding claims relating to the survey, &c., &c., were particularly attended to. The views and proceedings had in relation to these subjects are explained in a report of the superintendent, dated May 5, 1855; in a report of Agent Fuller of the same date; in instructions of the superintendent to this agent, dated May 7th and May 8th, and more particularly in the annual report of Agent Fuller, dated August 20, 1855. (See Appendix, Docs. Nos. 8, 9, 10, 11, 12 and 13.)

5th. From the 10th of May to the 12th of July, I was employed in making various examinations and inquiries in reference to the condition and exigencies of the several works under my charge, and in giving to the United States agents such instructions in reference to each as were deemed expedient and proper. For a full account of my proceedings in relation to these duties, I take leave to refer to my inspection report of June 20, and a continuation of the same dated July 20, 1855, copies

of which are hereto appended. (See Appendix, Docs. Nos. 14 and 15.)

6th. On the 30th of June I visited Napoleon, and attended personally to the sale of the small twin snag-boat Terror, and on the 7th of the month following bestowed similar attentions on the sale of the large twin snag-boats Bell and Sevier, (No. 3 and No. 4,) and in each case adopted such courses as were deemed compatible with the fair dealing, and most conducive to the interests of the public. The results of the proceedings in these cases are given in the Appendix. (See Appendix, Doc. No. 16.)

7th. The snag-boats having been disposed of in the manner above explained, arrangements were promptly made for the repairs, re-outfit, &c., of the snag-boat Sevier, and for the resumption of the snag business in the Mississippi, between the mouth of the Missouri and Vicksburg. Captain J. Y. Clemson was re-appointed to the command of this boat on the 7th July, and a series of instructions were consequently furnished for his guidance in the performance of the duties assigned him. Copies of his appointment, and of the instructions mentioned, are appended hereto. (See Appendix, Docs. Nos. 17, 18, 19, 20, 21, and 22.)

8th. Sundry preliminaries affecting the improvements of Red river have received due attention. These are sufficiently detailed in a report of Agent Fuller dated on the 27th July last, a copy of which is hereto annexed, (see Appendix, Doc. No. 23.) Other duties relating to the same improvement, and more especially to the preparation of suitable water craft for its prosecution, have received due attention. The agent was directed in due time to repair to this port, and superintend the construction, equipment, and outfit of the craft in question. His annual report before cited contains various useful items of information relating to this improvement. (See Appendix, Doc. No. 13.)

9th. Proceedings touching the improvement of the Illinois received due attention. Many details relating thereto are presented in the annual report of Agent Dunlap, hereto appended. (See Appendix, Doc. No. 24.)

10th. On the 31st of May instructions were given to J. C. Jennings, esq., U. S. agent for the harbor of Dubuque, requiring surveys, drawings, and a report explanatory of the manner in which the improvement of the harbor may be most advantageously carried into effect, in conformity to the method of improvement recommended by the board of engineers of lake harbors and western rivers, and approved by the War Department. The directions given, and the surveys, &c., that have been made, are contained in the Appendix. (See Appendix, Docs. Nos. 25 and 26, for the instructions, and Doc. No. 27 for the report, &c., the last being the annual report of the agent.)

11th. The unexpended balances of sundry appropriations for the improvement of western rivers, including that for the survey of the Mississippi delta, were transferred to my credit prior to the close of the 2d quarter of 1855, and have been duly credited in my accounts for that quarter.

12th. The disbursements and unexpended balances on account of the several objects above considered, for the fiscal year beginning

July 1, 1854, and ending June 30, 1855, agreeably to the abstracts of Col. Johnston, to my personal accounts, and to the statements received from the U. S. agents, are as follows, to wit:

Objects of expenditure.	Amount expended.	Unexpended balances.
1. W. R. improvements at large.....	\$5,033 17	\$38 24
2. Improvement of Mississippi river.....	201 89	5,043 51
3. Improvement of Missouri river.....	460 07	1,574 94
4. Improvement of Arkansas river.....	16,509 15	1,911 65
5. Construction, repairs, custody, &c. of craft.....	4,964 35	23,041 18
6. Mississippi Delta survey.....	1,901 20	40,208 10
7. Survey of Falls of Ohio.....	812 00	(due ag't) 93
8. Improvement of Ohio, including Cumberland dam.....	2,985 23	1,706 78
9. Improvement of Illinois river.....	9,787 16	9,449 77
10. Improvement of rapids of Mississippi.....		55,550 57
11. Improvement of harbor of Dubuque.....	3,308 23	1,760 79
12. Amount from sale of two mud scows at Dubuque.....		330 00
Amount.....		140,615 53
13. To the amount of unexpended balances as above, may be added amount of proceeds from sale of Sevier, payable on 1st of November next.....		6,050 00
		146,665 53
Deduct item 7, overpaid.....		93
Total of unexpended balances.....		146,664 60

The above balances, with the exception of that relating to the delta survey, and that relating to the Ohio river, are likely to be nearly or quite exhausted during the current fiscal year ending on the 30th June next, in payments for operations in progress during the year.

An estimate covering the expenditures likely to be incurred on account of the farther prosecution of the works under my superintendency during the next fiscal year, beginning on the 1st of July, 1856, and ending on the 30th of June, 1857, now claims attention, and will be presented in the following order, viz:

Estimate for the ensuing fiscal year.

Construction and equipment of three large twin snag-boats of improved construction for service in the Mississippi generally, and in the Missouri and Arkansas occasionally, at a probable cost of \$30,000 for each boat, &c.....	\$90,000
Construction and equipment of two light draught snag-boats with single hulls, for service in the Missouri and Arkansas rivers, at a probable cost of \$15,000 for each boat, &c.....	30,000
Construction and equipment of two machine boats for service in Arkansas and Missouri rivers, at a probable cost of \$2,500 for each boat.....	5,000

Construction of two quarter-boats, for accommodation of crews of machine boats, at \$500 for each.....	\$1,000
Total for constructions and equipments.....	126,000
Improvement of the Mississippi below the rapids.....	90,000
Improvement of the Missouri.....	40,000
Improvement of the Arkansas.....	40,000
Improvement of the Ohio, including Cumberland dam...	90,000
Improvement of Illinois river.....	20,000
Improvement of Des Moines rapids.....	60,000
Improvement of Rock Island rapids.....	40,000
Improvement of Dubuque harbor.....	15,000
Improvement of Red river, and requisite craft therefor....	100,000
Amount of appropriations required.....	621,000

It is believed that the several sums estimated as above can be expended to advantage within the ensuing fiscal year, and are respectfully recommended to the consideration of the government in the assessment of their appropriations for the year in question.

Among the strongest arguments in favor of appropriations for the objects above mentioned, are the peril and destruction of human life and property annually occasioned by ruinous obstructions in the way of safe navigation, the removal of which may be effected at an expense comparatively moderate.

During the last fiscal year the number of lives lost by casualties of one kind or other is no less than 124; the number of steamers wrecked 85; and the value of freights and other property lost incalculable; besides which, enormous sacrifices of health and labor have been incurred during the same year. (See Appendix, Doc No. 28.)

The arrivals and departures of steamers at Cairo, the main centre of western navigation, during the last fiscal year, are approximately as follows, viz :

Months.	Number of arrivals.	Number of departures.
July, 1854	211	211
August, 1854.....	156	156
September, 1854	146	146
October, 1854.....	100 ?	100 ?
November, 1854.....	147 ?	147 ?
December, 1854.....	290	290
January, 1855.....	303	303
February, 1855	180 ?	180 ?
March, 1855	375 ?	375 ?
April, 1855	355 ?	355 ?
May, 1855	368	368
June, 1855.....	274	274
Totals for the year.....	2,905	2,905

N. B.—The register from which the foregoing statements were derived has been subjected to frequent changes both in the places where, and the persons by whom, it has been kept; consequently it may be inaccurate and defective in many respects.

Efforts have been made to obtain statistical information in relation to the condition of western commerce within the district of my superintendency for the last fiscal year. The results of inquiries instituted for this purpose are exhibited in the annual reports of the several agents, and may be regarded as approximately correct to the extent of their bearings merely. (See Appendix, Docs. Nos. 7, 13, 24, and 27, before cited.) Statistics of this character have been more particularly required of Lieutenant Abert, my military assistant, in reference to the ports of Cincinnati, Louisville, and St. Louis. The inquiries and investigations of this officer have been far more comprehensive, and have led to results much more abundant and reliable, by reason of his having been favored with opportunities of consulting observations and registers more authentic, systematic, and comprehensive than those to be found at other commercial points of less magnitude and less accessible to trade. The results obtained by Lt. Abert are exhibited in the Appendix. (See Appendix, Doc. No. 29.)

Speaks well of proposal of Eads & Nelson; adds it to his report; but considers the use of diving-bell boats "somewhat chimerical;" states why. Thinks simultaneous employment of diving-bell and snag-boats would be advantageous.

Reiterates views of the proper administration of his superintendency. These views are stated in his report.

Supplemental observations of mode of improving and of varieties of work; views of these; then gives cost and equipment of varieties of craft for these several views.

States periods during which the several rivers may be operated upon advantageously.

Concludes with the following remark: "These observations, like those relating to the estimate and to the operations of the next fiscal year, are to be regarded as relevant to the cause of western river improvements only in the event of new appropriations for the objects comprised under that general head."

Appendix C.—Colonel Turnbull's report, dated Oswego, 1st September, 1855.

Work at this place 1,069 feet long, 35 feet wide at top. Crib-work of wood ballasted with stone, placed in front of the wharves of the town, affords good protection. In 1853, 100 feet was added to the northern breakwater, but appropriation being exhausted, work was left unfinished. Repeats his recommendation that 200 feet be added to the northern breakwater. Submits estimate for this purpose.

Burlington, Vermont.—Describes its position. States its commerce to year ending 30th June, 1854.

Duties collected.....	\$67,975 00
Foreign merchandise exported.....	1,066,001 00
Domestic.....	310,101 00

Merchandise imported and entered, for other districts	\$502,665 00
Hospital money collected.....	275 00

American tonnage entered.....	21,592
“ “ cleared.....	20,499
Foreign tonnage entered.....	12,194
“ “ cleared.....	9,589

Tonnage outstanding—enrolments—

Steam.....	4,527
Sailing.....	2,847

Then follow estimates in detail for the work.

Survey of the harbor of Ogdensburg.—Completed (now.)

Oswego—Operations for this year.—Completing unfinished work; filling up breach made in 1852; removing temporary work, and building crib; west pier entirely rebuilt; may last three years; and, unless from casualty, will last from five to seven years. East pier kept in repair by private enterprise. The United States dredge-boat has been employed by the corporation.

Oswego, the most important harbor on that lake, has much increased. Two daily lines of Canada steamers have been established: one to Toronto, with the Collingwood route through Georgian bay to Lakes Michigan and Superior, a route much used; the other from Oswego to Hamilton, connecting with the railroad through Canada to Detroit.

Amount of duties for year ending 30th June, 1855.....	\$245,112 48
Value of foreign merchandise exported.....	1,239,306 00
Domestic	2,541,169 00
Amount of merchandise imported and entered, for other districts	990,348 00
Hospital money collected.....	951 99

American tonnage entered.....	564,816
American tonnage cleared.....	506,052
Foreign tonnage entered.....	110,257
Foreign tonnage cleared.....	109,960
Tonnage of steamers, on outstanding enrolment	5,199
Tonnage of sailing, on outstanding enrolment	23,309

Then submits estimates for completing the work. Gives charts of Oswego.

Sodus bay, Cayuga county, fifteen miles west of Oswego.—A fine harbor, water deep, shores bold; describes the plan for improving the harbor, (or rather entrance to harbor;) work commenced; 240 feet of west pier built.

This bay in the collection district of Oswego; appropriation exhausted; submits estimates for the completion of the plan.

Sodus bay, Wayne county.—Nothing done this season; appropriation exhausted; old work much decayed, except the part rebuilt in 1853,

in the collection district of Oswego; describes its commerce and prospects; a fine harbor and of great importance to the commerce of the lake; submits estimate for the work required.

Genesee harbor.—Nothing done this season; appropriation exhausted; in 1853, 1,943 feet of west pier rebuilt; in good order; the east pier 2,034 feet long, decayed to water edge, and several breaches through it; entirely submerged in moderate gales, which renders it dangerous; requires to be rebuilt; describes the plan and submits estimate.

Oak Orchard creek, (harbor.)—Nothing done this season; want of means; west pier 884 feet long, 20 feet wide; 290 feet, built in 1853, in good order; other part much decayed; east pier, 734 feet long, 20 feet wide, much decayed. It is intended these piers should be extended into the lake to a depth of fifteen feet; an important harbor to the commerce of the lake; its position described, and estimates given for work required.

Harbor of Buffalo.—No work done this season for want of means; last season occupied in rebuilding the sea-wall thrown down in the storm of 1843.

Renews recommendation to rebuild wall about the light-house; present wall exhibits signs of yielding, being built of small stone. Also recommends renewal of the tow-path in character with the wall, and for its greater security; now much dilapidated; states how the work should be done, and submits estimate for work proposed.

Harbor of Dunkirk.—Describes the plan projected and approved; speaks of delivery of materials under the contract; gale of wind removed first crib placed in position; frames for six more cribs in readiness; weather has been stormy; describes its position and amount of tonnage in 1854; value of property received there by the lake, \$10,000,400, and by railroad \$15,000,000.

30,000 emigrants left that harbor. Submits estimate and chart.

Harbor of Erie.—Describes the plan, and brush-work operation, in which he has confidence; season unfavorable; submits estimate.

Appendix D.—Report of Captain Stansbury, dated 30th September, 1855.

Has nine harbors under him. Appropriations made in 1852 nearly all exhausted in 1854, except for Cleveland. Has been at work on the west pier of that harbor.

Conneaut.—Planking and filling of the west pier completed to extent of piers; in good order; nine to ten feet water taken in. A good harbor of refuge for lake navigation.

The piers should have about 150 feet added to each. Report and estimate submitted in 1854, (printed;) estimate repeated. Appropriation of 1852, \$10,000. With this 890 feet of pier was rebuilt, and 120 feet repaired; also a crane-scow built, and harbor surveyed.

Ashtabula.—No work done this season; appropriation exhausted. Fourth quarter of last year occupied in finishing up what had been commenced. Harbor now in tolerable condition, but work required on west pier, for which an estimate is submitted.

Grand River harbor.—Operations suspended at close of last season; appropriation exhausted. Describes work done with appropriation of

1852. Renews estimate of last year, deducting for one pier; reduces estimate.

Cleveland harbor.—Operations prosecuted with vigor. Has given to this work much personal attention; states course in procuring timber and stone; describes plan and work in much detail. During two last seasons 950 feet of pier has been built; speaks well of the work; will send on a model of his crib; refers to estimate. Describes east pier; submits estimate for repairs; a strong necessity for these repairs. States how appropriation of 1852 has been expended, and submits estimates for further work.

Harbor of Black river.—Extensive repairs yet required. Reports work done with appropriation of 1852; submits estimate.

Harbor of Vermillion.—No work done; no appropriation. Something done with funds from Light-house Board. Describes the work and its condition, and submits estimate.

Harbor of Huron.—Nothing done this season; appropriation exhausted. Gives statement of work done with appropriation of 1852. Describes condition of piers, and submits estimate.

Harbor of Sandusky.—Describes its position and object of work done, and closing of breaches in peninsula point; speaks well of the work done with much intelligence, and submits estimate.

Harbor of Monroe.—Describes the condition of funds, and why he has not been able to do work there; describes work done by former agent; submits estimate. Gives summary of his estimates, and many valuable general remarks.

The report concludes with a recapitulation (in detail) of the several estimates.

Appendix E.—This appendix should have been the report of Lieut. Col. Graham, which would have embraced the works on Lake Michigan; but it has not yet been received.

Appendix F is the report of Lieut. M. L. Smith of his survey in Florida.

The report is interesting, the drawings voluminous, and an estimate to complete the survey is submitted.

The annual report of Lieut. Col. McClellan, not having been received in time, was not referred to in the report of last year from this office. It was sent on this year after his death, being, I suppose, found among his papers. Having added it to my report of this year as Appendix G, it becomes, therefore, necessary to notice it. It is dated Knoxville, September 1, 1854.

He describes his work at the Knoxville shoal; reports the difficulty encountered by an unexpected tendency of the water, which obliged him to the construction of a dam 1,900 feet long; has improved this shoal; states what is necessary to complete plan.

Chota shoal.—Describes work at this shoal, and amount yet required.

Booth's shoal.—Describes operations at this shoal, and why intended dam was not built.

Cancy creek, 1st shoal.—Has had to add 260 feet to dam built the year before, and states what will be necessary to complete work there.

Cancy creek, 2d shoal.—Alludes to the defect of the dam built there

by the State; describes his work; left incomplete as the one at Chota shoals, wanting funds.

Winton's shoal.—His efforts were to establish two dams at this shoal; describes them and their positions; these dams have been completed, and “the boat channel, through a distance of near four miles, has a sufficient depth at low water.” Speaks of a former dam at this place and its defects, which defects have been remedied. “This work may be considered complete.”

He then gives summary of work done in 1855, and from May to 14th August, 1854; and, in addition, states how a party was employed till 14th August, (soon after which Lieut. Col. McClellan died.)

He concludes his report as follows:

“I beg leave to refer to the maps which accompanied my annual report of last year, for the positions of the dams referred to in the foregoing report, and to the estimates which accompanied the same report, for the probable cost of the dams and other improvements to be made, should the work be prosecuted further.”

Appendix H.—Report of Captain Simpson in relation to the roads of his superintendency. With the report is a map exhibiting these several roads.

1st. *Road from Point Douglass to St. Louis river of Lake Superior.*—Length by first survey, 190 miles. Survey and construction reduced length about nine miles.

States when operations were commenced, and reports how conducted. Solicits a change of orders. His orders are, “present funds must be so disposed upon the roads as to produce the best general results, and should future appropriations be made, future work can be attended to;” reports his course under his orders. States contracts awarded; placed a civil engineer on each section; reasons for so doing, and reasons for present plan of road; then to widen and otherwise improve, as the appropriation will allow. States extent of road under contract, and work laid out. Reports bridges under contract; reports contracts for more road-work; reports extent of road completed; reports employment of assistant engineers.

Table in the sequel gives fiscal condition of the road. No further estimate submitted.

2d. *Point Douglass and Fort Ripley road.*—Describes the road; reports measures for its construction; also, measures under appropriation of 1854. States contracts awarded; reports contracts finished, and when others will be, and reports bridges being made; reports extent of road under contract, and work yet to be done. Submits estimate to complete; reports employment of civil engineer assistants.

3d. *Wabashaw and Mendota road.*—Describes the same, and reports course of operations, contracts, and work. No further estimate submitted.

4th. *Big Sioux and Mendota road.*—Describes the road; states when put under his care; course and extent of operations; extent under contract; extent completed and yet to be made; remarks on contractors Dodd and Nash; reports other contracts for road-work, and for bridge; describes bridge adopted; reports contract for bridge over the Chan-

tesha; also reports employment of civil engineer assistants on this road. No further estimate submitted.

5th. *Swan River and Long Prairie road*.—Describes road; will be completed in October. No further estimate submitted.

6th. *Fort Ripley and Red River (or Pembina) road*.—Copies the law; reports course under it; further description of the route; reports difficulties under the law; reports upon the country, and refers to Captain Pope's report, from which gives extracts, and from other sources. Submits additional estimate.

7th. *St. Anthony Falls and Fort Ridgely road*.—Reports upon this road, and states that under the law "nothing can be done on his part."

Tabular statement of the amounts which have been appropriated for the roads under my charge from the commencement, with an account of their present fiscal condition.

Designation of road.	Amounts appropriated.				Total amount appropriated.	Balance in hands of general superintendent this date.	Balance due general superintendent this date.	Balance in treasury this date.	Total balance remaining available.
	July 18, 1850.	Jan. 7, 1853.	July —, 1854.	Mar. —, 1855.					
From Point Douglass to mouth of St. Louis river	\$15,000 00	\$20,000 00	\$20,000 00	\$34,213 50	\$39,213 50	\$7 625 63	.....	\$34,717 53	\$42,543 16
From Point Douglass to Fort Ripley	10,000 00	10,000 00	10,000 00	13,494 09	43,494 19	157 13	.....	2,989 09	4,146 22
From Wabashaw to Mendota	5,000 00	5,000 00	15,000 00	13,871 76	38,871 76	.....	\$509 74	8,201 76	7,692 02
From Mendota to mouth of Big Sioux river	5,000 00	5,000 00	25,000 00	27,475 68	62,475 68	3,712 98	.....	40,362 62	44,075 60
From mouth of Swan river to Winnebago Agency at Long Prairie	5,000 00	5,000 00	5,000 00	2,535 39	17,535 39	1,215 11	.....	.....	1,215 11
From Fort Ripley to main road leading to Red river of the North .....	.....	.....	.....	10,000 00	10,000 00	261 21	.....	9,400 00	9,661 21
From St. Anthony Falls to Fort Ridgely .....	.....	.....	.....	5,000 00	5,000 00	.....	.....	5,000 00	5,000 00

The following are the estimates required for the service of the roads, and for which appropriations are recommended at the ensuing session of Congress.

To complete the road from Point Douglass to Fort Ripley, the balance, stated before, between the appropriation of March last, \$13,494 09, and the amount required in my last annual report, \$18,190, or \$4,695 01.

For survey and construction of a military road from Fort Ripley, via Crow Wing river, to Pembina, on the Red river of the North, as follows:

Grubbing, clearing, and levelling off 360 acres, at \$120 per acre.....	\$43,200 00
Cutting down 560 acres, at \$40 per acre.....	22,720 00
Corduroying or logging 2,160 rods, at \$3 per rod.....	6,480 00
Earth-work 41,670 cubic yards, at 30 cts. per cubic yd.	12,501 00
Bridging (32 rivers) 2,080 feet lineal, at \$8 per foot...	16,640 00
Total amount.....	101,541 00
Add 20 per cent. for contingencies.....	20,308 20
Add for first survey.....	12,000 00
Total amount of estimate	<u>133,849 20</u>

Of which amount I would recommend that Congress appropriate before spring \$30,000 in addition to the \$10,000 already appropriated, so that the survey may be commenced early enough to arrange for contracts during the summer.

Submits some valuable general remarks upon road making in Territories, and particularly on "right of way," in reference to which serious embarrassment has been encountered.

Of the roads reported as under Lieut. Bryan and Capt. Scammon, no annual report has been received.

Four roads are reported as under the superintendence of Major Bache, and referred to in Appendix I. These are:

Road from Astoria to Salem.

Road from the Dalles to Columbia City barracks.

Road from Columbia City barracks to Fort Steilacoom.

Road from Great Falls of the Missouri to the road leading from Walla-Walla to Puget's sound.

No regular annual report on these has been received. The information in relation to them is embodied in the Appendix I, to which reference is respectfully made.

The road from Great Salt Lake City to the eastern boundary of California was placed under the direction of Lieut. Col. Steptoe. His letters are reported in Appendix K, to which reference is respectfully made; they contain all information on the subject in this office.

The road from Myrtle creek, in Umpqua valley, to Scottsburgh, was placed under the direction of Lieut. Withers. His letters contained in

Appendix L, to which reference is respectfully made, is all the information contained in this office.

Respectfully submitted :

J. J. ABERT, *Col. Corps Top. Eng.*

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, December 1, 1855.

Compendium of the Report of the Colonel of Ordnance for the year 1854-'55.

FISCAL AFFAIRS.

Available means for the year from all sources.....	\$1,858,801 32
Expenditures during the year for all purposes.....	1,159,601 08
Amount reverted to surplus fund during the year.....	26,298 05

All accounts duly forwarded, received and examined, excepting those from the military storekeeper at Monterey, California, whose failure in this respect has been duly noticed. No appropriation having been made for arsenals in Texas, New Mexico, and on the North Pacific coast, the estimates, therefore, heretofore made, are renewed, and attention called to these items, and to the remarks thereto appended on the necessity of arsenals at these points.

ARMAMENT OF FORTIFICATIONS.

The expenditures for this object, and the principal articles obtained, stated. Armaments at the forts repaired, and 224 heavy seacoast and garrison guns, mounted and equipped, furnished, principally to the forts at San Francisco and at Key West. The subject of armament of fortifications has been revised by a board of officers. The total number of pieces of ordnance required for the fortifications is 6,459, of which there are on hand 3,912, leaving 2,547 to be procured. The plan of procuring the armament, gradually by annual appropriations, is approved; and the establishment of a national armory for the fabrication of cannon and projectiles, both for the land and sea service, is recommended. Reports of measures which have been adopted to improve the quality of cast-iron cannon, and to apply tests more reliable than the mere powder-proof, have been arranged and prepared for publication.

ORDNANCE, ORDNANCE STORES, AND SUPPLIES.

The expenditures under this head, during the year, and the principal articles procured by fabrication at the arsenals and by purchase, specified. A statement of the quantities and kinds of arms, ammunition, and other ordnance supplies furnished for the United States service, during the year, appended. The duty of furnishing horse equipments has been assigned to the Ordnance department, and a new pattern of these equipments has been procured and issued to the cavalry regiments for

trial. Several kinds of breech-loading arms for cavalry, and also muzzle-loading carbines, have likewise been supplied for the same purpose. When the results are made known, and the relative merits of the different equipments and arms practically ascertained, the best will be adopted as the regular patterns for mounted troops. The propriety suggested of making provision for securing to the government the use of any machine or improvement made in the government workshops, by persons in its pay and employment, with compensation therefor, only when authorized by special laws.

NATIONAL ARMORIES.

Expenditures and products stated: 19,543 small-arms made at the armories during the year, besides experimental arms and other work. Satisfactory progress has been made in the preparation of the new model arms, all the details of which have been submitted to the examination of the Ordnance Board; a summary statement of the action of which, together with the decision and instructions thereon, is appended. The fabrication of arms of the old model has been gradually diminished during the year, and recently brought to a close after using the stock of materials on hand not suitable for the new model. Proposed to place the final inspection of all the arms made at the two armories under charge of one officer of the Ordnance department, in order to secure uniformity and the best quality of materials and workmanship, and in connection with this to establish a depository of small-arm models, under the charge of the inspecting officer.

ARMING THE MILITIA.

The expenditures and the principal articles procured on this account specified. Statements annexed exhibit the apportionment of arms to the several States and Territories, and the arms and equipments furnished to the militia during the year. The distribution was made in accordance with the seventh section of the act of March 3, 1855. This mode of distribution is more equitable than it was practicable to make under the former law. In execution of the proviso to the section directing an equalization of arms as far as practicable, there was assigned to each State and Territory, which had received a supply of less than 2,000 stand of arms, a sufficient number to make its supply equivalent to that amount. Proposals have been invited for the erection of an armory for the volunteers of the District of Columbia on a site selected for the purpose; the lowest bid accepted, and a contract made for a sum not exceeding the amount appropriated. To keep within this limit, and at the same time to include the three purposes of the building mentioned in the act, it was necessary to omit some items of work for finishing and painting; to provide for which, and for the reception and arrangement of small-arm models, as before proposed, will require an additional appropriation.

ARSENALS.

The amount expended on this account, and its general application, stated. Reports of commanding officers annexed are referred to for detailed information. The number of arsenals and depots which have been occupied during the year is twenty-six, including depots established as temporary arrangements from necessity, and which ought to be replaced by suitable arsenals. The depot at St. Augustine, established during the Seminole war, has been broken up, being no longer required. Recent experience shows that the depot at Liberty, Missouri, is now out of position, and ought to be transferred to Fort Leavenworth. The establishment of a depot at Fort Snelling, when it shall be abandoned as a station for troops, is recommended in order to supply forts and troops on the headwaters of the Mississippi, and on the frontier north and west of that river, and the lakes. Assignments to duty of ordnance officers stated generally, with remarks in reference thereto. The present compensation of military storekeepers of ordnance and of master-armorers and clerks at the national armories is insufficient, and is recommended to be increased twenty-five per cent. Attention called to the exclusion, by construction, and contrary to the intention of the law, of the enlisted men of ordnance from the benefits of the act to increase the pay of the rank and file of the army. They are the only enlisted men of the army excluded; and an explanatory act to include them is recommended.

A. K. CRAIG,
Colonel of Ordnance.

ORDNANCE OFFICE, *October 24, 1855.*

Documents accompanying the Report of the Secretary of War.

1. Report from the Sioux Expedition.
2. Reports from the Department of Texas.
3. Reports from the Department of New Mexico.
4. Reports from the Department of the Pacific.
5. Report on Pacific Railroad Explorations and Surveys.
6. Reports of Board of Commissioners of the Military Asylum.
7. Reports on the Capitol Extension, Reconstruction of Dome, and Post Office Extension.
8. Communication from the Commanding General, and Statements from the Adjutant General.
9. Report of the Quartermaster General.
10. Report of the Commissary General.
11. Report of the Paymaster General.
12. Report of the Surgeon General.
13. Report of the Chief Engineer.
14. Report of the Colonel of Topographical Engineers.
15. Report of the Chief of Ordnance.

REPORT OF GENERAL HARNEY, COMMANDER OF THE SIOUX EXPEDITION.

HEADQUARTERS SIOUX EXPEDITION,
Camp on Blue Water Creek, N. T., September 5, 1855.

COLONEL: I have the honor to report, for the information of the general-in-chief, that on my arrival at Ash Hollow, on the evening of the 2d instant, I ascertained that a large portion of the Brulé band of the Sioux nation, under "*Little Thunder*," was encamped on Blue Water creek, (Mee-na-to-wah-pah,) about six miles northwest of Ash Hollow, and four from the left bank of the North Platte.

Having no doubt, from the information I had received from the people of the country I had previously met on the road, and from the guides accompanying me, of the real character and hostile intentions of the party in question, I at once commenced preparations for attacking it. I ordered Lieutenant Colonel P. St. Geo. Cooke, 2d dragoons, with companies "E" and "K" of the same regiment, light company "G," 4th artillery, and company "E," 10th infantry, all mounted, to move at 3 o'clock a. m., on the 3d instant, and secure a position which would cut off the retreat of the Indians to the Sand Buttes, the reputed stronghold of the Brulés. This movement was executed in a most faultless and successful manner—not having apparently attracted the notice or excited the suspicion of the enemy up to the very moment of the encounter.

At 4½ o'clock a. m., I left my camp with companies "A," "E," "H," "I," and "K," 6th infantry, under the immediate command of Major A. Cady, of that regiment, and proceeded towards the principal village of the Brulés, with a view to attacking it openly in concert with the surprise contemplated through the cavalry. But before reaching it, the lodges were struck, and their occupants commenced a rapid retreat up the valley of the Blue Water, precisely in the direction from whence I expected the mounted troops. They halted short of these, however, and a parley ensued between their chief and myself, in which I stated the causes of the dissatisfaction which the government felt towards the Brulés, and closed the interview by telling him that his people had depredated upon and insulted our citizens whilst moving quietly through our country; that they had massacred our troops under most aggravated circumstances, and that now the day of retribution had come; that I did not wish to harm him, personally, as he professed to be a friend of the whites; but that he must either deliver up the young men, whom he acknowledged he could not control, or they must suffer the consequences of their past misconduct, and take the chances of a battle. Not being able, of course, however willing he might have been, to deliver up all the butchers of our people, "*Little Thunder*" returned to his band to warn them of my decision, and to prepare them for the contest that must follow.

Immediately after his disappearance from my view I ordered the

infantry to advance, the leading company (Captain Todd's) as skirmishers, supported by company "H," 6th infantry, (under Lieutenant McCleary,) the remaining companies of the 6th being held in hand for ulterior movements. The skirmishers, under Captain Todd, opened their fire, crowned the bluffs on the right bank of the stream (where the Indians had taken up their last position) in a very spirited and gallant manner, driving the savages therefrom into the snare laid for them by the cavalry, which last troops burst upon them so suddenly and so unexpectedly as to cause them to cross, instead of ascending, the valley of the Blue Water, and seek an escape by the only avenue now open to them, through the bluffs of the left bank of that stream. But, although they availed themselves of this outlet for escape from complete capture, they did not so without serious molestation, for the infantry not only took them in flank with their long range rifles, but the cavalry made a most spirited charge upon their opposite or left flank and rear, pursuing them for five or six miles over a very rugged country, killing a large number of them, and completely dispersing the whole party. This brilliant charge of cavalry was supported, as far as practicable, by the whole body of the infantry, who were eager from the first for a fray with the butchers of their comrades of Lieut. Grattan's party.

The results of this affair were, 86 killed, 5 wounded, about 70 women and children captured, 50 mules and ponies taken, besides an indefinite number killed and disabled. The amount of provisions and camp equipage must have comprised nearly all the enemy possessed; for teams have been constantly engaged in bringing into camp everything of any value to the troops, and much has been destroyed on the ground.

The casualties of the command amount to 4 killed, 4 severely wounded, 3 slightly wounded, and one missing, supposed to be killed or captured by the enemy. I enclose herewith a list of the above, and also field returns exhibiting the strength of the troops engaged in the combat.

With regard to the officers and troops of my command, I have never seen a finer military spirit displayed generally; and if there has been any material difference in the services they have rendered, it must be measured chiefly by the opportunities they had for distinction. Lieut. Col. Cooke and Major Cady, the commanders of the mounted and foot forces, respectively, carried out my instructions to them with signal alacrity, zeal, and intelligence. The company commanders, whose position either in the engagement or in the pursuit brought them in closest contact with the enemy, were Captain Todd, of the 6th infantry, Captain Steele and Lieut. Robertson, of the 2d dragoons, and Captain Heth, 10th infantry. Captain Howe and his company ("G," 4th artillery) participated largely in the earlier part of the engagement, but, for reasons stated in his commanding officer's report, he took no active part in the pursuit. Brevet Major Woods, Captain Wharton, and Lieut. Patterson, of the 6th infantry, with their companies, rendered effective service as reserves and supports, taking an active share in the combat when circumstances would permit. Colonel Cooke notices the conduct of Lieuts. Buford and Wright, regimental quartermaster and adjutant

of the 2d dragoons, in a flattering manner. Lieutenants Drum, Hudson, and Menderhall, 4th artillery, Lieutenants Hight and Livingston, 2d dragoons, and Lieut Dudley, 10th infantry, gave efficient aid to their company commanders.

I should do injustice to Mr. Joseph Tesson, one of my guides, were I to omit a mention of his eminently valuable services in conducting the column of cavalry to its position in the rear of the Indian villages. To his skill as a guide, and his knowledge of the character and habits of the enemy, I ascribe much of the success gained in the engagement. Mr. Carrey, also, chief of the guides, rendered good service in transmitting my orders.

The members of my personal staff rendered me most efficient service in the field. Major O. F. Winship, assistant adjutant general and chief of the staff, and Lieutenant Polk, 2d infantry, my aid-de-camp, in conveying my orders to different portions of the command, discharged their duties with coolness, zeal, and energy. Assistant Surgeon Ridgely, of the medical staff, was indefatigable in his attentions to the suffering wounded, both of our own troops and of the enemy. Lieutenant Warren, topographical engineers, was most actively engaged, previous to and during the combat, reconnoitring the country and the enemy, and has subsequently made a sketch of the former, which I enclose herewith.

Captain Van Vliet, assistant quartermaster, was charged with the protection of the train—a service for which his experience on the plains rendered him eminently qualified. Lieutenant Balch, of the ordnance, was also left in charge of the stores of his department.

I enclose herewith several papers found in the baggage of the Indians, some of which are curiosities, and others may serve to show their disposition towards the whites. They were mostly taken, as their dates and marks will indicate, on the occasion of the massacre and plunder of the mail party, in November last. There are also in the possession of officers and others, in camp, the scalps of two white females, and remnants of the clothing, &c., carried off by the Indians in the Grattan massacre; all of which, in my judgment, sufficiently characterize the people I have had to deal with.

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

WM. S. HARNEY, *Bvt. Brig. Gen., &c.*

Lieut. Col. L. THOMAS,

Asst. Adjt. Gen., Headquarters of the Army, N. Y.

HEADQUARTERS OF THE ARMY,

New York, Sept. 29, 1855.

Respectfully forwarded to the Adjutant General, by direction of the general-in-chief, who highly approves of the conduct of Brevet Brigadier General Harney and his command.

L. THOMAS, *Asst. Adjt. Gen.*

Respectfully submitted to the Secretary of War.

S. COOPER, *Adjutant General.*

ADJUTANT GENERAL'S OFFICE, *October 1, 1855.*

REPORTS FROM THE DEPARTMENT OF TEXAS.

March 14, 1855: From General P. F. Smith.

June 2, 1855: From the same.

August 27, 1855: From the same.

HEADQUARTERS DEPARTMENT OF TEXAS,
Corpus Christi, March 14, 1855.

COLONEL: I have reports from Major Simonson, R. M. riflemen, commanding the expedition beyond Fort Davis, up to the 15th of February. He was thoroughly scouring the mountainous district north of the El Paso road, and between Fort Davis and the Rio Grande. The Indians had left it, he thinks, and gone northward, having received intelligence of the expedition. This is very probable, for I have already informed the department that a party of Lipans, from the band established on the Nueces, near Fort Inge, by the Indian agent, had joined the Mezcaleros, and kept up a regular communication with their friends near Fort Inge, by which they learned the strength and object of every party that passed that point on the road to El Paso. Major Simonson has been as far north as Capt. Marcy's road, and met Brevet Major Longstreet, 8th infantry, with a command out from El Paso, in the Guadalupe mountains.

The explorations of Major Simonson, and of Colonel Sewall, nearer Fort Davis, have had very valuable results, the former having discovered running streams of good water, that may serve for temporary camps in the future, and possibly give a better route for the El Paso road; and the latter has found by an examination made by Lieut. Col. Bomford, 8th infantry, fine pine timber within 11 miles of his post, and accessible by a wagon road.

The company of Texas volunteers under Capt. Henry, part of which had broken open the post office at D'Hane's and pillaged the town, some of whom were afterwards discharged for misconduct, on the march towards Fort Davis, and of which the Lieut. Jackson was under arrest, was ordered to be discharged, and I have now charges on hand against the captain for misconduct while drunk. The other two companies with Major Simonson appear to have been usefully employed; but on the receipt of your letter enclosing Major Neighbors' remonstrance against the prosecution of expeditions against the Indians, they, as well as the companies with Capt. Calhoun, were ordered to be discharged. But I trust that I shall be allowed to continue the movements against the Mezcaleros and Apaches, so as at least to keep them out

of reach of the roads to El Paso and Doña Ana, which I can do if the companies now here are filled up with recruits and horses.

On the subject of recruits, I would urge that they be sent out, if practicable, to arrive here the 1st of December; when they come in the spring or summer they suffer from the fevers and dysenteries of the climate and country, and embarrass the command rather than aid it. I am aware that this has not been possible lately, for it is only since August last that recruits could be procured.

My own regiment has been very unfortunate in this matter. It was at first filled up in 1846 with as good men as ever enlisted; these served during the war, but, on their return in '48, they collected a purse of seven or eight hundred dollars, and employed one of the agents about Washington to have a law passed discharging them all, which he had done. They were entirely recruited anew, but with inferior men, and marched across the plains in '49, to Oregon. In 1851, the men were all transferred to the dragoons in the Pacific division, and the regiment recruited the third time in six years, and stationed here. They have now had no recruits for over two years, and some of the companies have not over twenty men. When filled up now, a large majority will be recruits; and another evil follows, that so many will have their discharges due at the same time, that a large leaven of raw men will come into each company at once.

I delay making any plans for the summer, until I know the purposes of the department, since the increase of the army authorized, but will keep everything, as far as possible, in the most perfect state of efficiency, for any design that may, under the new circumstances, be determined on.

It is said at Brownsville that General La Vega and most of the troops in Tamaulipas are going south to aid Santa Anna against the revolution.

With high respect, your obedient servant,

PERSIFOR F. SMITH,

Brevet Major General, Commanding.

Colonel S. COOPER, *Adjutant General.*

Respectfully submitted to the Secretary of War.

S. COOPER,

Adjutant General.

ADJUTANT GENERAL'S OFFICE,

March 28, 1855.

HEADQUARTERS DEPARTMENT OF TEXAS,

Corpus Christi, June 2, 1854.

COLONEL: I have late reports from the whole of the frontier. The efforts of the troops have been successful in driving the Indians entirely out of that part of the State forbidden to them, and the roads on the frontier are travelled with security.

A tribe of Lipans, and three bands of Mezcaleros, have crossed into Mexico ; the former are established opposite Laredo and Fort Duncan, and the others in Chihuahua ; all under the protection of the respective State governments with whom they have made treaties.

As soon as the rains shall afford water and grass, we may expect them to cross the Rio Grande in marauding parties.

Major Simonson, from the Limpia, reports that the governor of Chihuahua has forbidden the exportation of corn. This decree, made solely to annoy us, will embarrass our supplies of forage towards Fort Davis, where no corn is raised on our side of the river.

The season has been uncommonly dry, and water and grass very scarce.

With high respect, your obedient servant,

PERSIFOR F. SMITH,

Brevet Major General, Commanding Dep't.

Lieut. Colonel L. THOMAS,

Assistant Adjutant General.

Respectfully forwarded to the Adjutant General.

L. THOMAS,

A. A. General.

HEADQUARTERS OF THE ARMY,

New York, June 16, 1855.

Respectfully submitted to the War Department.

W. G. FREEMAN,

A. A. General.

ADJUTANT GENERAL'S OFFICE,

June 19, 1855.

HEADQUARTERS DEPARTMENT OF TEXAS,

Corpus Christi, August 27, 1855.

COLONEL : I have the honor to transmit the report of Second Lieut. Horace Randall, now of the 1st dragoons, of an affair between a party of mounted riflemen under his command, detached from Brevet Major Ruff's company I, and a party of Mezcalero Indians who had crossed the Rio Grande, evidently to way-lay the El Paso road. It took place in the gorges of the mountains near the Rio Grande, between the Presidio del Norte and the Cañon de los Lamentos, (through which the El Paso road descends to the river.)

The prompt, skillful, and well-devised plans of Lieut. Randall have their best eulogy in their perfect success, and the vigor he showed in executing them is not less praiseworthy.

His commendations of the non-commissioned officers and men whom he commanded are unqualified, and the whole party seem to have done themselves great honor.

I have not time to have copied the report of Major Ruff, enclosing that of Lieut. Randall. I will transmit it by the next mail.

With high respect, your obedient servant,

PERSIFOR F. SMITH,

Brevet Major General, Army Department.

Leut. Col. L. THOMAS,

Assist. Adjutant General, Headquarters of the Army.

Respectfully forwarded by command of Brevet Lieutenant General Scott.

IRVIN McDOWELL,

Assistant Adjutant General.

Respectfully submitted to the Secretary of War.

S. COOPER,

Adjutant General.

ADJUTANT GENERAL'S OFFICE,

September 17, 1855.

REPORTS FROM THE DEPARTMENT OF NEW MEXICO.

January 31, 1855: From General John Garland.
February 28, 1855: From the same, enclosing reports from Captain R. S. Ewell, February 10 and February 25, 1855.
March 31, 1855: From General J. Garland.
March 31, 1855: From the same.
May 31, 1855: From the same, enclosing reports of Colonel T. T. Fauntleroy of April 30, May 5, and May 25, 1855.
May 31, 1855: From General J. Garland.
June 30, 1855: From the same.
July 31, 1855: From the same.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Santa Fé, January 31, 1855.

COLONEL: The events of the current month have been more exciting than ordinary. The Mezcalero Apaches are in open hostility with us, have murdered a few men, and run off a large number of animals from the Pecos settlement. Captain Ewell, first dragoons, has been in pursuit of them with one hundred and eighty men since new year's day, and will, I doubt not, force them into a fight before he returns. The Indians took the direction of the White mountains, and may have crossed over into Texas; this will not, however, check the pursuit.

On the 13th instant a party of nine Mezcaleros attacked a rancho near "Galisteo," not over twenty miles from this place, killed one man, wounded another, stripped a dozen women, and run off seventy mules. Information of this outrage was given to me about nine o'clock the same night. Lieutenant Sturgis, first dragoons, with a small detachment, went in pursuit at ten o'clock, and was on the ground at break of day, ready to take up the trail.

The pursuit was the most rapid, and the result the most satisfactory, of any which it has been my duty to report. One hundred and sixty (160) miles were accomplished in two days and three hours, when the Indians were overtaken and attacked. Three (3) Indians were left dead on the field; four (4) others badly, if not mortally, wounded. The morning of the fight was intensely cold—so much so, that after the first fire the men had to use their sabres. Of Lieutenant Sturgis's party three soldiers were wounded, once since dead. Several citizens accompanied this party, one of whom received an arrow wound.

For the satisfaction of the general-in-chief, I enclose a copy of the

official report of Lieut. Sturgis, which gives all the details of his successful expedition.

I regret to be compelled to report to the general-in-chief, that on Christmas day a war party of over one hundred (100) Utahs and Jicarilla Apaches, (who have taken shelter among them,) destroyed a settlement on the Arkansas river, above the mouth of the Huerfano, killing fifteen (15) men, capturing two women and children, and running off all the stock of the settlement. They have also committed some minor depredations, leaving no doubt of the hostile disposition of the Utahs, a numerous and warlike band. These causes, with other evidences of hostility round about us here, induced me reluctantly, but of necessity, to call upon the governor of this Territory for five companies of mounted volunteers to serve six months, unless sooner discharged. The volunteers have promptly responded to the call, and the last of the companies have been this day mustered into the service. It is very desirable that an appropriation should be made by the present Congress to meet this call. There is great uneasiness and insecurity among all the frontier settlers; and in order to inspire confidence, I have determined to place in the field a force of about four hundred regulars and volunteers, with orders to carry the war into the Utah country, and force upon *them* the necessity of looking after their own security, and that of their women and children. Supplies are already being placed in depot at the most convenient points for this expedition.

Before closing this communication, I desire to say that not less than five hundred and fifty-seven (557) recruits are necessary to fill up the companies within this department.

Most respectfully, your obedient servant,

JNO. GARLAND,
Bvt. Brig. General, Commanding.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Headquarters of the Army, N. Y.

HEADQUARTERS OF THE ARMY, *March 7, 1855.*

The attention of the Secretary of War is specially invited to this report. Lieut. Sturgis has a high spirit of enterprise, with much partisan zeal, talent and gallantry.

Respectfully submitted.

WINFIELD SCOTT.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Santa Fé, February 28, 1855.

COLONEL: I report with feelings of more than ordinary satisfaction the result of Captain Ewell's expedition in pursuit of the Mezcalero Apaches. For the information of the general-in-chief commanding the army, I send herewith the report of Captain Ewell, giving all the details of his march, encounter with Indians, and return to his post, all of which

redounds greatly to the credit of this well tried, gallant and valuable officer. But for the impatience of one of his officers, smarting under disappointment in the Mexican war, it is believed that not a man of the command would have been killed. As it is, we have to lament the death of Captain Stanton, 1st dragoons, and two of his men; whether in the field or in barracks, the Captain was looked upon by his comrades as the very pattern of an officer, and a gentleman.

It gives me unfeigned pleasure to call the attention of the general to the names of the young officers so favorably noticed in the accompanying report.

The Apaches lost in the fight fifteen men, and I am gratified to say that I have positive information that their great war chief "Santa Anna" and one of his sons were killed.

On the night of the 23d instant, a few days after the return of Capt. Ewell, his grazing camp, 25 miles from his post, was attacked by fifteen Mezcalero Indians, who after a desperate struggle were driven off. The four men who so valiantly defended their camp and animals were all injured, none of them having less than four wounds. Their names are Ringgold (in charge,) Culligan, Weaver, and Young. Lieutenant Moore, 1st dragoons, heretofore spoken most favorably of, was on the ground at 7 o'clock a. m. the next morning, and is now in pursuit, as is also Brevet Major Carleton, with 60 men. The loss of the Indians has not as yet been ascertained.

The force from Fort Bliss, under Brevet Major Longstreet, 8th infantry, ordered to co-operate with Captain Ewell, or any command which he might fall in with in the vicinity of the Guadalupe mountains, met with a party from General Smith's department, under the command of Major Simonson; at the time of their separation near the mountains, nothing of consequence had been accomplished.

Colonel Fauntleroy is now believed to be en route, with 500 men, for the Upper Arkansas. His expedition against the Utahs and Jicarilla Apaches will, it is believed, lead him into the district of country which proved so disastrous to Colonel Fremont a few years since.

I am at present fitting out an expedition under Colonel Miles, 3d infantry, of over 300 men, to traverse the White, Sacramento, and Guadalupe mountains, for three months if necessary, in order to bring the Apaches of that district to terms, or to drive them from the strongholds which these mountains afford.

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

Brevet Brigadier General, Commanding.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Headquarters of the Army, New York.

HEADQUARTERS OF THE ARMY,
New York, April 7, 1855.

Respectfully forwarded, and attention asked to the highly creditable service of Captain Ewell and command.

By command of Brevet Lieutenant General Scott.

IRVIN McDOWELL, *Asst. Adjt. General.*

Respectfully submitted to the Secretary of War.

S. COOPER,
Adjutant General.

ADJUTANT GENERAL'S OFFICE, *April 9, 1855.*

Read, with concurrence in the commendation of the commanding general of the army.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *April 11, 1855.*

LOS LUNAS, NEW MEXICO,
February 10, 1855.

SIR: I have the honor to report my return from the scout ordered from your office December 21. On the 7th I proceeded to Anton Chico with 61 men, company "G," 20 of "K," and Lieutenants Moore and H. B. Davidson, 1st dragoons. Dr. Kennon was the acting surgeon of the command; and his services proved highly important, and were cheerfully rendered.

At Anton Chico, I learned from your office of the co-operating force from Fort Fillmore to meet me on the Bonito, and also that the depredators were Mezcalero Apaches. I accordingly proceeded down the Pecos and up the Bonito rivers, to the vicinity of the Sierra Capitan, where, on the 13th January, as previously arranged by General Garland, I met Captain Stanton, 1st dragoons, Lieutenants Daniels and Walker, 3d infantry, and 50 infantry and 29 dragoons. On my route down the Pecos I was overtaken at Bosque Redondo by J. Gittings, esq., with four Mexicans, who proved my only reliable guides, and whom Mr. Gittings, at the instance of General Garland, had been active in hunting up—he, with great public spirit, mounting them on his own horses. Fatigue and exposure brought on an attack of sickness, which, to his regret, prevented Mr. Gittings from going further.

I made two night marches on a small Indian trail on the Pecos, which, proving older than thought at first, I abandoned, and continued my march to meet the troops from Fort Fillmore.

After combining the two commands, I moved south towards the Guadalupe and Sacramento mountains; and on the 17th of January encamped on the Peñasco—a fine stream running from those chains towards the Pecos. Up to this time we had seen no Indians, or sign; though constantly on the trail of the cattle, now six weeks old, and few in numbers. This night the camp was attacked by the Indians with arrows and fire-arms; at the same time they tried to burn us out.

Next morning the Indians appeared in force, with every mark of defiance, and during the whole day opposed our march, disputing every ravine, at times coming under cover within arrow-shot. A body of skirmishers, first of infantry, under charge, at different times, of Lieutenants Daniels and Walker, and then of mounted and dismounted

dragoons, under Lieutenant Moore, was engaged the whole day clearing the line of march. The country was broken into high hills, with deep ravines crossing the line of march. Lieutenant Moore, with some of the best horses, gave chase to some Indians, on the first open ground, but a winter march of 450 miles had reduced the horses too much to catch the Indians on their fresh animals. The Indians gave the impression, from their boldness, that they were trying to keep us from their families, and hoping to bring on a close fight, we kept up the march as rapidly as possible. During the day some fifteen of them were shot from their horses, and carried off by their comrades, leaving the ground marked by their blood; and at one time, after the fall of the boldest, they collected on a high hill and set up a lamentation, afterwards becoming bolder in their attacks. None of my guides had ever seen the country I passed through, after reaching the Peñasco.

About 3 p. m., on the 18th of January, I came to the first of their abandoned camps, where my command was halted for the night, and Captain Stanton was directed to take his company, with some additional men, and examine a small open valley to the right, where were some abandoned lodges, about 500 yards distant, and endeavor to find the direction taken by the Indians when they left.

This officer, after reaching the point designated, charged after some Indians he saw in front, and in following up the steep hill-sides, in the ardor of the chase, became separated from some of his men, badly mounted, which were unable to join when he sounded the rally. After rallying about a dozen of his men, he proceeded up the valley until he became satisfied that the Indians had not retreated in that direction, and he started back, leading his horses. About three-fourths of a mile from camp the valley narrowed, with trees and here he was ambushed and fired into, the first fire killing one of his men. He ordered his party to take to trees; but the Indians being in too great force, he mounted and directed his party to retreat, remaining in the rear himself, firing his Sharp's carbine, when he received a shot in the head, and was instantly killed. One of the men with him, when he first charged, (Private Duger, company "B," 1st dragoons,) was dismounted, surrounded, and lanced, after killing an Indian.

As soon as I ascertained that Captain Stanton was engaged, I ordered Lieutenant Moore, with a strong party on foot, whose approach dispersed the Indians. Lieutenant Moore brought in the bodies of Captain Stanton and the two men killed, and the horse and rifle of the Indian killed by Duger. After this the Indians dispersed, and my guides were utterly incapable of tracking them; and on the 20th, having passed above the sources of the Peñasco, I started back, with my horses so worn out that I was forced to lead them to my post. Within five miles of my camp, the day of my fight, were over 300 newly abandoned lodges.

The infantry were of invaluable service, and towards the last were able to outmarch the dragoons. The Indians were not aware of musket range until they paid for their experience. M. Gleason, esq., gave me important assistance, not only in the fight, but in keeping in advance with Mexicans when trailing.

I had the hearty co-operation of officers and men.

Enclosed is a map of my route, drawn by Lieutenant Moore.

The signal smokes of the Indians, on my return, satisfied me that they retreated towards the lower range of the Guadalupe mountains.

I remain,

R. S. EWELL,
Captain 1st Dragoons.

Major W. N. NICHOLS, *U. S. Army,*
Asst. Adjt. General, Department of New Mexico.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Santa Fé, February 24, 1855.

Official.

S. D. STURGIS,
First Lieut. 1st Dragoons, Acting Asst. Adjt. General.

ALBUQUERQUE, NEW MEXICO,
February 25, 1855.

SIR: I have the honor to report, for the information of the general commanding, that a grazing camp east of Los Lunas was attacked night before last by the Indians, who pulled the tent down over the men, shooting arrows through it at the same time. The men got out and fought the Indians, who were driven off, without committing further damage than wounding three men. They are all here in hospital, having been sent up last night. There were four soldiers in the tent at the grazing camp, and two a little back in the mountain burning coal, but before the latter reached the camp the Indians had retreated. In tracking the Indians after they retired, they were found to have encamped twice, leaving much blood on the ground. Lieut. Moore was on the ground at seven in the morning, and continued in pursuit. I am on my way to Los Lunas, and shall mount all my available horses, if any left, to follow Lieut. Moore. Should anything make it of importance I shall send another express. There were about fifteen Indians. Too much credit cannot be given to these four men, whose names are Ringgold, (in charge,) Culligan, Weaver, and Young; they are all wounded in several places. Culligan was wounded early in the affair, and mounted a horse to bring the alarm, Ringgold telling him he could hold his ground.

The Indians told the Mexicans they did not want the animals, only to kill the soldiers, but they succeeded in neither.

I write in haste, to give the earliest news; the bearer can answer as to more minute details.

The herd of mules were broken-down animals from my late scout; it was reported that the Indians took one pony.

Respectfully,
R. S. EWELL,
Captain 1st Dragoons.

First Lieut. S. D. STURGIS,
Acting Asst. Adjt. General, Dept. New Mexico.

HEADQUARTERS DEPARTMENT NEW MEXICO,
Santa Fé, February 28, 1855.

Official.

S. D. STURGIS,
First Lieut. 1st Dragoons, Acting Asst. Adjt. General.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Santa Fé, March 31, 1855.

COLONEL: I have the honor to report, for the information of the general-in-chief commanding the army, that about a thousand men of this department are now in campaign against the Indians of the Territory of New Mexico. Col. Fauntleroy, with a force numbering over (500) five hundred regulars and volunteers, is now in hot pursuit of the Utah Indians, who, since their foray against the settlements of the Upper Arkansas, made an effort to break up a new settlement on the Conejos, wounding a few men, and driving off a number of animals; this affair took place at a point where the Conejos river discharges itself into the Rio Grande. The command of Col. Fauntleroy will doubtless suffer much from the cold, and it would not surprise me to hear that many of his animals have perished in the deep snows of the Rocky mountains, where the troops were operating when last heard from. The Utahs will, it is believed, give him battle. They are, doubtless, the most formidable and the most inaccessible of all the Indian tribes bordering upon New Mexico.

The Mezcalero Apaches appear to have suffered, in killed and wounded, in their fight with Captain Ewell, more than was represented. They are now suing for peace; but fearing my terms may not suit them, I have thought it best to send a force of over (300) three hundred men into their country, under Col. Miles, 3d infantry, who will establish a camp on the Bonita river. This stream runs from the White mountains to the Pecos. The general impression here is that a military post in that vicinity will have the effect to neutralize this troublesome band. It is my present design to visit that region of country some time next month, when it will be in my power to judge more correctly as to the expediency of taking such a step. The advantage of keeping the eastern frontier of New Mexico free from hostile incursion will be one of its inevitable results.

The Gila Apaches and the Navajoes continue to remain quiet. The Jicarilla Apaches have dispersed; those of them entertaining feelings of hostility towards the whites have joined the Utahs.

I hope soon to hear that my call upon the governor of this Territory for volunteers has been approved. They are all now in the field. The moment their services can be dispensed with they will be discharged.

Most respectfully, your obedient servant,

JNO. GARLAND,

Bvt. Brig. General, Commanding.

Lieut. Col. L. THOMAS,

Asst. Adjt. General, Headquarters of the Army, New York.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Santa Fé, March 31, 9 o'clock p. m., 1855.

COLONEL: I have the honor to report, for the information of the general-in-chief of the army, that Lieutenant Magruder, 1st dragoons, has just arrived from Colonel Fauntleroy's camp, and brings information of a skirmish between a portion of our troops and the Utahs and Apaches, at the Coochetopa Pass; eight of the former were killed, and two dragoons wounded. After the fight, the Apaches separated from their confederates, were pursued for four days, overtaken, and all of their animals captured. Colonel Fauntleroy, after a hasty refit at Fort Massachusetts, will again take the field in pursuit of the Utahs. The Colonel speaks well of the conduct of the troops, volunteers included.

I have not time to copy the despatch of Colonel Fauntleroy before the closing of the mail.

Most respectfully, your obedient servant,

JNO. GARLAND,
Brevet Brigadier General, Commanding.

Lieut. Colonel L. THOMAS,
Assistant Adjutant General.

Respectfully forwarded for the information of the War Department.
 By command of Brevet Lieutenant General Scott.

IRVIN McDOWELL,
Assistant Adjutant General.

HEADQUARTERS OF THE ARMY, *New York.*

HEADQUARTERS DEPARTMENT NEW MEXICO,
Santa Fé, May 31, 1855.

COLONEL: I had the honor to report, on the 31st March last, the operations of Colonel Fauntleroy, 1st dragoons, against the Jicarilla Apaches and Utahs, which resulted in some small advantage over them. It gives me great satisfaction now to report a triumph over these Indians, seldom if ever equalled in the United States. The Colonel reports in his despatch, herewith annexed, (marked A,) that forty Utahs were killed, in a battle fought with them on the Upper Arkansas, near the Punche Pass. Six children were taken prisoners, thirty-five horses captured, with a number of arms, buffalo-robbs, &c., &c. Our loss was one man killed and two wounded. This expedition appears to have been conducted with skill and judgment, and reflects great credit upon Colonel Fauntleroy, his officers and men. The surprise of the Indians at night was of itself a great triumph. These were the Indians who broke up the settlement on the Arkansas, on Christmas day of last year. Their chief is called Blanco. It is gratifying to know that the volunteers participated freely in the fight.

On the evening of the 1st and morning of the 2d instant, Colonel

Fauntleroy reports some skirmishing with the Indians, in which four of them were killed, and some horses and baggage taken.

Lieutenant Colonel St. Vrain, of the volunteers, was detached by Colonel Fauntleroy, on the 20th April, from Fort Massachusetts, with two companies of volunteers, one company 1st dragoons, and a corps of guides and spies, in pursuit of the Jicarillas, under their leader, Chacon. The Colonel reports a fight near the crossing of the Huerfano, on the 25th and 26th April; the Indians numbering about sixty. They lost in killed and prisoners thirteen; in their flight they abandoned everything in their camp. Lieutenant Colonel St. Vrain possesses most excellent judgment, and the most perfect reliance can be placed upon his report, which is herewith enclosed, marked B.

It is proper here to remark, that the Utah Indians have tried, thus far unsuccessfully, to incite the Navajoes to join in a war against us. Brevet Major Kendrick, a most judicious officer, gives it as his opinion that the Utahs will fail in their efforts to involve the Navajoes in any such attempt.

Most respectfully, Colonel, your obedient servant,

JNO. GARLAND,

Brevet Brigadier General, Commanding.

Lieut. Colonel L. THOMAS,

Assistant Adjutant General.

In transmitting these reports to the Adjutant General, the general-in-chief desires me to express his appreciation of the services rendered by Colonel Fauntleroy, and the officers and men of his command.

L. THOMAS,

Assistant Adjutant General.

HEADQUARTERS OF THE ARMY,

New York, July 5, 1855.

pectfully submitted to the Secretary of War.

S. COOPER,

Adjutant General.

ADJUTANT GENERAL'S OFFICE,

July 6, 1855.

HEADQUARTERS NORTHERN DISTRICT OF NEW MEXICO,

Camp, Head of St. Louis Valley, April 30, 1855.

SIR: I have the honor to report that on the night of the 28th instant, about twenty miles from the Punche Pass, up the Arkansas river, I came on a camp of the Utahs, consisting of twenty-six lodges, and estimated to contain, in fighting men, about one hundred and fifty in number. I had under my command four companies—"D," 1st dragoons, "D," 2d artillery, and Chavez and Deas' companies N. M. volunteers—with which I made an attack at daylight, and carried the camp after a fight of about twenty-five minutes; killing forty, and wounding a large

number of others, and taking six children prisoners, and thirty-five horses, twelve sheep and goats, six rifles, four pistols, twenty-four bows with their arrows, and all their baggage of every description whatsoever. We had none killed in the action, but two wounded, (of D company, 2d artillery,) one of whom died some hours afterwards, having had his leg amputated; the other quite severely wounded in the shoulder, but not dangerously. Blanco is supposed to have commanded the Indians, and evidently left in great haste, as we found all of his (supposed) regal paraphernalia. The surprise was complete, and would have been decisive, if the Indians had not accidentally that night been engaged in a scalp dance, and had not slept at all. A small party of "D" company, 1st dragoons, which was out after the troops had returned from pursuit, had a man killed by the enemy.

I have come to this point with the expectation of proceeding to the Chowatche Pass, in which vicinity a party of Utahs are supposed to be, with a considerable quantity of stock. This party I hope to chastise in like manner, and will then proceed down the Del Norte from the cañon via the Coñejos, and possibly Abiquiere.

I shall communicate with Col. St. Vrain from here; and should circumstances have occurred, of which he may be apprized, to make it necessary, ask his co-operation in that direction, uniting with me at the Coñejos.

I have made this report in advance of a more detailed one, which I shall make in time for your next despatch to the Department of War.

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

TH. T. FAUNTLEROY,

Colonel 1st Dragoons, Commanding.

Lieut. S. D. STURGIS, *A. A. A. General,*

Headquarters Dept. of New Mexico, Santa Fe, N. M.

HEADQUARTERS NORTHERN DISTRICT NEW MEXICO,

Camp on the Garrita, May 5, 1855.

SIR: I have the honor to report that on the evening of the 1st inst., just at dusk, I arrived at the Chowatche Pass, near its entrance from the St. Louis valley, with a part of my command, company D, 1st dragoons, and Captains Chavez and Deas' companies of M. volunteers, (company D, 2d artillery, having been left ten or twelve miles behind in consequence of exhaustion from marching,) when I suddenly came in view of a party of Utahs, about fifteen in number, at the distance of two miles in the valley. Pursuit was immediately ordered, when they took directly to the mountains on the opposite side to that of our approach, and from which they were also distant about two miles. After passing the Chowatche creek, which here equally divides the valley, about the same number in addition, in different parties, were discovered making from various points in the same general direction of the others. The distance, and the darkness that ensued, prevented the possibility of pursuit.

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beyond the foot of the mountains. The command, however, succeeded in killing two Indians and five horses, and capturing thirteen of the latter. After the return to the creek, six lodges were found just vacated, with all the usual articles of Indian equipage, consisting in this instance in part of numerous pots and kettles and buffalo-ropes, to the number of thirty; a lance was also captured in the pursuit.

At daylight the next morning the pursuit was renewed, and the firing was continued through the hills with more or less rapidity for two hours, which resulted in the killing of two Indians and wounding several severely; the capture of two horses, one lance, one United States sabre, and one Indian shield.

At daylight, just before the troops went out, fifty Indians joined from the upper part of the valley, supposed to be a portion of those from the Arkansas, with which we had been engaged on the morning of the 29th ultimo, making on this morning, (the 2d instant,) the number of about eighty.

After the route of the Indians had been completed, and the troops withdrawn, several Indians, about 11 a. m., appeared in the distance in the valley, and pursuit was again ordered. These it appears did not wish to fight, for shortly after Tierra Blanco, who proved to be one of them, showed himself upon a ledge of rocks, on one of the highest points of the mountains, wholly inaccessible to us, declared his name, and expressed a desire for peace. Unfortunately, just at this moment a shot was fired at him, by some men who were scattered through the hills, which effectually ended all communication at the time, and he has not renewed his demonstrations. This he will not do, I suppose, as he must be well aware of the enormity of his outrages, and that the usual trick of the hollow pretence of a friendly and peaceful disposition will not avail him.

I have proceeded to this point, having effectually dispersed the Indians through the mountains; and they being now fully aware of our presence, will elude entirely a successful pursuit for the present; and being now clear of the mountains east of Del Norte, I shall continue my original plan of examining the different cañons west of that river, as far at least as the Coñejos, and possibly Abiquiere. Being fully convinced that no continued expedition can be carried on, but that success can only be secured by repeated excursions, practising at each one on a species of surprise, I shall, if not drawn below the Coñejos, be at Fort Massachusetts in about eight days, from whence I shall, at the earliest possible moment, renew my march for the mountains in the direction of the Coochetopa Pass with all my force.

I have not heard from Lieutenant Colonel St. Vrain since we parted, as reported to you, and can only, therefore, throw out my general purposes, which may be greatly or materially changed by unforeseen circumstances.

I take this opportunity to correct a mistake made in my report of the fight of the 19th of March, in which I called the pass where it took place the Coochetopa. It was the Chowatche Pass, and is the spot almost identical with our last affair, as related above.

I have the honor and pleasure to report that as yet we have lost but one horse.

I will hereafter make a more detailed report, in time for your next despatch to the Department of War.

Very respectfully,

TH. T. FAUNTLEROY,

Colonel 1st Dragoons, Commanding.

Lieut. S. D. STURGIS, *A. A. A. General,*

Headquarters Department of New Mexico, Santa Fé, N. M.

HEADQUARTERS NORTHERN DISTRICT NEW MEXICO,

Fort Massachusetts, N. M., May 10, 1855.

SIR: I have the honor to report my arrival at this post, on the 9th instant, with my immediate command, consisting of D company 1st dragoons, D company 2d artillery, and the companies of Chavez and Deas, New Mexico mounted volunteers. Nothing has occurred, since my report from the Garrita, in any manner worthy of note. It remains, therefore, for me to report a little more in detail in relation to the affair of the 29th ultimo, and the events precedent thereto. After being out from this post three days, we discovered recent signs of Indians on the south side of the Sierra Blanco, to the probable number of six lodges, making up the valley of the St. Louis. These we cautiously followed, conducting our march close under the mountains, and, when necessary, in the night. When we reached the point opposite the cañon, which connects the last mentioned valley with the Chawatche Pass, we discovered the trails of a few Indians, on horseback, crossing in that direction, which doubtless were expresses to communicate with other parties, whom we found out eventually to be moving under the preconceived purpose of forming a union at some point north of the mountains. We proceeded to the above mentioned cañon, and there came upon a camp supposed to be only a few days old, which had been occupied by a considerable number of Indians. This party took up the valley to the Puncha Pass. We followed it on the morning of the 28th ultimo, and encamped at the mouth of a pass which leaves the Puncha about midway in the mountains, and comes out about six miles west of the regular mouth of that pass, connecting with a cañon, said to come from the direction of Grand river. Here, about 5 o'clock in the evening, we called a halt, having marched about twenty-six miles, prepared for refreshment, and to await events. Spies and small parties were sent out in various directions for several miles to reconnoitre. They soon returned with concurring testimony of the union of several large parties of Indians, proceeding in the direction of the Arkansas river, and probably not more than a few hours old. All efforts were instantly made for a night pursuit. About 10 o'clock p. m. we took the line of march, preceded by Captain Chavez with thirty picked men, as spies. In about twenty-six miles we were greeted with the exciting information that the Indians, in a very

large body, had turned off towards the mountains, and had encamped near a cañon, a mile or so from the trail. As soon as possible, the supply train was concealed, and the command dismounted and placed in two parties: one, D company 1st dragoons, and D company 2d artillery, headed by Brevet Lieutenant Colonel Brooke, 2d artillery, and the other composed of Chavez and Deas' companies, led by Chavez; the first to deploy to the right of the Indian camp, and the other marching in a line to the left, and parallel to the line of the camp, to advance upon it when it had reached a point opposite the enemy. Lieutenant Beale, 2d artillery, led D company of that regiment, and Lieutenant Williams commanded D company 1st dragoons, and Captain Deas conducted his company of New Mexico volunteers. This arrangement was carried out by the officers and men with the utmost alacrity; the greatest difficulty which I had, being to restrain them. The Indians being engaged in a war-dance at the time, were more likely to discover us than if they had been ordinarily at rest in their camp; we had to approach with the utmost caution. This was done until we reached a point about one hundred and fifty yards from their camp, when suddenly the dogs of the enemy gave the alarm, and a fire from them was opened upon us. It then became necessary to make the assault, being discovered. A fire was opened from our parties on two sides of the square, which formed one continuous line on each side of light, most beautiful to behold, and almost eclipsing the illumination of the camp. This swept the enemy like chaff before the wind, and evidently so disconcerted them that they abandoned their camp, and, retreating in various directions, kept up but a scattering fire, which lasted about twenty-five minutes. The troops pursued to the mountains, and, having quieted all resistance, returned and took possession of the camp. The amount of plunder and baggage which it contained was almost incredible. There must have been two hundred buffalo-robbs and one hundred and fifty pack-saddles burnt, after the soldiers loaded themselves down.

My first report states the general result. I have found nothing to vary that report, but only to add, with regard to this affair, the officers and men acted with the most admirable decision and promptitude. It cannot be omitted that the artillery company on foot had marched, in the last twenty-four hours before the attack, fifty-two miles, without a complaint. Lieutenant Magruder, 1st dragoons, acted as my assistant adjutant general, and Lieutenant M. Cooke, 3d infantry, and Assistant Surgeon Peters, United States army, were in my staff, and all acted with zeal and efficiency. The conduct of the volunteers excited my warm approbation.

The enclosed copy of Lieutenant Colonel St. Vrain's report of his operations is sent for the information of the general commanding, and will explain itself, and is evidence of the zeal and activity of that officer. He has acted in full accordance with my instructions, and I have all confidence that, as well as he has done, more may be expected from his energy and experience. The band of Apaches he is pursuing is doubtless the same so hotly pressed by my command on a former

expedition, and I cannot but hope that the colonel will inflict a final blow of extermination upon them.

I have the pleasure to announce to the general that I returned with every horse and mule which I carried out with me but one dragoon horse, that dislocated his shoulder in a charge, and was shot three days after.

I would desire to say that, in my opinion, effective expeditions cannot be carried on against the Utahs by footmen, with any adequate success. Of this I am positively assured. The season is now near at hand when the difficulty of supporting mounted troops in the field will be removed by the abundant supply of grass now coming on. I found, upon my last trip, the grass not much improved beyond what it was at first. The new is not sufficiently advanced to afford sustenance, of itself, whilst the old has become more dry and tasteless.

I shall proceed to Taos, from which point I can re-unite my command, and shall, at the earliest moment, renew my operations against the Utahs.

I am, very respectfully, your obedient servant,

TH. T. FAUNTLEROY,

Colonel 1st Dragoons, Commanding.

Lieut. S. D. STURGIS, *1st Dragoons,*

A. A. A. General, Headquarters Dept. New Mexico, Santa Fé.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,

Santa Fé, May 31, 1855.

COLONEL: In order to put a proper force in the field to punish the Apaches of the White and Sacramento mountains, I was forced to call into service a sixth company of volunteers. The mustering of this company, I believe, was in the hurry of business omitted to be reported at the proper time.

I have now the honor to report, for the information of the commanding general of the army, that the expedition under Colonel D. S. Miles, third infantry, designed to follow up the blow inflicted by Captain Ewell, first dragoons, proceeded to the Bonita river, with modified instructions growing out of the interposition of Indian Agent Steek, to whom the chiefs of the Mezcalero Apaches sued for peace. They were impelled to this course after their defeat by Captain Ewell, and the knowledge of another hostile movement in the direction of their country. The Indian agent wrote to his excellency Governor Merriwether and myself that he had promised security to the Indians until he should get answers to his communications relative to peace. This step was not a little annoying when we were prepared to strike, and led to the modification of the instructions above referred to. Colonel Miles was authorized to make peace with these marauders upon condition of their surrender of all stolen property in their possession, and the delivery into his hands of hostages, to be held until some permanent arrangement could be had with them. A road for wagons was opened, under

the direction of Colonel Miles, from Fort Fillmore to the junction of the Rindoso with the Bonita river; and another, by the co-operating force under Brevet Major Carleton, first dragoons, from Albuquerque to the same point—the distance about 150 miles.

On the 4th of April I set out on a visit to the lower posts. This being accomplished, I took with me a strong escort and proceeded to Bonita, taking the route of Colonel Miles. The command was found in good fighting condition, with three months' supply of subsistence and forage. The troops under Major Carleton having joined those of Colonel Miles, two rude blockhouses and a defensive work for one company have been hastily put up. A site also selected for a fort, which, in memory of a gallant officer who lost his life near the spot, I have directed to be called Fort Stanton, until otherwise ordered. The post is easy of access; its vicinity affords abundance of grass, wood, and timber; the water is pure, and the roads good. The troops are now getting out timber for the new work, which is intended to hold a garrison of four companies, and, being in the heart of the Mezcalero country, will exercise the same influence over them as does Fort Defiance over the Navajoes.

His excellency the governor left Santa Fé on the 28th of April for Fort Thorn, the place appointed for holding treaties with the Gila and Mezcalero Apaches. It was my wish to accompany him, but my presence was of more importance here in regulating affairs in the north.

Most respectfully, Colonel, your obedient servant,

JNO. GARLAND,

Brevet Brigadier General, Commanding.

Lieut. Col. L. THOMAS,

A. A. General, Headquarters of the Army, Washington.

HEADQUARTERS OF THE ARMY,

New York, July 5, 1855.

Respectfully referred to the Adjutant General.

L. THOMAS,

Assistant Adjutant General.

Respectfully submitted to the Secretary of War.

S. COOPER,

Adjutant General.

ADJUTANT GENERAL'S OFFICE, *July 6, 1855.*

Fort Stanton as the name of the new fort is approved.

JEFFERSON DAVIS,

Secretary of War.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,

Santa Fé, June 30, 1855.

COLONEL: The most important result of the past month which I have to communicate for the information of the lieutenant general

commanding the army, is the conclusion of a treaty of *peace and boundary*, by Governor Merriwether, with the Mezcalero Apaches. His excellency informs me that the Indians were very much disheartened by their several defeats, the occupancy of their country by a military force, &c., and were willing to accede to any terms which he might have felt disposed to dictate to them. The country reserved for their occupancy is south of Fort Stanton; has a width of 27 miles, running from the Sacramento mountains to the Pecos river. An important feature in establishing a *boundary*, is the right which is carried with it of enforcing the intercourse law of 1834. The military operations of the month, although active, have not been so fruitful of good results as the past. A part of Colonel Fauntleroy's command in the north, under Lieutenant Colonel St. Vrain, bounced a party of Jicarilla Apaches, killed six, took seven prisoners, two Mexican captives, and captured thirty-one horses. This band is now broken up into small parties, and have taken to the mountains, from which they have lately made some successful forays against the unguarded Mexican population. The troops are now in active pursuit of them. Thirty of these warriors, with their families, made a recent effort to reach the country of the Mezcaleros, but were driven back by a part of the garrison of Fort Stanton, leaving in their trail a boy of three years old and half a dozen ponies.

Governor Merriwether and myself have appointed the 13th July to meet the Navajoes near Fort Defiance. This tribe I consider as not only friendly, but ready to make common cause with us against the Utahs. The latter are already making overtures of peace.

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

JNO. GARLAND,

Brevet Brigadier General, Commanding.

Lieut. Col. L. THOMAS,

Asst. Adjt. General, Headquarters of the Army, New York.

Respectfully forwarded by command of Brevet Lieut. Gen. Scott.

IRVIN McDOWELL,

Assistant Adjutant General.

Respectfully submitted to the Secretary of War.

W. G. FREEMAN,

Assistant Adjutant General.

ADJUTANT GENERAL'S OFFICE, August 5, 1855.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,

Santa Fé, July 31, 1855.

COLONEL: I am highly gratified to have it in my power to report, that the condition of things in this department has very much improved since my despatch of last month. The zeal and perseverance with which our military operations have been prosecuted, have contributed largely to the favorable results which have already accrued to us.

On the 24th instant I returned from Fort Defiance, which I found in admirable condition. Its commander, Brevet Major Kendrick, 2d artillery, is watchful and provident, and commands the confidence of the Navajo Indians, in whose midst the fort is located. I was invited by his excellency the governor of New Mexico to be present at an interview which he was to have with these Indians, the object of which was to make a treaty defining the limits of their country; this was accomplished in a very satisfactory manner, and with little effort, for many of these people are wealthy, and desire to lead an agricultural and a pastoral life.

The Utah Indians, against a part of whom we have been engaged in hostilities, have through their agent, Mr. Labadie, made an appeal for peace. His excellency Governor Merriwether has engaged to meet them at Abiquiere on the 8th proximo. His principal object, and one which I have very much at heart, is to establish a definite boundary of their country, so that the intercourse law of 1834 can be enforced; until that is done we cannot count upon a permanent peace with any of the tribes.

The Jicarilla Apaches are petitioners for peace, through the same medium. They have suffered greatly, their numbers reduced, and very much scattered.

Since the Mezcaleros have gone upon the district of country assigned to them by treaty, I have heard of no depredations by them.

The Comanches, those I presume who have been driven out of Texas, are likely to give us some trouble. They hover about our eastern border, and occasionally kill a few head of cattle, but have not, to my knowledge, thus far, committed a murder.

In the recent operations against the Indians, several slight skirmishes have taken place, in which the enemy were, as usual, the losers; several captives have been taken from them and restored to their friends.

The campaign is now drawing to a close, by reason of the discharge of the volunteers, who, I am gratified to say, have maintained good discipline, and vied with the regular troops in the prompt and efficient discharge of their duty.

The officers of the army, with whom they were associated, speak in high terms of their zeal and gallantry.

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

JNO. GARLAND,

Brevet Brigadier General, Commanding.

Lieut. Col. L. THOMAS,

Asst. Adjt. Gen. U. S. A., Headquarters of the Army, New York.

Respectfully forwarded by command of Brevet Lieut. Gen. Scott.

IRVIN McDOWELL,

Asst. Adjt. General.

Respectfully submitted to the Secretary of War.

S. COOPER,

Adjutant General.

ADJUTANT GENERAL'S OFFICE,

September 3, 1855.

REPORTS FROM THE DEPARTMENT OF THE PACIFIC.

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- January 30, 1855: From General J. E. Wool.
 February 26, 1855: From the same.
 April 11, 1855: From the same.
 September 4, 1855: From the same.
 October 19, 1855: From the same.
 October 24, 1855: From Governor Curry, of Oregon, enclosing—
 A. Letter from Major G. J. Rains.
 B. Governor Curry's reply.
 C. Proclamation calling for volunteers.
 D. Proclamation calling for more volunteers.
 E. General Order, No. 10.
 November 3, 1855: From General J. E. Wool.
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HEADQUARTERS DEPARTMENT OF THE PACIFIC,
Benicia, January 30, 1855.

SIR: It appears from reports received from Brevet Lieut. Colonel Buchanan, commanding Fort Humboldt, that, about the 10th instant, the whites living at Orleans bar, and at the mouth of Salmon river, some thirty miles from Fort Humboldt, "under the impression that the natives contemplated a general outbreak next spring, determined to demand a universal surrender of their fire-arms, ammunition," &c. Meantime a party of the whites, under the impression that prompt and energetic action would make "an indelible impression" on the river tribes, "without any general consultation in the matter, proceeded to certain Indian ranches, and with fire destroyed them and their contents."

The result was, that the Indians retaliated by shooting some of the party.

The above extracts are taken from a citizen's letter, who calls upon Colonel Buchanan for aid in protecting the peaceful inhabitants against further apprehended attacks upon them. In sixteen hours after the despatch was received, Colonel Buchanan sent a command to the scene of difficulty, and it is hoped he will be able to restrain the Indians, who in this department are even more ready to listen to reason than the lawless whites, who so often wantonly attack them.

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

JOHN E. WOOL,
Major General.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Headquarters of the Army, New York City.

HEADQUARTERS OF THE ARMY,
New York, February 26, 1855.

Respectfully forwarded for the information of the War Department.
L. THOMAS,
Assistant Adjutant General.

Respectfully submitted to the Secretary of War.
S. COOPER,
Adjutant General.

ADJUTANT GENERAL'S OFFICE, *Feb. 27, 1855.*

HEADQUARTERS DEPARTMENT OF THE PACIFIC,
Benicia, February 26, 1855.

SIR: Reports from Brevet Lieutenant Colonel R. C. Buchanan, commanding Fort Humboldt, show a lamentable state of affairs on the Klamath river, in consequence of the occurrences mentioned in my report of the 30th January. Captain Judah, on arriving at the scene of disturbance, found that the "hostile Indians," as they are called, had taken to the mountains; and that some of the whites, instead of pursuing them, had banded together to exterminate the peaceable Indians, who had given up their arms, and were living on their ranches under promise of protection and security. Captain Judah remained in their vicinity, and succeeded in frustrating, for a time, these murderous schemes; and also in exerting a moral influence over some of the better disposed whites, by which it is hoped further aggression upon the harmless natives is, for a time, stayed. It appears there is not so much as a justice of the peace in that section. There is no law, except that of common humanity, which would justify an interference by the military authority. Captain Judah's mission was, therefore, one of extreme delicacy; and he seems to have exercised much judgment. He was compelled to return to his post the 7th February, Colonel Buchanan not being able to supply him with provisions on account of the season of the year.

I have had an interview with Colonel Henley, Superintendent of Indian Affairs, on the subject. He expresses his conviction that the excitement has passed away for the time, and that nothing more can be done, but that things had better be left to take their course. He has appointed a special agent to repair immediately to the Klamath, who will confer with Colonel Buchanan on his way. Colonel Buchanan has special instructions to support the agent in every way he can, and to call for more troops if necessary. Captain Judah found himself compelled, either to abandon the pursuit of what are called the *hostile* Indians, (though, as my report of January 30 shows, they only retaliated when attacked) or to give up the inoffensive tribes to massacre. He properly chose to remain and protect the latter.

In this, as in a thousand other instances, the Indians were not to blame. The contest is between a party of whites, few in number,

who would wantonly "exterminate," after disarming them, and the more right-minded, who would protect them, both out of humanity, and to avoid the disastrous consequences of the retaliation which would certainly be attempted. It is hard that the troops should be called upon to mediate between these contending parties, while they have also to restrain the Indians, and try to protect them from destruction. Yet such is mainly their duty in California. It is useless, even where there are courts, to bring offenders before them, for in such cases they have been uniformly acquitted.

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

JOHN E. WOOL,
Major General.

Lieut. Col. L. THOMAS,

A. A. General, Headquarters of the Army, City of New York.

Respectfully forwarded, by command of Brevet Lieutenant General Scott, March 26, 1855.

S. COOPER,
Adjutant General.

ADJUTANT GENERAL'S OFFICE, *March 27, 1855.*

HEADQUARTERS DEPARTMENT OF THE PACIFIC,
Benicia, April 11, 1855.

SIR: I am happy to report that since my letter of February 26, affairs on the Klamath river seem to have taken a more favorable turn. Captain Judah was sent, March 17, with a detachment of thirty men, to accompany Mr. Whipple, the special Indian agent, to the scene of difficulty. Captain Judah was instructed to aid the agent by all means in his power, and if the agent saw fit, to select a site for an Indian reserve, to examine it with reference to its suitableness for a military post.

Captain Judah and Mr. Whipple arrived in the Indian country March 22. They found that the majority of the whites, who had interests in farming and mining at stake, were ready to leave the settlement of the troubles to them. There was much excitement among them, caused by the murder of one of the most influential chiefs named Patora, by a white man, who enticed him out to hunt for the purpose. Patora had not only given up his arms, but induced other Indians to do so, and "was universally respected for his honesty and friendly offices towards the whites." There were two companies of "volunteers," under brothers named Woodward, who would appear to be the authors of all the trouble. Being out of employment, they have embodied themselves, with the intention of claiming compensation for their services in "suppressing hostilities." Captain Judah reports that they went to one of the Indian ranches, called the Indians from their homes, shook hands with them, and immediately afterwards, each white picking his man, numbers of the Indians were shot. They then took away with them

some squaws "under the name of prisoners," whom they "outrageously abused." In calling attention to this report of Captain Judah, Brevet Lt. Col. Buchanan, commanding Fort Humboldt, remarks that this is "the battle! which has been described heretofore in the newspapers in such glowing colors." And, "as these men are now making efforts to get pay, as having been in the service, I deem it my duty to call especial attention to this case, in order that the government may be prepared to act on any application that may be made in favor of paying them. Muster-rolls of the party are in preparation, as I am informed."

March 28, Captain Judah writes as follows, after premising that the hostile Indians had separated, and taken to "recesses unknown and almost impenetrable to whites," in consequence of which he had abandoned the pursuit of them: In furtherance of "my intention to mete out justice to the Indian murderers, (for nothing short of their lives will satisfy the people upon the river,) through Indians now friendly, and of allowing the remainder to come in, it became necessary for me to communicate with the Indians below this point, numbering over three hundred warriors. Convinced, upon the representations of those who knew them best, that it would be useless in their present alarmed state, after the cowardly murder perpetrated by Captains C. and M. Woodward upon one of their ranches, and the indignities imposed by them and their men upon the squaws, to request them to meet me, I took with me Captain Young, Mr. Walker, and six men of my command, (having previously sent word to the mouth of the river of my intended visit,) and on Monday, 26th, proceeded in canoes to a ranch called Senigoyne, about twenty miles below this point, [camp Strawbridge,] and eighteen below any white settlement. The portion of the river I descended has never before been traversed by any government official, and by but few white men. In view of this fact, I made such observations upon the general character of the country through which it runs, and its adaptation to meet the wants and comfort of the Indian, as I thought might prove useful to any officer who should succeed me. I found every ranch deserted to the point referred to, and no Indians to meet me at the point designated. I immediately despatched two Indians to the mouth of the river, with messages from Captain Young and Mr. Walker, (well known to them,) and just before dusk last evening they arrived at my camp to the number of fifty-one, embracing the most prominent among them, and all armed with a species of long knife, bows and arrows. The details of our conference would be too extended to particularize. They complained much of the treatment they had experienced at the hands of the volunteers, enumerated their acts of forbearance, and asked me what I could expect of them, when, after their voluntary offer to operate against the hostiles, they were not permitted thus to justify their friendly protestations, because a portion of the whites (referring to the command of Mr. C. Woodward) would not concede the privilege of killing *them* (themselves) whenever they felt inclined to do so.

"They were perfectly ignorant of troops, or their character; and had been so often deceived by individuals representing themselves to be in

authority, that I found it next to impossible to convince them that I had any, or to make them understand its character. Before we separated, they became convinced that my intentions towards them were friendly; promised to co-operate with the Indians above in punishing the murderers, and agreed to meet me and them at a point about four miles below my present camp, on Saturday, 31st instant. Upon my return a few hours since, I found Mr. Whipple, who brought with him three Indians from the mouth of Salmon. I shall try to go to Hoopah valley to-morrow with Mr. Whipple, and bring down a deputation of the Trinity Indians. I have very little doubt but that the war party will be made up, and start to accomplish its object by the middle of next week. In the mean time I expect three of the hostile Indians to be brought to my camp, according to my directions, to-morrow—they having, through squaws, expressed their desire to come in. A majority of the people upon the river seem, from all I can learn, to acquiesce in the plan I am now endeavoring to carry out. There are, however, desperadoes who would, if an opportunity offered, kill any of the hostile Indians upon sight." Captain Judah thinks the presence of a permanent regular force in that section of the country is absolutely necessary to preserve peace between the whites and Indians. Should an Indian reserve be established there, the question will be settled, and Fort Humboldt may be broken up, and moved on to the reserve, depending on circumstances.

The 29th of March, eight hostile Indians and five squaws, instead of only three, came into Captain Judah's camp. Four were well armed with yagers. These were not implicated in the murders, but the names of the murderers were known to Captain Judah. The 30th March, Captain Judah held a conference with the Hoopah Valley Indians, "who number, it is said, nearly two hundred warriors."

April 3, a grand conference was held—deputations from the several tribes, to the number of seventy-five warriors, being present. Captain Judah writes: "I succeeded in securing their services in the execution of the plan I had determined upon. The war party will meet at Young's ferry on Friday, 6th instant, where I shall furnish them with ten rifles, and food, and give them the names of the eight murderers whom I wish to have killed. Any of the remaining hostiles whom they may encounter are to be sent in to my camp, where they will be taken care of with those already here, until arrangements are completed to locate them upon the river below, then return to their old ranches, situated as they are in the vicinity of the murder of the white men, being certain to prove fatal to them." "I leave to-morrow morning with Captain Young, for the mouth of Salmon river, twenty-eight miles above this point, for the purpose of making known to the people of the river what has been done, in order that they may do nothing to frustrate our operations; also, to station a guard of Captain Young's company at the mouth of Salmon for the protection of the friendly Indians near that point, against the desperadoes of Orleans bar and mouth of Salmon. I am daily in receipt of intelligence of outrages upon squaws, which I shall endeavor to prevent by moral, the only kind of suasion my limited authority permits me to use."

I make one more extract from Captain Judah's report, concerning the volunteers, showing who the Captain Young, to whom he refers, is:

"A man named Young, himself nearly an Indian in habits from long residence among various tribes, is in command of the only reliable company of volunteers in the field, being formed of men who live upon the river, and have interests at stake. The men of this company are at their respective residences, and ready to respond to the call of their leader at any moment. Captain Young is in the entire confidence of all the Indians below this place, and has his spies out at this time. He is daily apprized of the whereabouts of the Red Caps, who number only fourteen, the number of those hostile being made up probably to the number of thirty-four from other ranches." "I have this morning (March 22) apprized Captain F. M. Woodward that his services are no longer necessary, and he will leave in a day or two. I shall see his brother in the course of the day, and do not doubt but that he will also disband."

In conclusion, I have only to say, that Captain Judah's reports prove what I stated in my communication of February 26, that, "in this, as in a thousand other instances, the Indians were not to blame." After suffering the greatest outrages from the whites, they were still ready to listen to reason, and even to take arms against the few who, having killed several whites in retaliation, fled to the mountains.

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

JOHN E. WOOL,
Major General.

Lieut. Col. L. THOMAS,
Assistant Adjutant General.

Respectfully submitted to the Secretary of War.
WINFIELD SCOTT.

HEADQUARTERS OF THE ARMY,
New York, May 14, 1855.

Respectfully submitted to the Secretary of War.
S. COOPER,
Adjutant General.

ADJUTANT GENERAL'S OFFICE,
May 15, 1855.

HEADQUARTERS DEPARTMENT OF THE PACIFIC,
Benicia, September 4, 1855.

SIR: I have reports from Brevet Major Haller, commanding the expedition against the Snake Indians, dated July 31.

The command reached Fort Boise July 15, Mr. Olney, Indian agent, being with it. The next day a talk was held with some two hundred Indians there collected, of whom sixty-five were warriors; and it having been ascertained that four of the murderers were present, they

were seized, brought before a board of officers, or, as Major Haller terms it, a military commission, and, their guilt having been clearly established, three were hung on the graves of their victims, the 18th; the fourth was shot by the guard in endeavoring to escape. The proceedings of the commission are herewith enclosed.

The command then continued to the great Cammish prairie, thirty-five miles west from crossing of Malade river, and upwards of sixty miles beyond Fort Boise. One emigrant train had been met and escorted to Fort Boise, and detachments had been sent out towards the Salmon falls, and other routes where emigrants were expected, and where they might be molested by the Indians.

It appears that a tribe known as the White-knives, numerous and powerful, are the authors and instigators of most of the outrages committed by Indians upon emigrants, their object being plunder. They cover a large extent of country along the south side of Snake river for one hundred miles above and below the Salmon falls, across to the headwaters of Humboldt river, and down that stream, and across to Lake Syloi, at or near the head of Malheur river. It was Major Haller's purpose to visit this tribe, and to cut them off from their fishery. He had some expectation of a hostile reception from them.

The activity and energy of Major Haller, and the officers of his command, deserve commendation.

The excitement in Scott's valley has somewhat abated. The origin of the difficulty there seems to have been the refusal of a white man to give up a squaw, for whom he had paid one horse; the Indian from whom the purchase was made having stolen the squaw from the Applegate tribe. This man was one of those murdered, and his body alone was much mutilated after death. Captain Smith, at Fort Lane, has some of the Indians implicated, and has refused to surrender them to a company of volunteers, except on a warrant or requisition from the governor of California, their reserve being in Oregon. Upwards of a hundred Indians, chiefly women and children, have collected for protection on the military reserve at Fort Jones. Captain Judah informs me that there are constant threats of a night attack upon his post for the purpose of killing these inoffensive people, but that he has made known that he shall repel force by force. It is found necessary to issue flour and beef to the Indians thus collected on the reserve, the Superintendent of Indian Affairs declining to subsist them.

At a council held by the Oregon superintendent, thirty miles from Fort Orford, an Indian shot a white man. As usual, the Indian was demanded that he might be hung. He was protected by the detachment of troops from Fort Orford; and while being conducted to be given over to the civil authority, in charge of a constable, and guarded by a corporal's guard, the boat in which he was was pursued by a party of whites, who fired into the boat, killing the prisoner and the Indian who was poling the canoe. The corporal warned the party before they fired to keep off, and returned their fire, killing three of them; the rest gave up the pursuit. The superintendent had sent for the commanding officer of Fort Orford, and, notwithstanding the ex-

citement, was endeavoring to keep the Indians together and finish the council.

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

JOHN E. WOOL, *Major General.*

Lieut. Colonel L. THOMAS,

Asst. Adjt. General, Headquarters of the Army, New York City.

Mostly on Indian affairs—interesting. Respectfully submitted to the Secretary of War.

OCTOBER 3, 1855.

WINFIELD SCOTT.

Respectfully submitted to the Secretary of War.

S. COOPER, *Adjutant.*

ADJUTANT GENERAL'S OFFICE,

October 5, 1855.

HEADQUARTERS DEPARTMENT OF THE PACIFIC,

Benicia, California, October 19, 1855.

SIR: The Yakimas and Klikitats Indians, in Oregon and Washington Territories, being dissatisfied, it is said, with the treaty made with Governor Stevens, have assumed a warlike attitude, and have killed a number of white inhabitants going to and returning from the mines near Fort Colville. To punish these Indians, and to check their murderous intentions, Major Haller moved against them with about 100 men. He met them on the banks of the Pisko river, Sinqua valley, but finding them too strong, he retired to the heights and sent for a reinforcement. Major Rains, with all the forces under his command, marched to his relief. I have ordered two detachments, one from Benicia and the other from the Presidio, composed of one captain, two lieutenants, and seventy rank and file, to proceed in the steamer Columbia, to reinforce Major Rains. I have no doubt the Major will be able to chastise the Indians and bring them to terms.

The whites and Indians keep up a predatory warfare near Forts Jones and Lane. The whites have determined to exterminate the Indians in that region; hence they kill indiscriminately the innocent as well as the guilty.

I ordered Major Fitzgerald, with his company of dragoons, some two months since, to the Dalles; but owing to difficulties between the whites and Indians in Southern Oregon and Northern California, I suspended the order until his services could be dispensed with. It is rumored that he has recently had a brush with the Indians, when he killed and wounded forty of them.

I am, very respectfully, your obedient servant,

JOHN E. WOOL,

Major General.

Lieut. Col. L. THOMAS,

A. A. General, Headquarters of the Army, New York City.

Respectfully forwarded by command of Brevet Lieutenant General Scott.

L. THOMAS, *Assistant Adjutant General.*

HEADQUARTERS OF THE ARMY,
New York, November 14, 1855.

HEADQUARTERS, TERRITORY OF OREGON,
Portland, October 24, 1855.

SIR: The frontiers of our Territory are again the scene of Indian hostilities. Heretofore, operations for their suppression have been directed against single tribes or combinations not formidable in point of numbers. The extent of the alliance, the numbers already openly in arms, and the character for bravery and perseverance of the allied tribes, render the present hostilities, especially on the northern frontier, exceedingly grave and important.

My information is reliable, that the number of Yakimas, Klikitats, and disaffected spirits from other neighboring tribes, now in the field on the northern frontier, exceeds fifteen hundred, and that the Cayuse, Pelouse, and Walla-Walla tribes have taken the resolution to join the war party.

Suspicion for some time past has been attracted towards the Yakimas and Klikitats, and the intercourse of the latter with the bands dispersed through the settlements in the valley of the Willamette has been very carefully observed. To what extent the tampering with these bands has been successful is not known, but the simultaneous rising of the Shasta and Rogue River Indians, in Southern Oregon, has occasioned an extraordinary feeling of alarm and insecurity throughout the whole extent of our settlements.

A. J. Bolan, esq., one of the sub-Indian agents of Washington Territory, lately returned from the interior. Having heard that depredations were being committed by the Yakimas upon parties of our citizens returning through their country from the Pend d'Oreilles mines, and that several returning miners had been waylaid and murdered, immediately set out for the camp of Ca-mi-a-kin, the principal chief, by appointment of Governor Stevens, relying for his own safety upon the friendly disposition always manifested towards him, and with a confident expectation of being able to reconcile, by his presence, any existing feeling of hostility. On the way he was waylaid and most barbarously murdered by the orders of the treacherous Ca-mi-a-kin. His death signalized the general outbreak.

Brevet Major Haller, in command at Fort Dalles, with commendable promptitude and gallantry, commenced operations against the enemy; but the events of a few days ascertained the inadequacy of the whole disposable force of the United States troops in this military district to suppress hostilities.

On the 11th instant I received at this place, where I had established headquarters immediately upon hearing of the death of Mr. Bolan, a communication from Major G. J. Rains, commanding officer of the

Columbia river and Puget's sound district, copy of which, marked A, is herewith transmitted.

Other and reliable information, painfully confirmed, constrained me to call a larger force into the field than was contemplated by the requisition of Major Rains, and, for reasons assigned in my communication to him—copy of which, marked B, is herewith transmitted—to maintain a distinct military organization of the force authorized by my proclamation of the 11th instant, copy of which, marked C, is also herewith transmitted.

To enrol an adequate force, with that "celerity" which the exigency required, left no other alternative to the election of the executive.

From the office of the adjutant general of the Territory will be forwarded important information connected with the campaign in both sections of the Territory, to which I beg leave to refer.

It affords me great satisfaction to inform you of the zeal manifested by all classes in support of my efforts to meet the emergency. Without other resources than the generous confidence of my fellow-citizens has placed at my disposal, trusting entirely to the justice of Congress for reimbursement, a force of eight hundred men, fully armed and equipped, with subsistence for a campaign of three months' duration, will have been concentrated at Fort Dalles, in the short space of three weeks.

The operations in the south will doubtless be brief. For the suppression of hostilities in that quarter two battalions have been authorized, by my proclamation of the 15th instant, copy of which, marked D, is herewith transmitted. By the latest information received, the conviction is forced upon me, that the settlers in the Rogue River valley, roused to frenzy by the repeated outrages perpetrated by the Indians in their neighborhood, and by this renewed evidence of their faithlessness, will have utterly exterminated the Indian race in that valley before an organized force takes the field. To prevent, if possible, the exhibition of such a spectacle, and to insure discrimination between the innocent and the guilty, an order has been issued, copy of which, marked E, is also herewith transmitted.

Constant attention will be paid to the management of each department called into active operation by the state of hostilities, and the utmost prudence and economy in their administration enforced.

Should not a decisive blow be struck early in the campaign, I fear that the northern frontier will be the theatre of a protracted struggle; and I beg to earnestly press upon the attention of the government the necessity, in that event, of an augmentation of the force of regular troops to relieve the volunteers, whose avocations and relations to society forbid their being kept as a permanent force in the field. Upon the enrolment list, and now actively engaged in the service as officers or privates in the volunteer corps, is one of the associate justices of the Territory, Cyrus Olney, esq., the United States district attorney, W. H. Jarrar, esq., and several members elect of the legislative assembly.

I am, very respectfully, your obedient servant,

GEO. L. CURRY, *Governor of Oregon.*

HON. JEFFERSON DAVIS, *Secretary of War.*

A.

HEADQUARTERS, COLUMBIA RIVER, PUGET'S SOUND DISTRICT,
Fort Vancouver, W. T., October 9, 1855.

GOVERNOR: We have just received information from Brevet Major Haller, who was ordered into the Yakima country with a force consisting of five officers, one hundred and two men, and one mountain howitzer, on the 3d instant. He states that he fell in with the enemy on the afternoon of the 6th instant, and commenced an action with them in the brush on the Pisco river, and after fighting some time he drove them out at the point of the bayonet, and has taken possession of the heights surrounding that river. He was surrounded, and has called for a reinforcement.

This morning Lieutenant Day, of artillery, leaves Fort Dalles to join Major Haller's command, with about forty-five men and one mountain howitzer.

As commanding officer I have ordered all the United States disposable force in this district into the field immediately, and shall take the command.

As this force is questionable to subdue these Indians, the Yakimas, Klikitats, and, may be, some other smaller bands, I have the honor to call upon you for four companies of volunteers, composed, according to our present organization, each of one captain, one first lieutenant, one second lieutenant, four sergeants, four corporals, two musicians, and seventy-four privates. This number of companies is just enough for a major's command, and would authorize that officer also.

We have only arms enough at this post for two companies, so it is advisable to have two of the four companies armed with rifles, or such arms as best can be obtained. We have plenty of ammunition, however.

As celerity is the word, we want as many of the volunteers as can be immediately obtained to rendezvous at this post, and proceed with the troops to Fort Dalles. They can be mustered there.

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

G. J. RAINS,

Major 4th Infantry, Commanding.

Hon. GEO. L. CURRY,

Governor of Oregon Territory.

B.

TERRITORY OF OREGON,
Headquarters, Portland, October 16, 1855.

MAJOR: The very serious character of the Indian difficulties on the northern frontier, more fully developed after the date of your requisition for four companies of Oregon volunteers, to be mustered into the

service of the United States, as a reinforcement of the United States troops under your command, has determined me to call into the field a regiment of mounted volunteers under the command of J. W. Nesmith, brigadier general of the Oregon militia. This force will cordially co-operate with your command in a vigorous prosecution of the campaign.

It is wholly impracticable to induce the citizens of Oregon to enrol for service in the suppression of any Indian hostilities under the organization prescribed by the rules and regulations of the United States army. I am therefore constrained, in order to secure the enrolment of a sufficient force for the present critical emergency, to preserve a distinct military organization, under the authority of the territorial government, of the force in the field in pursuance of my proclamation. I trust, however, that the effectiveness of the whole force engaged will not be impaired by this necessity, but that both commands, invigorated by a spirit of cordial co-operation, will conjointly achieve a prompt and successful issue to the enterprise in which they will be employed.

A deficiency of suitable arms immediately available to complete the equipment of the first company enrolled, impelled me to send forward that company under command of Captain A. V. Wilson, with a requisition upon Lieut. Withers, commanding Fort Vancouver, to furnish such of the command as were without arms, from the extra supply of guns at that post, and with instructions to halt at the Cascades, an exposed and important point in Washington Territory, then reported to be entirely defenceless, and await further orders.

The refusal of Lieut. Withers, as reported to me by Captain Wilson, to comply with my request, unless the men were mustered into the service of the United States, enforced a delay of nearly twenty-four hours in the march of Captain Wilson's company. I am happy to state, however, that upon my personal application the necessary arms were furnished by Captain Eckerson, of the Ordnance department at Fort Vancouver, and company A, of the regiment of Oregon mounted volunteers, is en route for the Dalles of the Columbia. Two more companies will be despatched for the scene of action this day. The colonel commanding leaves to-day for the Dalles. The communication with the settlements in the Willamette valley, across the Cascade range, is reported to me, by settlers on this side of the summit, to be open, and daily employed by straggling parties of Indians. I have directed a detachment to be sent to the Dalles by that road. It will move to-day.

A band of Klikitats, reported to be friendly, encamped near Cowallis, some seventy miles south of this place, were in possession of the particulars of the engagement in Simcoe valley, between the gallant command under Major Haller and the hostile tribes north of the Columbia river, on the same day that the intelligence reached this place. It has been known some time by the superintendent of Indian affairs for Oregon, that the Indians west of the Cascade range had been tampered with by those now engaged in open hostilities on the northern frontier; and the Shasta and Rogue River Indians are now in open arms against the settlers in that section of the Territory. For the suppression of this new outbreak, I have taken prompt and, I trust, effective measures.

Herewith I transmit for your information a copy of my second proclamation.

The hostile conduct of the Indians on our northern and southern frontiers, together with other circumstances herein named, strongly fortifies the belief that a combination has been effected among the different tribes on our borders, as well as in our midst, and a general war resolved upon on their part against the whites. The zeal and alacrity with which the citizens of this Territory have responded to my call for volunteers in this service, during the continuance of the war, is an unmistakable evidence that our people are prepared for the emergency.

Very respectfully, your obedient servant,

GEO. L. CURRY,

Governor of Oregon.

Major G. J. RAINS, *4th Infantry, U. S. A.,*

Commanding Columbia River and Puget Sound district.

C.

BY THE GOVERNOR OF THE TERRITORY OF OREGON.

A Proclamation.

Whereas certain Indians have been guilty of criminal offences, and have combined and are now engaged in hostilities that threaten the peace and security of the frontier settlements, and the chief in command of the military force of the United States in this district having made a requisition upon the executive of this Territory for a volunteer force to aid in suppressing the attacks of said hostile Indians, I issue this my proclamation, calling for eight companies of mounted volunteers, to remain in force until duly discharged; each company to consist of one captain, one first lieutenant, one second lieutenant, four sergeants, four corporals, and sixty privates; each volunteer, if possible, to furnish his own horse, arms, and equipments. Each company to elect its own officers, and rendezvous without delay on the right bank of the Willamette river, opposite Portland, where they will be mustered into service on reporting to the adjutant general of the Territory.

The following named counties are expected to make up the number of men wanted; and, in order to facilitate operations, the subjoined named gentlemen are respectfully requested to act as enrolling officers in their respective counties:

Multnomah county, one company, Shubrick Norris.

Clackamas county, one company, A. F. Hedges.

Washington county, one company, W. S. Caldwell.

Yamhill county, one company, A. J. Hembrer.

Marion county, one company, L. F. Grooer.

Polk county, one company, Frederick Weymire.

Linn county, one company, L. S. Helm.

Wacco county, one company, O. Humason.

The last named company will organize at the Dalles, and report in writing to the adjutant general.

Our fellow-citizens who may be in possession of arms—rifles, muskets, and revolvers—are most earnestly desired to turn them over to assistant quartermaster general Albert Zieber, or his agents, in order that they may be appraised and supply a deficiency that is most seriously experienced.

Given under my hand at Portland, the 11th day of October, A. D. 1855.

By the Governor:

GEO. L. CURRY.

B. F. HARDING,

Secretary of the Territory of Oregon.

D.

BY THE GOVERNOR OF THE TERRITORY OF OREGON.

A Proclamation.

Whereas, by petition numerously signed by citizens of Umpqua Valley, calling upon me for protection, it has come to my knowledge that the Shasta and Rogue River Indians in Southern Oregon, in violation of their solemn engagements, are now in arms against the peace of this Territory; that they have, without respect to age or sex, murdered a large number of our people, burned their dwellings, and destroyed their property; and that they are now menacing the southern settlements with all the atrocities of savage warfare; I issue this, my proclamation, calling for five companies of mounted volunteers to constitute a northern battalion, and four companies of mounted volunteers to constitute a southern battalion, to remain in force until duly discharged.

The several companies to consist of one captain, one first lieutenant, one second lieutenant, four sergeants, four corporals, and sixty privates; each volunteer to furnish his own horse, arms, and equipments; each company to elect its own officers, and thereafter to proceed with the utmost possible despatch to the rendezvous hereinafter appointed.

It is expected that Jackson county will furnish the number of men wanted for the southern battalion, which will rendezvous at Jacksonville, elect a major to command, and report in writing to headquarters. It will then proceed to take effective measures to secure indemnity for the past, and conquer a lasting peace for the future, with the enemy.

The following named counties are expected to make up the number of men wanted for the northern battalion: Lane county, two companies;

Linn county, one company; Douglas county, one company; Umpqua county, one company; which will rendezvous at Roseburg, Douglas county, elect a major to command, and report in writing to headquarters. It will then proceed immediately to open and maintain the communication with the settlements in the Rogue River valley, and thereafter co-operate with the southern battalion in a vigorous prosecution of the campaign.

Given under my hand at Portland, the 15th day of October, A. D. 1855.

By the Governor :

GEO. L. CURRY.

B. F. HARDING,

Secretary of the Territory of Oregon.

E.

[GENERAL ORDERS, No. 10.]

TERRITORY OF OREGON,

Headquarters, Portland, October 20, 1855.

Information having been received that armed parties have taken the field in Southern Oregon with the avowed purpose of waging a war of extermination against the Indians in that section of the Territory, and have slaughtered, without respect to age or sex, a band of friendly Indians on their reservation, in despite of the authority of the Indian agent and the commanding officer of the United States troops stationed there, and contrary to the peace of the Territory, it is therefore ordered that the commanding officers of the battalions authorized by the proclamation of the governor of the 15th day of October instant will enforce the disbanding of all armed parties not duly enrolled into the service of the Territory by virtue of said proclamation.

The force called into service for the suppression of Indian hostilities in the Rogue River and Umpqua valleys, and chastisement of the hostile party of Shasta, Rogue River, and other Indians now menacing the settlements in Southern Oregon, is deemed entirely adequate to achieve the object of the campaign; and the utmost confidence is reposed in the citizens of that part of the Territory that they will support and maintain the authority of the executive by cordially co-operating with the commanding officers of the territorial force, the commanding officer of the United States troops, and the special agents of the Indian department in Oregon.

A partisan warfare against any bands of Indians within our borders or on our frontiers is pregnant only with mischief, and will be viewed with distrust and disapprobation by every citizen who values the peace and good order of the settlements. It will receive no countenance or support from the executive authority of the Territory.

By the Governor :

E. M. BARNAUD,

Adjutant General.

HEADQUARTERS, DEPARTMENT OF THE PACIFIC,
Benicia, November 3, 1855.

SIR: I have the honor to report that, since my last letter, the Indian troubles in this department have very much increased. In Rogue River valley the threats of the whites to commence a war of extermination against the friendly Indians on the reserve and in the vicinity of Fort Lane have been put into execution, despite the efforts of the officers of that post to prevent it. Captain Smith reports that a party of whites, who had organized themselves into a company, with the avowed purpose of assisting the regular troops in pursuing and chastizing the Shasta Indians for recent murders, attacked, the 8th ultimo, two camps of friendly Indians in the immediate vicinity of the reserve, and killed twenty-five, (four very old men, four young men, and seventeen squaws and children.) Exasperated by these brutal outrages, some of the Indians on the reserve, and in the valley, heretofore friendly, proceeded to murder the whites indiscriminately, burning their houses, and destroying everything in their way.

Captain Smith immediately sent a detachment, under Major Fitzgerald, to the scene of the outrages, for the protection of the settlers, and to punish the murderers.

The troops are now actively employed in trying to suppress the troubles; but with what prospect of success, while there is an Indian left for whites to destroy, may be easily conjectured.

In Washington Territory there appears to be an extensive combination of hostile tribes, which a check unfortunately given to Brevet Major Haller, with a small command, may possibly cause to extend to yet other tribes. The Yakimas, Walla-Wallas, Clikitats, Des Chutes, and Cayuses are doubtless in arms.

They have been excited by fears at seeing their country rapidly filling up with settlers and miners, lest their fate shall be like that of the California Indians, and hope to exterminate the whites at a blow.

Brevet Major Haller marched from Fort Dalles with one hundred men, the 3d of October, in pursuit of some hostile Indians. He seems to have been drawn into a sort of ambush, for on the 6th he found himself surrounded in a position without wood or water, and was compelled to return to the Dalles, reaching them the 10th, after much hard fighting. The loss is reported to be three enlisted men killed, nineteen wounded, and two died of wounds. One mountain howitzer was cached and abandoned, the carriage being broken and the mule having given out. About thirty pack-animals were also lost. Major Rains had gone to the Dalles, whither he had ordered all the troops at Steilacoom and Fort Vancouver. I have ordered, in addition to Captain Ord's company, already arrived in Oregon, the company at the Presidio, except a guard of twelve men to preserve the Reservation from the eager hands of squatters, and a company from Fort Humboldt, also the company of infantry at Fort Reading, to relieve Fitzgerald's company 1st dragoons at Fort Lane—the latter company to push as fast as possible to the Dalles. Ample stores and ammunition have been forwarded, and I leave in the steamer of the 6th instant for the scene of war at the Dalles, when I shall be able more clearly to explain to you

the position of affairs. It will not be safe to move any more of the troops from their present positions, but I shall endeavor to avoid the necessity of recognising volunteers in the United States service.

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

JOHN E. WOOL,
Major General.

P. S.—We require more troops in this department—at least one regiment.

JOHN E. WOOL,
Major General.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Army Headquarters, New York.

HEADQUARTERS OF THE ARMY,
New York, December 1, 1855.

The general-in-chief directs me to forward this despatch for the information of the War Department, and to say that he proposes to send the 9th infantry from Fort Monroe to reinforce General Wool's command, Department of the Pacific.

Very respectfully,

IRVIN McDOWELL,
Asst. Adjt. General.

Respectfully submitted to the Secretary of War.

S. COOPER,
Adjutant General.

ADJUTANT GENERAL'S OFFICE,
December 3, 1855.

REPORT OF CAPTAIN A. A. HUMPHREYS, TOP. ENGINEERS, UPON THE PROGRESS OF THE PACIFIC RAILROAD EXPLORATIONS AND SURVEYS.

WAR DEPARTMENT,
Office Pacific Railroad Explorations and Surveys,
Washington, November 29, 1855.

SIR: Since my report to you of February 5, 1855, the general map of the territories of the United States lying between the Mississippi river and the Pacific ocean has been completed as far as the materials collected admit, and is in the hands of the engraver. The labors of the parties organized for continuing explorations will afford data for still further additions.

Many of the maps, drawings, and scientific papers intended to form part of the reports submitted to you by the first exploring parties, soon after their return from the field, could only be prepared after an elaborate use of the materials collected. In some instances hastily prepared drawings and preliminary reports were temporarily substituted for the more elaborate results, which are now, for the most part, complete.

The results of the investigations in the various branches of physical science in connexion with the expeditions are of great practical value, and full of scientific interest. The geological and meteorological reports are eminently so in many points of view. By the former it will be perceived that the sources and quality of building materials at various remote and important localities have been determined, and rich deposits of gypsum and limestone have been marked out. On the routes of the 35th and the 32d parallel, the structure of desert areas has been minutely studied with special reference to the practicability of obtaining water by wells or boring, and generally with the most satisfactory results. From the report of Mr. W. P. Blake, the geologist of the expedition in charge of Lieutenant R. S. Williamson, it appears that the structure of the Colorado desert, between Fort Yuma and the Coast mountains, is very favorable to the success of artesian borings, and it is considered probable that an abundant supply of water would be obtained by boring to a moderate depth. Such a result would be of extreme importance, not only by facilitating communication between Fort Yuma and the coast for government trains, but as a relief to the emigrant parties which are constantly crossing to California through New Mexico and Sonora. The general nature and composition of the soils and sub-soils over the regions explored has been determined, and analyses of the most desirable have been made. An analysis of the soil of the alluvial portion of the Colorado desert, which covers an area of 4,500 square miles, and is four times greater in extent than the land under cultivation on the Mississippi river, between the

mouth of Red river and the Balize, shows that it has all the elements of great fertility, and, but for the adverse climatic conditions, would rival in its productions the best lands of the Delta of the Mississippi. According to the barometrical levellings of Lieutenant Williamson, the alluvial portion of this plain is lower than the surface of the Colorado river; and should this be confirmed by more accurate modes of levelling, as there is every reason to believe it would be, an extensive system of irrigation would entirely change the character of its surface by the introduction of water, the only element required for great productiveness. About one half of the Colorado desert is within our territory.

Valuable ores of several metals have been brought in and examined, and their localities visited and described. A specimen from the collection of Captain Pope proves to be a mass of carbonate of lead, nearly pure, and containing seventy-two per cent. of metal. Another specimen of earth, taken from the bed of Delaware creek, contains over eighteen per cent. of free sulphur. In California two veins of copper ore, one of iron, and one of antimony, of great extent and richness, have been found and reported upon; worth alone the whole cost of Lieutenant Williamson's expedition. The character and extent of large deposits of bitumen or asphalt near Los Angeles has also been made known. The examination of a collection of salty and alkaline incrustations from the soil and dry lakes of California, shows that they consist principally of salt, sulphate of magnesia, and carbonate of soda. Nitre was not found in any quantity.

Along the 35th parallel the carboniferous limestone has been found as far west as the San Francisco mountains, in longitude 112° . The discovery of these rocks so far west renders it possible that deposits of true coal will be found in that region, although, the observations having been very limited, none has yet been seen. The probable existence of coal in other new and important localities has been indicated, which more thorough examinations may develop. Much additional geological exploration is required to throw light on this important subject.

The character of the sand-hills of the Colorado desert has been carefully considered by Mr. Blake, who has shown that they are confined in position to a bank or terrace, and, contrary to the opinion previously entertained, do not constitute a formidable obstacle to the construction and working of a railroad.

Among the results of special scientific interest is the determination of the geological age of mountain chains. It has been ascertained that the coast mountains, in the vicinity of San Francisco, and further south, have upraised within or since the eocene division of the tertiary period. The strata about San Francisco, Benicia, Monterey, and other localities, have been shown to be of tertiary age, and the foldings and contortions to which they have been subjected reveal the violent disturbances and mighty changes of that part of the continent within recent geological times. Tertiary marine shells and sharks' teeth have been brought from the tops of hills, at the base of the Sierra Nevada, over 1,500 feet above the ocean.

Of similar interest are the examination and description of volcanoes, the exhibition of the nature of the rocks and soils along the several

routes, by large collections of rocks, minerals, and fossils, and the comparison of the ages of mountains, and the strata on their flanks. These additions to our knowledge of the geological structure of the country have been of great assistance in determining its general features and topography.

The results of the investigations into the zoology and botany of the country west of the Mississippi have proved interesting and important. The existence and geographical distribution of many species, useful in an economical point of view, or interesting to science, have been determined.

The precise range of the buffalo, the antelope, the prairie dog, the various species of deer, and of other animals, with that of numerous valuable trees and herbaceous plants, has been satisfactorily ascertained. Several forms of animal and vegetable life, noticed by earlier travellers, especially by Lewis and Clark, but unknown since their time, have been re-discovered.

The labors of the naturalists and the collectors attached to the several parties have resulted in a collection illustrating the natural resources of our country west of the Mississippi, more complete than will be found in all the museums of the United States and Europe combined.

Lieutenant Williamson's report shows a remarkable coincidence of the elevations deduced from barometrical observations with those obtained at the same time by the spirit-level. The profiles of the Tejon Pass and the Cañada de las Uvas, delineated from the spirit-level altitudes, differ so slightly from the barometrical profiles, that the barometer may be regarded as sufficiently accurate for the purpose of railroad reconnaissance in that climate.

The report of Captain Whipple, topographical engineers, upon the manner in which the elevations for the elaborated profile of his route have been deduced, indicates means by which great accuracy can be attained in barometrical levelling over extensive regions, without the delay consequent upon the mode of eliminating those errors arising from irregular changes of atmospheric pressure, by simultaneous observations at near points. Between the Mississippi and the Pacific, these errors are in some instances equal to 1,000 feet. The investigation made by Captain Whipple leads to the following conclusions, regarding these irregular movements of the barometer:

1st. They are of great magnitude, and if not taken into account may produce an error in the deduced altitude of many hundreds of feet.

2d. They are but slightly affected by local storms.

3d. They *may* occur almost simultaneously over the whole interior portion of the continent.

4th. They are actually identical within certain areas of great extent.

These conclusions will be regarded with great interest by scientific explorers and those engaged in studying and observing meteorological phenomena.

It has been suggested, in connexion with this, to make series of barometrical observations at military posts on lines crossing our territories from east to west, in order to determine the areas over which these irregular (abnormal) movements occur simultaneously. These

having been ascertained, it will be merely necessary, in future explorations, to have corresponding observations made at one point in each of the barometrical areas, or regions, traversed by an expedition. The plan of observations proposed could be carried into effect at the cost of a few thousand dollars; and, incidentally, would make important additions to meteorological knowledge.

As a kindred subject, I beg leave to ask your attention to a proposed arrangement for improving the means of computing the observations for longitude of exploring parties. The best mode of determining longitudes by these parties, is that of observations upon moon culminating stars. One night's observations by a good observer will give a resulting longitude—the error of which will not exceed two miles, provided there are corresponding observations at some well determined point; but without these corresponding observations, errors, three or four times as great, may be introduced by the use of tables of the computed positions of the moon. Thus it appears that the field observations are more accurate than the means of computing used in the office. This source of error could be obviated by a preconcerted arrangement with an observatory for observations, at certain times during the continuance of exploring parties in the field.

Upon reviewing his barometrical work for the correction of errors due to abnormal changes, Captain Whipple has included a mass of altitude observations, not reduced before for want of time, which gives a remarkably detailed and accurate profile of the ground; and in connexion with the equally minute topographical notes, now for the first time used, has greatly improved the character of his route as a railroad line.

Among the most important changes that the revision has introduced, may be mentioned the reduction of the length of the route, which from Fort Smith to San Pedro is now 1,760 miles, and from Fort Smith to San Francisco, direct from the Mojave river by the Tay-ee-chay-pah Pass, avoiding the tunnel of the Cajon Pass, it is 2,025 miles. In the preliminary report the distances were measured upon the wagon trail; those now given are along the plotted railroad line. Many of the difficulties of construction previously reported may now be obviated; and there is strong probability of improving the route still further, by shortening distance and avoiding costly construction. A scrutiny of the barometrical observations through Campbell's Pass of the Sierra Madre, about twenty miles north of the Camino del Obispo, shows that that mountain chain may be crossed without a tunnel or excavation at the summit, with a maximum grade of 40 feet to the mile, at an elevation of 6,952 feet above the sea. By the Camino del Obispo, the old route, elevation 8,250 feet, a tunnel three quarters of a mile long, at an elevation of 8,000 feet, was required.

The elevations of several of the passes have been materially reduced; and the data are now provided for an actual computation of the excavation, embankment, and cost of construction of the proposed route.

As this computation necessarily involves much tedious labor, it has not yet been made, and in the mean time Captain Whipple has sub-

mitted an estimate similar to those of the other routes, in order to exhibit more correctly the comparative practicability of this, than was done in the preliminary report. It is based upon the facts developed by a careful study of the observations made, and the material collected in the field, and it is believed by him that the amount will be much diminished when the results of the computation are arrived at. The cost of construction, as given in the preliminary report, was greatly exaggerated, the estimates having been formed without reference to the field-notes. In the examination which, by your direction, I made of that report, the estimates were thought by me to be largely in excess. They were—

From Fort Smith to San Pedro, distance 1,892 miles,	\$169,210,265 00
From Fort Smith to San Francisco, the road leaving the Mojave river 34 miles from the east entrance of Cajon Pass, and crossing the Tay-ee-chay-pah Pass, (the estimate from the Mojave river to San Francisco, a distance of 406 miles, having been made by me) distance 2,174 miles.....	175,877,265 00

These would now become—

From Fort Smith to San Pedro, distance 1,760 miles,	86,130,000 00
From Fort Smith to San Francisco, crossing direct from the Mojave river to the Tay-ee-chay-pah Pass, distance 2,025 miles.....	94,720,000 00

Under the appropriation for continuing explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi river to the Pacific ocean, three parties were organized by your directions.

The first, under the command of Lieutenant John G. Parke, topographical engineers, was instructed by the letter of the department of October 2, 1854, to determine the practicability of constructing a railroad from the waters of the Bay of San Francisco to the plain of Los Angeles, by the Salinas River valley, and through the spurs of the Coast range, which extend to the seacoast near Point Conception, or, if that was found to be impracticable, by the coast route; to make certain explorations in the Great Basin, in connexion with the route of the 35th parallel, and between the Pimas villages on the Gila and the Rio Grande; the attention of the party being particularly directed to such examinations in the latter region as would show the degree of practicability of constructing artesian and common wells. These duties have been thoroughly and satisfactorily executed, and the party has just returned to Washington from the field. A rough reduction of portions of the field-work, at the most difficult points, shows that a railroad route from the headwaters of the Salinas, through the spurs of the Coast range, direct to the plains of Los Angeles, is not practicable; whilst that along the coast route is eminently so. With equal length, it has the advantage over the route by New (Williamson's) and Tay-ee-chay-pah Passes, of a less sum of ascents and descents, less elevation, (the greatest attained being only 1,350 feet above the sea,) less

cost of construction, and of passing continuously through a settled and cultivated country. The grades are favorable, the greatest required being, with a cut of 60 feet at the summit, 125 feet per mile for the space of 15 miles, (ascending and descending;) and this, it is believed, can be reduced to 100 feet per mile, by a tunnel 1,000 feet long.

The labors of the party will develop the topography of a district that was before unknown, or the nature of which was greatly misconceived; and will show a practicable railroad route, with easy grades, connecting the valley of Salinas river with the head of Tulare valley, by the Estrella, a tributary of the Salinas, and the Estero, a plain lying within the Coast range and connected with the Tulare Valley, near the Cañada de las Uvas. The exploration in the Great Basin was successfully executed, demonstrating that the Mojave river is a stream of the Great Basin, and does not flow into the Colorado at any time; an elevated ridge separating the basins of the two rivers.

The topographical examinations between the Pimas villages on the Gila and Doña Ana, or El Paso, on the Rio Grande, have resulted in many important improvements upon the line of survey of last year. They have established the practicability of constructing a railroad between those points, by the Gila river, to the mouth of the San Pedro, and up that stream to the vicinity of the line of 1854; a route possessing great advantages over all others in this region, since, from the Pimas villages to the point of departure from the San Pedro, a distance of 166 miles, it passes along the cultivable valleys of those streams, instead of over bare jornadas. The ridge of mountains east of the San Pedro is crossed by a more direct route than that of the old line, and the Puerto del Dado of the Chiricahui mountains is avoided, that range being turned on the north by a gap or break lying between it and Mount Graham. The length and the cost of construction of this route will be about the same as of that examined by Lieutenant Parke in 1854; the summits to be overcome will be fewer in number, the elevations less, the grades more gentle, and the supply of water greater: these, with the great advantage first mentioned, constitute this the best route yet made known in that region. The results of the examinations with reference to the supplies of water make it probable, from the form and geological structure of the basins and plains, that ordinary wells, at distances not exceeding twenty miles, would furnish abundant supplies, distances not too great for the economical working of passenger trains. They also indicate the feasibility of artesian wells in some localities, which might be resorted to if needed.

Upon the arrival of Lieutenant Parke at Fort Fillmore, after the completion of this duty, a report was made by him to this office of the principal results bearing upon the question of supply of water, of the points where it was desirable to have borings made, indicated in the order most suitable for trial, together with all the information necessary for the party directed to make the borings. A copy of this was furnished by Lieutenant Parke to Captain Pope, then engaged in the construction of an artesian well near the Pecos, who had been previously instructed to make the requisite borings west of the Rio Grande, upon the successful completion of the first duty assigned him.

By the construction, at no great cost, of a series of eight common wells between the Rio Grande and the San Pedro, and a series of four or six across the plain known as the Colorado Desert, and the expenditure of a few thousand dollars in making the route along the San Pedro and the Gila, to the Pimas villages, practicable for wagons, an excellent emigrant and mail route for coaches will be had, and great suffering be saved to those crossing the continent in this latitude. This route will be much shortened, and its value still further increased by constructing a series of artesian wells, not exceeding five in number, across the Llano Estacado. The party of Lieutenant Parke is now engaged in the reduction of the field-work and preparation of the reports, maps, &c.

The duty assigned to the second party organized under the direction of Brevet Captain John Pope, topographical engineers, by the instructions of the department of January 5, 1855, was that of testing the practicability of procuring water by artesian wells on the arid plains of the interior.

The point selected for the first trial was upon the Llano Estacado, near latitude 32° , about fourteen miles east of the Pecos, at the mouth of Delaware creek, where water for the use of the party could be conveniently obtained from the river. The party arrived at this point in the latter part of May, and commenced the operation of boring. At the depth of three hundred and sixty feet water was reached, which rose immediately seventy feet in the well, and remained at that height—the level of Delaware spring. It was found that the various strata of sandstone passed through in boring did not possess the degree of hardness reported by Mr. Marcou, the geologist, who examined the geological collection made by Captain Pope when crossing the Llano the preceding year; and in consequence, after some delays from the caving in of the sides of the well, it was found necessary to line it with tubing throughout. From the reported character of the formation, five hundred feet of tubing was considered sufficient for all the experiments the party was directed to make, less than half of which would be required for the well of the Llano Estacado; but the unexpected softness of the strata made it necessary to use all the tubing in the first five hundred feet. About the middle of September, at the depth of six hundred and forty feet, a second supply of water, pressed up through sandstone, was attained, which rose three hundred and ninety feet in a few minutes, and was still rapidly rising, when the caving in of the marly clay below the tubing filled in the well to the height of seventy feet, and effectually cut off the communication of the subterranean reservoir or stream with the surface. An attempt was made to remove this accumulation with the mud-pumps, but, after a continuous labor of twelve days and nights without making any impression upon it, the attempt was discontinued, as without additional pipe the well could not be finished; and, in the opinion of Captain Pope, the practicability of constructing artesian wells on the Llano Estacado had been fully established. The party then proceeded to the execution of the second duty assigned to it.

This result having been reported to the department by your direc-

tions, measures were taken to supply additional tubing to Captain Pope, who has been instructed to resume the work on the Llano.

In the opinion of the officer charged with the operation, they had, at the depth of six hundred and forty feet, closely approached coal measures, and he was convinced that a clear stream or reservoir would have been found twenty feet lower. From his report and accompanying diagram it appears that, at five hundred and seventy feet, a stratum of dark blue shale of the coal measures was pierced. It is highly probable that the water, which appeared at the depth of six hundred and forty feet, pressed up through the lower portion of the stratum of sandstone which they had been boring through for the last sixty feet, would have risen to the surface in large quantities. As the first supply of water rose to within two hundred and ninety feet of the surface, it might reasonably be concluded that, if another supply were attained three hundred feet below the source of the first supply, it would rise to the surface; the bottom of the boring was within twenty feet of this point when the second supply was pressed up through sandstone. The level attained by the first supply of water was that of Delaware spring. At Independence spring, which is west of Delaware spring, and six hundred feet above it, the upper carboniferous formation of the Guadalupe mountains begins. If the strata of sandstones, indurated clays, and marls, found between these two springs, should extend under the Llano Estacado, parallel to each other, and of equal thickness, it was probable that, at a depth of six hundred feet below the point at which the first supply of water was reached, (coming from the same level as Delaware spring,) the second supply would be had coming from the upper carboniferous strata and the level of Independence spring; but as the blue shale of the coal measures was reached at one-half this depth, it would appear that the strata are about three hundred feet apart at the point where the boring was made, instead of six hundred feet, as they are between Delaware and Independence springs. Both supplies of water in the well were clear, pure, and palatable, free from any impurities, appreciable by the tests at the command of the geologist, Dr. Shumard. An important result of this boring is the probable existence of coal in the carboniferous formation which appears upon the surface at the foot of the Guadalupe mountains.

The instructions of the department required Captain Pope, after the successful completion of the well on the Llano Estacado, or the demonstration of its impracticability, to make borings at certain points west of the Rio Grande on the route to be examined by Lieutenant Parke's party, in order to determine the practicability of artesian wells there, and the depths at which water can be had (by ordinary wells) at the dryest season, and the thickness of the water-bearing strata. By the time this duty is completed, it is probable that he will have received the additional tubing necessary to the successful completion of the artesian well on the Llano Estacado, and will then be enabled to resume that work.

The importance of obtaining large supplies of water on the interior

Ex. Doc. 1—7*

plains and basins, by the construction of artesian wells at moderate cost, is too apparent to need exposition.

The greater part of the rain and other precipitation in these arid regions falls upon the mountains, and, percolating through the loose debris on their flanks, descends below the surface of the plains, appearing again, sometimes at great distances, in springs and streams—the sources of rivers.

On the plains and table-lands of Asia, which so closely resemble those of North America that a description of one may be taken for the other, water for irrigation, where no streams are found, is obtained by a series of wells connected by subterranean conduits. This laborious process is extensively used, and converts waste barren land into productive fields.

If to a demonstration of the practicability of constructing artesian wells at moderate cost on the interior plains and table-lands be joined the discovery of coal-beds, fertility, industry, and wealth may be made to take the place of sterility and solitude over extensive areas of those arid, naked, and treeless districts.

A third party, under the command of Lieutenant R. S. Williamson, topographical engineers, was organized, under instructions from the department of May 1, 1855, to explore, first, the region between the Sacramento and Columbia rivers, to ascertain the practicability of connecting them by railroad; second, to make examinations and surveys near the sources of Carson river, to ascertain the practicability of crossing the Sierra Nevada in that vicinity by railroad, provided the information obtained from the troops and others who had recently crossed the mountains by that route should indicate the probable existence there of a railroad route. By a report of this officer of the 19th of October, the first duty has been successfully executed.

In addition to the immediate practical value of these explorations in ascertaining the best routes suitable for rail and common roads; their importance from military considerations; their usefulness in making known shorter and better routes of travel to emigrants by which much suffering and loss is avoided; their value in indicating additional sources of national wealth and strength; in substituting exact knowledge for vague surmise and the entirely unknown; the large amount of valuable information collected by them respecting the physical features and condition of our country in topography, geography and geology, meteorology, botany, and zoology, render it highly desirable to continue them.

Many portions of the interior are entirely unknown; and for continuing their exploration during the following year, an appropriation of one hundred and fifty thousand dollars could be well expended.

Very respectfully, your obedient servant,

A. A. HUMPHREYS,
Captain Top. Engineers.

HON. JEFFERSON DAVIS,
Secretary of War.

REPORT OF BOARD OF COMMISSIONERS OF THE MILITARY ASYLUM.

WASHINGTON, D. C.,
November 11, 1852.

SIR: The Board of Commissioners of the Military Asylum reported, December 31, 1851, that they had provided temporary places of reception for persons entitled to the benefits of the act of March 3, 1851, (which provides a Military Asylum, for the relief and support of invalid and disabled soldiers of the army of the United States,) near New Orleans, Louisiana, and at Washington, D. C., and that a site had been purchased in the District of Columbia for one of the permanent establishments. Subsequent to that report, the buildings on this site have been occupied by the qualified persons who have presented themselves. The number now within this asylum is forty; and at the last report from East Pascagoula, Mississippi—to which point, for the sake of their health, the invalids were removed from New Orleans—the number there present was ten. Some twenty others have temporarily taken advantage of the institution, and, after establishing claims to admission, have returned to their families, or to work, secure of this retreat whenever necessary. Of the total number—seventy—who have thus far received relief from the institution, eleven have been in the service of their country for periods ranging from twenty to thirty-eight years, and the remainder are cripples, or have lost their health from the effect of wounds or disease incurred during shorter periods of service. Many of these men have been relieved from circumstances of extreme penury and distress, and the number of applications for admission is increasing.

Under an order of the board, taken May 18, 1852, handbills were sent to every post office in the United States and Territories, giving notice of the establishment of this institution; but it appears that the object of the publication has not been fully attained. The board, therefore, deem it not improper to repeat, in this report, the advantages presented by the institution, together with the conditions of admission.

The Military Asylum is under the control of a Board of Commissioners, composed of the General-in-chief, the generals commanding the eastern and western divisions, the Quartermaster General, the Commissary General of Subsistence, the Paymaster General, the Adjutant General, and the Surgeon General, all of the United States army.

It is the duty of this board to provide for the accommodation, in suitable buildings, to be erected under their direction, of all qualified persons, hereinafter enumerated, and further to provide for all their necessities and comforts, in food, clothing, medical attendance, &c.

The officers—governor, deputy governor, and secretary and treas-

urer—at the different sites, are selected by the board from the officers of the United States army.

The classes of persons entitled to the benefits of the asylum are:

1. All soldiers and discharged soldiers of the army of the United States who may have served honestly and faithfully for twenty years.

2. All soldiers and discharged soldiers of the regular army, and of the volunteers, who have served in the war with Mexico, and were disabled by disease or wounds incurred in that service, and in the line of their duty, and who are by such disability incapable of further military service. This class includes the portion of the marine corps which served with the army in Mexico.

3. Every soldier and discharged soldier who may have contributed to the funds of the Military Asylum, since the passage of the act to found the same, approved March 3, 1851, according to the restrictions and provisions thereof, and who may have been disabled by disease or wounds incurred in the service and in the line of his duty, rendering him incapable of military service.

4. Every pensioner, (whether a regular or volunteer,) on account of wounds or disability incurred in the military service of the United States, though not a contributor to the funds of the institution, who shall transfer his pension to the Military Asylum during the period he voluntarily continues to receive its benefits.

No provision can be made for the wives and children of the inmates of the asylum, as no such provision is contemplated by the law; but to such invalids as can prosecute a trade or handicraft, facilities will be afforded for so doing.

No deserter, mutineer, or habitual drunkard, will be admitted without such evidence of subsequent service, good conduct, and reformation of character, as the commissioners shall deem sufficient to authorize admission; nor do the provisions of the act to found the asylum apply to any soldier in the regular or volunteer service who shall have been convicted of felony, or other disgraceful or infamous crime of a civil nature, subsequent to his original admission into the service of the United States.

All *discharged* soldiers (regulars, marines, or volunteers) included in any of the above classes will make application, stating the company and regiment in which they last served, or the name of their captain and colonel, the length of their service, and whether a pensioner or not, directly, to Brevet Captain *Schuyler Hamilton*, secretary to the Board of Commissioners, Washington, D. C., who, in reply, will inform applicants of the decision of the board relative to claims; and when that is favorable, will furnish the means allowed by the board for the transportation of each from his home to the nearest branch of the asylum.

Invalid soldiers, entitled to pensions for disability incurred prior to the Mexican war, and who have served for a period less than twenty years, are required, by the terms of the act to found this institution, to contribute such pensions to the funds of the institution, during the period they may avail themselves of its benefits; those who have

served twenty years and upwards do not contribute their pensions to the fund of the institution.

Such invalid soldiers as receive pensions for disability incurred during the late war with Mexico, being contributors to the funds of the Military Asylum, through the contribution levied on the city of Mexico, retain their pensions, as do all who may receive pensions for disabilities incurred since the passage of the act approved March 3, 1851.

The board further report, that contracts have been entered into for the erection of the permanent buildings at the site in the District of Columbia, and that the work is advancing favorably.

A site was selected under the direction of the board, near East Pascagoula, Mississippi, and submitted to the Secretary of War, May 22, 1852, to be laid before the President of the United States; the completion of the purchase only awaits the approval of the President.

In accordance with the 18th section of the act making appropriations for the support of the army, approved August 31, 1852, a committee of the board was appointed to visit and examine the Blue Lick Springs, Kentucky, and the lands attached thereto. After a careful consideration of the subject and mature deliberation, the board, on the report of the committee, have decided that this location was *not* an eligible (preferable) site for the Western Military Asylum; and further, "that until the board are better assured of the sufficiency of their means, they do not deem it expedient to commence any other branch asylum than the two already agreed upon."

The accompanying report of the treasurer, which is approved by the board, exhibits the financial condition of the institution at the date of that report.

All of which is respectfully submitted.

WINFIELD SCOTT,

General-in-chief, and President of the Board.

SCHUYLER HAMILTON,

Captain by Brevet, U. S. A., Secretary to the Board.

Hon. C. M. CONRAD,

Secretary of War.

WASHINGTON, D. C., November 11, 1852.

The Board of Commissioners of the Military Asylum having been called together by the General-in-chief, met this day. Present: the General-in-chief, the Quartermaster General, the Commissary General of Subsistence, the Surgeon General, and the Adjutant General.

Agreeably to an understanding had with the generals commanding the eastern and western divisions of the army at the last meeting of the board at which they were present, viz: November 3, 1852, the annual report of the board was considered and approved by the members of the board present in this city, they being a majority of the board, and it was *ordered, unanimously*, that it be authenticated by the signature of

the president of the board, countersigned by the secretary, and submitted to the Secretary of War.

The board then adjourned *sine die*.

WINFIELD SCOTT.

SCHUYLER HAMILTON,
Captain by Brevet, U. S. A.

A true copy.

SCHUYLER HAMILTON,
Captain by Brevet, U. S. A., Secretary.

Statement of funds received and expended on account of United States Military Asylum by Assistant Surgeon Benjamin King, treasurer, from January 1, 1852, to September 30, 1852.

DR.	
Balance in hands of treasurer December 31, 1851.....	\$641 11
Invested in coupon bonds of the State of Virginia, remaining on hand December 31, 1851.....	118,000 00
Received for interest on \$118,000 invested in (six per cent.) coupon bonds of State of Virginia	7,080 00
Received on account of balance of appropriation of March 2, 1847, "for the benefit of discharged soldiers disabled by wounds"	30,320 68
Received from the post funds of the several forts and military stations.....	1,457 42
Received on account of fines, &c, by the sentences of courts-martial.....	8,566 07
Received on account of forfeiture for desertion.....	9,722 08
Received on account of stoppages of twenty-five cents per month, per man, from the enlisted men in the army.....	21,761 91
Received on account of pay, &c., due the estates of deceased soldiers.....	2,495 82
	200,045 09
CR.	
Paid to George W. Riggs, jr., for the purchase of his farm for the military asylum.....	\$41,500 00
Paid to George W. Riggs, jr., for horses, cows, forage, farming implements, &c., &c., for stocking the asylum farm.....	2,000 00
Paid on account of expenditures for the support of the asylums in the District of Columbia and near New Orleans, and other contingencies, including the travelling expenses of applicants from their homes to the asylums, the repairs, furnishing and fitting up of suitable buildings, and for clothing for the members, &c., &c.....	9,463 95
Paid Gilbert Cameron, contractor, for erecting asylum buildings	1,350 00
Remaining on hand of coupon bonds of the State of Virginia.....	118,000 00
Remaining in the hands of the treasurer.....	27,731 14
	200,045 09

BENJAMIN KING, *Assistant Surgeon,*
Treasurer Military Asylum.

WASHINGTON CITY, Sept. 30, 1852.

OFFICE OF BOARD OF COMMISSIONERS OF MILITARY ASYLUM,
Washington, November 8, 1853.

SIR: Since the report of this board on the affairs of the Military Asylum, dated November 11, 1852, preliminary arrangements have been made for the purchase of a site for a branch asylum at East Pascagoula, Mississippi, containing one hundred and ten acres, for the sum of five thousand dollars.

The site for the western branch, at Harrodsburg, was selected by the commissioners May 6, 1853, for which is to be paid the sum of one hundred thousand dollars. The payment of the purchase money for each of these positions is deferred until the transfer of the property to the United States shall be approved by Mississippi and Kentucky, respectively, which, it is expected, will be done at the next meeting of their legislatures. In the mean time, temporary accommodations are provided for a few inmates at East Pascagoula, and Harrodsburg has been occupied as an asylum since the month of June last. The whole number of persons admitted to the benefits of the asylum since its establishment amounts to at least one hundred and thirty, and new applications for admission are constantly received. The number now present at the several asylums is as follows:

At District of Columbia branch.....	43
At Harrodsburg branch.....	22
At East Pascagoula	5
Total.....	<u>70</u>

During the year there have died at East Pascagoula, three; and at the District of Columbia branch, one. The difference between those admitted and those present is accounted for by deaths, discharges, and voluntary relinquishment of the benefit of the asylum.

The buildings in the course of erection in the District of Columbia are well advanced, and will be completed before the end of the next year. The quarters for the officers may be occupied early in the spring. At Harrodsburg some repairs are required.

The accompanying report of the treasurer, approved by the board, exhibits the state of the finances of the asylum at the end of September, 1853.

Respectfully submitted.

WINFIELD SCOTT,
Major General, and President of the Board.

GEO. DEAS,
Brevet Major and Secretary.

HonJ EFFERSON DAVIS,
Secretary of War.

Statement of the receipts and expenditures on account of the United States Military Asylum fund, by Assistant Surgeon Benjamin King, U. S. A., treasurer, from October 1, 1852, to September 30, 1853, inclusive.

DR.	
Balance remaining in hands of treasurer of military asylum September 30, 1852.	\$27,731 14
Remaining in hands of treasurer, of six per cent. coupon bonds of State of Virginia	118,000 00
Received, through office of Second Auditor of the Treasury, for pay, &c., due estates of deceased soldiers.....	13,498 82
Received, through office of Third Auditor of the Treasury, for pay, &c., due estates of deceased soldiers.....	86,856 65
Received from the post funds at the several forts and military stations.....	1,972 70
Received from assessment of twenty-five cents per man, per month, from the enlisted men in the army.....	30,204 80
Received from stoppages and fines of soldiers by the sentences of courts-martial.	9,099 02
Received from forfeitures on account of desertions from the army.....	8,261 02
Received for interest on the six per cent. coupon bonds of the State of Virginia.	7,000 00
Received for interest on deposits of funds of military asylum in hands of treasurer	658 89
Received from the hospital funds at the several forts and military stations....	4,093 18
Received from the treasury, per act of March 3, 1853, to establish a western military asylum.....	10,000 00
	317,456 22
CR.	
Paid for the erection of buildings at the site of the military asylum near Washington city, D. C	\$49,950 00
Paid for the support of site of military asylum near Washington city, including repairs of buildings, clothing for invalids, bedding, furniture, &c.....	15,314 60
Paid for support of site of military asylum at East Pascagoula, Miss.....	4,502 71
Paid for the support of site of military asylum at Harrodsburg, Ky.....	4,000 00
Paid for compensation of secretary to board of commissioners, and to architect of military asylum.....	2,046 00
Paid for commutation of quarters and fuel for officers on military asylum duty.	1,308 52
Paid for transportation allowances to old and invalid soldiers, to bring them from their homes to the military asylum near Washington.....	1,009 52
Paid for the transportation of invalid members of military asylum to the military asylum at Harrodsburg, Ky.....	455 88
Paid for clerk, messenger, and draughtsman, in office of board of commissioners, and of architect of military asylum	638 20
Paid for contingencies of military asylum, including medicines and medical attendance, transportation of supplies, officers' baggage, stationery, &c., &c.	1,349 94
Remaining on hand in six per cent. coupon bonds of the State of Virginia.....	118,000 00
Remaining on hand in cash subject to the order of board of commissioners, and payment of sites of military asylum at Harrodsburg, Ky., and East Pascagoula, Miss	118,880 85
	317,456 22

I certify that the above is correct.

BENJAMIN KING, *Assistant Surgeon,*
Treasurer Military Asylum.

WASHINGTON CITY, Sept. 30, 1853.

MILITARY ASYLUM, OFFICE OF BOARD OF COMMISSIONERS,
Washington, November 25, 1854.

SIR: Since the annual report of the Board of Commissioners, dated November 8, 1853, the States of Mississippi and Kentucky have each transferred to the United States their title to the land selected for the sites of the military asylums at East Pascagoula and Harrodsburg, and the purchases have accordingly been consummated. At the former place no improvements have been made or projected, and its few inmates continue to reside in the temporary building near the premises. It has not been deemed necessary to make any expenditure for improvements or repairs, during the year, upon the buildings and offices at Harrodsburg. At the asylum in the District of Columbia, the two houses for the officers' quarters have been completed, and are now occupied by the governor, and the secretary and treasurer. The main building continues to advance steadily towards completion; and it is supposed it will be in condition for occupation by the invalid soldiers in December, 1855—the time specified in the contract. The report of the architect (marked A) is enclosed.

On the first Monday of the present month a portion of the officers of the asylum were relieved, and ordered to their respective regiments. Others have been selected for the ensuing year; and the officers now on duty are:

At the District of Columbia asylum: Brevet Colonel *M. M. Payne*, 4th artillery, governor. Assistant Surgeon *B. King*, secretary and treasurer.

At the Harrodsburg asylum: Major *T. L. Alexander*, 8th infantry, deputy governor. Brevet Captain *L. B. Wood*, 8th infantry, secretary and treasurer.

At the East Pascagoula asylum: Brevet Major *Earl Van Dorn*, secretary and treasurer, and acting governor.

The following is the number of inmates now receiving the benefits of the asylum:

At the District of Columbia asylum.....	43
At the Harrodsburg asylum.....	26
At the East Pascagoula asylum.....	8
	—
Total.....	77
	==

The whole number of persons who have been admitted to the institution since its establishment is 170. A number of inmates who were in the receipt of pensions, in addition to the benefits of the asylum, were required, in accordance with the law establishing the same, to surrender them to the asylum so long as they continued to remain among its beneficiaries. The larger and most worthy portion of these men cheerfully acquiesced in the justice of this rule; but others, refusing to give up their pensions, left the asylum. Several of the latter have returned under the conditions expressed, and the others are at liberty to do the same whenever they may feel so inclined. It is acknowledged by every sensible man that the benefits derived

from the asylum are much to be preferred to the support afforded by a soldier's pension.

The report of the treasurer (marked B) is herewith enclosed, and shows the state of the funds of the asylum at the end of September, 1854.

Respectfully submitted.

WINFIELD SCOTT,
Major General, and President of the Board.

GEO. DEAS,
Brevet Major, Secretary to the Board.

HON. JEFFERSON DAVIS,
Secretary of War.

A.

WASHINGTON, D. C., November 24, 1854.

SIR: For the information of the Board of Commissioners, I have the honor to submit the following report of the operations in the construction of the buildings for the Military Asylum during the past year:

At the date of my last report (November 7, 1853) the walls of the two dwellings were up, and the roofs of those houses were then being put on.

The basement story of the main building was constructed, and the first tier of arches was then being laid.

During the past year the operations have continued without serious interruption; and although the contractor failed to have the two dwelling-houses finished until the 1st of October last, yet nothing has occurred to give me any apprehensions as to the completion of the main building within the time specified in the contract.

The walls of this building are now all complete, except the upper story of the tower and some exterior masonry, and the roof is now being put on. It is expected to have all of the building, except the tower, under cover in a month from this time.

All the brick and stone for paving the areas and halls are on the ground. The flooring is also delivered. The iron beams for the piazza are also made. In fact, the greater part of the materials necessary to finish the building have been delivered. Here I might close this report; but there are two other subjects connected with the finish of the building which may properly be mentioned here.

The first refers to the matters mentioned in my letter to you of — of August last, particularly to the recommendation which I made, that another story be added to the central tower of the asylum building. All of my subsequent reflections confirm the correctness of the recommendation on this subject which I made in the communication above referred to. It is our first duty, no doubt, to construct rooms which will afford shelter to the inmates, and to provide all the other offices necessary for their comfort. Everything about the building should be

subordinate to these ; and I have endeavored to make them so. But after providing a building which shall answer all the useful purposes that may be required of it, the duty of the architect is not all performed. It is necessary that the building shall not only do its duty, but it must do it with grace and with dignity.

The asylum is a public building, located at the seat of government ; and from its nature and its commanding position, it will be examined when finished, and probably for centuries to come, as indicative of the architectural taste of its projectors and of the age in which it was built. If, therefore, the board is satisfied that the addition of another story to the tower will improve the appearance of the building, I think it a duty which they owe to themselves, as well as to the architecture of the country, that it should be added.

The other subject is the warming of the building. It will be recollected that the contractor was not required to supply the heating and ventilating apparatus. I think it important to get the best professional talent to do this work ; and as it will require some months to provide and put up the warming apparatus for so large a building, and as it will be wanted on the first of December, 1855, I would recommend to the board that some action be taken on the subject at its present meeting.

An additional reason for this recommendation is, the probability that the work will be more cheaply and better done by giving the contractor a longer time in which to do the work than he will have if the subject is deferred until the next meeting of the board.

Very respectfully, your obedient servant,

B. S. ALEXANDER,

Lieut. Engineers, Architect Military Asylum.

Major GEO. DEAS,

Secretary of Board of Commissioners Military Asylum.

B.

Statement of receipts and expenditures on account of the United States Military Asylum fund, by Assistant Surgeon Benjamin King, U. S. A., treasurer, from October 1, 1853, to September 30, 1854, inclusive.

Dr.	
Balance remaining on hand September 30, 1853, in cash.....	\$118,880 85
Virginia State bonds on hand September 30, 1853.....	118,000 00
Received through Second Auditor's office, pay, &c., of deceased soldiers.....	10,272 52
Received from stoppage of twenty-five cents per man per month, from enlisted men in the army.....	13,756 71
Received for forfeiture on account of desertion.....	3,976 45
Received for fines by sentence of courts-martial.....	4,373 47
Received for interest on Virginia State bonds.....	7,080 00
Received for interest on deposits in bank	3,980 00
Received from the post funds at the several forts and military stations.....	760 09
	281,080 09
Cr.	
Paid for the erection of buildings for military asylum in District of Columbia..	\$51,300 00
Paid for the purchase, in part, of Harrodsburg Springs, Kentucky, for military asylum.....	53,250 00
Paid for the purchase of lands for military asylum at East Pascagoula, Miss...	5,000 00
Paid for the purchase of lands for military asylum in District of Columbia.....	613 75
Paid for the support of military asylum in District of Columbia.....	7,600 00
Paid for the support of military asylum at Harrodsburg, Kentucky.....	5,500 00
Paid for the support of military asylum at East Pascagoula, Mississippi.....	6,454 22
Paid attorney for examining title to land purchased at East Pascagoula.....	75 00
Refunded to heirs of deceased soldiers, per act of March 3, 1851.....	130 00
Paid for compensation to officers of military asylum, including arrears.....	4,282 00
Paid for commutation of quarters and fuel to officers of military asylum.....	723 07
Paid for transportation of members of board of commissioners of military asylum.	718 90
Paid for transportation of members of board of commissioners, (disallowed at Treasury as a charge against army appropriation).....	1,721 44
Paid for transportation of invalids from their homes to military asylum.....	432 13
Paid for support of insane members of military asylum in Penn. hospital.....	460 27
Paid for compensation to clerk to board, draughtsman, &c. &c.....	814 25
Paid for contingencies, including stationery, &c. &c.....	182 64
Total expended during the year.....	139,257 67
Remaining on hand of Virginia State bonds.....	118,000 00
Remaining on hand subject to order of board of commissioners, in cash.....	23,822 42
	281,080 09

I certify that the above statement is correct.

BENJAMIN KING, *Assistant Surgeon,
Treasurer Military Asylum.*

NEW YORK, November 14, 1855.

SIR: Since my last annual report upon the affairs of the Military Asylum, the work upon the principal building at the site in the District of Columbia has been well advanced, but will not be in readiness for occupation at the time required by the contract, the 1st of December next; nor is it in my power to state positively when the building will be completed.

The officers of the several asylums for the year beginning November 5, 1855, were chosen at the meeting of the Board of Commissioners in June last, and are as follows:

District of Columbia asylum: Brevet Colonel M. M. Payne, 4th artillery, governor; Assistant Surgeon Benjamin King, secretary and treasurer. Harrodsburg asylum: Major T. L. Alexander, 8th infantry, deputy governor; Brevet Captain L. B. Wood, secretary and treasurer.

Brevet Captain Charles G. Merchant, of the 8th infantry, was assigned to duty at the East Pascagoula asylum, by special orders from the headquarters of the army, dated April 27, 1855; and being chosen secretary and treasurer of the same, he relieved in the month of May last, by direction of the board, Brevet Major Earl Van Dorn, in the duties of that office, and those of acting governor of the asylum—the latter officer having been appointed captain in the 2d regiment of cavalry. Captain Merchant died on the 4th of September last at East Pascagoula; and the Board of Commissioners having (with your approval) come to the determination to remove the few inmates there remaining to Harrodsburg, and to dispose of the public property, Lieutenant Anderson Merchant, of the 2d artillery, was ordered to East Pascagoula for that purpose. His report of the execution of this duty has not been rendered.

The number of persons who have been admitted to the benefits of the Military Asylum since its establishment is one hundred and ninety-one. The present number of inmates is—

At the District of Columbia site.....	59
At Harrodsburg.....	28
Others, not residents of the asylum, but receiving its benefits and living with their families.....	6
Total	<u>93</u>

The annual report of the treasurer is herewith enclosed.

Respectfully submitted.

WINFIELD SCOTT,

Brevet Lieut. General, and President of the Board.

HON. JEFFERSON DAVIS,

Secretary of War.

Statement of receipts and expenditures on account of the United States Military Asylum fund, by Assistant Surgeon Benjamin King, U. S. A., treasurer, from October 1, 1854, to June 30, 1855, inclusive.

DR.	
Balance remaining in hands of treasurer of military asylum on September 30, 1854	\$23,822 42
Virginia State bonds in hands of treasurer September 30, 1854.....	118,000 00
Received from the assessments of twenty-five cents per man per month, from the enlisted men of the army.....	20,476 13
Received on account of fines, &c., by sentence of courts-martial.....	6,529 40
Received for forfeitures on account of desertion from the army.....	6,738 93
Received through Second Auditor's office, for pay, &c., due the estates of deceased soldiers.....	8,246 61
Received from the post funds of the several forts and military stations.....	26 35
Received for interest on Virginia State bonds.....	3,540 00
Received for interest on deposits in bank.....	400 00
Received from the hospital funds at the several forts and military stations.....	369 51
Received on account of appropriation for benefit of discharged soldiers disabled by wounds, &c. &c.....	8,017 83
Received on account of appropriation for the support of military asylum.....	183 20
	196,350 38
CR.	
Paid for the erection of buildings at the site of military asylum, near Washington, D. C.....	\$13,500 00
Paid on account of the purchase of the Harrodsburg Springs, Kentucky, for military asylum	38,325 00
Paid for support of military asylum in District of Columbia, including clothing of invalids, bedding, furniture, &c.....	9,000 00
Paid for support of military asylum at Harrodsburg.....	5,600 00
Paid for support of military asylum at East Pascagoula.....	2,937 69
Compensation to treasurer, secretary, and architect of military asylum.....	1,578 00
Compensation to clerk to board of commissioners.....	270 00
Paid for draughtsman in office of architect of military asylum.....	288 00
Paid for transportation of members of board.....	767 60
Paid for transportation of officers of military asylum.....	251 30
Paid for quarters and fuel for officers of military asylum.....	317 08
Paid for furniture for houses of officers of military asylum in Dist. of Columbia.....	2,500 00
Paid for support of insane members of military asylum.....	358 81
Paid for travelling expenses of members of military asylum, in bringing them to asylums	372 35
Paid for constructing sewer, &c., at military asylum in District of Columbia..	820 00
Paid for laying gas pipes in military asylum building, District of Columbia....	400 00
Refunded to heirs of deceased soldiers.....	41 90
Paid for contingencies including printing, stationery, &c. &c.....	380 42
Remaining in hands of treasurer in coupon bonds of the State of Virginia.....	118,000 00
Remaining in hands of treasurer, cash.....	642 23
	196,350 38

N. B.—The last annual report included September 30, 1854; therefore this statement is only from that period to the end of the "fiscal year," June 30, 1855.

I certify that the above statement is correct.

BENJAMIN KING, Assistant Surgeon,
Treasurer Military Asylum.

REPORTS OF CAPTAIN M. C. MEIGS, CORPS OF ENGINEERS, IN CHARGE OF
CAPITOL EXTENSION, RECONSTRUCTION OF DOME, AND POST OFFICE
EXTENSION.

OFFICE OF EXTENSION UNITED STATES CAPITOL,
October 14, 1855.

DEAR SIR: I have the honor to report the progress during the past year of the works of the extension of the United States Capitol.

At the date of my last annual report, the walls of the Senate and Representative chambers had been raised to the height of the ceilings. Most of the interior walls were at the height of the spring of the roofing arches of the attic story. The exterior walls of the basement story had been completed, and the marble exterior facing of a portion of the buildings had been carried to the height of the top of the window-jambs of the principal story. None of the carved window-jambs had been finished.

The construction of the iron roofs for the buildings, a very heavy work, had been commenced. The carving of the pilaster capitals had been begun, and some little progress made with it.

The work during the year has progressed satisfactorily, excepting that the supply of marble has been limited. This has retarded the completion of the building.

The present condition of the work may be summed up as follows:

MARBLE WORK.

The marble facing on the eastern front is so far completed that the setting of the pilaster capitals is commenced. The middle of these fronts is less advanced, as the time consumed in the elaborate carving of the doorways has retarded the work. One of these doorways, that of the north wing, is completed, and its entablature set. Part of the entablature only of the other is up, the cornice not yet being finished.

On the other fronts most of the windows of the principal story are completed; 187 richly carved window-jambs have been cut and set during the year; a few yet remain unfinished.

The average level of the ashlar of the building may be assumed as that of the attic window-sills. In some places it is not above the principal windows; in others the attic windows are completed, and some of the pilaster capitals of the exterior order are in place.

The marble-work of the interior is in progress. About one-half of the column shafts, and three-fourths of the pilasters of the principal corridor of south wing, are set. Workmen are carving the capitals for these columns, which are of very elaborate design, introducing in a

Corinthian capital details selected from the foliage of native plants. None of them is yet finished. The capitals of the pilasters are all finished and most of them set. The marble base of the corridor is completed.

A large quantity of marble has been procured for the marble-work of the Senate retiring-room, and the vestibules and stairways of the building.

For three of the great stairways the Tennessee variegated marble has been procured, and the working drawings having been completed, the work is now in hand. The fourth staircase it is intended to build of the green serpentine of Vermont, commonly called verd antique: this is also in hand.

A very beautiful marble has lately been discovered in Frederick county, Maryland. If it exists in sufficient quantity, the attempt will be made to use it in this interior work.

A variety of specimens of colored marbles from Vermont have also been received, and some blocks have been ordered.

There have been received during the year, in all, 71,954 cubic feet of marble of various kinds.

Messrs. Rice, Baird, and Hebner had delivered, at the date of my last annual report, 124,627 cubic feet of marble, costing \$188,179 63. They have delivered under their contract during the year ending the 30th September, 1855, and including the first payment to them in October, 59,806 cubic feet, costing \$99,671 77.

There has also been purchased from them for the work of the interior and for the statuary of the pediment, not included in their contract, 8,166 cubic feet, costing \$13,596 95.

There have been received also 2,255 cubic feet of Tennessee marble for the stairways, and 1,727 cubic feet of Italian marble.

The whole quantity of marble received during the year has been 71,954 cubic feet, costing \$131,015 16.

The payments for the marble-work during the year to Provost, Winter & Co., under their contract, have amounted, including the payment in October for the work done in September, to \$223,001 17.

There are now on hand, cut and ready to be set, or in the hands of the workmen, 39,184 cubic feet of marble, much of which is finished, and there are on the ground 13,510 cubic feet of rough marble.

BRICK-WORK.

This has kept pace with the marble facing; we have been able to put in a few more arches of the attic ceiling, and to arch the eastern vestibule of the basement of south wing.

The floors of the western tier of rooms in the basement of the north wing have been levelled with brick-work, and prepared to receive the tiling.

A good deal of brick-work has also been done in the shops on the north of the building. A smoke-stack 60 feet in height, with founda-

tions for engine and machinery used in building the iron roof, have been built during the year.

There have been received during the year 2,301,189 brick, of which there have been laid 1,734,782, and there are now on hand 1,662,841.

PLASTERING.

Many of the basement rooms have received the first coat of plaster, which leaves them in proper condition for finishing either with plaster decorations or to receive the intonaco for fresco painting.

FLOORS.

The rooms in the western part of the basement of the north wing having been plastered, the laying of the tile floors has been begun. These rooms will be floored with encaustic tiles.

A very beautiful composition, called chalcedon, has been submitted for flooring, which promises even greater beauty than the encaustic tile. Floors for two small rooms have been ordered from the inventor, in order to test its fitness for the purpose, and his ability to make it in quantity.

ROOF.

The interior of the Senate and Representative halls are, at present, filled with scaffolding, erected for the purpose of putting up the iron roofs.

The whole of the roof-trusses for the House of Representatives have been completed, and part of them have been erected on the building. The Senate roof is also sufficiently advanced to begin its erection.

These roofs require great strength; the span of one of them is 96 feet. They carry, besides the roof covering, the cast-iron ceilings of the rooms below. The iron used has been carefully selected. The tie-beams are from the same works (the Tredegar) as the chain-cable iron used in the navy. The rafters are made of Cooper & Hewitt's rolled-iron beams, weighing thirty pounds to the foot, and in parts where the strain is too great for these they are strengthened by side-pieces riveted to them.

Every bar subject, in the roof, to a tensile strain, is submitted in a hydraulic proving-machine, before being put up, to an accurately measured strain, greater than it will ever be liable to in the roof. They are proved to a strain of 10,000 pounds to the square inch. The greatest strain liable to come upon them is calculated at 8,545 pounds per square inch. The ultimate strength of the iron ranges, according to experiments made, from 50,000 to 60,000 pounds per square inch. The tie-beams are all double, and each beam is proved under a strain of 55,000 pounds, equal, for the double-beam, to 110,000 pounds.

The corrugated copper for the roof covering has been received, and

is in store. The roof plate-glass for the sky-lights is being manufactured in Philadelphia; a part of it has already been completed.

The cast-iron plates for the ceiling of the House of Representatives have been completed, and are in store; they will be put up as soon as the roof is covered in. Those for the Senate are in progress, and will be completed this winter.

Many experiments have been made during the year upon different specimens of metals and marble presented for the use of the building. Booth's patent iron beam, and Cooper & Hewitt's rolled-iron beam, have been submitted to tests. Upon these experiments, when somewhat more extended, I shall have the honor of addressing to you a detailed report.

The workshops have been considerably extended during the year. The carpenter-shop, machine-shop, and smith-shop have all been enlarged. Machinery for sawing marble, and for working wood and iron, has been put up, and the work has been much facilitated and the completion of the building hastened thereby.

In a work of such magnitude and variety as the Capitol Extension, it is difficult to notice in a report all the various branches which have engaged the attention during the year. I can but indicate them generally.

CARPENTRY.

Though the building is one apparently entirely composed of marble, brick, and iron, yet the carpentry required is very extensive. Centres for the complicated arches, scaffolds for erecting the roof and ceiling, patterns for the stonecutters, frames for machinery, cranes and derricks, buildings for shops, doors and window-frames, &c., have employed during the year a large force of carpenters.

Two hundred large window-frames have been made for the basement and principal stories, and the 125 doors for the basement are in an advanced state.

A large quantity of work for mouldings of windows, shutters, and doors, has been got out by machinery, and is ready for use.

The carpentry for the removal of the old dome of the Capitol has been executed under the same direction during the year.

SCULPTURE.

The original models of several of the figures designed by Mr. Crawford for the eastern pediment have been received, and workmen are now engaged in carving in marble the figures of the Mechanic and the groups of Commerce and Instruction. The marble has not yet been received for the other groups. These figures are being carved in American marble, which is believed to be more durable than Italian statuary marble, when exposed to our climate. It is, though not of so delicate a texture, quite as white, and though not so well suited for parlor statues, it is better adapted to the situation in which this sculpture will be placed.

We have received the models of the Mechanic, the groups of Instruction, Youth, Commerce, and War. I am informed by Mr. Crawford that he has completed the models of America, for the centre of the pediment, and the figures of the Woodman and Indian Boy, and is now engaged upon that of the Indian.

A small figure for the decoration of one of the principal stairs has been nearly completed in the studio at the Capitol, by the artists there employed.

A skilful worker in bronze is engaged in casting the bronze decorations for the gallery doors of the House of Representatives.

As Congress appropriated \$20,000, at its last session, for the purchase by the President of a work of art from Mr. Powers, it is hoped that his statue of America will be one of the decorations from his hand for the new halls of legislature.

One of the rooms of the basement of the south wing is now being painted in fresco. This will enable Congress to see a specimen of this the highest style of architectural decoration. It is the most appropriate and beautiful mode of finishing the building, and it will afford a field for the talents of artists never before offered in this country. It is not necessary that it be done rapidly, as, the designs and cartoons being made and approved, the painting can be done after the completion of the building, during the annual recesses of Congress.

The following list shows the labor applied during the year:

	Days.
Architect	311
Clerks.....	1,095
Messengers	730
Draughtsmen	1,825
Foremen	2,920
Masons	7,300
Carpenters.....	10,950
Smiths	9,800
Laborers	39,750
Receiver and assistant	730
Applicateurs of asphaltum	730
Steam engineer.....	400
Watchmen	2,737
Plasterers	975
Sculptor.....	252
Modeller	310
Bronze-workers	278
Painter	66
Stonecutters.....	620
Horses and carts.....	933

By contractors.

	Days.
Foremen	933
Marble cutters	55,980

Smiths	4,665	
Laborers	27,900	
Setters	730	
Carvers	6,220	
Horses	1,244	
Teamsters	1,866	
		99,538
Total days		182,250

I have thus indicated some of the labors of the year. I regret that I have not been able to make as much progress as I had hoped at the date of my last report, but the impossibility of getting a sufficient supply of marble has retarded everything else.

Cash account.

Amount available September 30, 1854.....	\$1,082,130 67
Amount appropriated 4th March, 1855.....	325,000 00
	1,407,130 67

Amount in treasury undrawn, 30th September, 1855.....	\$710,000 00
Deposited with Treasurer United States, at Washington, and assistant treasurers at New York and Philadelphia, subject to checks of superintendent, on 30th September, 1855.....	37,803 90
In hands for pay-roll.....	104 90
Amount available on 30th September, 1855.....	\$747,918 80
Amount expended in the year ending 30th September, 1855.....	\$629,808 44

The following appropriations have been made for the extension of the Capitol, viz :

Appropriation of 30th September, 1851.....	\$100,000 00
Joint resolution 14th April, 1852.....	500,000 00
Deficiency bill for year ending 30th June, 1853.....	400,000 00
General appropriation bill for year ending 30th June, 1854.....	600,000 00
General appropriation bill for year ending 30th June, 1855.....	750,000 00
General appropriation bill for year ending 30th June, 1856.....	325,000 00
	2,675,000 00

Of which there has been expended to 30th September, 1855.....	\$1,927,081 20
Leaving available for the fiscal year ending June 30, 1856.....	747,918 80

Respectfully submitted:

M. C. MEIGS,

Captain of Engineers, Engineer and Superintendent.

HON. JEFFERSON DAVIS,

Secretary of War.

WASHINGTON, November 16, 1855.

DEAR SIR: I have the honor to report the progress of operations for rebuilding the dome of the Capitol.

At the termination of the last session of Congress, an appropriation was made for removing the old dome, a great part of which was constructed of wood, and for replacing it by one of cast iron, incombustible, and of a design more appropriate to the building as enlarged.

At that time the exterior elevation only of the dome had been studied, and a drawing sketched, showing the general effect of the whole building as completed.

Immediately after the appropriation was made, the study of the details of the exterior and the design for the interior were taken up.

The design for the exterior has been revised, and an elaborate drawing of it made upon a large scale.

The design of the interior was made at the same time with this drawing, the distribution of parts and decorations of the exterior and interior being so made as to correspond.

The more careful and deliberate study then given to the subject has resulted in an improvement of the proportions of the whole design.

The exterior presents a noble peristyle, 124 feet in diameter, of columns 27 feet in height resting upon an octagonal base or stylobate, which itself is 93 feet above the basement floor. The top of the entablature of the peristyle is at the height of 127 feet above the basement floor.

From this entablature springs an attic 44 feet in height and 108 feet in diameter; and from the cornice of the attic, the great dome, of a semi-ellipsoidal form, rises to a height of 228 feet.

The lantern on top of this dome is 17 feet in diameter, and 52 feet high, and will be crowned by a bronze statue of Liberty 16 feet 6 inches in height, rising to the height of 300 feet above the basement floor of the building.

The interior of the rotundo will remain unchanged to the height of the stone cornice 44 feet above the floor. Above this cornice a vertical wall will be raised, with a deep recessed panel nine feet in height, to be filled with sculpture, forming a continuous frieze three hundred

feet in length, of figures in alto relievo. The subject to be the history of America.

The gradual progress of a continent from the depths of barbarism to the height of civilization; the rude and barbarous civilization of some of the Ante-Columbian tribes; the contests of the Aztecs with their less civilized predecessors; their own conquest by the Spanish race; the wilder state of the hunter tribes of our own regions; the discovery, settlement, wars, treaties; the gradual advance of the white, and retreat of the red races; our own revolutionary and other struggles, with the illustration of the higher achievements of our present civilization, will afford a richness and variety of costume, character, and incident, which may worthily employ our best sculptors in its execution, and which will form for future ages a monument of the present state of the arts in this country.

Above the frieze the interior will be enriched by a series of attached columns, with large windows in the interspaces, giving ample light to the rotundo.

Above this colonnade a dome will spring, which, contracting to a space of 65 feet in diameter, will, through its opening, permit the eye to see another and lighter colonnade at a higher level. The whole being closed in at the base of the lantern, and at a height of 203 feet above the pavement of the rotundo, by a second dome of 73 feet span.

This upper dome, lighted by openings around its base, should be richly painted. Galleries at various heights of stairs between the inner and outer shells of the building will afford easy access to all parts of the dome, and from thence will be obtained a series of most picturesque views of the interior of the rotundo, and of the beautiful surrounding scenery.

The whole will form a fitting centre to this magnificent building, the very central meeting-point of a great nation.

The magnitude and complication of this structure makes laborious and careful study necessary in the drawings and preparations for its execution.

It will be proper to employ the resources of several foundries in its construction. By making careful drawings, and supplying to each founder a standard United States scale, the patterns, though made in different places, can all be made to correspond, so as to insure their fitting properly.

Each casting will be so made as to allow in all its important bearing points a small surplus of metal to be turned or cut off by machinery, so as to insure a perfect fit, and bring into play the full strength of the material.

The columns for the peristyle have been already put in hand. The patterns are nearly completed by Messrs. Pool & Hunt, of Baltimore. Thin shafts, 27 feet in length, will be cast in a vertical position in dry sand. For this purpose the founders have been obliged to sink a pit in their foundry nearly 30 feet in depth. This will be lined with a cast-iron curb to make it perfectly water-tight. By this means it is expected to secure castings perfectly straight and true.

The patterns for the foliage of the capitals are nearly ready for the

foundry. These patterns have been cast in bronze, and require only fitting to the bell of the capital to be ready for casting in iron.

The complication of these patterns, and the skill required to prepare them, can hardly be conceived by one who has not had occasion to execute, with perfect sharpness and relief in metal, the intricate and elaborate foliage and volutes of a Corinthian capital.

The wall of the present rotundo is, where it rises above the roof of the old building, about five feet in thickness. This wall will be the base upon which the weight of the whole structure will be thrown.

The old dome being removed to a level about five feet above the interior cornice of the rotundo, a vertical wall of twenty feet in height will be carried up, and upon a strong iron curb the cast-iron structure will be commenced. This foundation plate will be made of cast iron, with a massive band of wrought iron let into it.

The pilasters and pillars of the drum of the dome will be securely bolted down to this foundation plate, and the pedestals of the columns of the peristyle being tied to the wrought-iron band, the whole will be so united as to insure perfect stability.

There are few of the great domes of the Old World which have not begun to show symptoms of decay. Irregularities in the settlement of their massive foundations cause cracks, which break the bond of the masonry of which they are generally composed.

In some cases the wrought-iron bands which were originally introduced in their construction have been broken by the immense forces thus called into play, and new ones have been added to them in more modern times.

Those who have visited Rome will remember the threatening cracks in the great dome of the Pantheon of Agrippa, and will have heard of, if they have not seen, the iron hoops by which the dome of St. Peter's has been reinforced.

Our structure being built of the strongest material used in construction, admits of a lightness and yet of a strength which cannot be attained in masonry. Each course in its construction will be so united as to form a continuous chain, capable of itself resisting all the thrusts it may receive from the parts above it. At the same time, the ease with which a pattern once made is repeated in iron, enables us to erect it at far less cost than anything of the same magnitude and magnificence in another material. Instead of months spent in the elaborate carving of columns and cornices, the pattern once made, a few days suffices to multiply it as often as may be required.

The arrangements for demolishing the old dome and erecting the new one, required careful study and extensive preparation.

The lower part of the interior dome of the rotundo is of brick. Upon this brick-work rests a course of heavy cut-stone voussoirs, from which spring wooden ribs which supported a lath and plaster ceiling.

The exterior dome was entirely of wood, covered with copper.

A scaffold has been erected in the form of a triangular tower, 18 feet base and 100 feet in height. This rises a little above the eye of the old dome.

Upon this will be placed a derrick built of two sticks of timber,

mast and boom, each 80 feet in length; the diameter of the peristyle of the dome being 124 feet, and that of the circle commanded by the boom-derrick 160 feet. Every piece of iron to be used can be set by the derrick.

By this means we avoid the use of the immense and expensive scaffolding generally used in these constructions.

As it is important to interfere as little as possible with the use of the old building during the construction of the dome, a temporary wooden roof has been thrown over the rotundo. An offset of $3\frac{1}{2}$ inches in the rotundo wall just above the cornice supports a set of wooden rafters, so framed together, in the form of a cone, that they were erected without the use of other scaffolding than the central derrick tower.

A wooden curb against the wall took the thrust of these rafters as they were raised, and prevented any tendency to cause the wall to spread.

The boards with which they are covered are doubled at the lower edge of the roof. They break joint and serve as continuous ties. By this means a very light and yet very strong and substantial conical roof, 96 feet in diameter, has been made, which, while supported by an offset of $3\frac{1}{2}$ inches in the masonry, exerts no outward thrust upon the wall.

By twelve large glazed windows, sufficient light is admitted to allow of the rotundo being used as though no work was going on above.

At first, a light covering of canvass was intended; but the height at which the work above is to be carried on is so great, that the smallest object dropped by a workman would have penetrated anything less substantial; and thus a chisel or hammer falling from a careless hand might have been productive of fatal effects. This roof is now nearly completed; and while writing this, it has saved the life of a workman who fell from above.

The lath and plaster of the interior dome, and the copper and part of the framing of the exterior, have been removed.

The work of demolishing the masonry will be one of difficulty not unattended with danger; but by the employment of proper precautions, in careful hands, I expect to accomplish it without accident.

The great height of the derrick to be used upon the dome above the points from which it must be stayed, made it necessary to use for its stays wire-rope. These have been manufactured, for the purpose, at the wire-rope factory of Mr. Roebling, at Trenton, N. J. Most of the rope has been received; but one or two coils are still needed.

The castings and other materials for the dome will be hoisted by a steam-engine, placed upon the top of the Capitol near the base of the dome. The engine has been procured, but the platform upon which it is to stand and the hoisting-crabs are not yet completed.

The heaviest single casting to be used in the dome will weigh ten tons. The parts of all the derricks and cranes have been so proportioned as to lift this weight safely.

A crane, worked also by the steam-engine, will raise the castings from the ground and place them upon the platform by the steam-engine, and within reach of the great derrick on the central tower.

All these preparations are in a forward state. The central scaffold or tower is completed. The temporary roof of the rotundo is finished,

except the painting of its canvass sheeting and the completion of the copper rain-gutter. The machinery and castings of the derrick are nearly ready. The spars are fitted and placed within the tower, ready to be raised as soon as the remainder of the wire stays are received. The crab for the steam hoisting apparatus is in progress.

The large lathes—one of 27 feet in length, for turning and jointing the ends of the column shafts, the other a horizontal-face plate lathe, for turning the bases and capitals of the columns, and for fitting other parts of the work—are set up in an addition of the machine shop of the Capitol Extension, now being erected.

The importance of having all parts of this work accurately fitted, in order that when set up they may come together without difficulty and with the least possible hand-work, has led to the determination, while procuring the castings from different skilful foundries, to do all the fitting on the spot. The more perfect the bearing surfaces, the stronger the work, and the lighter it will be possible to make it.

In the building of the New York Crystal Palace, it was found that different parts coming from different and distant foundries, worked from different scales, and with different allowances for shrinkage, required to be fitted upon the ground in order to bring them together.

The great height of the dome makes it difficult to find workmen who are effective.

In the demolition of the old one, men, strong and active on the ground, were found to crawl about upon these heights, some of them unable even to stand upright, and few of them at first able to do a reasonable day's work, such is the effect upon the nerves of the sensation of height.

This makes it the more necessary that the parts should be perfectly fitted before they are hoisted to their places.

Cash account.

Appropriated March 4, 1855.....	\$100,000 00
Expended in year ending September 30, 1855.....	6,173 74
Amount available for fiscal year ending June 30, 1856	93,826 26
Required for service of fiscal year ending June 30, 1857	\$100,000 00

Respectfully, your obedient servant,

M. C. MEIGS,
Captain of Engineers, Supt.

HON. JEFFERSON DAVIS,
Secretary of War.

Report of operations at the continuation of the Post Office building, during the year ending September 30, 1855.

The ground was broken for the building on the 26th of April.
The foundations have been excavated for the F street and the 8th

street fronts, and for so much of the 7th street front as is not covered by the old houses occupied by the city post office.

The foundations of this part of the building have been laid in concrete. The cellar-walls have been built of rubble masonry to the proper height to receive the superstructure, except some of the partition walls on 7th street.

All of this work is laid in cement mortar, and in the most substantial and durable manner.

Marble for the 7th and 8th street fronts is procured from the quarry of Mr. J. F. Connolly, in Baltimore county, Maryland. Arrangements have been made for the marble for the F street front from the quarries of the Lee Marble Company, in Berkshire county, Massachusetts. By thus procuring the material from two different quarries, it is hoped that it will be supplied in a much shorter time than it could be by any single quarry. The material is the same in quality, except that that from Massachusetts is of a finer grain, and more clouded than the Baltimore county stone. At the same time, it is better for carving the delicate details of the Corinthian order, which is the style of the building.

The granite for the court-yard wall is from the quarries of Sumwalt & Green, near Baltimore. It matches that used in the older portions of the building, which was from the same vicinity.

The earth taken from the cellars was used to fill up Judiciary square, on the line of F street, to street grade, and the embankment thus formed gave a convenient site for the shops for cutting stone. Marble and granite shops, carpenter's and blacksmith's shops, and stables, have all been erected in Judiciary square.

Horses and wagons, trucks, jacks, and tools, have been purchased. Four large and powerful derricks for handling and setting the stone in the walls have been built, and are now being put up. They will enable the superstructure to be carried up as rapidly as it is possible to procure and cut the stone.

The floor-beams, of wrought iron, for the lower floor, have been procured from the works of Cooper & Hewitt, at Trenton, and are on the ground.

As soon as the centre portion of the F street front can be completed to the height of the second floor, it is intended to remove the city post office to its new rooms, and commence the foundations of the remainder of the 7th street front.

Cash account.

Appropriation of March 4, 1855.....	\$300,000 00
Expended to September 30.....	51,220 76
Available.....	248,779 24

All of which will be expended during the present fiscal year.

There will be required for the prosecution of the work during the fiscal year ending June 30, 1857, \$300,000.

Respectfully submitted.

M. C. MEIGS, *Captain of Engineers, Supt.*

REPORT OF THE COMMANDING GENERAL.

HEADQUARTERS OF THE ARMY,
New York, November 27, 1855.

The undersigned, the immediate commander of the army, being charged, by general regulations, with "all that regards [its] discipline and military control," deems it his duty, according to long continued usage, to submit such views and suggestions as may seem likely to increase, without extravagance in cost (having regard to numbers,) the national worth, the prowess and efficiency, of our military establishment.

In respect to the condition of enlisted men, or the rank and file of the army, recent acts of Congress enlarging their monthly pay, and giving them, through the grade of sergeant, eligibility to commissions, leave, perhaps, no want but time to work out every expected and almost every desirable amelioration. And the addition of the four new regiments will, it is hoped, give us adequate numbers to subdue the Indians in actual hostility, and afford reasonable protection to every frontier against their future depredations.

An increase of general officers is a want very sensibly felt throughout the army, and I beg to suggest one additional major general, and two additional brigadier generals, to make, with the two brigadiers of the line already in commission, five commanders for the geographical departments of the army, with six other brigadier generals, for chiefs of the Adjutant General's department, the corps of engineers, the corps of topographical engineers, the Ordnance department, the commissariat of subsistence, and the Pay department, respectively. Justice, symmetry, and the good of the service appear equally to demand these additions.

Several recent attempts have been made in Congress to improve the efficiency of the body of commissioned officers, generally, by a retired list, as well as by augmented compensation. In the opinion of the undersigned, both are measures of demonstrable necessity.

Some forty or fifty officers, mostly in the higher commissions, rendered non-effective by the infirmities of age, by wounds or chronic diseases, now press downward into lethargy, and then despair, thrice the number of juniors, who are sighing for the increased rank which would, before they are too old, increase the field of distinguished usefulness. How soon the undersigned may himself be considered one of the superannuated, he knows not; but while any vigor remains, he will not cease to urge a remedy for the great evil in question.

The other amelioration, affecting the commissioned officers of the army, so much needed from the enhanced cost of all the necessities and comforts of life, is a corresponding increase of compensation, such as has already been accorded to our rank and file. As this general

proposition will hardly be disputed anywhere, the mode and scale of increase alone remain to be suggested.

Fixed salaries according to rank, would, generally, by persons in civil life, be applied to military officers. But the experience of all armies, including our own, has made the system of *emoluments* or *allowances*, (rations, forage, &c.,) graduated according to rank and circumstances, in addition to fixed *pay* for each grade, universal, and to tamper with such experience would seem unwise. Leaving, for the moment, the scale of pay proper, and every allowance, except one, as established, the undersigned will first seek to find what approach to a reasonable increase of compensation may be made under the head of rations alone, by making the number cumulative according to the length of each officer's service, and putting up the commutation price to what has always been allowed to naval officers—twenty-five cents a ration.

The cumulative principle was first adopted in the act of June 30, 1834, section 3, in behalf of medical officers only, and next in the act of July 5, 1838, section 15, in these words:

“Every commissioned officer of the line or staff, exclusive of general officers, shall be entitled to receive one additional ration *per diem* for every five years he may have served or shall serve in the army of the United States: *Provided*, That, in certain cases, where officers are entitled to receive double rations, the additional one allowed in this section shall not be included in the number to be doubled.”

The undersigned cannot resist the temptation to say, in this place, that he wrote the two sections in question, and followed each up before Congress, in person and by letter, to final success; and that the exclusion of “general officers” in the second act was, in the way of compromise, offered by him after he had fully discussed the subject before the Military Committee of the House. He now respectfully suggests the change of a single word in the section just quoted, so that “every five years” may, for the future, be made to read *every THREE years*.

To illustrate the proposed increase of compensation, taking the four middle classes of commissioned officers, say of the artillery and infantry, this table is submitted.

Rank, &c., of officers.	Monthly pay.	Rations per day.	Proposed service rations.	Commutation of rations at 25 cents.	Forage commutation.	Servants' commutation.	Total monthly compensation.	Total annual compensation as proposed.	Total annual compensation at present.	Proposed increase.
Colonel, after 30 years' service.....	\$75 00	6	10	\$120 00	\$24 00	\$42 00	\$261 00	\$3,132 00	\$2,520 00	\$612
Lieutenant colonel, after 24 years' service.....	60 00	5	8	97 50	24 00	42 00	223 50	2,682 00	2,124 00	558
Major, after 18 years' service.....	50 00	4	6	75 00	24 00	42 00	191 00	2,292 00	1,860 00	432
Captain, after 12 years' service.....	40 00	4	4	60 00	.....	21 00	121 00	1,452 00	1,146 00	316

Of course, lieutenants would be proportionally benefited in the commutation value of their rations from the beginning of service, and,

after three years, in the number also. In the case of general officers, their only benefit would be in the change from twenty to twenty-five cents a ration.

The principal design in the foregoing plan, is to throw an accumulated increase of compensation on experienced officers, at a time of life, too, when most needed, and when, in general, it would be most merited, stopping at the rank of colonel; and here another remark for the good of the country, and not for the special benefit of the service, may, at some hazard, be added, viz: The increased compensation would not attach to the new officers of new corps, of whatever name, that might, in times of public danger, be temporarily called into service; and in another war like that we waged in 1812-'15, we should, probably, have on the rolls at least 150,000 troops for short periods of service.

But the increase of compensation only to the point suggested, would, in the opinion of the undersigned, fall considerably below the demands of both justice and expediency; and he does not think the principle of *cumulative rations* can be extended beyond what he has proposed. He, therefore, to make up the deficiency, begs further to suggest a slight addition to the *monthly pay*, proper, of all officers, save the lieutenant general, (who now receives, under this head, fifty dollars more than the grade next below him) as follows: To a major general, (we have more than one in command by brevet) forty dollars; to a brigadier general, thirty dollars; to a colonel, twenty-five dollars; to a lieutenant colonel, twenty dollars; to a major, fifteen dollars; to a captain, ten dollars, and to lieutenants (whether first or second) five dollars each. To recur to the foregoing table, this would further increase the *annual* compensation of the middle classes in commission as follows: A colonel's, from 612 to 912 dollars; a lieutenant colonel's, from 558 to 798 dollars; a major's, from 432 to 512 dollars; and a captain's, from 316 to 436 dollars.

The undersigned respectfully remarks, that officers should be compensated, approximately, according to some regular scale, maintaining a sensible progression between every two successive grades; for if, in the way of example, the scale were raised from second lieutenant to captain, and the increase stopped there, it might make the pay of a captain equal to, if not higher than, that of a major in the same corps. This would be both unjust and absurd.

There are other topics connected with the good of the service which the undersigned has heretofore called up in his annual reports, and to which he hopes attention may be attracted: 1. The revision of the "rules and articles for the government of the armies of the United States"—*articles of war*; 2. Revision of the pension laws of the army, placing them on the same footing with those of the navy; and 3. Change in the system of recruiting.

Should his views on those subjects be desired, they may be found at large in his former reports.

All which is respectfully submitted, through the Secretary of War.

WINFIELD SCOTT,

Brevet Lieut. General.

A.—Organization of the regular

	Major general.	Brigadier general.	Adjutant general.	Assistant adjutant general, (lieutenant colonel.)	Assistant adjutants general, (majors by brevet.)	Assistant adjutants general, (captains by brevet.)	Judge advocate.	Inspectors general.	Quartermaster general.	Asst. quartermasters general.	Dept. quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissary general of subsistence.	Assistant commissary general of subsistence.	Commissaries of subsistence, (majors.)	Commissaries of subsistence, (captains.)	Surgeon general.	Surgeons.	Assistant surgeons.	Paymaster general.	Deputy paymasters general.	Paymasters.
General officers.....	1	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aids-de-camp to general officers.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Adjutant general's department.....	..	..	1	1	†4	†8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Judge advocate's department.....	..	..	..	..	..	..	†1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Inspector general's department.....	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Quartermaster's department.....	..	..	..	..	..	..	..	..	1	2	2	4	†28	..	..	..	..	..	..	..	..	..	..
Subsistence department.....	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	2	†8	..	..	..	..	..
Medical department.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	22	72	..	..	..
Pay department.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	25
Corps of engineers.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Corps of topographical engineers.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ordnance department.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of dragoons.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of dragoons.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of dragoons.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of cavalry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of cavalry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of cavalry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Regiment of mounted riflemen ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of artillery.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of artillery.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3d regiment of artillery.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4th regiment of artillery.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of artillery.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3d regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10th regiment of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of infantry.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Non-commissioned staff unattached to regiments.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grand aggregate.....	1	3	1	1	†4	†8	†1	2	1	2	2	4	†28	1	1	2	†8	1	22	72	1	2	25

* The 5 aids-de-camp being taken from regiments, and reported in the strength thereof, to avoid counting them *twice*, are excluded as *staff* officers from the columns "total commissioned" and "aggregate."

† 2 of the 4 assistant adjutants general, (majors by brevet,) 1 of the 8 assistant adjutants general, (captains by brevet,) 7 of the 28 assistant quartermasters, and 2 of the 8 commissaries of subsistence, (captains,) belonging also to regiments, and being reported in the strength thereof, to avoid counting them *twice*, are excluded as *staff* officers from the columns "total commissioned" and "aggregate" of their respective departments. The regimental and staff commissions held by these officers are of *unequal* grades, and hence they are not affected by the provisions of the 7th section of the act of June 18, 1846. The like remark is applicable to the *judge advocate* of the army, who is also a captain in the ordnance department.

‡ By the act of March 3, 1853, section 9, a lieutenant of engineers, topographical engineers, and ordnance, having served "fourteen years continuous service as lieutenant," is entitled to promotion to the rank of captain; but such promotion is not to increase the whole number of officers in either of said corps beyond the number previously fixed by law.

§ Under the 4th section of the act of April 29, 1812, "making further provisions for the corps of engineers," 1 brevet second lieutenant is allowed to every "company." The number authorized is consequently 199. The number now attached to the army is 9.

|| The adjutants of artillery and infantry, (14,) and *all* the regimental quartermasters, (19,) being taken from the subalterns, and accounted for in their several regiments as belonging to companies, are excluded as regimental *staff* officers from the columns "total commissioned" and "aggregate."

¶ 2 companies in each of the 4 regiments of artillery, being equipped as light artillery, are allowed, in consequence thereof, 64, instead of 42, privates per company. See act "to increase the rank and file of the army," &c., approved June 17, 1850, section 1.

Army of the United States—1855.

Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants §	Military storekeepers.	Sergeant majors.	Quartermaster sergeants.	Principal or chief musicians.	Chief buglers.	Ordnance sergeants.**	Sergeants.	Corporals.	Buglers.	Musicians.	Farmers and blacksmiths.	Artificers.	Privates.††	Enlisted men of ordnance.	Total commissioned.	Total enlisted.	Aggregate.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	4	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	...	11	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	32	...	32	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	...	10	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	95	...	95	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	28	...	28	
1	2	4	15	...	...	...	12	9	§1	...	...	...	...	...	...	10	10	...	2	...	...	7c	...	44	100	144
1	1	4	12	...	...	...	10	8	§1	...	...	...	...	...	...	...	...	...	...	...	...	...	37	...	37	
1	1	4	14	...	...	...	12	4	§1	15	...	...	...	...	...	...	...	...	...	...	...	...	250	52	250	302
1	1	2	10	...	1	11	10	10	§1	...	1	1	1	2	...	40	40	20	...	10	...	500	...	36	615	651
1	1	2	10	...	1	11	10	10	...	...	1	1	1	2	...	40	40	20	...	10	...	500	...	35	615	650
2	2	4	20	...	2	12	20	20	§1	...	2	2	2	4	...	80	80	40	...	20	...	1000	...	71	1230	1301
1	1	2	10	...	1	11	10	10	...	...	1	1	1	2	...	40	40	20	...	10	...	500	...	35	615	650
1	1	2	10	...	1	11	10	10	...	...	1	1	1	2	...	40	40	20	...	10	...	500	...	35	615	650
2	2	4	20	...	2	12	20	20	...	...	2	2	2	4	...	80	80	40	...	20	...	1000	...	70	1230	1300
1	1	2	10	...	1	11	10	10	§1	...	1	1	1	2	...	40	40	20	...	20	...	640	...	36	765	801
1	1	2	12	...	1	11	24	12	§1	...	1	1	...	...	...	48	48	...	24	...	24	548	...	53	694	747
1	1	2	12	...	1	11	24	12	...	...	1	1	...	...	...	48	48	...	24	...	24	548	...	52	694	746
1	1	2	12	...	1	11	24	12	§1	...	1	1	...	...	...	48	48	...	24	...	24	548	...	53	694	747
1	1	2	12	...	1	11	24	12	...	...	1	1	...	...	...	48	48	...	24	...	24	548	...	52	694	746
4	4	8	48	...	4	14	96	48	§2	...	4	4	...	...	...	192	192	...	96	...	96	2192	...	210	2776	2986
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	§1	...	1	1	2	...	...	40	40	...	20	...	...	420	...	35	524	559
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	§1	...	1	1	2	...	...	40	40	...	20	...	...	420	...	35	524	559
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
1	1	2	10	...	1	11	10	10	...	...	1	1	2	...	...	40	40	...	20	...	...	420	...	34	524	558
10	10	20	100	...	10	10	100	100	§2	...	10	10	20	...	...	400	400	...	200	...	...	4200	...	342	5240	5582
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	**68	...	...	...	...	...	...	...	...	...	68	68
22	23	50	239	*5	19	19	280	219	§9	17	19	19	25	10	**68	802	802	100	298	60	96	††9110	250	1044	11659	12703

** By the act of April 5, 1832, section 2, "providing for the organization of the ordnance department," the number of ordnance sergeants cannot exceed "1 for each military post." The number actually in service is 68.

†† By the act of June 17, 1850, "to increase the rank and file of the army," &c., section 2, the President is authorized, whenever the exigencies of the service require it, to increase to 74 the number of privates in any company "serving at the several military posts on the western frontier, and at remote and distant stations." In the table the minimum or fixed organization is given, viz: 50 privates to a company of dragoons, 64 to a company of light artillery and riflemen, and 42 to the artillery and infantry. Under the authority conferred upon him, the President has directed that the number of privates be carried up to 74 in the several companies serving in the peninsula of Florida, and on the island of Key West in the same State; in Texas, New Mexico, California, and Oregon, as well as those stationed at Forts Snelling and Ripley, on the Upper Mississippi; Fort Ridgely, on the Minnesota river; Fort Riley, on the Kansas; Fort Gibson, on the Arkansas; Fort Arbuckle, on the False Washita river; Forts Kearny and Laramie, on the Oregon route; the several companies engaged in the Sioux expedition, and all the companies of the 9th and 10th infantry, those regiments being destined for distant frontier service. There being at this time 181 companies serving at or in route to these distant stations, the authorized increase in the number of privates is 5,164, making the "total enlisted," (as the troops are now posted or in route,) 16,823, and the "aggregate" 17,867. If all the companies belonging to "regiments" (198) were serving at the distant stations described, the additional number of privates allowed would then be 5,620, thus increasing the "total enlisted" to 17,279, and the "aggregate" to 18,323.

ADJUTANT GENERAL'S OFFICE,
Washington, November 27, 1855.

S. COOPER,
Adjutant General.

B.—General return or exhibit of the actual strength of the Army of
tant General's

	Major general.	Brigadier generals.	Adjutant general.	Assistant adjutant general (lieutenant colonel.)	Assistant adjutants general (majors by brevet.)	Assistant adjutants general (captains by brevet.)	Judge advocate.	Inspectors general.	Quartermaster general.	Asst. quartermasters general.
General officers.....	1	2	.....	.....	.....	.....	.....	.....	.....	.....
Aids-de-camp to general officers.....										
Adjutant general's department.....			1	1	*4	*8	.....	.....	.....	.....
Judge advocate's department.....							*1	.....	.....	.....
Inspector general's department.....								2	.....	.....
Quartermaster's department.....									1	2
Subsistence department.....										
Medical department.....										
Pay department.....										
Corps of engineers.....										
Corps of topographical engineers.....										
Ordnance department.....										
1st regiment of dragoons.....										
2d regiment of dragoons.....										
Aggregate of dragoons.....										
1st regiment of cavalry.....										
2d regiment of cavalry.....										
Aggregate of cavalry.....										
Regiment of mounted riflemen.....										
1st regiment of artillery.....										
2d regiment of artillery.....										
3d regiment of artillery.....										
4th regiment of artillery.....										
Aggregate of artillery.....										
1st regiment of infantry.....										
2d regiment of infantry.....										
3d regiment of infantry.....										
4th regiment of infantry.....										
5th regiment of infantry.....										
6th regiment of infantry.....										
7th regiment of infantry.....										
8th regiment of infantry.....										
9th regiment of infantry.....										
10th regiment of infantry.....										
Aggregate of infantry.....										
Non-commissioned staff unattached to regiments.....										
Military Academy detachments.....										
Cavalry recruiting depot, Jefferson barracks, Mo.										
Principal recruiting depot, Fort Columbus, N. Y..										
Recruiting depot, Newport barracks, Ky.....										
Recruits in rendezvous and in route.....										
Aggregate of detachments, and at depots, rendez- vous, &c.....										
Grand aggregate.....	1	2	1	1	*4	*8	*1	2	1	2

* Two of the assistant adjutants general, (majors by brevet,) one of the assistant adjutants general, (captain long also to regiments, and being reported in the strength thereof, to avoid counting them twice, are excluded. The regimental and staff commissions held by these officers are of unequal grades, and hence they are not judge advocate of the army, who is also a captain in the ordnance department.

*the United States, according to the latest returns received at the Adj-
Office—1855.*

[illegible]

by brevet,) *seven* of the assistant quartermasters, and *two* of the commissaries of subsistence, (captains,) be-
as *staff* officers from the columns "total commissioned" and "aggregate" of their respective departments.
affected by the provisions of the 7th section of the act of June 18, 1846. The like remark is applicable to the

Ex. Doc. 1—9*

B.—General return or exhibit of the actual strength

	Aids-de camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Sergeant majors.	Quartermaster sergeants.
General officers.....	†4	.....	.....	.....	.....	.....	.....	.....	.....
Aids-de camp to general officers.....									
Adjutant general's department.....									
Judge advocate's department.....									
Inspector general's department.....									
Quartermaster's department.....							2	.....	.....
Subsistence department.....									
Medical department.....									
Pay department.....									
Corps of engineers.....				12	9	1	.....	.....	.....
Corps of topographical engineers... ..				10	8	1	.....	.....	.....
Ordnance department.....				12	4	1	15	.....	.....
1st regiment of dragoons.....		1	†1	10	10	1	.....	1	1
2d regiment of dragoons.....		1	†1	10	10	.....	.....	1	1
Aggregate of dragoons.....		2	†2	20	20	1	.....	2	2
1st regiment of cavalry.....		1	†1	10	10	.....	.....	1	1
2d regiment of cavalry.....		1	†1	10	10	.....	.....	1	1
Aggregate of cavalry.....		2	†2	20	20	.....	.....	2	2
Regiment of mounted riflemen.....		1	†1	10	10	1	.....	1	1
1st regiment of artillery.....		†1	†1	24	12	1	.....	1	1
2d regiment of artillery.....		†1	†1	24	12	.....	.....	1	.....
3d regiment of artillery.....		†1	†1	24	12	1	.....	.....	1
4th regiment of artillery.....		†1	†1	24	12	.....	.....	1	1
Aggregate of artillery.....		†4	†4	96	48	2	.....	3	3
1st regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
2d regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
3d regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
4th regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
5th regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
6th regiment of infantry.....		†1	†1	10	10	.....	.....	1	.....
7th regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
8th regiment of infantry.....		†1	†1	10	10	1	.....	1	1
9th regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
10th regiment of infantry.....		†1	†1	10	10	.....	.....	1	1
Aggregate of infantry.....		†10	†10	100	100	1	.....	10	9
Non-commissioned staff unattached to regiments.									
Military Academy detachments.....									
Cavalry recruiting depot, Jefferson barracks, Mo..									
Principal recruiting depot, Fort Columbus, N. Y..									
Recruiting depot, Newport barracks, Ky.....									
Recruits in rendezvous and in route.....									
Aggregate of detachments, and at depots, rendezvous, &c.....									
Grand aggregate.....	†4	†19	†19	280	219	8	17	18	17

* The "number of recruits required" is calculated for each regiment according to the stations of the several companies at the present date—the number of *privates* varying according to station, as explained in note (†) to table A, showing the legal organization of the army.

† The aids-de-camp being taken from regiments, and reported in the strength thereof, to avoid counting them twice, are excluded as *staff* officers from the columns "total commissioned" and "aggregate."

‡ The adjutants of artillery and infantry, (14,) and all the regimental quartermasters, (19,) being taken from the subalterns, and accounted for in their several regiments as belonging to companies, are excluded as *regimental staff* officers from the columns "total commissioned" and "aggregate."

of the Army of the United States—Continued.

Principal or chief musicians.	Chief buglers.	Ordnance sergeants.	Sergeants.	Corporals.	Buglers.	Musicians.	Farriers and blacksmiths.	Artificers.	Privates.	Enlisted men of ordnance.	Total commissioned.	Total enlisted.	Aggregate.	Number of recruits required.*
.....											3	.....	3	.....
.....											11	.....	11	.....
.....											2	.....	2	.....
.....											32	.....	32	.....
.....											10	.....	10	.....
.....											95	.....	95	.....
.....											28	.....	28	.....
.....			7	5	.....	2	.....	31	35	.....	44	80	124	20
.....											37	.....	37	.....
.....										248	52	248	300	2
.....											36	855	891	.....
1	2	.....	37	32	14	.....	10	.....	758	.....	35	536	571	319
.....			38	38	18	.....	9	.....	428	.....	.....	.....	.....	.....
1	4	.....	75	70	32	.....	19	.....	1,186	.....	71	1,391	1,462	319
.....														
.....	1	.....	29	31	12	.....	2	.....	597	.....	35	674	709	181
.....			37	36	16	.....	3	.....	581	.....	35	675	710	180
.....														
.....	1	.....	66	67	28	.....	5	.....	1,178	.....	70	1,349	1,419	361
1	1	.....	36	28	15	.....	18	.....	400	.....	36	501	537	364
.....														
.....			47	45	.....	23	.....	16	638	.....	53	771	824	125
.....			43	47	4	14	.....	19	749	.....	52	877	929	73
.....			45	38	3	15	.....	12	585	.....	53	699	752	325
.....			47	42	2	19	.....	14	494	.....	52	620	672	190
.....														
.....			182	172	9	71	.....	61	2,466	.....	210	2,967	3,177	713
2			34	32	.....	20	.....	.....	410	.....	34	500	534	344
2			33	38	.....	18	.....	.....	592	.....	34	685	719	159
2			38	31	.....	23	.....	.....	743	.....	34	839	873	5
2			32	29	.....	10	.....	.....	705	.....	34	780	814	64
2			40	30	.....	17	.....	.....	509	.....	34	600	634	244
2			38	35	.....	16	.....	.....	684	.....	34	776	810	68
2			39	35	.....	14	.....	.....	515	.....	34	607	641	237
.....			25	20	.....	30	.....	.....	722	.....	35	799	834	45
2			32	29	17	.....	.....	.....	620	.....	34	702	736	142
2			32	29	16	.....	.....	.....	565	.....	34	646	680	198
18			343	308	33	148	.....	.....	6,065	.....	341	6,934	7,275	1,506
.....		68	.....	.....	.....	.....	.....	.....	.....	.....	.....	68	68	.....
.....			5	5	2	1	.....	.....	129	.....	.....	142	142	.....
.....			4	2	2	.....	.....	.....	129	.....	.....	137	137	.....
.....	1	.....	19	11	.....	24	.....	.....	403	.....	.....	458	458	.....
.....			4	6	.....	2	.....	.....	275	.....	.....	287	287	.....
.....			24	4	.....	.....	.....	.....	120	.....	.....	148	148	.....
.....	1	.....	56	28	4	27	.....	.....	1,056	.....	.....	1,172	1,172	.....
20	7	68	765	678	121	248	42	92	12,386	248	1,042	14,710	15,752	2,113

§ The number of enlisted men necessary to complete the military establishment is obtained by deducting from the whole number of recruits required to fill up all the regiments, the several detachments at the Military Academy, the three depots, (Fort Columbus, Newport barracks, and Jefferson barracks,) and the recruits at rendezvous and in route. The number required for regiments and corps is 3,285; the number at the Military Academy, at depots, and in route, is 1,172; leaving 2,113 as the number of recruits yet required to fill up the establishment.

ADJUTANT GENERAL'S OFFICE, Washington, November 27, 1855.

S. COOPER, Adjutant General.

C.—Position and distribution of the troops in the Department of the
nel second artillery—Head

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	REGIMENTS.
				Department staff.....
Fort Crawford *.....	Prairie du Chien, Wis....	Maj. and Bvt. Lieut. Col. R. S. Canby, 10th infantry.	4	10th infantry
Fort Brady	Sault de Ste. Marie, Mich.	Capt. F. N. Clarke, 4th artillery.	1	4th artillery
Fort Mackinac.....	Michilimackinac, Mich...	Capt. and Brevet Major T. Williams, 4th artillery.	1	4th artillery
Fort Ontario.....	Oswego, N. Y.....	Capt. J. P. McCown, 4th artillery	1	4th artillery
Fort Independence....	Boston harbor, Mass.....	Capt. and Bvt. Maj. J. B. Scott, 4th artillery.	2	4th artillery
Fort Hamilton.....	} Narrows, N. York harbor	{ Capt. and Brevet Major J. C. Pemberton, 4th artillery. }	2	4th artillery..... {
Fort Lafayette.....			..	.....
Headquarters, 4th artillery.	Baltimore, Md.....	Col. and Bvt. Brig. Gen. J. B. Walbach, 4th artillery.	..	.....
Fort McHenry	Baltimore harbor, Md....	Lieut. Col. and Bvt. Col. J. L. Gardner, 1st artillery.	2	1st and 2d artillery...
Fort Monroe†.....	Old Point Comfort, Va...	Col. G. Wright, 9th infantry....	12	1st artillery and 9th infantry.
Fort Moultrie.....	Charleston harbor, S. C..	Capt. and Bvt. Lt. Col. J. H. Winder, 1st artillery.	2	1st artillery.....
Fort Capron	Indian river, Fla.....	Capt. and Bvt. Maj. J. A. Haskin, 1st artillery.	1	1st artillery.....
Fort Dallas	Key Biscayne, Fla.....	Capt. S. K. Dawson, 1st artillery	2	1st artillery.....
Key West Barracks...	Key West, Fla.	Capt. J. Vogdes, 1st artillery ...	1	1st artillery.....
Fort Deynaud.....	Caloosahatchee, 28 miles from Fort Myers.	Capt. and Bvt. Maj. L. G. Arnold, 2d artillery.	3	2d artillery.....
Fort Myers	Caloosahatchee river, Fla.	Maj. and Bvt. Col. H. Brown, 2d artillery.	3	2d artillery.....
Fort Brooke	Tampa, Fla.....	Maj. and Bvt. Col. J. Munroe, 2d artillery.	..	Detachment, 2d artillery.
Fort Pickens.....	} Pensacola harbor, Fla. {	{ Lt. Col. J. Erving, 2d artillery.. }	..	Headquarters, 2d artillery.
Fort McRee			..	2d artillery.....
Barrancas Barracks...	} Baton Rouge, La.	{ First Lieut. A. Merchant, 2d artillery. }	1	2d artillery.....
Baton Rouge Barracks.			1	2d artillery.....
Aggregate of	the department .....	.....	39	.....

* This post is only occupied temporarily, its garrison being destined for frontier service.

ADJUTANT GENERAL'S OFFICE, Washington, November 27, 1855.

East, commanded by Brevet Brigadier General James Bankhead, colo-
quarters, Baltimore, Md.—1855.

PRESENT.																										ABSENT.					PRESENT AND ABSENT.					
Brigadier generals.	Assistant adjutants general, (majors by brevet.)	Assistant adjutants general, (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence, (majors.)	Commissaries of subsistence, (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General and staff officers.	Field and regimental staff officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..		1	1	1	1	..	..	..	1	1	2		2
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	4	..	..	..	2	4	..	..	250	12	262	..	1	..	3	..	4	4	16	250	266
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	1	..	..	39	4	43	..	..	..	..	..	..	..	4	39	43	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	36	5	39	..	..	..	1	..	1	1	4	36	40	
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	1	..	..	64	5	67	..	..	..	1	..	1	1	4	64	68	
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	1	2	..	..	88	5	93	..	..	1	3	..	4	4	8	88	97	
..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	2	..	1	1	1	..	..	134	6	140	..	1	..	3	..	4	4	10	134	144	
..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	1	..	1	..	1	..	..	..	..	..	..	..	1	1	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	4	..	..	..	..	..	..	2	2	4	
..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	..	1	..	4	2	..	..	137	10	147	..	..	1	..	..	1	1	11	137	148	
..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	1	10	..	1	2	8	11	..	814	30	850	1	3	2	5	..	11	11	47	814	861	
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	2	2	..	..	98	6	104	..	1	1	2	..	4	4	10	98	108	
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	2	1	..	..	76	5	81	..	..	..	..	..	..	..	76	81		
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	1	2	..	..	156	5	164	..	..	1	3	..	4	4	5	159	168	
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	1	1	1	..	82	5	87	..	..	..	1	..	1	1	6	82	88	
..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	2	..	..	3	1	..	..	204	7	211	..	..	1	5	..	6	6	15	204	217	
..	..	..	..	..	..	1	..	..	1	..	..	..	1	3	..	..	..	3	2	..	..	232	11	243	..	..	1	3	..	4	4	15	232	247		
..	..	..	..	..	..	..	1	..	..	..	1	..	..	1	..	..	..	1	..	..	..	11	4	15	..	..	..	..	..	..	..	..	4	11	15	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	1	..	8	..	11	..	..	..	..	..	..	..	3	8	11
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	..	50	5	53	..	..	1	1	..	2	2	5	50	55		
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	..	49	5	52	..	..	1	1	..	2	2	5	49	54		
..	..	..	..	..	1	..	1	3	10	..	1	3	3	4	30	..	4	4	35	34	1	..	2535	13	2669	2	6	10	32	..	50	50	184	2535	2719	

† The 9th infantry is only temporarily at this post, being destined for service in *Department of Pacific*.

S. COOPER, *Adjutant General*.

D.—*Position and distribution of the troops in the department of the colonel sixth infantry—Head*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	REGIMENTS.
				Department staff.....
Fort Ripley.....	Upper Mississippi, Minnesota.	Maj. H. Day, 2d infantry.....	2	2d and 10th infantry..
Fort Ridgely.....	Minnesota river, 90 miles from Fort Snelling.	Lieut. Col. J. J. Abercrombie, 2d infantry.	3	2d infantry.....
Fort Snelling	Near St. Paul, Minnesota.	Col. E. B. Alexander, 10th infantry.	5	3d artillery and 10th infantry.
Jefferson Barracks....	Near St. Louis, Missouri.	Major and Bvt. Col. C. A. May, 2d dragoons.	..	Recruits.....
Fort Leavenworth....	Missouri river, Kansas ...	Col. E. V. Sumner, 1st cavalry.	10	1st cavalry.....
Fort Gibson.....	Cherokee Nation, west of Arkansas.	Lieut. Col. P. Morrison, 7th infantry.	4	7th infantry.
Fort Smith.....	Arkansas.....	Capt. S. G. French, assistant quartermaster.	..	.....
Fort Washita.....	False Washita, west of Arkansas.	Capt. and Bvt. Maj. H. J. Hunt, 2d artillery.	2	2d and 3d artillery....
Fort Arbuckle	Wild Horse creek, west of Arkansas.	Capt. and Bvt. Maj. D. P. Whiting, 7th infantry.	4	7th infantry.....
		Col. and Bvt. Brig. Gen. W. S. Harney.	..	Staff of Sioux expedition.
Fort Pierre.....	Upper Missouri, Nebraska.	Maj. A. Cady, 6th infantry.....	14	2d dragoons, 2d and 6th infantry.
Fort Laramie.....	Oregon route, Nebraska..	Maj. and Bvt. Lieut. Col. W. Hoffman, 6th infantry.	6	4th artillery, 6th and 10th infantry.
Fort Kearny	Oregon route, Nebraska..	Capt. H. W. Wharton, 6th infantry.	1	6th infantry and detachments.
Fort Riley	Republican Fork of Kansas river, Kansas.	Lieut. Col. P. St. G. Cooke, 2d dragoons.	7	2d dragoons and 6th infantry.
Aggregate of	Sioux expedition.....	.....	18	.....
Aggregate of	the department.....	.....	18	.....

ADJUTANT GENERAL'S OFFICE, Washington, November 27, 1855.

West, commanded by Brevet Brigadier General Newman S. Clarke, quarters, St. Louis, Missouri—1855.

PRESENT.																									ABSENT.					PRESENT AND ABSENT.						
Brigadier generals.	Assistant adjutants general, (majors by brevet.)	Assistant adjutants general, (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence, (majors.)	Commissaries of subsistence, (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General and staff officers.	Field and regimental staff officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
..	..	..	..	..	1	..	..	1	1	..	..	5	1	..	..	..	..	1	..	..	..	..	..	....	10	10	3	..	..	1	..	4	4	14	....	14
..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	1	2	..	..	..	2	2	..	..	135	8	143	..	..	..	..	4	..	4	8	139	147
..	..	..	..	..	..	1	..	..	..	1	..	..	..	1	..	3	..	..	..	2	4	..	..	136	11	147	..	..	..	1	6	1	7	12	142	154
..	..	..	..	..	..	1	..	..	..	1	..	..	1	..	..	5	..	1	1	4	5	..	..	357	18	375	..	1	..	2	..	3	3	21	357	378
..	..	..	..	..	..	1	1	..	..	1	..	..	..	..	1	..	..	..	1	..	2	..	143	6	149	..	..	..	..	..	..	..	6	143	149	
..	..	..	..	..	1	..	..	..	..	..	..	..	1	1	1	9	..	1	1	8	9	..	..	674	32	706	..	1	1	2	..	4	4	36	674	710
..	..	..	..	..	1	1	..	..	..	1	..	..	..	..	..	4	..	1	1	2	3	..	..	289	13	302	..	2	..	1	..	3	3	16	289	305
..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2	..	..	..	..	..	..	..	1	1	2	
..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	1	..	..	4	1	..	..	127	7	134	..	..	1	..	..	1	1	8	127	135	
..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	4	..	..	..	2	3	..	..	253	10	263	..	..	3	..	..	3	3	13	253	266	
..	1	..	..	..	1	..	1	1	..	1	1	1	..	..	..	..	..	..	1	1	..	..	..	8	8	..	..	..	..	..	..	..	8	..	8	
..	..	..	..	..	1	..	..	..	2	..	..	..	..	..	12	..	..	3	9	7	..	..	1008	34	1042	..	3	2	4	48	9	57	43	1056	1099	
..	..	..	..	..	..	2	..	..	..	..	..	..	1	6	..	..	..	6	6	..	..	417	21	438	..	..	..	1	..	1	1	22	417	439		
..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	1	1	..	..	173	5	178	..	..	..	..	..	..	..	5	173	178		
..	..	..	..	..	..	3	..	..	1	..	5	..	1	2	4	8	..	..	340	24	364	..	..	1	2	7	3	10	27	347	374	..	..	..	..	..
..	1	..	..	..	..	8	1	1	1	1	1	1	1	1	25	..	1	5	21	23	..	..	1938	92	2030	..	3	3	7	55	13	68	105	1993	2098	
..	1	..	..	1	4	..	2	3	15	1	6	4	3	4	53	..	5	8	46	50	2	..	4053	208	4261	3	7	8	14	65	32	97	240	4118	4358	

S. COOPER, Adjutant General.

*E.—Position and distribution of the troops in the department of Texas,
regiment of mounted riflemen—Head*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	REGIMENTS.
				Department staff.....
Fort Merrill	Nueces river, 50 miles above Corpus Christi.	Second Lieut. L. S. Baker, mounted rifles.	1	Mounted riflemen....
Fort Brown.....	Brownsville, Texas.	Major G. Porter, 4th artillery..	3	4th artillery.....
Ringgold Barracks	Rio Grande City, Texas..	Major J. H. La Motte, 5th infantry.	7	Rifles, 4th artillery, and 5th infantry.
Fort McIntosh.....	Laredo, Texas.....	Lieut. Col. and Bvt. Col. W. W. Loring, mounted rifles.	10	Rifles, 1st artillery, and 5th infantry.
Fort Duncan.....	Eagle Pass, Texas.....	Capt. S. Burbank, 1st infantry..	4	Rifles, 1st artillery, and 1st infantry.
Fort Clark.....	Head of Las Moras river, Texas.	Maj. J. S. Simonson, mounted rifles.	1	Mounted riflemen....
Camp Lancaster.....	Live Oak Creek, El Paso road, Texas.	Captain S. D. Carpenter, 1st infantry.	2	1st infantry.....
Camp at Eagle Spring.	El Paso road, Texas.....	Capt. and Bvt. Maj. C. F. Ruff, mounted rifles.	1	Mounted riflemen....
Fort Davis.....	Limpia river, 475 miles N.W. of San Antonio.	Lieut. Colonel W. Seawell, 8th infantry.	6	8th infantry.....
Fort McKavett	San Saba river, Texas....	Lieut. Col. H. Bainbridge, 1st infantry.	2	1st infantry.....
Fort Chadbourne	Oak Creek, 95 miles from Fort McKavett.	Capt. S. Eastman, 1st infantry..	2	1st infantry
Fort Belknap.....	Red Fork Brazos river, Texas.	Capt. and Bvt. Maj. G. R. Paul, 7th infantry.	4	1st and 7th infantry..
In route from department of the West.....	ent of the West.....	Col. A. S. Johnston, 2d cavalry.	10	2d cavalry.....
Escort to surveying party, (Pacific Railroad route.)	ty, (Pacific Railroad route.)	Captain C. L. Stevenson, 5th infantry.	1	5th infantry.....
Recruits in route.....	.....	Col. B. L. E. Bonneville, 3d infantry.	..	8th infantry.....
			—	
Aggregate of the department .....	.....	.....	54	.....

ADJUTANT GENERAL'S OFFICE, Washington, November 27, 1855.

commanded by Brevet Major General Persifor F. Smith, colonel quarters, San Antonio, Texas—1855.

PRESENT.																											ABSENT.						PRESENT AND ABSENT.		
Brigadier generals.																											General and staff officers.						Commissioned officers.		
Assistant adjutants general, (majors by brevet.)																											Field and regimental staff officers.						Enlisted men.		
Assistant adjutants general, (captains by brevet.)																											Captains.						Aggregate.		
Assistant quartermasters general.																											Subalterns.						Enlisted men.		
Deputy quartermasters general.																											Enlisted men.						Total commissioned.		
Quartermasters.																											Aggregate.						Aggregate.		
Assistant quartermasters.																											General and staff officers.						Commissioned officers.		
Commissaries of subsistence, (majors.)																											Field and regimental staff officers.						Enlisted men.		
Commissaries of subsistence, (captains.)																											Captains.						Aggregate.		
Surgeons.																											Subalterns.						Enlisted men.		
Assistant surgeons.																											Enlisted men.						Total commissioned.		
Deputy paymasters general.																											Aggregate.						Aggregate.		
Paymasters.																											General and staff officers.						Commissioned officers.		
Colonels.																											Field and regimental staff officers.						Enlisted men.		
Lieutenant colonels.																											Captains.						Aggregate.		
Majors.																											Subalterns.						Enlisted men.		
Captains.																											Enlisted men.						Total commissioned.		
Aids-de-camp.																											Aggregate.						Aggregate.		
Adjutants.																											General and staff officers.						Commissioned officers.		
Regimental quartermasters.																											Field and regimental staff officers.						Enlisted men.		
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S. COOPER, Adjutant General.

F.—*Position and distribution of the troops in the department of New 8th infantry—Headquarters,*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	REGIMENTS.
				Department staff..
Fort Massachusetts ...	Utah country, 85 miles from Taos.	First Lieut. Lloyd Beall, 2d artillery.	1	2d artillery.....
Cantonment Burgwin..	Near Taos, New Mexico..	Capt. N. C. Macrae, 3d infantry	1	3d infantry.....
Fort Union.....	Moro river, New Mexico.	Major G. A. H. Blake, 1st dragoons.	2	1st dragoons.....
Ordnance Depot, Fort Union.	do.....do.	Military Storekeeper W. A. Shoemaker.	..	Detachment ordnance
Fort Marcy.....	Santa Fe, New Mexico...	Capt. and Bvt. Major W. T. H. Brooks, 3d infantry.	1	3d infantry
Albuquerque	New Mexico.....	Capt. and Bvt. Major J. H. Carlton, 1st dragoons.	1	1st dragoons.....
Fort Defiance.....	Navajoe country, 190 miles west of Albuquerque.	Capt. and Bvt. Major H. L. Kendrick, 2d artillery.	3	2d artillery and 3d infantry.
Los Lunas.....	25 miles below Albuquerque.	First Lieut. J. N. Moore, 1st dragoons.	1	1st dragoons.....
Fort Stanton.....	Bonita river, 20 miles east of White Mountains.	Capt. and Bvt. Major J. Van Horne, 2d infantry.	4	1st dragoons, 3d and 8th infantry.
Fort Craig	Near Valverde, New Mexico.	Capt. and Bvt. Lieut. Col. D. T. Chandler, 3d infantry.	2	1st dragoons and 3d infantry.
Fort Thorn.....	Santa Barbara, New Mexico.	Capt. and Bvt. Lieut. Col. J. H. Eaton, 3d infantry.	2	1st dragoons and 3d infantry.
Fort Fillmore.....	Brasito, 40 miles above El Paso.	Lieut. Col. D. S. Miles, 3d infantry.	2	3d infantry.....
Fort Bliss.....	Near El Paso, Texas.....	Capt. and Bvt. Lieut. Col. J. B. Magruder, 1st artillery.	4	1st artillery and 8th infantry.
		Recruits in route.....	..	3d and 8th infantry...
Aggregate of	the department .....	.....	24	.....

ADJUTANT GENERAL'S OFFICE, Washington, November 27, 1855.

Department of New
Headquarters

GARIBOLDI	
REGIMENT	
Depot	
1	1st artillery.
2	2d infantry.
3	3d infantry.
4	4th infantry.
5	5th infantry.
6	6th infantry.
7	7th infantry.
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90	90th infantry.
91	91st infantry.
92	92nd infantry.
93	93rd infantry.
94	94th infantry.
95	95th infantry.
96	96th infantry.
97	97th infantry.
98	98th infantry.
99	99th infantry.
100	100th infantry.

S. COOPER, *Adjutant General.*

G.—*Position and distribution of the troops in the department of the
Wool—Headquarters,*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	REGIMENTS.
				Department staff.....
Steilacoom.....	Puget's Sound, Washington Territory.	Capt. M. Maloney, 4th infantry.	2	4th infantry.....
Fort Vancouver	Vancouver, Washington Territory.	Maj. G. J. Rains, 4th infantry...	2	4th infantry.....
Fort Dalles... ..	Dalles of Columbia, Oregon Territory.	Capt. and Bvt. Maj. G. O. Haller, 4th infantry.	3	3d artillery and 4th infantry.
Fort Lane.....	8 miles from Jacksonville, Oregon Territory.	Capt. A. J. Smith, 1st dragoons.	2	1st dragoons.....
Fort Orford.....	Port Orford, Oregon Territory.	Capt. and Bvt. Maj. J. F. Reynolds, 3d artillery.	1	3d artillery
Fort Jones.....	Yreka, California	Capt. H. M. Judah, 4th infantry.	1	4th infantry.....
Fort Humboldt.....	Humboldt Bay, California.	Maj. and Bvt. Lieut. Col. R. C. Buchanan, 4th infantry.	2	4th infantry.....
Fort Reading	Cow creek, Upper Sacramento, California.	Capt. and Bvt. Maj. F. O. Wyse, 3d artillery.	2	8d artillery and 4th infantry.
Nome Lackee Indian Reserve.	25 miles west of Tehama, California.	First Lieut. J. Edwards, 3d artillery.	..	Detachment 3d artillery.
Benicia Barracks.....	Benicia, California.....	Maj. and Bvt. Lieut. Col. G. Nauman, 3d artillery.	1	3d artillery.....
Benicia Arsenal.....	Benicia.....do.....	Capt. F. D. Callender, ordnance department.	..	Ordnance.....
Presidio San Francisco.	Near San Francisco, California.	Capt. E. D. Keyes, 3d artillery.	1	3d artillery.....
Monterey Redoubt....	Monterey, California	Military Storekeeper B. G. Baldwin.	..	Ordnance.....
Fort Miller	San Joaquin river, California.	First Lieut. L. Loeser, 3d artillery.	1	3d artillery.....
Fort Tejon	Near Tejon Pass, California.	Lieut. Col. B. L. Beall, 1st dragoons.	1	1st dragoons.....
Fort Yuma.....	Mouth of Gila, California.	Capt. and Bvt. Lieut. Col. M. Burke, 3d artillery.	2	3d artillery.....
Mission of San Diego..	Near San Diego.....do....	Capt. H. S. Burton, 3d artillery.	1	3d artillery.....
Escort to surveying party,	(Pacific railroad)....	First Lieut. G. T. Andrews, 3d artillery.	1	3d artillery.....
Aggregate of the department.....	.....	.....	23	.....

ADJUTANT GENERAL'S OFFICE, Washington, November 27, 1855.

Pacific, commanded by Brigadier and Brevet Major General John E. Benicia, California—1855.

PRESENT.																											ABSENT.							PRESENT AND ABSENT.		
Brigadier generals.																											General and staff officers.							Commissioned officers.		
Assistant adjutants general, (majors by brevet.)																											Field and regimental staff officers.							Enlisted men.		
Assistant adjutants general, (captains by brevet.)																											Captains.							Aggregate.		
Assistant quartermasters general.																											Subalterns.							Enlisted men.		
Deputy quartermasters general.																											Total commissioned.							Aggregate.		
Quartermasters.																											General and staff officers.							Commissioned officers.		
Assistant quartermasters.																											Field and regimental staff officers.							Enlisted men.		
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Commissaries of subsistence, (captains.)																											Subalterns.							Enlisted men.		
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S. COOPER, Adjutant General.

H.

ADJUTANT GENERAL'S OFFICE,
Washington, November 27, 1855.

*Statement showing the whole number of recruits enlisted in the army from the
1st of October, 1854, to the 30th of September, 1855.*

I.—GENERAL RECRUITING SERVICE.

Major E. Backus, 3d Infantry, General Superintendent.

Boston, Mass.....	431
New York, N. Y.....	1,587
Albany ".....	224
Rochester ".....	74
Buffalo ".....	43
Oswego ".....	43
Philadelphia, Pa.....	941
Harrisburg ".....	16
Pittsburg ".....	140
Baltimore, Md.....	105
Newport, Ky.....	549
Chicago, Ill.....	199
St. Louis, Mo.....	181
New Orleans, La.....	121
Washington, D. C.....	5

Number of recruits enlisted for the general service... 4,659

II.—MOUNTED SERVICE.

New York, N. Y.....	309
Baltimore, Md.....	146
Louisville, Ky.....	85
Nashville, Tenn.....	170
Cleveland, Ohio.....	237
Cincinnati ".....	161
St. Louis, Mo.....	220
Jefferson Barracks, Mo.....	46

Number of recruits enlisted for mounted service..... 1,374

III.—REGIMENTAL SERVICE.

1st regiment of dragoons.....	75
2d regiment of dragoons.....	46

1st regiment of cavalry	805	
2d regiment of cavalry	948	
Regiment of mounted riflemen.....	31	
Total mounted troops.....		1,905
1st regiment of artillery	136	
2d regiment of artillery	57	
3d regiment of artillery	89	
4th regiment of artillery	97	
Total artillery.....		379
1st regiment of infantry	37	
2d regiment of infantry	132	
2d regiment of infantry	28	
4th regiment of infantry	16	
5th regiment of infantry	13	
6th regiment of infantry	382	
7th regiment of infantry	19	
8th regiment of infantry	4	
9th regiment of infantry	811	
10th regiment of infantry.....	673	
Total infantry.....		2,115
Corps of sappers and miners		37
Detachment at West Point		77
Total number enlisted from the 1st of October, 1854, to the 30th of September, 1855		10,546

IV.—RECAPITULATION.

For the general service	4,659	
For mounted service.....	1,374	
By regiments—		
Dragoons, cavalry, and mounted riflemen....	1,905	
Artillery	379	
Infantry	2,115	
Sappers and miners and detachments	114	
		10,546

V.—Amount of recruiting funds in the hands of officers of the army September 30, 1854	\$18,471 51	
Amount of recruiting funds advanced to recruiting offi- cers from October 1, 1854, to September 30, 1855....	155,822 52	
		174,294 03
Amount of funds accounted for from October 1, 1854, to September 30, 1855.....	128,272 00	
Balance in the hands of recruiting officers September 30, 1855	46,022 03	

It will be observed that a marked increase in the number of enlistments has taken place during the past year. This is partially owing to the extended field for recruiting opened by distributing the officers of the four additional regiments at various points throughout the country. In the year ending the 30th of September last, 31,068 persons have presented themselves at the rendezvous for enlistment, 10,546 of whom were received, and 20,522 refused. Appearance of intemperance, ignorance of the English language, physical and moral disqualification for military service, and minority, are the chief causes for refusal to receive recruits. The character of the recruits continues to improve, and a very superior body of men has been enlisted for the four new regiments authorized by the act of Congress approved August 4, 1854, particularly for the cavalry. Those regiments are now nearly full, and in a high state of efficiency. The casualties during the year, caused by discharge, death and desertion, in the whole army, including the recruiting service, may be approximately stated at 5,500. The number of recruits now required is about 2,200.

There are now engaged upon the general recruiting service, two majors (superintendents) and eleven subalterns; and for the cavalry, one major (superintendent) and four subalterns.

Respectfully submitted:

S. COOPER,
Adjutant General.

Hon. JEFFERSON DAVIS,
Secretary of War.

REPORT OF THE QUARTERMASTER GENERAL.

QUARTERMASTER GENERAL'S OFFICE,
Washington City, November 22, 1855.

SIR: In obedience to your order of the 19th instant, and in compliance with the provisions of the regulations, I submit a report of the operations of the Quartermaster's department during the fiscal year commencing on the 1st of July, 1854, and terminating on the 30th of June, 1855.

At the date of my last report, the apparent balances in the hands of officers acting in the department in the preceding year, after deducting the sums due from three officers who had left the service, and from two for the settlement of whose accounts Congress had legislated, were stated to amount, in the aggregate, to..... \$731,143 91

But an error has been since detected, in bringing forward the balance, of..... 46,127 38

Leaving the real apparent balance..... 777,271 29

To which are to be added:

1st. Remittances, amounting to..... 5,247,954 27

2d. Proceeds of the sales of public property and rents of public buildings..... 68,565 43

Making a total to be accounted for of..... 6,093,790 99

From which are to be deducted:

1st. Expenditures prior to the fiscal year, the accounts for which were not received in time for the last report..... \$456,487 86

And within the fiscal year..... 4,537,086 52

2d. Deposits to the credit of the Treasurer..... 130,600 75

3d. Transferred to the Ordnance department, for the purchase of horse equipments..... 46,000 00

5,170,175 13

Leaving to be accounted for..... 923,615 86

Twenty officers and agents who have been employed in the department, or who have received money on account of it, and whose joint accountability amounts to sixty-seven thousand nine hundred and fifty-three dollars and twenty cents, have failed to render their accounts, or to credit sums of money placed in their hands. One of them, Lieut-

tenant A. D. Tree, who was reported in my last annual report, is now in this city. He has, since this report was commenced—to-day—called at the office, and placed in my hands a small portion of the accounts due, and reports that, in from ten to fifteen days, he will be able to complete and submit the remainder of his vouchers, which he believes will cover his whole indebtedness to the public.

Lieutenant M. R. Stevenson, who was reported in my last report, is still indebted the whole sum then due.

Three of these officers have ceased to disburse, and are accountable, severally, for the following sums, viz:

Lieutenant W. A. Slaughter.....	\$8,055 99
Lieutenant L. Loeser	565 09
Captain F. Steele.....	2,905 50

Lieutenant Slaughter is believed to have made disbursements, but, though relieved on the 27th of February last, he has submitted no accounts. Lieutenant Loeser reports that his vouchers and public funds were lost at the time of the wreck of the steamer San Francisco; and Captain Steele is said to have been robbed by a sergeant left in charge of his tent and money, when absent on duty. An act of Congress will probably be necessary to close his accounts, as well as those of Lieutenant Loeser.

Of the remainder of the sum unaccounted for, about one hundred and five thousand dollars, though remitted within the fiscal year, could not have been received at its termination. The balance was distributed among one hundred and eighty-eight officers and agents, and will be applicable to the payment of outstanding claims in the last and preceding years, and to the service of the present year.

The various regular supplies, due from the Quartermaster's department, have been promptly furnished to the several officers, corps, and branches of service to whom they were due.

The amount paid during the year, including purchases made in the preceding year, so far as accounts have been received, was—

For fuel.....	\$128,269 04
For forage.....	1,039,130 61
For straw	4,725 96
For stationery.....	13,584 98

Making a total of 1,185,710 59

For the same items the appropriations were—

1st. For fuel.....	\$120,000 00
2d. For forage.....	800,000 00
3d. For straw	10,000 00
4th. For stationery	20,000 00
	950,000 00

Making an excess of expenditures over the appropriations of..... 235,710 59

For the incidental expenses, the amount actually paid,
as exhibited in accounts received and examined in
the office, was \$402,842 64
And the appropriation for the year was..... 375,368 32

Making an excess of expenditure over the appropriation
of..... 27,474 32

For dragoon horses the expenditure, so far as accounts
were received, was \$89,669 00
And the appropriation was..... 150,000 00

Leaving a surplus of 60,331 00
of the appropriation over the expenditure.

On account of barracks and quarters, the
expenditures for rents were..... \$113,595 55
And the appropriation was..... 120,000 00
\$6,404 45

And the expenditure for repairs and con-
struction was..... \$377,179 68
And the appropriation was..... 500,000 00
122,820 32

Leaving an apparent surplus of 129,224 77

of the appropriation. But it is believed when all the outstanding
accounts shall be received, and outstanding claims paid, there will
remain but a small surplus.

The sum paid for the mileage or transportation of
officers when travelling on duty without troops, was. \$116,198 04
And the appropriation was 120,000 00

Leaving an apparent surplus of 3,801 96

The whole of which, it is believed, will be found to have been ex-
pended when the accounts due shall have been received.

Transportation was furnished during the year for all the supplies
required for the army; for the troops operating in the field; for more
than five thousand recruits from the recruiting depots to the regiments
and companies to which they were assigned; for six companies of the
6th regiment of infantry, from Forts Riley, Ridgely, Atkinson, and
Snelling, to Jefferson Barracks; two companies of the 6th regiment of
infantry to Fort Laramie; two companies of the 1st dragoons from
Fort Leavenworth to New Mexico; four companies of the 2d dragoons
from New Mexico to Fort Leavenworth; two companies of the 1st
artillery from Fort Monroe to Fort Dallas, Florida; four companies of
the 2d infantry from Carlisle, Pennsylvania, to Fort Pierre, on the
Missouri river, fourteen hundred miles above St. Louis; two compa-

nies of the 2d infantry from Fort Riley to Fort Pierre; three companies of the 6th infantry from Jefferson Barracks to Fort Kearny, and three companies of the 6th infantry to Fort Laramie; three companies of the 7th infantry from Fort Gibson to Bent's Fort, Upper Arkansas; two companies of the 3d artillery and a detachment of recruits from Fort Leavenworth to California, under Colonel Steptoe; for the details of whose march I refer to the reports and accompanying map of Captain Ingalls, marked A 1 and A 2.

The amount paid for transportation within and previous to the fiscal year, so far as accounts have been received and examined, amounted to the enormous sum of nineteen hundred and eighty-nine thousand eight hundred and fifty-eight dollars and thirty cents. The accounts to be received will increase this sum to at least two millions of dollars. The appropriation for the year was twelve hundred thousand dollars; the greater part of which excess of expenditure over the appropriation is a charge upon the appropriation for the present year.

Clothing and camp and garrison equipage have been provided and furnished to all the troops throughout the Union in the quantities in which they were due. The sum expended for labor and materials, on accounts accruing within the fiscal year, was three hundred and sixty-eight thousand one hundred and sixty-three dollars and seventy-eight cents; but there was a heavy arrearage on account of those supplies for the previous year which became a charge upon the appropriation for last year, amounting, as far as accounts have been received, to two hundred and seventy-four thousand and sixty-six dollars and thirty cents; in addition to which, twenty-one thousand four hundred and eighty-six dollars and twenty-five cents, over and above the amount received for damaged clothing sold, was applied at the Second Auditor's office in the settlement of paymasters' accounts.

The increase of the army at the last session of Congress required additional accommodations to be prepared in Kansas and Nebraska Territories. Accordingly, quarters for the officers and soldiers, and stabling for the horses of six companies of mounted troops, have been commenced at Fort Riley, and for ten companies of mounted troops at Fort Leavenworth. The work at Fort Riley has been delayed by the cholera breaking out at that post as the work was about being commenced, and the death of Major Ogden, who was in charge of the work. The successor of Major Ogden has exerted himself to the utmost, and it is believed the buildings will be ready for occupancy early in the winter. The additional buildings at Fort Leavenworth will be ready, it is believed, for the troops to winter at that post.

A new post has been established in the Sioux country, on the Upper Missouri, intended, it is understood, to be occupied by six companies of infantry, and four companies of cavalry. The season being advanced when the measure was determined on, it was deemed advisable to purchase the establishment called Fort Pierre, from the American Fur Company, situated on the west bank of the Missouri river, about fourteen hundred miles above St. Louis. Two steamers were purchased, and six chartered, to transport the companies of infantry with subsistence and other stores, to enable the troops to winter at the post. Owing

to the low water in the Missouri, this movement was both tedious and expensive. The drought in that section of country during the summer, caused a difficulty in securing any considerable supply of hay, and sending up the river a sufficient supply of corn for the cavalry horses during the ensuing winter; this may render it necessary to winter them lower down, probably near the Council Bluffs.

Owing to the heavy expenditures last year for forage and transportation, the excess of which over the appropriations for those objects in that year will, as heretofore stated, be a charge upon the appropriations for the present year, and to the numerous and extensive movements of troops which have been, and necessarily will be made to and within the States of Texas and California, and the Territories of New Mexico, Oregon, Washington, Kansas, and Nebraska, on account of the depredations and disturbed state of the Indians in those sections of our country, the appropriations for those items will, for the present fiscal year, fall far short of the wants of the service to the close of the year.

When the estimates for this year were presented, the Indian difficulties, especially those with the numerous and warlike Sioux, were not contemplated nor apprehended; and, as stated in my last annual report, the several items had been reduced under every head to the lowest sum which a proper regard for the efficiency of the service would warrant. A large appropriation for deficiencies will therefore be required for those two items, and perhaps others; and as soon as the amounts probably wanted can be ascertained, an estimate will be presented for them. The expenditures under these heads can be controlled no further than by an economical and faithful disbursement of the money appropriated; the amount of expenditure must depend upon the circumstances of the service as they arise, which are entirely beyond the control of this or any other department; and it is idle to suppose that they can be much reduced, so long as our troops are compelled to operate upon so extensive a theatre, and in a country so difficult of access, and possessing so few resources, as all our new territories possess. There is one fact connected with this matter that seems to have been overlooked: it is this—and an inspection of the map of the globe will prove the fact—that our army, small as it is, covers more ground, and carries on more extended operations, than the armies of all the nations of continental Europe, west of Russia, including all their colonies, in addition to their European territories. Now, operations upon a scale of such magnitude cannot be carried on without a heavy expenditure of money. The history of the last sixty years demonstrates the important fact to us, that there is not an army in Europe capable of keeping the field a single week in a country fifty miles from the seacoast, unless it be able to get the greater part of its supplies by daily contributions upon the country in which it operates; while our troops are able to operate, for months together, many hundred miles from the sources of supply, and in sections of the country possessing no other resources than a scanty crop of wild grass. We owe this superior military capacity to our freedom from debt, and greater resources; but we have to pay for it a price which would ruin any of the European governments, loaded down, as they all are, with unextinguishable debt.

If we are to retain our vast territories, and at the same time successfully defend them, there is but a single measure by which the expense can be materially reduced, and we should resort to it at once: that is, to adopt a system of railroad communication between the distant points of our exposed territory without the limits of the States. Such a system is necessary, not only to the economy and efficiency of the service in our Indian operations and frontier defence, but to secure us from the effects of European combination and aggression. Our resources would be much better applied thus, than in building up great steam corporations on the ocean, upon the silly pretext of strengthening our navy for war. We should strengthen and make our force and resources available on land, and we shall then have little to apprehend from the ocean; for naval power consists not in ships, but in seamen to man them; and, having more seamen than any other nation, we have more real naval power: to make that power available to its utmost extent, we have only to apply the volunteer system to the ocean, as we have already applied it on land.

Much difficulty is experienced in supplying Fort Yuma, on the Colorado, at the mouth of the Gila. The water as well as a portion of the land route to that place lies within the Mexican territory; and every wagon-load of public stores on the land route, and ship-load on the water route, is liable to be seized by the Mexican authorities. Either a direct communication should be opened within our own territories, or the permission of Mexico be obtained to use the routes referred to, and to establish a depot on the Gulf of California.

In examining the details of Lieutenant Williamson's reconnoissance of the route from San Diego to Fort Yuma, I have observed that, while the surface of the Colorado, at the fort, is thirty-three feet above the surface of the gulf, several points on the desert are as much as seventy feet below that surface. These altitudes, it is understood, were determined by the barometer. Now, should the application of the spirit-level prove the barometer to be correct, it might be well worthy of serious consideration whether it would not be sound policy to submerge the desert from the Colorado, and thus convert a barren waste into a navigable lake.

The estimates for the service of the next fiscal year were made, as you are aware, in my absence. I have carefully examined them since my return, and am apprehensive that, in many of the items, the sums asked for will be found insufficient; at all events, they should be considered as minimum estimates in all their details. And I am sure that without the greatest energy here, and the most hearty co-operation of commanding officers and other officers of the line of all classes with the officers of the staff, most of the items will be insufficient.

The whole amount estimated for clothing, and camp and garrison equipage, will be necessary during the year; and it will require the greatest care on the part of all officers, as well those connected with the supply as those in command of the troops, to make it sufficient. But it is desirable that there should be a good stock of material constantly on hand, to enable the department to provide for unforeseen losses and unexpected calls. As the quantity of clothing due to the

troops is limited and specific, an appropriation to provide materials in advance cannot lead to extravagance, but, on the contrary, to economy, by enabling the department to take advantage of the market in making its purchases. I therefore recommend that an amount of from two to three hundred thousand dollars be appropriated to provide a stock to meet all contingencies.

Owing to the dispersed state of the army, it has become necessary to employ, by detail, more than a hundred officers in the duties of the department who do not belong to it. Some of them are assistant commissaries of subsistence, who, in that capacity, receive additional pay; but such as are not of the subsistence department receive nothing for their extra services, and often greatly increased expenses and heavy responsibility. Justice would seem to require that they should be placed upon a footing, in regard to compensation, with assistant commissaries.

Congress, by an act approved the 4th of August, 1854, increased the per diem to enlisted soldiers employed on constant labor, and established different rates of pay—allowing to laborers and teamsters one rate, and to mechanics a different and higher rate. There is a class of men employed on extra duty as clerks in the several staff corps, whose services are as important and valuable as those of mechanics, and who, not being technically such, are paid as laborers only. I recommend that provision be made to pay them as mechanics.

The extra compensation allowed by law to ordnance sergeants, was based upon the extra pay allowed to other enlisted soldiers at the date of the act creating the office. I recommend that it be increased to ten dollars a month. And I respectfully ask attention to the recommendation in my annual report of 1853, and that of last year, in relation to an increased number of military storekeepers; at least five are now necessary for the pressing wants of the service—more could be usefully employed.

The renting of land in Texas and New Mexico as military sites, is attended with much difficulty as well as expense. I repeat the recommendation, made in my last annual report, that application be made to Congress to authorize the Secretary of War to purchase such sites in that State and Territory as the security of the country and the protection of the people require should be permanently occupied. That this authority be given, is necessary both to the efficiency and economy of the service. I also recommend that officers of all ranks be prohibited from erecting any but the most temporary buildings on lands belonging to private individuals, and then only on the condition that the public have the right to remove the buildings when the posts shall be abandoned.

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

TH. S. JESUP,

Quartermaster General.

HON. JEFFERSON DAVIS,

Secretary of War, Washington City.

A 1.

WASHINGTON CITY, D. C.,

November 22, 1855.

GENERAL: I have the honor to submit the following summary of the principal events and useful information contained in my communications to you in relation to the march of Colonel Steptoe's command into the Great Basin of Utah, last year, and referred to in the second paragraph of my report of the 25th of last August. I beg this may be substituted for the letters, as they contain many repetitions almost necessarily, and touch on various business matters which do not belong to a report of the march.

The route from Fort Leavenworth, Kansas Territory, via the Big and Little Blues, the Platte, Sweet Water, the Sandys, Green, and Bear rivers, into the Great Salt Lake valley, has been marched over, and very minutely described, by Captain Stansbury, in his report to Colonel Abert of his explorations and surveys in 1849 and 1850. His maps of the basin are very much in detail, and he very ably describes the resources of the country travelled over. The command of Colonel Steptoe followed his route almost all the way to Great Salt Lake City. The greater portion of the route was travelled over and described by Colonel Fremont more than ten years ago. His interesting reports and maps are extant, and have been much referred to by overland emigrants as a guide. The rifle regiment also marched over this route in 1849, as far as Green river, where it turned northerly and followed the old emigrant road into Oregon. Major Cross, of the Quartermaster's department, was on duty with this regiment, and rendered you a full and able report of the march, the route, and character of the country. The whole distance from the Missouri river to the valley of Green river, west of the Rocky mountains, is quite well understood by the army and emigrants. For these reasons I deemed it unnecessary to make a map or very detailed report of this part of our march. It is the route travelled over by the great majority of overland emigrants to California, and Oregon and Washington Territories. Many leave the Missouri river at Independence and Westport, others at Fort Leavenworth and Saint Joseph; but the different roads converge and form one great highway, touching the Platte at Fort Kearny, and following up south bank to crossing of South Fork, at a distance of nearly 500 miles from Fort Leavenworth. The Mormons, however, in their exodus, established themselves at and near Council Bluffs, and the following spring (1847) took their way to the Platte, and followed up its northern or left bank. This side of the river is not considered so eligible and easy a route as the old one, which is the one almost exclusively travelled. General Harney has gone over this route as far as Fort Laramie, and his recent conflict with the Brulee Sioux was at Ash Hollow, on the south bank of the North Fork of the Platte, and upon this emigrant road.

When I arrived at Fort Leavenworth, on the 12th of May, 1854, the late Major Ogden had the train that was to be assigned to Steptoe's

command quite in readiness; but most of the mules were young (many only three years of age) and required breaking before being put on the march. In making his estimate for transportation he had fixed upon the *same* number of wagons, mules, &c., that I had estimated for, here, before leaving. The train was at once perfectly organized, and drilled every day in order to reduce the mules to working condition.

I was to take some 300 horses, but only a part of them had been assembled up to my arrival. They were being purchased in the adjacent country. In Illinois and other places, some were purchased from farmers, but many from stables in St. Louis, where they were gathered in and sold by contractors. It will be observed that, in consequence of this necessity at the time, horses of various descriptions were furnished and sent to Fort Leavenworth by land and steamboat, *just on the eve of our march*. It is true that nothing better could have been done, inasmuch as it was not decided to send this command overland until some time after the disastrous wreck of the "San Francisco." But where the public wants can be foreseen and provided for, it would be the true policy to employ a proper time—several months—in the purchase and gathering in at depots of horses and mules. An inspecting officer must be a superior judge of a horse not to be occasionally imposed upon by jockeys, who resort to all the "tricks of their trade" to "set up" an old or diseased animal, in order to effect an advantageous sale. That all the horses I received had been honestly inspected, I do not doubt, for I know the gentlemen, and am aware of the interest they evinced for the public service; but that several diseased horses *were* actually purchased and turned over to me, and subsequently died in Utah, I have established by good testimony, now on file with my property accounts.

As the horses arrived, they were turned into a large enclosure to graze. Many had probably not been on grass for years; some had the distemper; and before starting, I found it absolutely necessary to call for a board of survey, which condemned 25 of them as unfit for the march. The command left the 1st of June, 1854, with about 300 horses and 448 mules. There were 70 heavy baggage wagons, each drawn by six mules, and seven light wagons, to which were attached the horses, in strings of from 30 to 40. Before the command had advanced 100 miles, most of the horses had been attacked with the distemper; but by the exercise of great care and attention none were lost. My superintendent and chief wagon-master were old experienced discharged dragoon sergeants, and had been much on the plains. They rendered me most efficient and faithful service during the entire march. My great success must be partly ascribed to their efficiency, under my direction. I kept these horses *in hand* day and night. By day they were led always at a walk, two abreast, in sections of a convenient number. They were attached to light wagons, which carried the lariats, pins, &c., belonging to the section. A man rode the near leader, and he, in connexion and concert with the driver of the wagon, could manage the whole section on the road. The horses could travel faster, and consequently would reach our camping

ground much earlier than the mule train, when they could at once be staked out to graze.

Wherever there was the slightest apprehension of attack or theft by Indians, the whole force, of one man to six horses, remained constantly on the ground among the animals, except a short interval for meals. This was also the case in windy or very cloudy weather, when animals are apt to "stampede." By these arrangements I took the animals through in good condition, and suffered *no loss* that would not probably have occurred with the same number of animals kept the same time in good pastures or stables. I received all the aid and co-operation from Colonel Steptoe and his officers that they could give. They evinced much interest in having the expedition result successfully. I have never served with a command for which I entertain so high a regard and esteem as I do for the late command of Colonel Steptoe.

The command probably suffered fewer annoyances than fall to the lot of most parties that make so long a journey. Most of the troops had been recently enlisted, and, like all recruits, were imprudent in food and drink just at the commencement of a march. The weather was very changeable; the roads were quite muddy, and these, added to other causes, conduced to the breaking out of the cholera, which raged only a few days. I observe that this disease breaks out in that region (Fort Leavenworth) at close intervals for the past six or seven years.

The waters were high at this season in all the streams. We forded all until we reached the Big Blue, which had to be ferried. For 500 or 600 miles along this route there can be always found, during spring and summer, an abundance of good water and grass at all necessary and convenient points. Persons travelling along the Platte—and the same remark will apply to all the streams—should use the running waters of the river for culinary and drinking purposes. The waters contained in wells or most of the springs contain many deleterious substances. It is much safer to use the living running water.

The command arrived at Fort Kearny the 21st June, where it remained two days, and then moved up the Platte to ford on South Fork, which we made on the 6th July following. This river usually has given parties great trouble and delay in crossing at this season, when it was swollen by the melting of the mountain snows. On our arrival the waters were quite high; so much so, that we found all the old "crossings" impracticable. We moved above some four miles; and by surveying a meandering route, succeeded in establishing a very easy ford. What may be considered a good ford one year, may prove an impracticable one the following season, owing to the shifting of the quick-sands that form its bed. The stream here is 800 or 900 yards across. There is no timber or other material in the vicinity for rafting; of course it would be difficult and expensive to bridge it: though citizens have thrown a very substantial one across the North Fork, where, however, the stream is comparatively narrow, and the bed hard.

As we reached the Platte we *saw* Indians for the first time after leaving Leavenworth. The Pawnees, and others, had studiously avoided us; and that was the case, as a rule, during the entire march.

These Indians fled at our approach; and we saw no more until our arrival at Fort Laramie on the 16th July. Here we saw and had conference with quite all the Sioux, who affected great friendship. This was only a short time prior to the unfortunate massacre of the late Lieutenant Grattan. The Indians had dispersed the buffalo on their range between Kearny and Laramie. We were in sight of comparatively few, and for a few days only.

After remaining two days at Fort Laramie, the command moved up the North Fork and *forded* it, on the 31st, to the left bank. From this place across the desert "divide," some fifty miles, to the Sweet Water, is a march that very frequently breaks down emigrant trains. The whole distance is over a miserably poor, sterile, arid country. There is no timber—no trees—very little grass and *good* water; but an abundance of poisonous alkali springs.

We knew the country, and averaged our marches so that we passed it safely.

The Sweet Water, last season, like the Humboldt this, was in a good state for travellers. It has its source in the mountains, within a stone's throw of waters that flow into the Gulf of California. We were now evidently very nearly on the summit of the "back-bone" of the continent. The command marched through the "South Pass" on the 11th August. From this pass to Green river the grass is scarce, but still enough can be found by proper search. Most parties, in their journey across the plains, have the same or similar guide notes; consequently all of them seek the same camping grounds. This is a fruitful source of misfortunes and suffering to stock. We always avoided the old camp-grounds, and, of course, fared well. The grass is always consumed at the regular stopping places.

The road from Green river, across the Wahsatch mountains, is over a very rough, mountainous region. In crossing this steep range we were at our highest elevation on the whole route. The march from the Weber to the city, a distance of only 50 miles, came nearer breaking down the train than all the preceding march. In descending from the summit, where the road crosses the range, to the basin below, one goes down over 3,000 feet!

The command reached Great Salt Lake City, the first settlement in the valley, on the 31st August. My report of August 25, 1855, will be found to embrace all necessary information concerning the movements of the command, and my operations in the Quartermaster's department for the past winter, and march this year.

The resources of Utah are many, but as yet quite undeveloped. Attention, so far, has been very properly and necessarily turned to agriculture.

By means of canals, or large ditches for water, any area of what is now almost a barren waste may be opened to agriculture, and contribute to the support of millions of people. There is a fearful want of timber and wood for fuel in the northern settled portion of the Territory, but there is an abundance of wood near the south, and much coal and iron. Isolated, however, as these settlements are, they can never look forward and expect to be a wealthy people, for they have no commerce;

can export nothing except cattle, unless some way be found to avoid the long overland transportation. They have lands on the coast at San Diego, and quite a flourishing settlement at San Bernardino, near the Capon Pass. They propose, probably, to create a depôt on the coast, and establish a chain of settlements along the southern military road; but this, after all, would be no great improvement on the present system. The Colorado river at its great bend, nearest to the line of the basin, is only 25 miles from Los Vegas, a recent settlement of the Mormons. From this point to Fillmore, the capital and centre of the Territory, is only some 350 miles, and 150 more to Great Salt Lake City. It is a regular descent from the southern rim of the basin in Great Salt Lake City. Now, if the Colorado be navigable to the point referred to, (and persons entitled to confidence say it is,) the Mormons might introduce their supplies, and send off their surplus products by the Gulf of California; and when there is wealth and enterprise enough, they might connect the Great Salt Lake City with the Colorado by a railroad, and thus avail themselves of the coal, iron, and other resources, in the southern portion of their Territory.

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

RUFUS INGALLS,

Captain, Assistant Quartermaster.

Major General THOS. S. JESUP,

Quartermaster General U. S. A., Washington City, D. C.

A 2.

BENICIA, CALIFORNIA, *August 25, 1855.*

GENERAL: Having now completed my duties connected with the overland command of Brevet Lieutenant Colonel E. J. Steptoe, before leaving for the east, I deem it proper to submit the following for your consideration and satisfaction.

I have always kept you informed of all my movements and operations in the Quartermaster's department by frequent letters, particularly of all occurrences from the time of my leaving Fort Leavenworth to my departure from Great Salt Lake City. I shall, therefore, in this sketch, touch but briefly on anything relating to the march of last year. Should you desire to embody the particulars of that march in a report, I beg you will refer to my letters to you of June 2, July 9, August 28, September 30, October 29, November 27, 1854, and February 6 and March 31, 1855. These letters contain all necessary information.

Enclosed herewith is a map of the whole region of country lying west of the Wahsatch range of mountains to the Pacific coast, between the 31st and 43d parallels of latitude. This map has been prepared with great care from the best maps and reports that have been published, and from notes and drawings taken by myself and other officers of Colonel Steptoe's command. I hope that that part of it on and near the routes passed over by Colonel Steptoe and myself will be found quite

accurate. This map shows the routes taken by the different detachments of the overland command from Great Salt Lake City to Benicia, Forts Lane and Tejon, the camps, measured distances, and the topography of the surrounding country. It is accompanied with a descriptive list, giving all necessary explanations of the character of the roads, distances, time when passed over, resources of route for grass, water, fuel, &c. These have been prepared with a view to afford you an opportunity to obtain a knowledge of the operations of Colonel Steptoe's command at a glance, and to answer as a guide to any military expedition detached over any of these routes. I also enclose a map of the Great Basin which immediately surrounds the Great Salt Lake, Lakes Utah and Sevier. This will give you a correct idea of the character of that singular basin, the localities, number, and description of the various Indian tribes of Utah Territory. These maps are submitted in order to convey the necessary information by the eye, to those interested, and to avoid long written reports, the reading of which would, after all, fail to afford that kind and amount of information given at one view by these maps.

I received orders from the War Department on the 6th April, 1854, to proceed to Fort Leavenworth, and report for duty as assistant quartermaster with Colonel Steptoe's command, under orders, by the plains, for California.

This command consisted of two companies of artillery, and about eighty-five dragoon recruits. In the Quartermaster's department there were some 130 citizen employés, as teamsters, ostlers, and herders; 450 mules, 300 horses, 70 wagons, &c. There were, on an average, 300 persons, soldiers and citizens, and nine officers.

Before leaving Fort Leavenworth, Colonel Steptoe received instructions from the War Department to secure the murderers of the late Captain Gunnison, if he found it practicable, on his arrival in Utah. Up to this time it had been expected that the whole march would be accomplished by the end of September following; but to carry out the spirit of his orders, it was now foreseen that the Colonel *must necessarily* have to pass the ensuing winter somewhere in the basin, for the band of Indians to which the murderers belonged inhabit the country lying 150 miles, or more, to the south of our route; and at the season of our probable arrival there, these savages could easily flee to the cañons and inaccessible recesses of the mountains. They can be successfully dealt with only in rigorous weather, when the snows are deep in winter, unless they are cajoled and entrapped under false promises, as some poor tribes have been by irregular troops.

In consequence, therefore, of the expected detention, it was not necessary to make long or wearisome marches, but to journey along leisurely; for, while *actually on the plains*, the command engendered no extra expense, and it was to the interest of all concerned not to reach the basin until autumn.

The command left Fort Leavenworth near the 1st June, 1854, and after marching forty miles, was brought to a halt by the cholera, which raged rather fiercely for some days. It disappeared after some eight or ten had fallen victims, and from that time on to our arrival in Cali-

fornia, the whole command was unusually healthy, suffering hardly any mortality in these elevated regions where the atmosphere is dry and pure, and the climate delightfully salubrious.

The route followed corresponds very nearly, if not exactly, with that taken by Captain Stansbury in 1849, and which is carefully, accurately and fully described by that officer in his maps and reports, as published. The geology, botany, topography, &c., of the route, and country generally, are so truly described by Captain Stansbury and Colonel Fremont, and so well known by thousands of immigrants, that it is unnecessary, even were it my province, to make any remarks descriptive of the route so far as Great Salt Lake City. I will simply observe that the march was conducted with great regularity and system; that there always prevailed contentedness and harmony in the command; that no accidents by high water in crossing rivers, or scarcity of grass for our stock, occurred on our whole march.

The command reached Great Salt Lake City on the 31st August, 1854, having been ninety-two days out from Fort Leavenworth, and having travelled 1,216 miles. The marching days, however, were only sixty-four, making on an average nineteen miles per day.

After resting in the city two days, the march was resumed to find a suitable location for a winter grazing camp. At a distance of forty-five miles from the city, in a southwest direction, we found an uninhabited valley called "Rush valley," which answered our purposes most admirably. We found it by experiment to be so very eligible, that a survey was made of the proper portion, a map of it prepared and forwarded to Washington, with a recommendation that it be declared a "reservation for military uses." It has been duly declared a reserve since by the President. Colonel Steptoe with his troops returned to the city on the 14th September, and remained in quarters there until last April, 5th, houses, stables, &c., having been rented for his accommodation. The climate is too cold there, and the season was too far advanced, to render it expedient to put up temporary quarters for the winter. Had this been attempted, many of the men would have fallen ill; winter would have arrived before the troops could move in; the building would have been attended with considerable expense, and the market would have been at a distance. I regard the arrangements that were actually made, as having been the most comfortable and economical that could have been entered into. I kept the citizen employés, and most of the quartermaster's property, such as horses, mules, wagons, at the grazing camp all winter, and until our march this last spring. The men were employed day and night cutting hay and fuel for winter use, attending to the horses and mules, and guard duty. They cut and hauled some 200 tons hay and 300 cords wood, and erected quarters, storehouses, corrals, and stables for the accommodation of themselves and animals, which are now standing in good repair, unless destroyed by Indians on the reservation in Rush valley.

The expense attending, or *consequent upon the detention* of this command in the basin, was quite heavy. I was the paymaster, quartermaster, and commissary, and expended from *first to last*, in my various characters, as follows:

In the Pay department.....	\$20,706 25
In the Quartermaster's department	151,250 59
In the Commissary of Subsistence department.....	36,492 74
Total.....	<u>208,449 58</u>

The sums disbursed in the Pay and Subsistence departments would have been as great anywhere else, of course—probably greater in the latter department; but had the command moved on into California last year, the sum necessary to have been disbursed in the Quartermaster's department would have been very much less; indeed it could hardly have exceeded \$20,000. As it was, however, there was no way of avoiding a heavy expenditure, unless the horses had been (as they might) sent forward last autumn. Over such matters I had no control. It was decided they should be kept all the time with Colonel Steptoe's command; and I was directed to provide grain for them, to keep persons employed to groom and look after them, and to deliver them at their destinations in as good order as possible this year; all of which I have performed.

I have often informed the department that I could have delivered these horses in California on or before the 30th of last September had I been permitted so to do, or relieved from duty with Steptoe's command for that purpose. The horses I think, though, are better now, and will wear longer on account of passing the winter in Utah. They had never been herded, and I could not risk the experiment often. I tried to teach them to herd; but they ran themselves down so rapidly, and the Indians threatening to be troublesome, I was forced to keep them up in yards. Consequently, the forage item was a heavy one. A part of the winter was severe, and during such time all the animals (over seven hundred) had to be foraged with grain and hay.

The recruits were mounted, and their animals were foraged in the city. They were often called upon to march south among the Indians during our stay there. The keeping so many citizens in service, and horses for which forage has necessarily to be purchased, in a new and distant Territory—particularly in a Mormon community—must be sources of great expense. I make these explanations to show reasons why the disbursements were apparently so great. If I had my way, and were similarly situated in that country again, I would turn the animals out under a strong herding force, and let them run night and day. There would be considerable loss from robbery, exposure, and estray; but it could be made good, I think, with much less money than would be required to provide forage. I had not the option last winter; it was necessary to pursue the very course followed. I had citizens in service whom it was policy to retain for the march in the spring. The horses were to be in good order for an early start. Wah-kar, the celebrated Utah chief and grand robber, (now dead,) had threatened to run off the animals; had said that if we kept our horses, we "must sit upon them all winter." I therefore kept them in hand, and lost none, scarcely, on the whole trip. If animals must, for security, be "corralled" every night, they do and will require almost as much hay

and grain as if not grazed at all during the day. The nights are long and cold, and the actual grazing hours are few compared with the number spent in yards. I tested this fully last winter, and the latter months kept them up all the time. By reference to my returns, it will be seen that the loss sustained on this march in animals is probably *less* than what might have been expected with the same number had they been stationary and in good pastures during the same time. It does not exceed the ordinary mortality. I was ever on the lookout for grass, water, &c., on the march, and generally rode in advance to select camps with a view to the safety and good subsistence of the animals. By scouting the vicinity of the trail—sometimes miles from it—I most always succeeded in finding a supply of grass and water; and I will say here, that the animals were kept in good condition during the entire march. The command left Fort Leavenworth with a very limited supply of clothing. I purchased and issued it to the whole command during the time we remained in the basin, which helped to swell the sum disbursed considerably. The wagon train was kept in motion during the winter hauling forage and subsistence, and fuel. The latter was drawn from the cañons, at a distance of twenty-five miles from the city. There was, consequently, much wear and tear upon the wagons and harness, which kept persons constantly employed to repair them; and many purchases were rendered necessary of suitable material to put the train in marching condition. While upon this subject, I will remark that my returns, which are now forwarded fully, account for every cent expended; that all my purchases were authorized by Colonel Steptoe, and rendered necessary from the circumstances under which the command was placed; *that the extra sum expended is chargeable to the orders that detained this command in the valley during winter.* Before I close this report, I shall show that the result will probably prove it to have been wise policy. The detention above referred to, the sojourn of the command among that singular people, and the influence exerted over the wild tribes of Indians by its presence there, will have (already has had) a beneficial effect.

It will prove money well expended.

The wagon routes across the continent are so very rough in mountainous regions, and always quite circuitous, particularly from Great Salt Lake City to the bay of San Francisco, that Colonel Steptoe took measures to have the country lying directly west explored for a more nearly air-line road. Two Morimons were engaged as principal explorers, and directed to explore from the south end of the Great Salt Lake, on the Beckwith route, or near to it, to Carson valley. This party left the lake in September, and returned the following November. It proved quite an expensive trip, owing, in my present opinion, to the tricky character of the Mormons. They made a most flattering report. They said they had discovered a wagon road, along which a command could move with ease, &c., saving 150 or 200 miles. The Colonel had not seen Lieutenant Beckwith's report, nor had he any other information than that given by his exploring party; but being deeply sensible of the importance to the Territory of Utah and the overland immigrants of laying out and opening a more direct and practicable road than the

crooked ones now travelled, he determined to take his command and the large wagon train over this new route. (See dotted red line, on my map.)

As spring approached, however, the chief Mormon, who had agreed to act as guide, became rather restive, and evinced an unwillingness to go, which caused the Colonel to distrust him, and shook his confidence in the report he had made of the road. As a matter of security, another party was organized under "Porter Rockwell," a Mormon, but a man of strong mind and independent spirit, a capital guide and fearless prairie-man. He went out as far as the great desert tracts lying southwest of the lake, and very nearly on a level with it, and found that at *that season* they could not be passed over, "unless with wings," and returned. It proved fortunate that we did not undertake the march with O. B. Huntington as guide. The march would have been disastrous; though Rockwell and others are of the opinion that by going on a line some thirty miles farther south, along the foot of mountains seen in that direction, a fine road can be laid out, avoiding, in a great degree, the desert. I believe such to be the case myself. I am clearly of the opinion that a suitable officer could, by a proper reconnaissance, lay out a road passing by "Rush valley," turning southwest, and going by New river, Walker's lake, into Carson valley, and save 200 miles distance. This route having been declared impracticable, the Colonel decided to pass around the north end of the lake, and thence by the Humboldt to Carson valley. In the mean time, Lieutenant Mowry was detached with the recruits and horses due at Fort Tejon, and ordered to proceed over the southern military road to that post. By reference to the descriptive list accompanying the map, the routes taken by each portion of the command are fully described—dates, distances, name of localities, and resources are given. I shall not, then, particularize in this report as might, were it not for the map and list, be necessary.

I left Great Salt Lake City on the 29th of April, and came up with the command on the 30th. It had moved on some 35 miles to Weber river, a day or two before. The country at that season was truly beautiful, affording signs of great fertility; the grass was green and well up, and there were numerous small mountain streams running west to the Great Lake. On the west there are no streams of any account that flow into the lake; the whole region there, for many miles west and southward, is a most inhospitable and forbidding desert, uninhabited by man, beast, or reptile. In the spring it is saturated with miserable water, and is quite impassable. But on the east there are many streams, some of considerable magnitude, as the Weber, Ogden, Box Elder, and (largest of all) Bear river. For sixty miles north of Great Salt Lake City the country is settled rather thickly, in towns, by the Mormons. There are plenty of localities where fine camps can be found for any command. The march was conducted very slowly as far as Bear river. The valley of this river is quite picturesque. The soil seems good, and the grass is most abundant and nutritious, though I think the country is too elevated to admit of its being made use of

successfully for grains. The nights are always cold. Before leaving the city I had purchased two boats, which were transported on wagons and served as beds to them, to use on this river and the Humboldt. They were of importance to us, but were abandoned in the Sierra a long time afterwards. The road should cross Bear river *below* the confluence of the Malad. Had we crossed there, more than 20 miles travelling could have been avoided. After leaving this river there are two marches without much good water or grass. There are springs, but their waters are not either abundant or sweet to the taste. We found no difficulty, however, in finding good camps. On a march over a rough, new country, with a large number of animals, persons should be sent each day in advance to *be sure* of getting the very best and most favorable localities. Such was our rule invariably, and *if there were* any grass and water *we always* had the benefit of them. Much time and anxiety are saved by this course, not to speak of other advantages. We found the roads quite good so far as the Humboldt, except in and near the Goose Creek mountains; there the road is rough, but still very practicable, and cannot be much improved. I have never in my travels seen such curiously shaped mountains and hills as I saw from the divide on these mountains. They are of all manner of shapes and sizes, and are piled up, or seemingly thrown very carelessly together, without the remotest attempt at order or utility. The road meanders through and over this singular region until it reaches the sources of the Humboldt. This region of country from the lake through to California is infested by nomadic tribes of Indians, generally of the lowest order of beings. They are troublesome and dangerous to stock-drivers who yearly pass over this route. They are infinitely worse, and more to be dreaded now, because their native propensity to rob and murder is sharpened, excited, and refined by contact with white men of notoriously bad characters, fugitives who have gone among them. They are induced to steal horses and cattle, and then exchange them with these persons for trifles. If the *truth were known*, it would be discovered that finally these cattle find their way into the hands of traders who are *slightly interested*, probably, in the thefts committed by the Indians. The command was never molested by Indians on the whole route, but the drovers in our vicinity were frequently disturbed and annoyed by them. Colonel Steptoe was applied to for protection. A military mounted force moving through this country every year would serve to keep the road clear and safe better than any stationary command. If a company of dragoons should start from the Salt lake, another from the Dalles, or Fort Boise, and one from Fort Reading or Lane, in each spring, and march out into the interior, say on the Humboldt, and then return to their respective posts in autumn, the Indians over all this vast area would be held in subjection; the immigrants and drovers would not be molested, the expense to government would be decreased for the time the troops might be out, and a great saving would thus be made to the army as compared with the establishing of fixed posts in the interior, which are supplied and kept up only at a great expense, and are at best inconvenient to the service and uncomfortable to officer and soldier. I make these

suggestions as they correspond with my observation and experience. They are not by any means original with me. I have noticed that these small, distant, and isolated posts do little more than keep possession, and exercise control over those Indians near by. At a distance of 30 miles they will commit a massacre or robbery with comparative impunity, because the posts cannot afford to send out sufficient detachments without weakening themselves too much; while a strong, well mounted marching force inspires more respect.

The command reached the Humboldt river on the 28th of May. This stream, like many others in this basin, finally disappears in the desert. It flows westerly nearly two hundred miles, then turns rather abruptly south ninety miles, and is lost in what is known as the "Sink of Humboldt." It is usually a source of great embarrassment and loss to stock-drovers to journey along this river, on account of the alkali waters and great scarcity of grass during seasons of high water. When the river is over its banks, and the narrow "bottom" inundated, it becomes necessary to keep on the bluffs or sandy ridge that borders and binds the valley. There are then many sloughs and hollows, filled with water strongly impregnated with alkali, and the rivers at such times difficult to approach. There is scarcely any grass to be found, and the traveller must exercise great caution, or he will lose all his stock here. But I should say that, generally, it would be safe to travel along this river any time after the 10th of June. Our command was exceedingly fortunate. The waters were unusually low. The bottom was dry and covered with rich blue grass. The train was able to go on the now hard-bottom road; the running water of the river, which was fordable at all convenient points, was palatable and wholesome. I have never journeyed two hundred miles along any river with the enjoyment and satisfaction that I did on the Humboldt. We sometimes saw Indians near the sources of the river, but they did not appear to notice us; they were chiefly old "Diggers," and were too busily engaged gathering seeds and insects, and snaring squirrels for their dinner, to have time to look up at us. They are like the beasts that roam over these wilds, little removed from them in instincts and habits. They are manifestly very low down in the scale of human beings. It is said they are improving since their country is travelled over so much of late years. If the whites substantially benefit *these Indians*, it will be for the reason that their condition could not be made worse. I have seen most all of our Indians, and the instances are rare where I have witnessed any permanent benefit resulting to the red man from contact with the white. Oil and water are more similar, and will mix on more easy terms. The Indian in the end has to "move on" or do worse.

The command reached Lawson's (or Lassen's) Meadows on the 10th of June. It is at this point where the river turns south, and where Colonel Steptoe detached me with the horses due at Fort Lane, on Rogue river, Oregon. The Colonel pursued the old Carson valley route with the artillery companies, and arrived at Benicia (his command) on the 12th of July. By reference to my map and descriptive list, a history of his march will be found. It was rather rapid, and quite successful.

On the supposition that I should or *ought* to be sent to Fort Lane direct with the animals required there, I instituted inquiries in Great Salt Lake City for guides, and information of the road necessary to follow, but could gather nothing reliable. No one there had ever been in Rogue River valley. I heard, however, that there was a road leaving the Humboldt at Lawson's Meadows, which followed a northwesterly course and entered California near Yreka. While we remained in camp at Lawson's Meadows, a man came in who knew some points on the way and a portion of the trail. I employed him as guide, and although he had no minute knowledge of the road, still he knew all the prominent points, and rendered good service.

Lieutenant Allston, in command of fifty dragoon recruits, accompanied me. He was not placed under my command, because it was said I could not, had no right to exercise command in the line. I contended that I was competent for *assignment* to a line command, though I could not *succeed to it* under ordinary circumstances. To avoid all controversy, it was ordered that the Lieutenant should make his marches and camps correspond to mine. I left Lawson's Meadows on the 14th June, with 122 horses, 112 mules, and 17 wagons, and moved out 18 miles, over a very fair road, to the side of a mountain, where there were water and fine bunch-grass. From this place the road leads over a sterile, dry desert for some sixty miles, without water or grass of a good quality. It is true there are some boiling springs, and a slough with alkali water; but it is decidedly dangerous to permit the stock to more than taste of it. By taking an early start, I crossed the main desert to Black Rock (40 miles) in one day, without fatigue, and the following day arrived in a country well watered and grassed. This road was travelled by quite a number of immigrants in 1852, and the signs are sadly frequent, to this day, of their great suffering. They crossed later in the season, when the weather was hotter, water more scarce and poisonous, grass dry or eat up, and themselves in a jaded and worn down condition. I saw the remains of numberless wagons and cattle on this desert; and not being acquainted with the country in front, I almost wished myself back with Colonel Steptoe. Whole wagons were sometimes met with, and very near by would lie the bleached bones of oxen that could draw them no further. Most of the wagons had been burned. The trace was strewn with pans, boxes, tires, and all manner of property usually seen in immigrant trains. The road was quite well marked thus far, but further on it gets dim and faintly marked, and sometimes it could not be traced at all for miles. It does not appear to have been used since the disasters of 1852, though I am highly pleased with it; and had I stock to take through, would certainly pursue nearly this same road. In early spring most of this desert is covered with water, and, of course, would be difficult to cross. The latter part of June is the best season. The roads then are quite hard and smooth. Black Rock is the southern point of a volcanic ridge which terminates here, near some immense boiling springs. It is a singularly picturesque and wild-looking place. It is where Colonel Frémont passed along on the 2d January, 1844, on his way from the Dalles south. There are very many isolated basins in this region: some quite

small, others on a grand scale; in the centre of each is generally a mud lake, caused by the melting of snows. On the 17th I came to the remarkable cañon described by Frémont, who passed through it two or three days before reaching Black Rock. This cañon is some twenty-five miles in length, and is one of the most wild and romantic spots I have ever seen. I had much labor to perform in order to take the train through. There were many marshy, miry places that I was obliged to bridge and causeway. I would remark, that from the desert on to Fort Lane the grass and water were *always* abundant, and a more lovely and interesting country, at that season, I never saw. The animals really improved each day. The road was always quite practicable, after bestowing proper attention to the bad places. I kept a party in advance to remove all obstacles, and suffered, in consequence, very little annoyance or detention.

On the 23d June, I crossed the main ridge of the Sierra Nevada. The ascent was steep and rather long, but not rocky, nor was there any snow. Very few of the teams were "doubled." From the lake on the east to Goose lake on the west, is only eight or ten miles. Here distance ought to be saved, by crossing the Sierra just to the south, so as to descend at the very south end of Goose lake. I observed the pass, but considerable labor is indispensable before it would be practicable. The pass is heavily timbered, but lower and of a much easier grade than the one now in use.

From the summit we enjoyed a most extended and pleasant view; we could look far to the east and west. The lake on the east is filled with salty water, disgusting to the taste; but Goose lake, which is some forty miles long and ten wide, is a most lovely sheet of fresh water, with myriads of shore-birds and water-fowl around it. There were many clear cold streams running into it. The grass was luxuriously abundant all around. I was charmed with the beauties of the place, though sadly reminded of the fate of poor Captain Warner, (who was massacred here,) by the numerous telegraph fires of the treacherous Indians. The road passes around the south end of this lake, and upon the west shore some eight miles, and then crosses a most dreadfully and fearfully rocky divide of twelve miles, when it falls into a nest of contemptible sloughs or spring-holes, and marshy ground. This could be avoided in a great measure, I think, and much distance gained, by crossing this divide farther south, thereby making the road much more direct. The rocks on this divide are not large, but are angular and loose. They are volcanic vitrified rocks, that wear down the hoofs of animals rapidly. In this vicinity are Clear, (Am-pa,) Rhett's, and Klamath lakes, and some serious sloughs; but I came across no very stubborn obstacles. I regard the road, considering the advantages of grass, water, &c., as a very good one. I crossed the Cascade mountains through Applegate's Pass, or on a trace cleared by him some years ago. He seems to have done it with great judgment. The road passes over a most rugged mountainous range, and through a forest; but still it presents no obstacle to wagons. After descending from these mountains, I reached Fort Lane in 27 miles, on the 6th July, having travelled 368 miles, from Lawson's Meadows, since the

14th June. I took in and turned over every particle of property that I started with. I neither lost nor abandoned anything on the way, and the horses and mules were in fine condition. The wagons were very acceptable at Forts Lane and Scott, as they cannot be got there from any other direction, without great expense and difficulty.

After remaining at Lane three days, I took all the surplus animals that were not wanted, and left with my party, provided with packs, for Fort Reading. These animals were turned over there on the 20th July; but, as I was responsible for the train that came with Steptoe, and as it was necessary to pay off and discharge the citizen employés, I left my party in Scott's valley, and came with rapidity to this post, where I arrived on the 18th July, in time to perform all duties connected with the Carson Valley command.

Since my arrival here, I have been busily occupied, with my clerks, in preparing my public accounts for the 2d and 3d quarters of this year, completing sketches, maps, &c.; so that I may be able to leave here for Washington on the 1st proximo.

Before closing this report, I trust you will permit me to indulge in a few remarks touching Utah and its inhabitants, Mormon and Indian—the more particularly as there may exist in your mind a desire to know some *few facts* in relation to the singular people who live there, and as hereafter events may make it interesting to have heard them. I assure you, that whatever I may remark here shall be the *naked truth*, told in a few lines; and if vouchers are asked for, call on Colonel Steptoe and all the officers of his command.

So much has been said and written about the Mormons, among whom we were thrown for the past winter, that were it even expected I should discuss their peculiarities, I would most certainly approach the task with great diffidence, fearing that, like most others who have touched the subject, I should permit my prejudices or prepossessions to induce me involuntarily to convey erroneous views instead of an impartial and just one. Captain Stansbury and the late Captain Gunnison have written much in praise of them; and I do not doubt their sincerity. They described the Mormons *as they then saw them*. If these "saints" had not sometimes raised the veil and disclosed to us their real intentions, feelings, and character, we too should eulogize them. We possessed opportunities for observing the *shady side* of this people, while the officers referred to always saw them in sunshine. They treated these officers with marked courtesy *after* their first acquaintance, and upon conviction that they had everything to gain and nothing to lose by affecting a liberal and polite feeling. But that these same Mormons had, *prior* to the arrival of Captain Stansbury in the Basin, and *before* the *true objects* of his visit were understood, "counselled" that he should be "whittled" off—a former favorite and prevalent pastime with them—or that he should be persecuted away by letting him "severely alone," there can be but little question. They quickly saw that they could gain by affected friendly contact with these gentlemen, and defer to a later day *an era that must dawn upon them*—an era when, aside from religious phrenzy and dictation, they *must* be *obliged* to regard the obligations of our "common law" and constitu-

tion as paramount. That they *do not now* so regard them, I should say is very evident to all who may have heard *them*—I mean the priesthood—talk, and have observed their “counsellings.” When the Mormons are referred to, it should be borne in mind that only a few of the whole number is meant. The great mass of the people are quiet, good men, chiefly foreigners of the lower orders, who *do in all things* exactly as they are told to do by their Prophet Brigham Young and his many apostles and elders. The common people have much merit of a negative kind; for instance, they are remarkably industrious, but their industry is far from being voluntary. The *task-masters* above named are ever on the alert, and give them no rest, no time for sober reflection, no opportunity to wander away from the trammels of Mormonism. They are seemingly independent, but their very independence is an abject submission to the will of the iron-handed priesthood. They strive hard to seem virtuous, and talk loud of their refined morality; but as soon as the curtain is drawn aside and the real, actual social condition is viewed, one sees what is generally regarded in other communities as sensuality and corruption. I will not say more on this subject now. Mr. Ferris, a former secretary of State in Utah, has written fully and rather accurately, though too severe, on the matter. But the people would make good citizens if it were not for the fact that they are constantly impressed with the necessity of bowing down to the dictation of the priests in *every transaction of life*, and made to abide their decisions as final. I like the people much, and believe that *they* are, at all events, sincerely devoted to the Mormon religion. As an instance of the power of the priest over the people, and also of the manifest perversion of justice, I will call to your notice the trial of the Gunnison murderers, whom Colonel Steptoe had secured after long toil, considerable expense, and the exercise of great tact and judgment. It was for *this* that he had kept his command in the valley.

These Indians were proven guilty of murder. The judge charged the jury that the case was plain; that they must find them guilty of *murder, or not guilty, &c.* The jury returned a verdict of *manslaughter!* the highest degree of punishment for which is three years’ imprisonment. These murderers were thus *necessarily* so sentenced by the judge; nothing more could be done. But by some *accident* (it has been said by connivance) they were suffered to escape from prison and proceed leisurely back to their band, and were *at liberty* when I left the lake. Thus escaped the assassins of one of our most meritorious officers and of many useful citizens. To those who were present, I am credibly informed, it was manifest that the jury had received “counsel” which was paramount to their oaths. It was known that a certain meddlesome old man had been permitted to talk to the jury while they were shut up. Any one can draw the inevitable conclusion. I myself have heard these priests talk in no flattering language of the chief officers of our government in their tabernacle and before their people. The government, then, *should be changed without delay*, if for no other reason, to separate Church and State there. I think that any upright, pure man—for instance Colonel Steptoe, who has been appointed governor—could administer the government there with

satisfaction to Utah and the general government. A man should be selected who would give dignity to the office, and not degrade it by engaging in traffic as many territorial appointees have done. The people will assist, if properly called upon, to enforce our laws. They number between 40,000 and 50,000.

The Mormons have pursued a too conciliating policy towards the rude savages that surround them. They frequently suffer abuse and insolence in consequence. They hold the Indians to be "brethren," and have "counselled" intermarriage, and have sent forth missionaries among them. When it is well known abroad that a Mormon elder can have wives of *any* or all nations; that he generally *does* have a dozen or more; it will excite no sort of wonder or consequence if he should take a fancy to introduce two or three "Digger" squaws, just to extend a principle!

It is generally believed that the Indians there are taught to consider Mormons and Americans as different people. It is *certain* the Indian makes a distinction. Whether this teaching is sanctioned or prompted by Governor Young, I cannot say; but one thing is plain: he is all-powerful to cause them to be properly instructed as to the real relations existing between his people and the citizens of the republic.

The map enclosed gives all necessary information concerning the Indians. They gave us no trouble; and if a regular force were stationed there at suitable points, they could be protected in *their rights*, and kept from molesting the *settlements*.

The climate of Utah is most excellent and delightful, though rather dry. Nothing is grown there except by aid of irrigation. Last year the crops were abundant, and the people appeared prosperous; but I am sorry to learn that their old enemies and persecutors, the grasshoppers and crickets, are destroying their crops this year. They are so remote from any depot of supply that they must suffer greatly, in case the crops prove a failure.

I beg you will excuse this hastily written report, and be reminded of the esteem of your most obedient servant,

RUFUS INGALLS,

Captain, and Assistant Quartermaster.

Major General THOS. S. JESUP,

Quartermaster General U. S. Army,

Washington City, D. C.

REPORT OF THE COMMISSARY GENERAL.

OFFICE COMMISSARY GENERAL OF SUBSISTENCE,
Washington, October 25, 1855.

SIR: I have the honor to submit the following report of the operations of this department during the past year.

The army during the past year has been supplied with subsistence by contract, and by purchase. The contracts made in 1854 expired in June, 1855.

Advertisements for proposals to supply many of the posts with subsistence during the fiscal year ending June 30, 1856, were duly made, but so few bids were received, and those at such exorbitant rates, that, by your instructions, no contracts were made, and subsistence was procured by open purchase.

Wherever possible, supplies were procured from the country in the vicinity of the posts.

Notwithstanding the active operations of much of the army, and the wide distribution of the troops over the unsettled portions of our country, it is believed that, with few exceptions, they were abundantly supplied with provisions of an excellent quality. Issues were made to Indians at many of our posts, and subsistence was furnished to the employés of the Mexican boundary commission, and exploring parties for the Pacific railroad, on their paying therefor the cost to the United States at the posts from which the articles were received.

The comparison of the solar evaporated salt of Syracuse with Turk's Island salt, in preserving pork, was brought to a conclusion. Whilst the experiments exhibited but little difference in the preservative qualities of the salts, they established the fact that the solar salt of Syracuse discolored the surface of the pork.

In obedience to your instructions, advertisements have been issued inviting proposals for subsistence for the army during the fiscal years ending 1856 and 1857, to be delivered at San Antonio, Fort Brown, and Corpus Christi, for the posts in Texas; at Fort Union, for the posts in New Mexico; at Benicia, for the posts in California; at Fort Vancouver, for those of Oregon and Washington Territories; and for the remainder at the posts themselves.

The proposals for the distant points, and the contracts based upon them, must necessarily include the cost of transportation to those points, an expense heretofore borne by the Quartermaster's department, and thus increase the disbursements of this department to that amount. In the estimate for that fiscal year, which I had the honor to present, a reasonable allowance was introduced for this increase on account of transportation.

The accounts of officers disbursing in this department were in general faithfully rendered.

The time allowed by law to each officer in forwarding his accounts, viz: three months from the end of the quarter, if within the United States, has in some instances, owing to the distant position of the officer, and want of mail facilities, proved insufficient. Justice in such cases must relieve the officer from the penalty of the violation of the law, as well as the imputation of delinquency.

The clerks in this office were attentive and zealous in their duties.

Before closing my report, I would call your attention to a few remarks upon the contract system, in supplying the army with subsistence.

The experience of thirty-seven years as the chief of this department has fully satisfied me, that the system of contracts, so far as this department is concerned, is not so advantageous to the United States as that of purchase in the open market; the expense is greater by it. The stores procured by contract are generally of an inferior quality to those procured by purchase, and consequently the waste and decay are greater. Owing to the change of position of the troops after contracts are made, stores are delivered at points where they are no longer required, and must be sold at a loss to the United States. There is an insecurity in the contract system at our distant posts, because a failure on the part of a contractor to make his delivery cannot be remedied, and much suffering if not actual starvation of the garrison might ensue.

For these reasons I would ask your recommendation to Congress for the repeal of the seventh section of the act approved April 14, 1818, thus leaving it optional with the Secretary of War to supply subsistence to the army either by contract or purchase, as he may deem most advantageous.

I am, sir, with great respect, your most obedient servant,

GEO. GIBSON,

Commissary General of Subsistence.

HON. JEFFERSON DAVIS,

Secretary of War.

REPORT OF THE PAYMASTER GENERAL.

PAYMASTER GENERAL'S OFFICE,
November 20, 1855.

SIR: I have the honor to submit herewith a report of the transactions of the Pay department for the fiscal year ending the 30th of June, 1855.

It will be seen by the tabular statement herewith, that there remained in the hands of paymasters on the 30th of June, 1854, applicable to payments due in the first quarter of the last fiscal year, the sum of \$315,638 33; in addition to which they have received from the treasury, and other sources, exclusive of amounts transferred from one to another, the sum of \$3,377,505 96, making a total to be accounted for, of \$3,693,144 29.

Expended as follows:

Payments to regular troops.....	\$2,700,186 06
Payments to volunteers.....	156,753 94
Three months' extra pay to regulars and volunteers...	6,650 96
In paying the Military Academy.....	80,495 55

Total expended.....	2,944,086 51
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Leaving a balance to be accounted for, of.....	\$749,057 78
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This unusually large balance has arisen from the necessity of supplying, near the close of the fiscal year, a large amount of funds for the payment of the Sioux expedition under General Harney, and the troops in New Mexico.

The balances, however, with a few exceptions, have been expended and accounted for since the commencement of the present year.

I deem it my duty to state, that it is reported to me by one of my officers (Major Cunningham,) that in January last he sustained a heavy loss of the public funds by robbery. He writes, under date of January 31, as follows: "On the night of the 18th instant my office was entered by three men, by whom I was seized, knocked down, and while insensible from the injury, the keys of my iron safes were taken from my pocket, and one of them opened and robbed of five bags of gold, and one containing gold and silver." The amount lost on that occasion has since been ascertained to be \$36,085, and no trace of the perpetrators of this outrage has yet been discovered.

Major C. had been collecting funds for the payment of his district, and was to have started the next morning on that duty; this accounts for the large amount in his office at that time.

It would be a great relief to disbursing officers in New Mexico, to have a government depository established there for the safe-keeping of the public funds.

I have the honor to be, very respectfully, your obedient servant,
 BENJ. F. LARNED,
Paymaster General.

HON. JEFFERSON DAVIS,
Secretary of War.

Statement showing the amount remaining in the hands of each of the disbursing officers of the Pay Department, and unaccounted for, on the 1st of July, 1854; the amount remitted to each from the Treasury, or turned over by other agents, during the fiscal year ending the 30th of June, 1855; the amount accounted for by accounts and vouchers of expenditure, or by transfer or replacements in the Treasury; and the balance unaccounted for, to be applied to payments in the first quarter of the next fiscal year.

Paymasters.	Balances in hand and unaccounted for on the 1st July, 1854.	Remitted from the treasury, and turned over by other agents, during the year ending 30th of June, 1855.	Total amount received and to be accounted for.	Amount expended in paying regular troops.	Amount expended in paying volunteers.	Am't for three months' extra pay to discharged regular and volunteer troops, in the Mexican war.	Amount expended in paying the Military Academy.	Amount turned over to other agents or replaced in the treasury.	Total am't accounted for.	Balances unexpended to be applied to payments in the next fiscal year.
T. P. Andrews, deputy paymaster general.....	\$362,794 24	\$362,794 24	\$362,794 24	\$139,581 00	\$236 17	\$243 00	.....	\$53,766 00	\$193,826 17	\$168,968 07
E. Van Ness.....do.....do.....	\$910 45	369,497 41	370,407 86	71,318 10	1,048 12	1,194 26	.....	296,847 38	370,407 86	.....
T. J. Leslie.....	1,727 81	105,383 82	107,111 63	84,624 91	94 24	162 00	.....	1,729 87	86,611 02	20,500 61
A. D. Stewart*.....	18,773 94	25,250 00	44,023 94	1,991 32	.....	.....	.....	42,032 62	44,023 94	.....
Benjamin Walker.....	22,841 36	57,236 93	80,078 29	15,737 43	25 43	21 00	.....	64,294 43	80,078 29	.....
St. Clair Denny.....	16,196 12	380,899 96	397,096 08	355,598 79	7,563 21	3,175 00	.....	16,186 38	382,523 38	14,572 70
David Hunter.....	3,340 12	519,145 44	522,485 56	345,033 84	1,990 92	601 00	\$36,411 69	134,249 41	518,286 86	4,198 70
L. J. Beall.....	4,861 74	248,276 84	253,138 58	131,470 50	34,586 64	84 00	.....	42,888 93	212,030 07	41,108 51
A. J. Coffee.....	8,402 54	181,255 77	189,658 31	55,925 93	4,233 99	408 00	.....	8,755 24	69,323 16	120,335 15
Geo. H. Ringgold.....	3,411 45	87,545 69	90,957 14	56,669 77	35 93	105 00	.....	16,219 12	73,029 82	17,927 32
Henry Hill.....	33,307 89	149,883 76	183,191 65	102,615 09	31,438 68	.....	.....	21,966 14	156,019 91	27,171 74
R. B. Reynolds.....	11,023 71	95,514 11	106,537 82	95,323 78	.....	21 00	.....	.....	95,344 78	11,193 04
J. Y. Dashiell.....	37,421 21	115,662 15	153,083 36	74,930 64	2,332 31	.....	.....	65,406 91	142,669 86	10,413 50
S. Maclin.....	22,085 91	128,795 50	150,881 41	126,868 24	77 27	24 00	.....	63 13	127,032 64	23,848 77
A. W. Gaines.....	3,716 93	145,493 82	149,210 75	86,571 38	113 24	108 00	.....	380 00	87,172 62	62,038 13
A. G. Bennett.....	1,281 80	.....	1,281 80	.....	.....	.....	.....	.....	.....	1,281 80
Hiram Leonard.....	39,946 29	206,325 43	246,271 72	76,104 45	1,317 63	.....	.....	159,499 32	236,921 40	9,350 32
F. A. Cunningham.....	1,674 83	130,932 98	132,607 81	78,695 38	.....	21 70	.....	1,200 00	79,917 08	52,690 73
Geo. C. Hutter.....	26,875 54	77,426 59	104,302 13	94,588 16	316 26	.....	.....	9,371 25	104,275 67	26 46
A. J. Smith.....	4,403 48	134,473 99	138,877 47	34,318 99	.....	.....	.....	44,558 48	78,877 47	60,000 00
N. W. Brown.....	7,569 90	87,366 96	94,936 86	84,370 96	463 02	147 00	.....	202 11	85,183 09	9,753 77
A. S. Johnston*.....	16,057 43	38,876 45	54,933 88	43,086 54	271 46	24 00	.....	11,551 88	54,933 88	.....
J. R. Hagner.....	8,830 19	129,501 47	138,331 66	128,883 64	.....	45 00	.....	998 55	129,927 19	8,404 47
B. W. Brice.....	1,474 94	271,933 11	273,408 05	108,046 27	686 81	207 00	.....	151,697 28	260,637 36	12,770 69
Cary H. Fry.....	19,502 75	145,538 62	165,041 37	140,402 83	.....	.....	.....	.....	140,402 83	24,638 54
Benj. Alvord.....	.....	176,672 49	176,672 49	68,922 28	69,922 61	.....	.....	1,015 16	139,860 05	36,812 44
R. H. Chilton.....	.....	110,246 39	110,246 39	56,461 41	.....	60 00	44,083 86	250 60	100,855 87	9,390 52
F. E. Hunt.....	.....	20,000 00	20,000 00	18,333 20	.....	.....	.....	.....	18,338 20	1,661 80
R. Ingalls, (special).....	.....	24,323 56	24,323 56	20,706 23	.....	.....	.....	3,617 33	24,323 56	.....
	315,638 33	4,526,253 48	4,841,891 81	2,700,186 06	156,753 94	6,650 96	80,495 55	1,148,747 52	4,092,834 03	749,057 78

PAYMASTER GENERAL'S OFFICE, November 20, 1855.

* Resigned.

BENJ. F. LARNED, Paymaster General.

SECRETARY OF WAR.

173

REPORT OF THE SURGEON GENERAL.

SURGEON GENERAL'S OFFICE,
November 10, 1855.

SIR: I have the honor to submit to you a report on the financial and other transactions of the Medical department of the army during the fiscal year ending on the 30th of June, 1855.

The amount of the appropriation for the Medical and Hospital department remaining on the 30th of June, 1854, was—

In the hands of disbursing agents	\$4,911 66	
In the Treasury of the United States	31,399 67	
Amount appropriated per act approved August 5, 1854.....	51,240 00	
Amount refunded into the Treasury.....	289 18	
		\$87,840 51
Of this sum there has been expended on account of pay, and other claims of private physicians contracted in—		
1847	\$2,165 83	
1848	1,401 45	
1849	595 17	
1850	1,361 18	
1851	896 60	
1852	339 56	
1853	1,126 90	
1854	3,575 11	
1855	8,132 46	
		19,594 26
On account of medical supplies, &c , contracted in—		
1841	27 75	
1846	28 25	
1848	335 12	
1849	161 32	
1850	421 75	
1851	899 37	
1852	245 43	
1853	143 92	
1854	9,598 17	
1855	31,091 74	
		42,952 82
Amount transferred by order of Secretary of War from the appropriation for raising four new regiments per act 3d March, 1855.....		10,000 00
Of this last sum there was expended on account of medical supplies, &c., &c.....		10,000 00
Leaving in the hands of disbursing agents.....	\$7,160 93	
And in the Treasury of the United States.....	18,132 45	
		25,293 43
	97,840 51	97,840 51

It appears from the preceding tabular statement, that the entire amount of funds available for the service of the Medical and Hospital

department of the army, during the fiscal year ending June 30, 1855, was ninety-seven thousand eight hundred and forty dollars and fifty-one cents, (\$97,840 51); and that the total expenditure amounted to seventy-two thousand five hundred and forty-seven dollars and eight cents, (\$72,547 08); leaving a balance applicable to the service of the present year of twenty-five thousand two hundred and ninety-three dollars and forty-three cents, (\$25,293 43.)

Of the whole sum expended during the year, nineteen thousand five hundred and ninety-four dollars and twenty-six cents (\$19,594 26) were paid on account of the pay and other claims of private physicians; and fifty-two thousand nine hundred and fifty-two dollars and eighty-two cents (\$52,952 82) on account of medical and hospital supplies; ten thousand dollars of which were expended exclusively for the four new regiments created by the last Congress.

An abundant supply of medical and hospital stores of good quality has been regularly provided by the medical purveyors at New York and New Orleans, and distributed in due time to the various military posts, and to the troops in the field; while reserved supplies have been kept at three or four of the important distant military depots to meet the special requisitions from the surgeons of the military stations around, to provide for newly established posts, and to furnish supplies to troops temporarily employed in the field.

I avail myself of this occasion to advert to the losses which annually accrue to the government from damage done to, and the actual destruction of very costly medicines, surgical instruments, &c., &c., while in transitu from the original place of supply to the different military depots, and thence to the various distant military stations, severally in Texas, New Mexico, California, and Oregon.

The captains of sail-vessels, nor of steamers, nor the conductors of railroad cars, can be made to understand that medical supplies, particularly the tinctures and other fluids, are very destructible and very perishable, as well as very costly things, and that they must be handled with care, and secured from exposure to the inclemency of the weather to prevent the total loss of, or damage to, the various delicate articles of supply contained in glass vessels, or in mere wrappers of paper. And even after these medical stores get into the hands and under the control of the subordinate agents and employés of the government, such as special and temporary storekeepers, wagon-masters, conductors of pack-horsemen, down to the teamsters and the muleteers, the liability to damage and destruction is the same, and this without the privilege on my part to exact, or power to enforce, remuneration or redress.

These people, not feeling themselves under special obligations to bestow greater care and attention upon packages of medical supplies than ordinary articles of freight intrusted to their charge, toss about casks and kegs of wine and brandy the same as they do barrels of flour and pork, and handle a box containing the choicest medicines as roughly and as recklessly as if they were boxes of camp-kettles and mess-pans, or a bundle of spades and pick-axes; and thus destruction is brought about which is frequently unknown to us until the packages reach their final

destination, and when it is often too late to have the damaged and destroyed articles renewed.

In making these remarks, I do not mean to convey the idea that this evil is increasing; on the contrary, I am pleased to have it to say, that, as far as we have yet learned, the losses are less frequent this year than usual. But these losses have heretofore accrued, as I believe, from other causes than unavoidable accident, sometimes to the great embarrassment of the service; and they will inevitably occur again, unless a more rigid system of responsibility is established, and a still greater observance of care and attention is enforced upon the carriers of the medical supplies for the army.

The annual report of the sick and wounded of the army for the year ending the 30th of June, 1855, as presented in the tabular statement herewith transmitted, exhibits the following, as its more prominent statistical results:

The number of officers and enlisted men remaining on the sick report on the 30th of June, 1854, was 571, (271 "sick," and 300 convalescent;) and the number of cases of disease which occurred during the twelve succeeding months was 30,428; making an aggregate of 30,999 cases that have been under medical treatment during the year ending on the 30th June, 1855.

Of the whole number of sick, 29,532, "returned to duty," 24 were placed "on furlough," 191 were "discharged service," 41 "deserted," and 309 "died," leaving 457 "sick," and 447 "convalescents," still under medical treatment.

The mean strength of the army for the year ending on the 30th of June last, was, according to the returns in this office, 9,367; and as the number of cases of sickness reported for the same period was 30,428, the relative proportion of cases of disease to the number of officers and enlisted men was 3.25 to 1; so that on an average each individual was sick three and one-fourth times during the year.

From the same data it also appears that the ratio of deaths to the number of officers and men was 1 to 30.31, or 3.30 per cent.; and the proportion of deaths to the number of cases of disease treated during the year was 1 to 100.32, or 0.96 per cent.

In the branch of meteorology much has been done within the past year, and I take pleasure in reporting that the subject appears to be exciting a stronger interest in the minds of our medical officers, and greater zeal has been awakened for further researches, with the hope of new developments.

I stated in my last annual report that the observations for eight years (from 1843 to 1850, inclusive) had been prepared for the press, in a form to correspond with the previous volumes issued by the department, and it was at that time my purpose to publish them at once; but the value of the more extended observations of late years, covering so great an area of our country entirely unexplored in this branch of science, induced me to defer the publication until the results of the last five years could be similarly prepared and added to the volume.

It was at the same time determined to change the form and mode of presenting the observations to the public, so as to be more available

for ready use, and to include much valuable data not heretofore appearing in print. The value of the work has been much enhanced by the addition of thermal and rain charts, and by consolidated temperature and rain tables, embracing all the records of this office in these particulars. All these changes in the plan of publication have caused a delay in its issue from the press, more than compensated, however, by its greater value. It is expected, in a few weeks more the entire edition will be ready for distribution, and I feel assured that it will be received with that confidence to which its inherent merit justly entitles it, and that it will reflect much credit upon the officers of the medical staff of the army, who have been, as a corps, for thirty-six years patiently collecting the facts embraced therein.

The hours of observation and the form of noting them in the meteorological registers have recently been changed, and new instruments or set of apparatus adopted with a view of diminishing the labor of the observer and computer, and at the same time giving a more practical character to the results. The particular change referred to in the time of observation has been in reverting to the former hours established by the department, to wit: 7 a. m., 2 p. m., and 9 p. m., instead of the four observations at "sunrise," "9 a. m.," "3 p. m.," and "9 p. m.," it having been found by the experience of late years that the mean of the three periods now adopted approximates more nearly to the true daily mean, than that which is obtained from the sunrise and 3 p. m. observations, under the recent system of observation embracing four periods a day.

In April last, a board of surgeons of the army was convened in the city of New York, for the examination of assistant surgeons for promotion. Five of these were examined, and as they all came up to the standard of merit prescribed, they were accordingly placed on the list for advancement to the higher grade of full surgeon.

Of the fifteen candidates for the appointment of assistant surgeon, approved by the board of examiners of 1853, eight only have yet been commissioned, leaving seven still awaiting an appointment to the medical staff of the army.

The duty again devolves upon me to report that the numerical strength of the medical corps of the army is not sufficient to meet the requirements of the service. It may appear at a first glance that ninety-four medical officers should suffice for an army of nineteen regiments and corps of the line, with the necessary officers and men of the staff departments, the whole force numbering 17,861 men; but upon an examination into the matter, it will be found that the corps, with its present number, does not and cannot give the necessary medical aid to all the troops dispersed throughout our very widely extended territory.

The number of physicians required does not depend upon the numerical force of the army, but upon the manner in which it is employed: that is, upon the divisions and subdivisions it has to undergo, and the particular service in which it is engaged.

One surgeon and two assistant surgeons will suffice for one regiment or corps of ten companies, or a thousand men; these three officers

may also serve that corps divided into three battalions; but they cannot possibly render the necessary medical aid to the ten companies of the corps, each company occupying a separate post, the one twenty miles distant from the other.

Our army is spread all over the country, from the Atlantic to the Pacific ocean, occupying eighty-nine military posts and arsenals, each station requiring one physician, and some of them two.

To supply medical officers to the military posts garrisoned by troops of the line, and furnish the necessary complement of physicians to serve with detachments of men constantly operating in the field, would exhaust the whole number of our regular medical corps, ninety-four in number, were they all efficient and present for duty; leaving us to supply medical aid to troops passing, in transports or by land, from one section of country to another; to the officers and men stationed in the large cities, on staff and other duties; to the many forts on the Atlantic, not garrisoned, but held in charge by a few engineers and ordnance men; and to the various recruiting rendezvous, as best we can, under contract by the month, or by the day and the visit.

Officers of the medical department, however, get sick as well as other people; they are also entitled to occasional relaxation from duty, like other officers; and again, they have a claim, the same as the officers of the line and other staff departments of the army, to the indulgence of a leave of absence from duty, to visit their families and friends, and to attend to important private business.

With the aged and permanently disabled officers, and the sick, together with those entitled to leaves of absence, our force of ninety-four surgeons and assistant surgeons may be considered as reduced, on an average, eight or ten per cent., or to eighty-five effective men for duty. At this time, however, there is but one medical officer on leave of absence; and this one has just now returned from a six years' tour of service in the department of the Pacific.

Within the last three years there has been paid out, on account of the employment of private physicians, seventy-two thousand five hundred and twenty dollars, (\$72,520) averaging twenty four thousand one hundred and seventy-three dollars (\$24,173) per annum; this last sum being about the amount of the annual pay of twenty-four assistant surgeons of the army.

Now, as we have to expend annually, for extra medical attendance, twenty-four thousand dollars and more, or the sum of the pay and emoluments of twenty-four medical officers of the army, the question arises whether we shall pay out this money to private physicians, unknown to us, and employed on the spur of the occasion, instead of regularly instructed and disciplined medical officers, who have been examined by competent persons, and found qualified morally and physically, as well as professionally, for the practice of physic and surgery in the army.

I avail myself of this occasion, also, to call the attention of the Department of War to two other measures which are highly essential to the proper organization of the corps, and efficient administration of

the affairs of the medical department of the army, and the adoption of which I have repeatedly urged in former reports.

The first is the enlistment of a certain number of qualified persons to serve specially as hospital stewards. The duties devolving upon hospital stewards are varied, responsible, and often confidential, as between physician and patient.

In consequence of the relative disproportion between the numerical force of the medical staff and the number of military posts occupied by troops, there are very few stations to which more than one medical officer can be assigned; so that the assistant surgeons are, almost without exception, performing the duties of surgeons, and there necessarily devolve upon the hospital stewards certain duties which, under other circumstances, properly pertain to assistant surgeons: such as responsibility for the proper preparation, distribution, and administration of medicines prescribed; and the immediate charge and direction of the nurses and attendants, &c., &c. It is manifest that the interests of the service require that none but steady, sober, and intelligent men be selected for this position; and if provision were made for securing the services of such men, they would, in a short time, be competent to supply, temporarily, the place of a medical officer incapacitated by sickness, or suddenly removed by death. At present, hospital stewards are detailed from the rank and file of the army; and as it is as much the interest of the captain of a company to retain his best men, as it is that of the medical officer to secure their services, it is frequently impossible to reconcile these conflicting interests, and the practice often leads to unpleasant differences between the surgeon and the commandant of the post, or of the company. Another forcible objection to the present system is, that in the frequent movements of troops from one point to another, the soldier detailed as hospital steward is required to go with his company; so that the medical officer has no sooner instructed one man in the duties peculiar to that office, than he has to renew the same process with another.

When a soldier is detailed as hospital steward, and serves at a post garrisoned by less than four companies, he is, by existing laws and regulations, entitled to receive the pay and emoluments per month of a first sergeant of infantry; and if assigned to duty to a post occupied by four or more companies, or is serving with a body of troops in the field, he is entitled to the pay and emoluments of an ordnance sergeant.

I would, therefore, recommend that persons enlisted as hospital stewards be brought into the service as non-commissioned staff officers, having the rank and pay of a first sergeant, and that their number be determined from time to time by the Secretary of War, but in no case to exceed the number of military posts actually occupied by troops.

It is also suggested that the original appointments be given to soldiers who have already proved themselves competent to the discharge of those duties, leaving the vacancies, as they occur, to be filled either by new enlistments, or by further appointments from the rank and file of the army.

The second point to which your attention is invited, is the making of some provision by which to requite hospital nurses and attendants

for the laborious and loathsome duties they have to perform, and in consideration of their frequent exposure to contagious diseases.

The following extract from my last annual report embodies my views in this particular:

"That soldiers acting as nurses and attendants in hospitals be allowed the extra pay authorized to other soldiers on fatigue duty by 'An act approved March 2, 1819,' the provisions of which were extended by 'An act to increase the pay of the rank and file of the army,' &c., approved August 4, 1854, by which soldiers employed on 'constant labor of not less than ten days are entitled to receive twenty-five cents per day at stations east of, and thirty-five cents per day at stations west of, the Rocky mountains.'"

The act of Congress just quoted granting additional compensation to soldiers "on constant labor for not less than ten days," was intended to embrace, as I verily believe, the soldiers acting as cooks and nurses in hospitals, as well as those employed in the Quartermaster's and Subsistence departments, or other staff departments of the army.

The object of the law was to reward the soldiers who were taken from company duty, or military duty *proper*, and placed on extra duty or constant labor for the period of at least ten days; and how it came to pass that hospital attendants, serving faithfully at hard labor by day and night for months consecutively, were by a forced construction of the law construed out of their well-earned compensation, I cannot understand.

The time was once when the hospital attendants were regularly mustered as a body of men, and received the extra compensation accorded to other soldiers on extra service or constant labor.

Paymaster Benjamin F. Larned, now the Paymaster General of the army, was wont to measure out justice with an even hand to these as well as other soldiers taken from the regular line of military duty and placed on service with the staff departments. And these payments were made for years without a question being raised as to the legality of the proceeding, until at last a clerk in the Treasury Department, more learned in the law than his predecessors at the desk, and less careful of other people's rights, perhaps, than of his own, found out that service in hospitals was not labor, and checked the accounts of the paymasters, just then under examination, by the amount of payments made on extra rolls to the hospital attendants.

From that time to the present moment the extra pay for extra service and labor has been withheld from the faithful, patient, and untiring nurse, while it has been lavished upon other soldiers not a jot more worthy of reward.

By what authority or by whose order the paymasters were prohibited to make these payments I have not to this day learned; but, that the first move on the chess-board was made by an eagle-eyed officer of the Treasury Department, there can be no doubt.

While defending (as I think I have a right to do) the claims of the men who faithfully serve in the staff department of the army of which I am the chief, I cannot refrain from expressing the opinion, that if the claim of a soldier to extra pay depends upon the amount of constant

labor and disagreeable duty he has frequently to perform, the hospital attendant has a clear right to the additional compensation guarantied by the acts of Congress approved March 2, 1819, and August 4, 1854.

Again, if the eligibility of the hospital attendant to receive extra pay is dependent upon the interpretation of the law given by the Secretary of War or other proper authority for the time being, it may be well to inquire how far the last construction of the law governing the matter (for there have been different versions of the law put forth under different administrations of the Department of War) should prevail over the interpretation given and acted upon in the good old times of yore.

Upon a second thought, however, it strikes me as being a rule of more than doubtful policy to reopen questions already decided by competent authority, inasmuch as it may lead to an interminable business of reconsideration of, and retraction upon, matters and things long since put to rest.

I would, therefore, rather ask for a new and special act of Congress to meet the case immediately under discussion, as well as that involving the right of assistant surgeons to the same allowance for forage for horses as is accorded to officers of the line of the army with whom they are assimilated in rank, and with whom they equally enjoy the other perquisites of office.

In conclusion, I beg leave to say that the doctrine which seems nowadays to obtain, viz: that nurses and physicians ministering to the body, as well as the high personages of the church who administer to the soul of man, have to look for their reward in Heaven for the good deeds done in this world, may be very consolatory, very satisfactory, and even very flattering to some of us of the craft, particularly as it brings us somewhat in juxtaposition with the pure members of the hierarchy. There are other persons, however, and among them soldiers of the army, faithfully laboring by day and by night as nurses in our hospitals, who cannot brook the idea of being placed beyond the pale of rightful consideration accorded to soldiers employed in making a bridge or cutting a road, and who cannot be brought to believe otherwise than that they might as well receive a portion, if not their full measure, of recompense on earth here below, and take their chance for higher and more permanent reward in another and a better world.

All of which is respectfully submitted.

TH. LAWSON,
Surgeon General.

HON. JEFFERSON DAVIS,
Secretary of War.

Annual report of the sick and wounded of the army of the United States for the year ending June 30, 1855.

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Quarters.	REMAINING LAST REPORT,			TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.												
	Sick.	Convalescent.	Total.	Fevers.							Eruptive fevers.					
				Febris continua com- munis.	Febris intermittens quotidiana.	Febris intermittens tertiana.	Febris intermittens quartana.	Febris remittens.	Febris typhus.	Febris typhus icte- redes.	Erysipelas.	Rubeola.	Scarlatina.	Varicella.	Varicoid.	Vaccina.
September 30, 1854.....				39	784	739	31	151	3	42	1	.....	.....	1	7	.....
December 31, 1854.....				20	987	594	7	138	8	6	3	.....	1	7	2	1
March 31, 1855.....				17	633	515	7	44	15	.....	12	2	3	5	7	2
June 30, 1855.....				71	622	520	8	95	13	.....	6	.....	1	6	.....	3
Grand total.....	271	300	571	147	3,031	2,368	53	428	39	48	22	2	5	19	16	6
Causes of death.....				4	2	.....	.....	8	10	20	.....	.....	1	.....	.....	.....

REPORT OF THE

Annual report of the sick and wounded of the army—Continued.

Quarters:	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																
	Diseases of the organs connected with the digestive system.																
	Cholera.	Colica.	Cynanche parotidæa.	Diarrhœa.	Dysenteria acuta.	Dysenteria chronica.	Dyspepsia.	Enteritis.	Gastritis.	Hæmatemesis.	Hepatitis acuta.	Hepatitis chronica.	Icterus.	Obstipatio.	Peritonitis.	Tonsillitis.	Cholera epidemic.
September 30, 1854.....	64	98	.....	1, 138	214	10	33	5	12	1	4	.....	1	301	1	27	68
December 31, 1854.....	10	70	.....	948	184	17	14	4	4	1	3	4	13	337	1	51	7
March 31, 1855.....	7	58	9	832	141	9	22	5	14	2	3	.....	4	307	1	130	5
June 30, 1855.....	59	99	20	1, 485	423	51	49	2	8	2	1	3	4	479	.....	83	371
Grand total.....	140	325	29	4, 403	962	87	118	16	38	6	11	7	22	1, 424	3	291	451
Causes of death....	3	4	.....	16	9	8	.....	5	1	.....	.....	1	.....	.....	2	1	104

SECRETARY OF WAR.

Annual report of the sick and wounded of the army—Continued.

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Quarters,	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																						
	The respiratory system.											The brain and nervous system.											
	Asthma.	Bronchitis acuta.	Bronchitis chronica.	Catarrhus.	Hæmoptysis.	Laryngitis.	Phthisis pulmonalis.	Pleuritis.	Pneumonia.	Influenza.	All other diseases.	Apoplexia.	Cephalalgia.	Delirium tremens.	Epilepsia.	Mania.	Melancholia.	Meningitis.	Neuralgia.	Paralysis.	Tetanus.	Ictus solis.	All other diseases.
September 30, 1854.....	9	16	5	228	5	1	11	16	10	....	....	4	87	27	9	7	1	1	31	....	....	6	2
December 31, 1854.....	5	57	6	596	5	2	6	16	21	1	....	2	73	26	6	2	1	....	24	2	....	....	1
March 31, 1855.....	3	157	4	1,356	....	6	4	48	68	27	....	3	60	32	14	1	3	....	30	3	1	....	5
June 30, 1855.....	5	91	23	582	5	11	4	48	56	22	1	5	123	27	18	3	1	....	21	1	....	2	5
Grand total.....	22	321	38	2,762	15	20	25	128	155	50	1	14	343	112	47	13	6	1	106	6	1	8	8
Causes of death....	....	3	....	.....	1	....	14	1	23	....	....	4	.....	12	1	1	....	.....	.....	2	....	....	3

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																						
	The urinary and genital organs.													The serous exhalent vessels.					The fibrous and muscular structures.				
	Calculus.	Cystitis.	Diabetes.	Enuresis.	Gonorrhœa.	Ischuria et dysuria.	Nephritis.	Orchitis.	Stricture urethræ.	Syphilis primitiva.	Syphilis consecutiva.	Ulcer penis non syphiliticum.	All other diseases.	Anasarca.	Ascites.	Hydrocele.	Hydrothorax.	All other diseases.	Pernio.	Podagra.	Rheumatismus acutus.	Rheumatismus chronicus.	All other diseases.
September 30, 1854.....	.....	.....	.....	1	110	5	3	20	6	58	23	4	.....	1	1	.....	1	1	3	1	127	38	.....
December 31, 1854.....	.....	2	3	.....	134	2	5	19	2	75	18	3	6	1	3	1	.....	.....	13	1	152	54	.....
March 31, 1855.....	.....	1	1	.....	137	6	.....	27	4	63	23	2	5	.....	2	.....	.....	.....	56	.....	210	76	.....
June 30, 1855.....	1	.....	1	.....	156	2	3	38	5	87	30	.....	14	4	.....	1	1	.....	1	1	240	106	3
Grand total.....	1	3	5	1	537	15	11	104	17	283	94	9	25	6	6	2	2	1	73	3	729	274	3
Causes of death.....							1								2		1				1		

Annual report of the sick and wounded of the army—Continued.

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Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																	
	Abscesses and ulcers.					Wounds and injuries.												
	Fistula.	Phlegmon et abscessus.	Ulcus.			Ambustio.	Amputatio.	Concussio cerebri.	Contusio.	Fractura.	Luxatio.	Punitio.	Subluxatio.	Vulnus incisum.	Vulnus laceratum.	Vulnus punctum.	Vulnus sclopeticum.	Vulnus contusum.
September 30, 1854.....	1	487	108	.....	.....	17	2	4	317	13	20	....	115	101	32	46	36	6
December 30, 1854.	2	400	97	.....	.....	25	5	8	473	13	5	1	135	78	52	20	20	9
March 31, 1855	3	435	107	.....	.....	35	1	4	465	14	12	2	139	161	56	35	21	12
June 30, 1855.....	1	466	102	.....	.....	29	2	3	446	13	12	6	131	137	51	38	23	18
Grand total.....	7	1,788	414	.....	.....	106	10	19	1,701	53	49	9	520	477	191	139	100	45
Causes of death.....	....	1	2	.....	.....	1	.....	.....	.....	3	.....	.....	.....	.....	8	6	1	2

REPORT OF THE

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																						
	All other diseases.																						
	Amaurosis.	Aneurisma.	Angina pectoris.	Atrophia.	Cachexia.	Debilitas.	Ebrietas.	Exostosis.	Hæmorrois.	Hemeralopia et nyc- talopia.	Hernia.	Morbi cutis.	Morsus serpentis.	Necrosis.	Odontalgia.	Ophthalmia.	Otitis.	Pericarditis.	Prolapsus ani.	Schirrus.	Scorbutus.	Scrofula.	Splenitis.
September 30, 1854 .....	.....	.....	2	1	1	78	87	2	42	7	7	70	3	.....	44	89	29	3	.....	.....	49	3	1
December 31, 1854.....	.....	1	2	.....	.....	88	71	.....	45	4	7	25	.....	.....	62	86	22	.....	.....	.....	53	3	3
March 31, 1855.....	4	1	3	.....	.....	77	82	.....	27	15	6	39	.....	1	63	97	27	1	.....	.....	93	2	3
June 30, 1855	4	1	3	.....	.....	144	75	.....	44	9	12	37	7	1	84	136	20	2	1	.....	191	6	5
Grand total	8	3	10	1	1	387	315	2	158	35	32	171	10	2	253	408	98	6	1	.....	386	14	12
Causes of death .....	.....	.....	.....	.....	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....

Annual report of the sick and wounded of the army—Continued.

[illegible]

Annual report of the sick and wounded of the army—Continued.

Quarters.	MEAN STRENGTH.		
	Officers.	Enlisted men.	Total.
September 30, 1854.....	460	7,402	7,862
December 31, 1854.....	497	8,472	8,969
March 31, 1855.....	551	8,913	9,464
June 30, 1855.....	520	10,652	11,172
Aggregate .....	.....	.....	37,467
Average.....	.....	.....	9,367

TH. LAWSON, Surgeon General.

REPORT OF THE COLONEL OF ENGINEERS.

ENGINEER DEPARTMENT,
Washington, November 24, 1855.

SIR: I have the honor to hand you my annual statement of the progress of operations and the condition of works under this department.

FORTIFICATIONS.

Referring to a statement that follows for the condition of the several military works in charge of the Engineer department, I shall here say but little on the general subject, and those few words will be little else than a repetition of remarks heretofore frequently presented by me.

In each one of the seventeen years that I have been at the head of this branch of the military service, I have strenuously pressed for means to prosecute rapidly to completion our military defences; and, had Congress thought proper to grant the sums asked for for that object, all the most important points on the Atlantic coast would now be well secured. If, therefore, circumstances of peril should awaken the nation to a sense of the backwardness of defensive preparations at any important places, it must be understood that the Engineer department is in no sense responsible for the delay. It is to be hoped, however, that time enough may still remain—that *time* which is as indispensable as money.

Efficient defence against such attacks as war with a great nation would throw upon our shores, cannot be quickly erected. While a state of war would no doubt be fruitful of many defensive expedients, all such should be confided in only as auxiliaries; however valuable some might be as auxiliaries, they must not be looked to as a reliance. They would rarely be ready for an enterprising enemy, and, if prepared in time, would most assuredly be inadequate to resist the power of modern warfare. The fundamental necessity is the preparation, in time of peace, of an adequate permanent defence; that is to say, a defence that, once prepared, will be always ready, leaving to the spirit of the hour the auxiliary means that a few hours can supply.

We have had ample proof lately that, within a very brief period, and out of the preparations of profound peace, great expeditions—greater than the world ever saw before—can be despatched to the most distant lands. It is only in a state of peace that we can provide means adequate to resist such expeditions.

We have also had the most conclusive demonstrations that reliance on fortifications duly prepared in time of peace, is a *sure* reliance.

It has also been shown to us that, while all great objects must be

prepared to resist great enterprises, lesser objects, that have value enough to excite the cupidity of an enemy, will need defences according to their value. It is even likely to happen, as we have also seen, that the successful defence of important places will turn off the repulsed force in fragments, to avenge itself upon the less valuable and weaker. While, therefore, we should, of course, apply our main efforts to the security of our great objects, the considerations just adduced show that none of our existing defences, even if they cover places of secondary importance, should fall under neglect—all being put and maintained in the best condition for service. Every harbor on our coast accessible to sea-going vessels, has a value much beyond what can be claimed by the towns or establishments upon its shores; because every such harbor will become, in an active war, the frequent place of refuge of our merchantmen, privateers, and men-of-war.

The recent introduction into maritime war of greatly enlarged calibres, will make it necessary to reform to a considerable extent the armament of our seacoast fortifications of all classes. A special board of officers having, under your directions, made a new assignment of calibres to these works, the modifications in the fortifications required by the changes in the armament—which cannot be made too soon—should be provided for by a considerable augmentation of the usual grant for contingencies of fortifications.

I must again call attention to the necessity of providing, by special appropriations, for the commencement of a fortification at the entrance of *New Bedford harbor*; another at *Sandy Hook, N. J.*, outlet of New York harbor; and a third on *Ship island, Miss.*

I refer to the reasons I have heretofore repeatedly presented in support of these several propositions, as still applicable, and as being more and more urgent, as the interests to be protected at these several places have swelled in number and value.

Mention will be made, in the proper place, of the progress achieved in the defensive works at the entrance to San Francisco bay, on the Pacific coast. Nothing has been done, beyond what was last year reported, as to additional defences on that coast, excepting that the board of engineers there have been engaged, as far as their other occupations would allow, in the preparation of plans for other important positions on the bay above mentioned; and it is expected that before long it will be my duty to ask authority for the commencement of one or more additional fortifications there.

The observations made last year as to other points on that coast, are no less applicable now.

Fort Mackinac, Michigan.—It has not been possible to spare an engineer officer for the repairs required by this fort.

Fort Wayne, Detroit, Michigan.—A small amount, from contingencies of fortifications, has been expended on this fort, which is in good condition. The buildings are in the same unfinished condition as reported last year.

Fort Porter, near Buffalo, New York.—Some small operations necessary to maintain the tower in good condition have been executed; others of like nature have to be taken in hand, together with some repairs on the officers' quarters.

Balance in the hand of agent October 1, 1855 \$16,141 22

Fort Niagara, New York.—A number of repairs and renewals have been made during the year; stone pintle-blocks and traverse-circles, cribs for shore protection, and portions of the timber-scarp, revetment being the principal.

Balance in the treasury October 1, 1855 \$6,379 00

Probable amount to be expended by June 30, 1856..... 6,379 00

Fort Ontario, Oswego, New York.—Nothing has been done during the year. On examination early in the year, the timber revetment of the scarp was found to be more decayed than was anticipated, and will require extensive renewal; several of the wooden gun-platforms also require renewal. Stone pintle-blocks and traverse-circles are also needed.

If an engineer officer or two could be spared to overlook these works on the northern frontier, a state of efficiency could be maintained in all at much less expense than now, when they can be visited only hastily and at long intervals; which is all that the restricted number of officers will permit.

Fort Montgomery, Rouse's Point, New York.—The operations of the season have been as follows: on *curtain IV*, the piers and face of parade-wall raised 19 feet and completed; the scarp and parapet raised 10 feet; 20 casemate and communication arches turned, and partially floored and roofed. In *bastion D*, the walls and piers of the lower magazines carried up about 9 feet from the top of foundation. In the ditch, 1,800 yards of earth excavated to the reference (0'), and embanked on the cover-face, 279 piles driven, capped, and grillaged, and 500 running feet of counter-scarp wall carried up three courses. The total amount of masonry in these items is 1,522 yards. In addition, there have been made considerable repairs and renewals of machinery, &c., rendered necessary by the suspension of operations since June, 1851.

Balance in treasury October 1, 1855 \$11,284 96

Probable amount to be expended by June 30, 1856..... 11,284 96

Estimate of the amount required to be appropriated for the fiscal year ending June 30, 1857 25,000 00

Fort Knox, Narrows of Penobscot, Maine.—The work done during the year is as follows: 4,707 cubic yards of stone-masonry laid in the scarp, counter-scarp, foundation of piers, and traverses of batteries A and B; 661 yards of dry stone-masonry in rear of counter-scarp; 369 of brick-masonry, in cisterns, drains, arches of counter-scarp, gallery and flanking casemates; 508 of concrete in foundations and covering of arches; 1,165 of rock excavation, for drains, cisterns, and founda-

tions; 2,198 of earth removed, for foundations of piers, drains, and cisterns; 6,948 of earth embanked in south and west glacis, and between piers of main work.

Much of the labors of the present season have been devoted to foundations and other underground structures, which are now nearly all finished; leaving the work in a most favorable condition for rapid progress.

Balance in treasury October 1, 1855	\$20,000 00
Probable amount to be expended by June 30, 1856	20,000 00
Estimate of amount required to be appropriated for fiscal year ending June 30, 1857	60,000 00

Fort Preble, Portland harbor, Maine.—The defences at this fort are about in as good condition as last year, having undergone but little change during the past twelve months. The sea-wall, wharf, buildings, and fences require renewal or repair.

Balance in treasury October 1, 1855	\$1,000 00
Probable amount to be expended by June 30, 1856	1,000 00

Fort Scammel, Portland harbor, Maine.—No material change has taken place at this work since last report. Some work is to be done on the rampart, gates to be hung, and repairs and readjustments to be made.

Fort Constitution, Portsmouth harbor, New Hampshire.—This fort is in a serviceable condition. Pointing, repairing, and readjusting are required; and the buildings are considerably out of order.

Fort McClary, Portsmouth harbor, New Hampshire.—This work is in pretty good condition. The lapse of time renders repairs on most of the buildings necessary.

Fort Winthrop, Boston harbor, Massachusetts.—The excavations for the foundation of the scarp-wall have been finished; the concrete foundation laid, and the superstructure erected thereon to a height of twenty and a half feet. These operations include 705 cubic yards of earth removed, 60 yards of concrete and 61 yards of stone masonry in foundations, and 1,167 yards of stone masonry in superstructure.

Work on the scarp-wall will be continued to the end of the present season and next year, with the aid of the appropriation asked, towards completing the masonry of the body of the place.

Estimate of the amount required to be appropriated for the fiscal year ending 30th June, 1857	\$10,000 00
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Fort Independence, Boston harbor, Massachusetts.—Certain operations are necessary here which have been deferred because difficult to carry on in the presence of the garrison, and because an engineer officer could not be spared to give them his personal attention.

Balance in the treasury 1st October, 1855	\$10,000 00
Probable amount to be expended by 30th June, 1856	

Fort Warren Boston harbor, Massachusetts.—All the breast-height walls are completed, except that on curtain of front No. 2—stone for which is on hand and in part prepared for laying.

The casemate quarters for soldiers, viz: ten on front No. 1, each 30 by 17 feet, and ten on curtain of front No. 2, each 50 by 18 feet, are nearly ready for plastering, as are also those for officers on curtain No. 3, comprising, besides the requisite halls and passages, thirty-two large rooms with fire-places, and twenty-four smaller rooms without fire-places.

All the pintle stones, for barbette guns bearing on the channels, are in place except thirteen on curtain No. 2.

The balance on hand, with the additional funds asked therefor, will be applied to complete the casemate quarters, and the arrangements for mounting guns on all the fronts, including the entire batteries; to build side-walks in front of quarters, for which most of the requisite materials are on hand; and to sundry miscellaneous work.

Balance in treasury 1st October, 1855.....	\$24,000 00
Balance in treasury 1st October, 1855, for site.....	10,000 00
Probable amount to be expended by 30th June, 1856.....	34,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1857.....	20,000 00

Fort Adams, Newport harbor, Rhode Island.—From lack of means, operations on this work were suspended from March, 1851, to May, 1855. During the present season, much has been done towards bringing the parapets, parade, ditches, and grounds into a state of good keeping, by clearing, mowing, loaming, and manuring; 1,550 running feet of breast-height slopes have been made good. The caponnier battery breast-height walls and most of the redoubt breast-heights have been pointed, and plastered with mastic and asphalt on the top, preparatory to sodding.

Repairs of the terreplein paving on the east-southeast fronts have been made. Some pointing has been done on the main scarp, and the counter-scarp of the redoubt and tower have been entirely pointed. Three banquet profile walls have been cut and laid on a small portion of the redoubt scarp.

An appropriation is required for carrying up and enclosing the six sets of permanent quarters begun in 1851, for continuing operations on the main work, and for completing the redoubt.

Balance in the treasury October 1, 1855.....	\$13,500 00
Probable amount to be expended by June 30, 1856.....	13,500 00

Fort Griswold, New London harbor, Connecticut.—Nothing has been done on the work, which is in good order.

Fort Trumbull, New London harbor, Connecticut.—Is also in good condition, nothing having been required there during the past year.

Fort Schuyler, East river, New York.—The police of this fort has been kept up by a fort-keeper, assisted at times by one or two men,

painting floors and iron-work of piazzas and galleries, roof of piazza, and cutting grass on the glacis and rampart slopes. A guard-house, oven, roof over stairways, and blinds to rear of casemates, &c., are to be constructed, and the sea-wall much damaged by a severe storm last fall needs extensive repairs; but it has not been possible to furnish an engineer officer to take charge of those labors.

Balance in the treasury October 1, 1855	\$38,499 56
Probable amount to be expended by June 30, 1856.....	38,499 56

Fort Wood, and sea-wall of Bedlow's island, New York harbor.—The services of one man have been applied as fort-keeper.

A new slate-roof has been put upon the hospital, and the plumbing work thoroughly repaired.

The cooking ranges in the soldiers' barracks and the roofs of the barracks and officers' quarters repaired, and the iron railway, stairs, and traverse circles, which were exposed to the weather, painted. The fort is now occupied by a detachment of recruits from Governor's island.

It needs completion in several important respects as regards efficiency and preservation.

Fort Richmond, Staten island, New York harbor.—The operations at this work during the past year have progressed favorably, as large a force being employed as could work advantageously. The building of the counter-scarp was commenced in the fall and continued during the winter, whenever the weather would admit.

Since spring opened the work has been confined chiefly to the arches covering the lower tier of casemates, and they are all completed with the exception of four conical arches and the arches of the two channel bastions.

It was proposed to build the permanent wharf this season, but the difficulty of procuring the stone in time has rendered it necessary to wait until spring before commencing. The preparation of these stones for laying has been commenced.

Balance in the treasury October 1, 1855	\$91,000 00
Probable amount to be expended by June 30, 1856.....	91,000 00
Estimate of amount required to be appropriated for the	
fiscal year ending June 30, 1857	75,000 00

Battery Hudson, Staten island, New York harbor.—The north magazine commenced last season was pushed forward rapidly, and by the beginning of winter the masonry, including the main brick arch, was nearly completed, together with the concrete and rough stone masonry over it. During the winter the floors were laid, interior lining finished, and the doors and window-blinds made and ready to be put up.

The south magazine, commenced last April, is also nearly completed. This magazine, as well as the north one, is perfectly dry and serviceable, though the roof covering still remains to be put on over the concrete.

It is of great importance to secure the rear of this and the other works

on Staten island, for which end the United States should be the owner of a controlling position on the high ground behind. This object has been in view for many years, and an opportunity now offers to purchase the necessary land. The price asked is considered reasonable, while the land is rising in value all the time. An appropriation is therefore now asked for the purpose.

Estimate of amount required to be appropriated for the
fiscal year ending June 30, 1857..... \$42,300 00

Fort Lafayette, New York harbor.—No appropriation is asked for this work at present. The change of armament will require some minor work to be done hereafter, and a new roof will soon be needed.

Governor's island, New York harbor.—The operations at this post during the past year have been confined chiefly to the construction and repair of quarters and barracks.

The appropriation for this purpose, however, not being available until after the 1st of July, but little was attempted early in the spring other than the repair of the permanent wharf, which had sustained some injury. In the month of June the work was commenced and pushed forward with energy, in order that the soldiers might be enabled to occupy their barracks before the weather became cold. New slated roofs, with new gutters, cornice, leaders, &c., have been put on the four brick buildings inside the fort, and two of these, the north and south, used as soldiers' barracks, have been thoroughly repaired, new floors laid, iron stairs and galleries put up, and are now occupied by the troops.

The two new buildings located outside the fort, on a line with the office and commanding officer's quarters, are both enclosed, and one of them nearly completed and ready to be occupied.

Fort Hamilton, New York harbor.—The operations at this work have consisted in finishing the cisterns commenced last year in the parade, repairing the window casings and blinds, closing the rear of the casemates on the water front, and also the grassed slopes facing the channel, which sustained some injury last winter.

The buildings outside the fort used for a hospital and for commanding officer's quarters are entirely unsuitable for these objects, and new ones should be erected, for which an appropriation of \$20,000 will be necessary.

Fort Mifflin, Delaware river.—Work at this position has been confined to some necessary strengthening of the banks and dikes enclosing the fort. No appropriation is asked at present.

Fort Delaware, Delaware river.—This fort, which is the main element of a full and proper system of defence of the passage up the Delaware river, has been pushed forward with much vigor since the last year's report. Now that its walls have risen above the wide basement given to its foundations, the progress of the work is visible from any direction. The filling in of the parade ground has

been completed. The piers and walls of the gun-rooms of the first tier of the fort are carried up to the height of the springing line of the covering arches. The work can, therefore, be reported to be in that state of forwardness, that it would only require some temporary and trifling arrangements to be made to enable it to receive at once all the guns destined for its first tier. Furthermore, if adequate appropriations are granted for a few years, this work is expected to be ready for its complete armament and a garrison by the autumn of 1858.

Balance in treasury October 1, 1855.....	\$80,000 00
Probable amount to be expended by June 30, 1856.....	80,000 00
Estimate of amount required to be appropriated for fiscal year ending June 30, 1857.....	150,000 00

Fort Carroll, Sollers' Point flats, Baltimore harbor.—The sea-wall, with the exception of the opening left in front 5, for the purpose of filling in the interior of the work, and 13 stones to be laid in the levelling course of front 6, has been completed. All the sections of the sea-wall have been filled with concrete, except two on front 5, at the opening, and seven sections on front 6; the latter it is expected to complete this month. During the year ending the 30th September, 722 pieces of cut granite have been laid, with the aid of the diving-bell, in the sea-wall. The piling of the foundation of the scarp walls and piers has been commenced, and 655 piles have been driven this season, exclusive of 101 piles driven for temporary wharves and fender piles. Arrangements have been entered into for the delivery of all the piles and grillage for the foundation, as also for the granite required for three courses of the scarp walls and piers, which will absorb the balance of the present appropriation.

Balance in the treasury on the 1st October, 1855.....	\$90,004 50
Probable amount to be expended by 30th June, 1856....	90,004 50
Estimate of amount required to be appropriated for fiscal year ending 30th June, 1857.....	150,000 00

Fort Madison, Annapolis harbor, Maryland.—The excavations and embankments of glacis ditch and parapet have been nearly completed; most of the sodding has been finished; ten traverse circles and seventeen pintle-blocks are laid; a wall built along the water-edge, and a brush dike made to protect the slopes from wash; gateway and drains built; the old fort demolished and its materials used in the new work; a post and board fence put up around the public grounds.

Balance in the hands of agent October 1, 1855.....	\$3,130 36
Probable amount to be expended by 30th June, 1856....	3,130 36

Fort Washington, Potomac river, Maryland.—This fort continues as reported last year. No work has been required thereon.

Fort Monroe, Old Point Comfort, Virginia.—In the magazines of front No. 6 the cellar floors, the plank floors, and the ventilators in the front wall, have been finished. The joists and ribs for facing have been put up, and the ceiling will soon be finished. Openings in the scarp for ventilators are in progress. The masonry of the mask of these

magazines is nearly finished. A new floor has been laid on the bridge of front No. 6. The part that had been commenced of the counter-scarp of the redoubt has been raised to the full height, and a sluice between the ditch and Mill creek is about two-thirds finished. The \$7,000 specifically appropriated for the wharf have been expended. Two of the ten detached piers of stone that were to form the pier-head have been laid. The materials for the remaining eight piers and for the platform are on hand and will be applied.

Balance in the treasury 1st October, 1855.....	\$65,000 00
Probable amount to be expended by 30th June, 1856....	58,500 00

Fort Calhoun, Hampton Roads, Virginia.—Mechanics commenced repairing and rebuilding barracks in May. Materials for this purpose could not be got sooner. The taking down the stone loading, and the piling it along the gorge, was begun in June.

Balance in the treasury October 1, 1855	\$20,000 00
Probable amount to be expended by June 30, 1856.....	20,000 00
Estimate of amount required to be appropriated for fiscal year ending June 30, 1857.....	50,000 00

Fort Macon, and preservation of its site, Beaufort harbor, North Carolina.—The appropriation of \$2,000 for repairs has been applied to repairs of quarters and embankments, and a small balance remains for other necessary work.

The appropriation of \$1,000 made for the site has been applied in the repairs of those jetties which most require it. The general condition of the site is good.

Fort Caswell, and preservation of its site, Smithville, North Carolina.—To make some small repairs regarded as of urgent necessity, the sum of \$330 has been advanced from the appropriation for "contingencies of fortifications."

This fort having been left many years to itself, now requires some other repairs, and a fence is much needed to keep off cattle. The condition of the site is excellent.

Repairs of Fort Moultrie, Charleston harbor, South Carolina.—The operations embrace replacing the decayed interior shingled slope of the parapet of the fort by a thin brick wall; putting new doors to the six small service magazines; readjusting inner parade; constructing and enlarging drains; building a new cistern without the fort, and putting up gutters to lead the water thereto; re-paving areas behind officers' quarters and soldiers' barracks; and making various slight repairs of the fort.

The balance of the appropriation will be applied to constructing a fifteen-feet shot-furnace, all the materials for which are on hand; putting down pintle centres and traverse circles of the columbiads designed for the new armament.

Balance in the treasury October 1, 1855.....	\$5,000 00
Probable amount to be expended by June 30, 1856.....	5,000 00

Preservation of the site of Fort Moultrie, Charleston harbor, South Carolina.—Materials have been procured and a large scow constructed for the erection of a new jettie designed for the more effectual protection of Sullivan's island, the building of which will be immediately commenced. Owing to the rise in the price of all materials since the estimate for the jettie was made, and to provide the means of repairing the old jetties, much damaged by the severe storm of September, 1854, an appropriation of \$8,000 is needed.

Balance in the treasury October 1, 1855	\$5,300 00
Probable amount to be expended by June 30, 1856.....	5,300 00

Fort Sumter, Charleston harbor, South Carolina.—The defences and accommodation for the garrison of this work have been much advanced. The operations of the year have been directed to completing the main or upper casemate arches, capping them with concrete; covering their roof-surfaces with asphalt; overlaying these latter with dry bricks, and turning the gutter arches in the valleys; finishing the stairway piers and parade wall; forming the barbette gun recesses in the parapet wall; asphaltting the interior of the scarp and parade walls above the casemate roofs; embanking the gorge terreplein, and laying the pintle centres of that front; building the entire masonry of the officers' quarters, putting in the floors and framing the roof; completing the walls of one of the soldiers' barracks, and covering it with a slate roof, and putting down the foundation piling and grillage, and erecting the entire masonry superstructure of the other; perfecting the drainage of the casemates and parade; repairing damages done to the sea-wall by the great gale of September, 1854; and attending to many minor but essential details of construction. The work remaining to be done is to turn the platform arches and form the scarp embrasures for the second tier of guns; embank the remaining terrepleins, and lay the pintle centres and traverse circles for the barbette guns; carry the brick parapet to its full height and put on its coping; complete the carpentry, plastering, &c., of quarters and barracks, and turn the floor arches of the latter; rebuild the bed of the permanent wharf; and attend to the various details belonging to the completion of the defences and accommodation of the garrison.

Balance in the treasury October 1, 1855	\$80,000 00
Probable amount to be expended by June 30, 1856.....	80,000 00
Estimate of amount required to be appropriated for fiscal	
year ending June 30, 1857	50,000 00

Preservation of the site of Fort Johnson, and repair of the wharf, Charleston harbor, South Carolina.—The work on the wharf has been completed. With its aid, material for the repairs of the work protecting the site can be landed, and these repairs should be taken in hand without delay. A storm of great violence, such as had not occurred for many years, having done much injury at this point, means are needed for reconstructing the sea-walls which guard the site from abrasion.

Balance in the treasury 1st October, 1855.....	\$1,200 00
Probable amount to be expended by June 30, 1856.....	1,200 00

Repairs of quarters and barracks at Fort Johnson, Charleston harbor, South Carolina.—These repairs, commenced some years since, should be completed. The work already done cannot be availed of for use, in its incomplete state, and the buildings are suffering for want of further protection.

Repairs of Castle Pinckney, Charleston harbor, South Carolina.—There being no appropriation for this work, nothing has been done, except repairing a breach in the southeast sea-wall, the funds for which were taken from the appropriation for “contingencies of fortifications.”

The severe storm of September, 1854, though doing little damage to the defences of Castle Pinckney, seriously injured its protecting sea-walls and wharf, the repairs of which ought not to be delayed. An expenditure of \$10,000 will be required for these repairs and those of the public buildings, the erection of a new shot furnace, and construction of two cisterns.

Estimate of amount required to be appropriated for fiscal

year ending June 30, 1857..... \$10,000 00

Fort Pulaski, Savannah river, Georgia.—During the year the injuries done at this work by the violent gale of September, 8, 1854, have been in a measure repaired, embracing the following objects: repairing the stone work of north wharf and rebuilding the wooden portion; re-embanking the dikes, enclosing the part of the island on which the exterior quarters stand; rebuilding the dry stone sea-wall on north side of island; repairing and re-adjusting the broken embankments of demilune and covered way; repairing injuries to doors of main casemates, and to wood-work of interior and exterior quarters; renewing the draw-bridges; cleansing and repairing the cisterns; repainting wood-work of fort and quarters; renewing the enclosures around the exterior quarters; closing leak through arch of main gateway; and cultivating grass on the earthen surfaces of the fort.

The operations yet necessary at this work are: to remove a large amount of mud from the ditches and from the feeding canal; renew the decayed portions of the wooden floors of the main casemates; establish barbette gun centres and platforms to suit the proposed changes of armament; repair slight leaks through casemate arches; repoint portions of the masonry; plant and cultivate grass on earthen surfaces of the fort; build a carpenter shop and repair the bake-house; re-embank the dikes along the southern and eastern margins of the island; replace the wooden portion of north wharf by a more permanent structure; and to build an advanced battery, giving more guns upon the main channel of Savannah river.

Estimate of the amount required to be appropriated for

the fiscal year ending 30th June, 1857..... \$19,000 00

Repairs of Fort Jackson, Savannah river, Georgia.—Operations were resumed at this work during the past winter, and continued into the month of July, when further labor was suspended on account of the unhealthy locality of the fort. The labor of the year comprises the

following operations: building scarp-wall to full height for the coping; taking up the broken blocks of masonry around the gun centres, and renewing them; adjusting and sodding superior slopes of parapets; pointing portions of new scarp-walls; building and putting in place the drawbridge; embanking the enclosing dikes; renewing the decayed and broken coffer-dam on the west fronts; laying grillage foundations for double walls leading from the wharf to entrance of fort; building the same walls to level of high water, and filling earth between them; rebuilding portions of the temporary wharf, and collecting materials for future operations.

The work yet to be done at this fort comprises the following objects, viz: finish the counterscarp and subscarp walls; build the walls of the permanent wharf; lay the coping on these walls; complete the adjustment of the machinery for drawbridge; build the pier for supporting outer end of bridge; establish traverse circles for the flank guns; renew the doors to guard-rooms, store-rooms, &c., and build the officers' and soldiers' quarters.

Balance in the treasury October 1, 1855.....	\$11,500 00
Probable amount to be expended by 30th June, 1856...	11,500 00
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1857.....	14,000 00

Fort Clinch, Amelia island, mouth of Cumberland sound, Florida.—

The construction of this work was resumed during the past winter, and has been regularly prosecuted up to this date. During the year the timber and brush-wood have been cut down and removed from the site of the fort; portions of the earthen parapets embanked; foundations for the scarp-walls of the fronts bearing on the channel excavated; the concrete forming the same put in; the cistern and drain under northwest bastion constructed; the sea-wall in advance of the north bastion built to its full height, and extended to the east and west far enough to protect the site of the work; a temporary wharf constructed; temporary quarters, shops, storehouses, &c., built, and a large quantity of materials collected for the further construction of the fort.

During the coming year it is proposed to complete the sea-wall; build the northwest bastion, the curtain between north and east bastions, and as great a portion of the last named bastion as the means available will permit.

Balance in treasury October 1, 1855.....	\$22,000 41
Probable amount to be expended by 30th June, 1856...	22,000 41
Estimate of the amount required to be appropriated for the fiscal year ending 30th June, 1857.....	25,000 00

Fort Pickens, Pensacola harbor, Florida.—The pintles of the lower battery have been countersunk to the requisite depth; eight traverse circles of centre bastion taken up and replaced with foundations; pavement of casemates relaid, where injured by mounting and dismounting guns; traverse circles of flank guns rectified, large holes in terreplein repaired, and lumber and traverse irons purchased.

Several traverse irons are to be laid; some pointing is to be done; a number of traverse circles must be relaid with foundations; pavements are to be repaired and relaid; cisterns to be repaired; water conductors to be cleaned and repaired; some sand-hills that mask the fire of the northwest curtain must be reduced in height; wharf to be repaired; terreplein to be arranged for the new armament; quarters to be repaired; ditches to be cleaned; leaks to be stopped; coping and pavements to be relieved from expansion; embankments to be graded; grass to be cultivated; and several other matters to be attended to; all indispensable to give to this important work its full efficiency.

Fort Barrancas and barracks thereat, Pensacola harbor, Florida.—Little has been done on this work beyond paving the passage to the ordnance store-room, and building a thin brick wall as a substitute for the shingle revetment of the breast-height wall; some further operations are required for the preservation of this work. The barracks remain in the same condition as last year.

Work on the redoubt of this fort has been prosecuted as rapidly as the warm season and high prices would allow. The whole counterscarp gallery has been paved, the wall coped, the scarp of the west face raised upwards of six feet; some work done on the gorge counterscarp, covered way, terreplein, and glacis of west face; machinery and apparatus has been provided, and large amounts of materials collected. The officer in charge proposes to complete the redoubt the next year; for which purpose the sum of \$39,000 is requisite.

Balance in the treasury October 1, 1855	\$25,000 00
Probable amount to be expended by June 30, 1856	25,000 00
Estimate of amount required to be appropriated for the	
fiscal year ending June 30, 1857	25,000 00

Fort McRee, Pensacola harbor, Florida.—The work of last year embraces sinking the gun-pintles of the first and second tiers to the requisite depths below the tongue-holes; removing the sand-banks which masked a portion of the fire of the ground tier, and extending somewhat the jetties protecting the site. The wooden floors of the gun-casemates require extensive repairs; repairs are also required on plastering, pointing, and on the asphalted terreplein, and on several other parts of the fort. The jetties for the preservation of the site need considerable extension. These matters being attended to, the work on the exterior batteries should be prosecuted.

Balance in the treasury October 1, 1855	\$24,000 00
Probable amount to be expended by June 30, 1856	24,000 00
Estimate of amount required to be appropriated for the	
fiscal year ending June 30, 1857	25,000 00

Fort Morgan, Mobile Point, Alabama.—During the year the buildings exterior to the fort, designated as the officers' quarters, the office and kitchen, have had the roofs repaired, and the former has been repainted throughout. Many small repairs of doors, windows, &c., have been made, and the large cistern of the quarters put in good order. The

fence around the fort has been repaired, so as to keep out all animals from the grassed surfaces, and the grass has been kept cut. The drains, sewers, and conduits of the main work have been opened, repaired, and kept clean.

The casemates have been cleaned out, their piers repointed, and the soffits of six arches, and as many communicating arches, plastered with cement. The iron columns and girders in store for the citadel have been cleaned and lackered, as well as the hinges, fastenings, &c., of gates and magazines. The coping of the scarp wall has been relieved from accumulated expansion by a thorough cut at every ten feet, nearly on half the circumference of fort. Some repairs have been made to the terreplein pavement by pointing with asphaltic tar, with a view to prevent the infiltration of water.

Balance in the hands of agent.....	\$2,946	22
Probable amount to be expended by 30th June, 1856....	2,946	22
Estimate of amount to be appropriated for fiscal year ending June 30, 1857.....	25,000	00

Fort Gaines, Dauphin island, Mobile bay, Alabama.—Since the appropriation made at the last session of Congress became available, a contract has been entered into for the construction of eight permanent buildings and three large cisterns appertaining to the work. Besides their ultimate destination, these buildings are now necessary for the accommodation of the workmen while building the fort. The site of the work has been cleared, a survey of the shore-lines and of the channel adjacent has been made, and operations in the erection of the buildings contracted for will be begun without delay.

Balance in the treasury 1st October, 1855.....	\$50,000	00
Probable amount to be expended by 30th June, 1856....	50,000	00
Estimate of the amount required to be appropriated for the fiscal year ending 30th June, 1857.....	50,000	00

Fort Pike, Rigolets, Louisiana.—This work has been in the care of Ordnance Sergeant Bosworth, who has maintained an excellent state of police.

Sundry repairs have been executed, viz: repairs to breast-height wall; replacing shingle work; repairing counter-scarp revetment; replacing earth on defective slopes; repairing gutters of citadel, and flooring the same; clearing casemates of stores; inserting ventilating windows to store-rooms; mounting casemate guns; covering cistern, and general policeing. The work is in first-rate condition. Nothing further is asked for this work, unless it is intended putting in the new armament, in which case the sum of \$2,000, in addition to what is in hand, is asked.

Balance in hand of agent 1st October, 1855.....	\$1,658	95
Probable amount to be expended by June 30, 1856.....	1,658	95

Fort Macomb, Chef Menteur, Louisiana.—This work is in care of an ordnance sergeant.

Repairs to breast-height walls have been made; shingling replaced;

counter-scarp revetment corrected; sundry leaks in casemates stopped; ventilating windows inserted in store-rooms; pavement and coping cut into blocks, and arranged with mastic joints; counter-forts added to some sustaining walls; a new bridge built over outer ditch; citadel gutters repaired, and rooms of same floored; a sustaining wall at foot of superior slope of parapet is being built; earth carried on the slopes where defective, and general policeing.

In addition to the amount now on hand there is asked \$5,000 to complete works for preservation of the site, and for such repairs as must, for want of means, be now passed over as being not so urgent as others.

Balance in treasury 1st October, 1855.....	\$5,262 97
Probable amount to be expended by 30th June, 1856....	5,262 97

Battery Bienvenue, Bayou Bienvenue, Louisiana.—This work is in the hands of a fort-keeper. Some repairs are necessary, which will be completed in about two months.

Amount in hands of agent 1st October, 1855.....	\$744 36
Probable amount to be expended by 30th June, 1856.....	744 36

Tower Dupré, Bayou Dupré, Louisiana.—This work has been in the hands of a fort-keeper.

A levee has been built surrounding the grounds as protection against high tides; the stockade repaired; as also the revetment of breast-height; cistern covered, and wooden banquets put in order. There is no masonry shot furnace, and for the small number of guns a movable one of iron will suffice.

Balance in hands of agent 1st October, 1855.....	\$88 81
Probable amount to be expended by 30th June, 1856.....	88 81

Tower at Proctor's Landing, Lake Borgne, Louisiana.—Negotiations have been entered into for the purchase of the necessary land, and the question of title is now before the Attorney General, on a report rendered by the United States attorney for Louisiana on this subject.

The working season is now at hand, and operations can go forward as soon as the title is approved.

Balance in treasury 1st October, 1855.....	\$125,000 00
Probable amount to be expended by 30th June, 1856..	125,000 00

Fort Jackson, Mississippi river, Louisiana.—Work was resumed in May last, by cutting down weeds, mowing grass, and collecting materials for the exterior battery, the construction of which will be resumed early in December next. It is proposed to complete this battery and make such repairs and improvements as the next appropriation will be adequate to.

Balance in treasury 1st October, 1855.....	\$4,500 00
Probable amount to be expended by 30th June, 1856....	4,500 00
Estimate of amount required to be appropriated for fiscal year ending 30th June, 1857.....	10,000 00

Fort St. Philip, Mississippi river, Louisiana.—During the last year the operations at this work have consisted in completing the scarp-walls all around to their coping, including small wall at the foot of the exterior slope; in reconstructing the relieving arches and breast-height walls of the water-front faces, and filling up the terrepleins and parapets to their proper level; also in refacing the old parade walls and constructing some of the new ones. With the balance at present available, and the sum called for for next year, the repairs of the interior and of the upper exterior battery will be completed, as well as resetting all the pintle blocks and gun traverse circles, and giving to the ditch of the main work its proper depth.

Balance in the treasury 1st October, 1855.....	\$11,000 00
Probable amount to be expended by 30th June, 1856....	11,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1857.....	30,000 00

Fort Livingston, Grand Terre island, Louisiana.—The operations at this work have consisted of fort-keeping and rebuilding the breakwaters which were injured by the gale of September, 1854. These have been completed, and it is believed will prove of great service in maintaining the beach. Since the completion of the breakwaters, four men have been employed wheeling earth upon the glacis, and executing sundry minor repairs. In order to complete the work, including additional means of preservation of the site, there will be required the sum of \$60,000, to be applied as follows:

Placing coping on scarp and counter-scarp walls; building breast-height walls and gun platforms; finishing store-rooms and magazines; building one cistern in parade and repairing and building another; raising bottom of ditch; raising floor of counter-scarp gallery, and grading parapet and glacis; erecting additional breakwater, and completing enclosure around the buildings.

Balance in hands of agent 1st October, 1855.....	\$1,902 86
Probable amount to be expended by 30th June, 1856....	1,902 86

Fort Jefferson, Garden Key, Tortugas island, Florida.—The cofferdam of the scarp-wall has been completed; the remainder of the scarp-wall brought up to the reference (0,) or low water; the grillages which underlie all the masonry in rear of the scarp, except those in bastions A and F, have been put down; the plank flooring of 83 cisterns laid, and the remainder prepared for laying; the scarp-wall on all the fronts but one has been raised to heights varying from 2 to 9½ feet above low water; all the piers of the curtain casemates brought up to reference (5',) and 58 of the arches supporting the lower tier of guns have been turned; the walls closing the parade end of the cisterns on three fronts have been carried up about 2 feet, and the earth embanked against them; 413 feet in length of the main sewers have been constructed. One new wharf has been constructed for receiving materials, the old one re-built, and additional quarters and mess-rooms provided for workmen.

The balance still available will be applied to continuing the scarp-

wall, turning the remainder of the lower tier of arches, and preparing for the first tier of guns. The flooring of the remaining cisterns will also be completed.

As every part of the work will be above the water, the operations under the next appropriation may be carried on with great rapidity, if sufficient funds are granted. The sum asked for is \$150,000, the same as the last appropriation, though twice this amount might be judiciously expended. It is proposed to apply the amount granted, first, to raising the scarp to the level of the floors of the second tier, then to the piers and the floor arches of that tier, and any balance to continuing the scarp-wall and providing for mounting the second tier of guns.

Balance in treasury October 1, 1855	\$61,000 00
Probable amount to be expended by June 30, 1856	61,000 00
Estimate of the amount required to be appropriated for the fiscal year ending June 30, 1857	150,000 00

Fort Taylor, Key West, Florida.—The operations to the 30th of September have raised the scarp on all the fronts to the height, about, of the second floors; turned nearly all the second floor arches on the northwest channel front; raised the piers of the other channel fronts to the imposts of the arches, and a portion of those on the gorge about half the height of the lower story. The cisterns under all the fronts have been completed; two magazines have been prepared and covered with timber-roofs; a hot-shot furnace has been built, and preparations completed for the armament of the ground tier, which has been received and mounted. The operations have been impeded by some sickness among the men; by their disposition to lie by or take their discharge during the hot days of summer in the tropics; and by the failure of contractors to supply bricks according to agreement. As soon as a good stock of bricks can be obtained, operations will be pushed forward with the vigor due to the cold season, and the means at command.

With the aid of the appropriation now asked for, the engineer in charge expects to be able to complete the fort proper in all its parts, thus enabling the two upper tiers of guns to be mounted. There will then remain the cover-face on the land side to be constructed, with its storehouses and bomb-proofs.

Balance in the treasury October 1, 1855	\$70,082 00
Probable amount to be expended by June 30, 1856	70,082 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1857	150,000 00

Forts on the western frontier of Texas.—Operations, except at the point referred to last year, are awaiting the purchase of the requisite sites.

No further appropriation is asked.

Balance in the treasury October 1, 1855	\$150,000 00
Probable amount to be expended by June 30, 1856	

Fortifications on Fort Point, entrance of San Francisco Bay.—The

operations for the year have consisted in the excavations for the foundations of the fort and cisterns; in grading the ditch on the land front, and excavating the site of the 10-gun battery; in laying the stone and concrete foundations of the scarp-wall and piers; in constructing the brick and concrete foundations of the cisterns; in the stone-masonry of the privies and the foundations of the magazine; in erecting the ten-gun battery; in constructing a part of the magazine at the extremity of that battery, and in mounting eight 8-inch and two 10-inch columbiads in battery.

The greater portion of the scarp-wall and cross-walls of the foundation have reached the level of the parade, and one of the cistern arches is turned.

There have been used in the construction of these foundations 3,723 cubic yards of concrete and stone, 4,251 cubic yards of concrete and brick; and in the 10-gun battery 152.5 cubic yards of brick-masonry,

The excavations, mostly of rock formation, consisted in the blasting and the removal of 9,540.4 cubic yards for the foundation of the scarp-wall and cisterns; 8,592.5 cubic yards on the land front and ditch; and 1,665.2 cubic yards for the battery and its magazine.

Balance in the treasury October 1, 1855	\$185,000 00
Probable amount to be expended by June 30, 1856	185,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1857	350,000 00

Fortifications on Alcatrazas island, San Francisco Bay.—During the year ending September 30, 1855, the scarp-walls of the south battery and the 3-gun battery have been finished ready for the coping; the whole line of breast-height wall of these batteries built; 24 circular containing walls for gun-platforms laid, and 20 columbiads mounted. The parapet for the entire length of this defensive line has been filled into a level 18 inches below the final grade or slope. The terreplein of these batteries has been embanked and roughly graded. The caponnier walls have been built to the springing lines of the gun-room arch, and the magazine bomb-proof arch constructed. The doors and windows of this magazine have been prepared, and the lining commenced; the double flight of steps to the terreplein has been set, and the enclosing area-wall raised to the same height. The scarp-wall of north battery has been completed, excepting the coping and the foundations of the corresponding breast-height laid. The natural surface has been excavated to the grade of the terreplein for a portion of the long face of this battery, and the embankment of that part below the grade has been formed.

The work executed during the year ending the 30th of September, 1855, upon the defensive lines of Alcatrazas island, embraces—
 2,557 cubic yards of masonry on south battery and 3-gun battery;
 3,494 cubic yards of excavation on south battery and 3-gun battery;
 1,964 cubic yards of embankment on south battery and 3-gun battery;
 2,783 cubic yards of masonry on north battery;
 4,164 cubic yards of excavation on north battery;
 964 cubic yards of embankment on north battery.

In addition, the north wharf has been extended to give 2,058 square feet additional wharf room.

Balance in treasury October 1, 1855	\$120,000 00
Probable amount to be expended by June 30, 1856.....	120,000 00
Estimate of the amount required to be appropriated for the fiscal year ending June 30, 1857	200,000 00

Corps of Engineers.

In my last annual report I urged the necessity of an increase of the corps of engineers, in order to afford the number of officers indispensable to the execution in a proper and economical manner of the duties belonging to the corps. That report contains some general remarks touching that necessity. I propose now to demonstrate the present deficiency by a statement specifying the officers now employed, and those needed in the several operations and duties under this department.

A similar statement was communicated, with your approbation, to the military committees of the two houses of Congress at the late session.

I propose also to explain that any augmentation should be gradual, and by additions to the foot of the corps; and to give, moreover, the exact expense of the proposed increase.

Here follows a statement of the fortifications and employments now in hand, (*exclusive of river and harbor works, light-house inspectorships, light-house constructions and repairs, custom-houses, marine hospitals, and other works of civil engineering assigned to the corps of engineers, some by law, and some by regulation,*) requiring the presence and services of engineer officers, and showing the number of such officers now engaged therein; and also the number indispensable to a due execution and control of the operations; all of the expenditures on the same being made by those officers.

Designation of fortifications and employments.	Engineer officers now present.	Engineer officers now wanted.
At Fort Knox, on the Penobscot river, Maine	1	1
At Fort Preble and Fort Scammel, Portland harbor, Maine; and Fort Constitution and Fort McClary, Portsmouth harbor, New Hampshire	0	1
At Fort Warren, and sea-walls of Lovell's island and Deer island, Boston harbor, Massachusetts	2	0
At Fort Independence, Boston harbor, Massachusetts	0	1
At Fort Winthrop, Boston harbor, Massachusetts	1	0
At Fort Adams, Newport harbor, Rhode Island	1	0
At Fort Schuyler, New York harbor	0	1
At Fort Wood and Governor's island, New York harbor	0	1
At Fort Richmond and Batteries Hudson and Morton, Staten island, New York harbor	1	0
At Fort Hamilton and Fort Lafayette, Long Island narrows, New York harbor ..	1	0

Designation of fortifications and employments	Engineer officers now present.	Engineer officers now wanted.
At engineer agency, for general engineer service, purchasing supplies, &c., New York	1	0
At Fort Delaware, Delaware river, Delaware, and Fort Mifflin, Delaware river, Pennsylvania	1	1
At Fort Carroll, Sollers' Point flats, Patapsco river, Maryland	2	0
At Fort Madison, Annapolis harbor, Maryland	1	0
At Fort Monroe, Hampton Roads, Virginia	1	0
At Fort Calhoun, Hampton Roads, Virginia	0	1
At Fort Macon, Beaufort harbor, and Fort Caswell, mouth of Cape Fear river, North Carolina	1	0
At Fort Sumpter and Castle Pinckney, Charleston harbor, South Carolina	2	0
At Fort Pulaski and Fort Jackson, Savannah river, Georgia	1	1
At Fort Clinch, Cumberland sound, and Fort Marion and sea-wall, St. Augus- tine, Florida	1	0
At Fort Taylor, Key West, Florida	2	0
At Fort Jefferson, Garden Key, Tortugas, Florida	1	1
At Fort Pickens and Fort McRee, and Fort Barrancas and barracks thereat, Pensacola harbor, Florida	1	0
At Fort Morgan, Mobile Point, Alabama	1	0
At Fort Gaines, Dauphin island, Alabama	0	1
At Fort Wood and Fort Pike, and Battery Bienvenue and Tower Dupre, at the eastern approaches to New Orleans, Louisiana	1	0
At Fort Jackson, Mississippi river, below New Orleans, Louisiana	1	0
At Fort St. Philip, Mississippi river, below New Orleans, and Fort Livingston, Barrataria bay, Louisiana	1	1
At Fort Wayne, near Detroit, Michigan	0	1
At Fort Porter, at Black Rock, Lake Erie, and Fort Niagara and Fort Onta- rio, Lake Ontario	0	1
At Fort Montgomery, outlet of Lake Champlain	1	0
In Engineer department	2	2
On the Board of Engineers for the Atlantic coast	0	2
On the Board of Engineers for fortifications, Pacific coast	0	2
On forts, entrance to San Francisco harbor, California	5	1
On the Pacific frontier on general military duty	0	1
On the Texas frontier on general military duty	0	1
At West Point, superintendent	1	2
engaged in instruction	2	
in company of sappers and miners	3	
On the Coast Survey	2	1
Directing the works on military asylum	1	0
Superintending construction of buildings under Treasury Department	1	0
Total	44	25

In the above statement, the number of officers requisite for a proper execution of the duties confided to this branch of the military service is placed at an absolute minimum. A less number at any of the forts or places must result in positive injury to the public interests, greater or less.

In relation to the above enumerated deficiencies, I could adduce striking particulars by way of showing the disadvantages, and even pecuniary losses, that unavoidably ensue from the want of our ever

present official supervision. In every instance in which additional officers are called for in the preceding table, I could, if it were not for too much lengthening these remarks, give conclusive reasons for such a call, connected with the *economical* as well as the *proper* execution of the work. The table, though liable to some modifications from year to year, gives a just average of the distribution of officers.

In this statement, none of the present employments of the officers on works of river and harbor improvement are specified, although there are many such works in their charge, because it might be alleged that those are temporary, being liable to be arrested by a suspension of appropriation for such objects. And no mention is made of various other duties that officers of engineers are now performing, in addition to those connected with fortifications, the Military Academy, &c., unless they exclusively occupy the attention of the officer. For instance, four are now employed, under provisions of law, as inspectors of light-houses; seven in their construction or repairs; one is engaged on the extension of the Capitol, and introduction of water into Washington city and Georgetown; three are superintending the construction of custom-houses, &c.; these duties being in addition to their charge of fortifications and military works.

It is seen above, that there is at this time a deficiency of twenty-five officers, independent of all duties upon the navy, harbor and river, and other civil works. I see no reason to suppose that this deficiency can be lessened in future by any diminished demand for the services of the officers of the corps. On the contrary, the urgent calls for their services on governmental constructions, including light-houses, custom-houses, or military asylums, navy yards, &c., all entirely independent of the system of fortifications, and the Military Academy, and company of sappers and miners; the unavoidable extension of the fortifications of the coasts by the acquirement of Texas, and California, and Oregon; the necessity in time of war, or on its approach, of attaching to every army in the field a number of experienced engineer officers, &c., &c., shows, without going into other considerations that might be forcibly presented, that the deficiency, instead of being temporary, is very certain to grow with years.

The probabilities of mistakes, of a languid or negligent execution of, and inattention to, the public interests during the absence, for the greater part of the time, of the only responsible person; the considerable expense of frequent journeys by the officers, and especially in the hire of persons to supply, as well as may be, the want of official supervision; these, and other like consequences, cannot but be inevitably connected with the present state of things.

And in the matter of mere expense, I risk nothing in asserting that the total cost to the country of the increase herein proposed, will be less than the additional cost of the operations under this department in extra transportation of supervising officers, in the hire of superintendents, draughtsmen, &c., &c., consequent, inevitably, heretofore, now, and in future, upon the want of an adequate number of officers of engineers.

But this want, real and pressing as it is, cannot be fully supplied in

any sudden manner. If the engineer officer is wanted at all, it is because his education and practical experience have prepared him for his peculiar functions—a preparation attested by the practice of all nations to be indispensable. And the only way for us to make sure that the officers added to the corps shall possess the requisite qualifications for their growing responsibilities, will be to superadd, while they are upon the first step in rank, to the scientific elements what they bring from the Military Academy, the practical instruction only to be given by professional labors, and the future studies which these labors involve.

In countries having large wants of this nature, as well as large experience in all military matters—in France, for instance—provision is made by a “school of application” for academical applications, during one or two years, of the scientific principles brought from the elementary school, (École Polytechnique,) before attempting, on the ground, their practical use. We having no such “school of application,” and being obliged to study while we work, have so much the greater need of stepping slowly and cautiously into labors involving large expenditures and grave consequences.

The officers that we design to add to the corps of engineers must therefore gain, in the lower grades and least responsible stations, as soon as possible, but still gradually, and step by step, the professional knowledge and experience indispensable in the higher duties that await them.

The scientific education acquired at our Military Academy by the higher graduates varies somewhat with the talent of the respective classes. But it may be assumed that, on an average, three or four such graduates each year may be relied on as qualified, by acquirement, habits of application, and talents, to go into the practical “school of application” afforded by the professional operations of the corps of engineers.

Accordingly, any scheme of enlargement should contemplate the addition, during a term of years, of a number of second lieutenants—say three or four, on the average, per annum—with corresponding promotions within the whole corps, until the augmentation shall have reached its limit—all the additions being made at the foot of the corps by such graduates of the Military Academy, *and such only*, as shall have been recommended for appointment into the corps by the Academic Board.

It may very naturally be asked how, with such a deficiency of officers, are the duties of the Engineer department now carried on? The answer is this: by multiplying the responsibilities of each officer; calling on them for still greater efforts; at the same time supplying them, though at considerable expense, with the best employés we can command. But, besides the cost of these additional employés, this must result, as said before, in positive injury, greater or less—that is to say, in the reliance we are forced to place on hired agents, often entirely without experience of the kind needed, and at best but partially competent; there never can be that care and success in the execution of work, and management of the public interests, that the presence of an engineer officer would secure.

This brings us to a word or two on the expense of the proposed augmentation.

On the graduation of the class in June next there will be some fifty brevet second lieutenants in the army; which brevet appointments, in addition to the stated organization of the several regiments and corps, are expressly provided for by law; and experience has shown, through a course of many years, that a number of such brevet second lieutenants will always be found in the army register.

Taking annually three or four of these brevet second lieutenants and attaching them to the corps of engineers, will not, in any sense, be adding that number to the officers of the army. If not thus attached, they would be connected with some other corps or regiment, therein to do duty while awaiting promotion; and as these three or four graduates are to have the recommendation of the Academic Board for this assignment, they must be at or near the head of their respective classes, and therefore would, if not added to the engineers, be attached to the topographical engineers, or to the ordnance, in both of which corps the allowances are the same as in the engineers, so that the proposed assignment would cause no additional cost whatever to the government.

It may therefore be asserted that the only additional expense would be in the difference of allowances within the corps consequent upon promotion therein. What this will amount to in the end, of course will depend on the extent to which the augmentation is to be carried. Knowing this extent, and the annual rate at which the promotions are to be made, it will be easy to calculate the additional cost each year, and the total annual addition.

Assuming that each officer is to draw *everything* in the way of *pay, subsistence, forage, servants, fuel, and quarters*, that is allowed by law or regulation, the fuel being calculated at five dollars per cord, and it being assumed that one-half the officers are to be at stations and on duties obliging them to hire private quarters—that being about the usual proportion of officers so situated; the cost of such quarters being taken, moreover, in all cases, at the rates paid in this city, the increased allowance, on promotion, will be as follows:

Promotion of second lieutenants to first lieutenants, no addition.

Promotion of first lieutenants to captains, \$271 79 per annum.

Promotion of captains to majors, \$581 75 per annum.

Promotion of majors to lieutenant-colonels, \$222 per annum.

Assuming now that, at the end of seven years, there shall have been added two lieutenant-colonels, four majors, twelve captains, and twelve lieutenants, making thirty in all, the total additional expense annually to the nation will be \$6,092 48; but, within that period, the twelve captains will have been supplied under existing law, so that, in fact, the additional expense annually chargeable against the proposition will be only \$2,831: resulting from the promotion of four captains (\$2,327) and the promotion of two majors (\$504).

I have given no other details than those required to follow and test my calculations; but it must be here stated, that it is only when the whole supposed addition shall have been made—that is to say, at the

end of seven or eight years, when the whole thirty officers shall have been added—that the annual increase of cost will reach the sum of \$2,831; it will be less than that for every preceding year, and afterwards no more than that.

Now, to say nothing of the injury to the public interests, before mentioned, this sum does not compare with our actual outlays consequent upon the want of officers—in the hire of persons to take charge of engineer operations of various kinds, and as draughtsmen—in cost of extra travelling, &c., &c. For instance, I have been obliged to keep draughtsmen employed in this office, on works purely technical and appropriate to engineer officers, at an expense for the year just elapsed of \$2,096 87; and there has been nothing peculiar in the demands of the year, nothing but what must be continued in future years, unless the number of officers is increased.

I say nothing of the propriety and justice of making corresponding promotion within the corps, beyond stating that all the present majors have been such more than seventeen years, the oldest captain has held his present rank more than nineteen years, and the next five captains have been such more than seventeen years.

I deem it quite important that the law providing for an increase should require that it be made by an average annual addition to the foot of the corps of (three or four) graduates for — years, specifying and restricting the augmentations for the several grades.

As the deficiency is severely felt at this moment, and can only be gradually supplied, it is very important that the increase should be commenced at the earliest day practicable.

On this subject, I beg to refer to an able report made by the Military Committee of the House in 1851—(see report number twenty-nine, second session thirty-first Congress;) and also to my annual report to the Secretary of War, November, 1850—(see Executive document number one, page 342, second session thirty-first Congress.)

In a conscientious discharge of duty, without any personal interest, present or prospective, in the matter, and in a way which seems to me to leave no room for cavil or objections, having shown the actual need of an increase, the proper mode of supplying the need, and the trivial expense to be incurred, I earnestly invoke the prompt support demanded for it by the public interest.

Here is the place for me to present the importance of an increase of the sapper, miner, and pontonier force. The single company now authorized has rendered much valuable and efficient service during the past year and previously. But its numbers have proved too small to fulfil the several purposes contemplated in its creation; indeed, the calls upon it have been so numerous that, as to some of these purposes, nothing could be done. So largely have detachments been made from the company for special purposes, that it has been possible to retain at West Point only a skeleton, so reduced as to suffice merely for the practical instruction of the cadets in siege and field operations. It has always been designed to station a few engineer soldiers at each fort under construction, and at our principal finished forts; their technical information, and their relation to the government, so different from that

employés temporarily hired, gives us confidence that by so doing, economy and efficiency in work in progress will be promoted; while the daily condition of finished works will be observed, the commencement of deterioration prevented or arrested, and their minor details maintained in the best order for prompt use. But we find ourselves unable to make detachments for these purposes at present, and I therefore recommend that Congress be asked to grant, the approaching session, one company in addition to the existing one, and on the same organization.

MILITARY ACADEMY.

The usual report of the Board of Visitors for the last annual examination is transmitted herewith. It exhibits the workings of the institution and its condition in sufficient detail, requiring but few words from me.

The system of five years' instruction, commenced last year, is going on harmoniously, and its advantages will be enjoyed by all the classes to enter hereafter.

The most important items of the estimate of expenditures for the next fiscal year are as follows :

Current and ordinary expenses.....	\$34,790 00
Library.....	1,000 00
Board of Visitors.....	3,000 00
Forage for artillery and cavalry horses.....	8,640 00
Replacing horses.....	1,000 00
Professors' quarters.....	5,000 00
Gas-house.....	15,000 00
Stables for dragoon and artillery horses.....	10,000 00
	78,430 00

I consider it important that a new professorship be established at the academy, to take a portion of the duties of the present chaplain and professor of ethics. This officer's duties have been largely increased by the studies which have been introduced with the additional year of instruction; while the demands upon him as a clergyman only, are sufficient fully to occupy his time and attention.

I desire also to recommend that there be provided a separate instruction of cavalry, so that that branch of instruction may be withdrawn from the subject of artillery, with which it is now associated; and also that the instructor of artillery have the pay and allowances which are given to officers of artillery when on duty with the light batteries.

Much inconvenience and discomfort are now experienced from the want of quarters at the academy, sufficient to accommodate the officers on duty with it. Many of these have families, and suffer from the

cramped accommodations, small, old houses (built for other purposes) and parts of houses, which are now allotted to them; while numbers of the unmarried officers are quartered in the barrack of the cadets, a building not designed for this purpose, and all of which is needed to afford the cadets due comfort and convenience. Even with these resorts there is a deficiency of quarters, so that some officers with families have to live at the hotel at high cost, and some are obliged to have lodgings beyond the limits of the post of West Point.

A letter of the superintendent, explaining the annual estimate for the academy, is appended to this report.

I now present an interesting statement (derived from the cadets themselves) exhibiting the condition in life of the cadets for the last fourteen years.

Statement exhibiting the condition in life of the cadets of the Military Academy, West Point, New York, for the last fourteen years, from 1842 to 1855, inclusive.

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REPORT OF THE

	1842.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	1855.
Parents are or were farmers or planters,.....	59	61	61	68	72	67	69	75	70	63	67	58	66	62
Do.....do.....mechanics.....	14	12	15	22	22	25	22	21	16	14	14	13	12	17
Fathers.....do.....judges or lawyers.....	27	25	30	35	33	30	29	23	34	33	34	35	36	26
Parents.....do.....merchants.....	18	15	23	37	29	29	31	38	36	38	35	35	39	40
Do.....do.....boarding or hotel keepers,.....	5	2	4	3	7	6	4	2	2	2	3	3	5	2
Fathers.....do.....physicians.....	12	15	15	13	21	19	21	21	18	14	14	13	9	8
Do.....do.....of the army, navy, or marine corps.	14	16	16	13	11	13	17	17	18	22	24	27	28	22
Do.....do.....clergymen.....	4	6	6	6	5	3	3	4	4	4	3	5	4	5
Do.....do.....in the civil employment of the gen- eral or State governments.....	5	15	16	9	5	2	3	7	7	8	10	11	14	13
Miscellaneous—as bank officers, editors, professors, engi- neers, masters of vessels, &c.....	15	11	15	23	35	36	41	24	32	30	30	26	14	25
Occupation not stated, or no occupation.....	48	34	23	17	1	2	2	8	7	11	13	7	10	19
Total.....	221	212	224	236	241	232	242	240	244	239	247	233	237	239
Of these numbers, there were—														
Without fathers living.....	26	57	44	48	42	41	54	48	40	45	36	35	29	33
Without father or mother living.....	22	16	18	15	21	20	18	16	26	17	19	17	15	9
Total orphans.....	48	73	62	63	63	61	72	64	66	62	55	52	44	42
Of these numbers the parents are stated to be in mod- erate circumstances.....	-----	156	150	164	192	182	193	203	215	207	218	206	206	215
Of these numbers the parents are stated to be in re- duced circumstances.....	182	26	26	36	35	38	40	29	25	16	9	8	8	7

Total orphans.....	48	73	62	65	63	61	72	64	66	62	63	64	65	66
Of these numbers the parents are stated to be in moderate circumstances.....	150	150	164	192	182	193	203	215	207	218	208	206	215	7
Of these numbers the parents are stated to be in indigent circumstances.....	6	8	8	8	8	4	4	2	2	.....	.....	1	1	
Of these numbers the parents are stated to be in independent life.....	6	10	12	6	4	5	4	2	14	20	19	22	16	
Of these numbers the parents are stated to be in unknown circumstances.....	39	18	19	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Total.....	221	212	224	236	241	232	242	240	244	239	247	233	237	239

List of the officers, professors, and cadets of the U. S. Military Academy, September 30, 1855, showing the name, rank, where born, and State or country from which appointed.

ACADEMIC STAFF.

Names.	Rank.	Corps or reg't.	Where born.	Appointed from	Department.
Jonathan S. Barnard, AM.	Capt. and bvt. maj...	Engineers . .	Massachusetts ..	Mil'y Academy..	Superintendent and commandant.
Dennis H. Mahan, LLD..	Professor .....	.....	New York	Engineer corps..	Professor of military and civil engineering.
John G. Foster	1st lt. & bvt. capt...	Engineers . .	New Hampshire..	Mil'y Academy..	Assistant professor of engineering.
James St. C. Morton	2d lieutenant.....	do	Pennsylvania	do	Acting assistant professor of engineering.
Wm. H. C. Bartlett, LLD.	Professor .....	.....	do	Engineer corps..	Professor of natural and experimental philosophy.
Edward D. Stockton.....	1st lieutenant.....	1st infantry...	Kentucky	Mil'y Academy..	Assistant professor of philosophy.
David C. Houston	Cadet .....	.....	New York	New York	Acting assistant professor of philosophy.
Miles D. McAlister.....	do .....	.....	do	Michigan	Do. do. do.
Albert E. Church, LLD..	Professor .....	.....	Connecticut	3d artillery.....	Professor of mathematics.
Wm. F. Smith	1st lieutenant	Top. Eng.....	Vermont	Mil'y Academy ..	Assistant professor of mathematics.
Absalom Baird	do	1st artillery ..	Pennsylvania	do	Acting assistant professor of mathematics.
Delavan D. Perkins	do	4th artillery ..	New York	do	Do. do. do.
James Thompson	do	2d artillery ..	do	do	Do. do. do.
Alexander J. Perry	do	do	Connecticut	do	Do. do. do.
Wm. R. Terrill	2d lieutenant	4th artillery ..	Virginia	do	Do. do. do.
Jacob W. Bailey, AM.....	Professor .....	.....	Massachusetts...	1st artillery	Professor of chemistry, mineralogy, and geology.
Caleb Huse	1st lieutenant	1st artillery ..	do	Mil'y Academy..	Assistant professor of ditto.
Francis J. Shunk	2d lieutenant.....	Ord'nce corps.	Pennsylvania	do	Acting assistant professor of ditto.
Rev. Wm. T. Sprole, DD.	Professor .....	.....	Maryland	Dist. of Col.....	Chaplain, and professor of ethics and English studies.
John C. Symmes	1st lieutenant	Ord'nce corps.	Kentucky	Mil'y Academy..	Acting assistant professor of ditto.
William Silvey	do	1st artillery...	Ohio	do	Do. do.
Adam J. Slemmer	do	do	Pennsylvania ..	do	Do. do.
Matthew M. Blunt	do	2d artillery ..	New York	do	Do. do.
Joshua W. Sill	2d lieutenant	Ord'nce corps.	Ohio	do	Do. do.
Jonathan G. Barnard, AM.	Capt. and bvt. maj ..	Engineers . .	Massachusetts ..	do	Instructor of practical military engineering.
Andrew J. Donelson.....	1st lieutenant	do	Tennessee	do	Acting assistant professor of ditto.
Quincy A. Gilmore.....	2d lieutenant	do	Ohio	do	Do. do.
Thomas L. Casey	do	do	New York	do	Do. do.

Wm. H. T. Walker.....	Maj. and bvt. lt. col..	10th infantry..	Georgia.....	do.....	Commandant of cadets and instructor infantry tactics.
Cadmus M. Wilcox.....	1st lieutenant.....	7th infantry...	North Carolina..	do.....	Assistant instructor of ditto.
William H. Wood.....	do.....	3d infantry....	Massachusetts ..	do.....	Do. do.
Thornton A. Washington..	2d lieutenant ..	1st infantry...	Virginia.....	do.....	Do. do.
Robert W. Wier, N. A....	Professor .....	.....	New York.....	New York.....	Professor of drawing.
Thomas H. Neill.....	1st lieutenant.....	5th infantry...	Pennsylvania ..	Mil'y Academy..	Assistant professor of drawing.
Hyacinth R. Agnel	Professor .....	.....	New York.....	New York.....	Professor of the French language.
Theophilus d'Orémieulx...	1st lieutenant.....	1st infantry...	France.....	do	Assistant professor of the French language.
John H. Greland.....	do	4th artillery ..	Pennsylvania ..	Mil'y Academy..	Acting assistant professor of the French language.
Samuel F. Claflin	do	1st artillery...	Illinois.....	do.....	Do. do. do.
Henry K. Clarke.....	1st lt. and bvt. capt.	2d artillery...	Pennsylvania ..	do.....	Instructor of artillery and cavalry.
John Gibbon.....	1st lieutenant.....	4th artillery...	do.....	do.....	Assistant instructor of artillery.
Orren Chapman.....	do.....	1st dragoons..	New York.....	do.....	Assistant instructor of cavalry.
George B. Cosby.....	2d lieutenant	2d cavalry....	Kentucky	do.....	Do. do.
Patrice de Janon	Instructor.....	.....	Carthagera ..	New York	Instructor of the sword exercise.

MILITARY STAFF.

James B. Fry.....	1st lieutenant.....	1st artillery...	Illinois.....	Mil'y Academy..	Adjutant.
Samuel P. Moore, M. I....	Surgeon.....	Med. depart't.	South Carolina..	South Carolina..	
Joseph K. Barnes, M. I. ..	Assistant surgeon	do.....	Pennsylvania ..	Pennsylvania ..	
Quincy A. Gilmore	2d lieutenant	Engineers	Ohio	Mil'y Academy..	Quartermaster, assistant commissary of subsistence, and treasurer.

List of officers, professors, and cadets—Continued.

CADETS.

No.	Names.	Where born.	Where appointed from.
<i>First Class.</i>			
1	David C. Houston.....	New York.....	New York.
2	George W. Snyder.....	do.....	Do.
3	Miles D. McAlister.....	do.....	Michigan.
4	Charles C. Lee.....	South Carolina.....	North Carolina.
5	Orlando M. Poe.....	Ohio.....	Ohio.
6	Henry V. De Hart.....	New York.....	Large.
7	John Bennett.....	Ohio.....	Ohio.
8	John Tipton.....	Indiana.....	Indiana.
9	John W. Barreger.....	Kentucky.....	Kentucky.
10	John B. Shinn.....	New Jersey.....	Ohio.
11	Lorenzo Lorain.....	Pennsylvania.....	Pennsylvania.
12	Thomas C. Sullivan.....	Ohio.....	Ohio.
13	Herbert A. Hascall.....	New York.....	New York.
14	Wesley Owens.....	Ohio.....	Ohio.
15	A. Parker Porter.....	Pennsylvania.....	Pennsylvania.
16	George D. Bayard.....	New York.....	Large.
17	Richard Lodor.....	do.....	New Jersey.
18	Charles B. Stivers.....	Kentucky.....	Kentucky.
19	Hylan B. Lyon.....	do.....	Do.
20	Edmund C. Bainbridge.....	Virginia.....	Large.
21	James W. Forsyth.....	Ohio.....	Ohio.
22	James P. Major.....	Missouri.....	Missouri.
23	Frank S. Armistead.....	Virginia.....	Large.
24	Lansford L. Lomax.....	Rhode Island.....	Do.
25	George Jackson.....	Ohio.....	Virginia.
26	John F. Ritter.....	Pennsylvania.....	Pennsylvania.
27	Guilford D. Bailey.....	New York.....	New York.
28	John K. Mezner.....	do.....	Michigan.
29	Jeremiah H. Gilmer.....	Maine.....	Maine.
30	Thomas E. Miller.....	Kentucky.....	Kentucky.
31	William H. Jackson.....	Tennessee.....	Tennessee.
32	Owen K. McLemore.....	Alabama.....	Alabama.
33	Herman Biggs.....	New York.....	New York.
34	William Gaston.....	North Carolina.....	Large.
35	Thomas B. Walker.....	Indiana.....	Indiana.
36	James B. S. Alexander.....	Virginia.....	Virginia.
37	Joseph H. Taylor.....	Kentucky.....	Large.
38	James McMillan.....	New York.....	New York.
39	William T. Gentry.....	Indiana.....	Indiana.
40	William P. Sanders.....	Kentucky.....	Mississippi.
41	Samuel S. Carroll.....	District of Columbia.....	District of Columbia.
42	Brayton C. Ives.....	New York.....	New York.
43	Richard S. C. Lord.....	Ohio.....	Ohio.
44	A. S. Cunningham.....	Virginia.....	Large.
45	William B. Hughes.....	Tennessee.....	Tennessee.
46	Fitzhugh Lee.....	Virginia.....	Large.
47	J. McLean Hildt.....	Pennsylvania.....	Do.
48	Marcus A. Reno.....	Illinois.....	Illinois.
49	Herbert M. Enos.....	New York.....	New York.
50	Francis L. Vinton.....	Maine.....	Large.
<i>Second Class.</i>			
1	John C. Palfrey.....	Massachusetts.....	Massachusetts.
2	Richard K. Meade, jr.....	Virginia.....	Virginia.

List of officers, professors, and cadets—Continued.

No.	Names.	Where born.	Where appointed from.
3	E. Porter Alexander.....	Georgia.....	Georgia.
4	J. K. L. Smith.....	New York.....	Large.
5	George C. Strong.....	Vermont.....	Massachusetts.
6	Henry M. Robert.....	South Carolina.....	Ohio.
7	Charles H. Morgan.....	New York.....	New York.
8	Thomas G. Baylor.....	Virginia.....	Virginia.
9	Oliver H. Fish.....	Kentucky.....	Kentucky.
10	William P. Smith.....	Virginia.....	Virginia.
11	Haldeman S. Putnam.....	New Hampshire.....	New Hampshire.
12	George A. Kensel.....	Pennsylvania.....	Kentucky.
13	Augustus G. Robinson.....	Maine.....	Maine.
14	Thomas J. Berry.....	Georgia.....	Georgia.
15	Samuel W. Ferguson.....	South Carolina.....	South Carolina.
16	Manning M. Kimmell.....	Missouri.....	Missouri.
17	Abraham C. Wildrick.....	New Jersey.....	New Jersey.
18	William Sinclair.....	Ohio.....	Ohio.
19	Charles J. Walker.....	Kentucky.....	Kentucky.
20	George W. Holt.....	Alabama.....	Alabama.
21	Francis Beach.....	Connecticut.....	Connecticut.
22	George H. Weeks.....	New Hampshire.....	Maine.
23	Edward R. Warner.....	Pennsylvania.....	Pennsylvania.
24	Aurelius F. Cone.....	Georgia.....	Georgia.
25	Ira W. Claflin.....	Vermont.....	Iowa.
26	John T. Magruder.....	Virginia.....	Large.
27	John S. Marmaduke.....	Missouri.....	Missouri.
28	Sardine P. Reed.....	Ohio.....	Ohio.
29	George A. Cunningham.....	Georgia.....	Alabama.
30	Thomas J. Lee.....	Indiana.....	Indiana.
31	Henry C. McNiell.....	Mississippi.....	Texas.
32	George Ryan.....	Massachusetts.....	Connecticut.
33	Paul J. Quattlebaum.....	South Carolina.....	South Carolina.
34	Charles E. Farrand.....	New York.....	New York.
35	Oliver P. Gooding.....	Indiana.....	Indiana.
36	Richard H. Brewer.....	Maryland.....	Maryland.
37	Jos. S. Conrad.....	New York.....	New York.
38	Ed. J. Conner.....	New Hampshire.....	New Hampshire.
39	Robert H. Anderson.....	Georgia.....	Georgia.
40	Lafayette Peck.....	Tennessee.....	Tennessee.
41	Charles Durfee.....	Ohio.....	Ohio.
<i>Third Class.</i>			
1	James H. Hallonquist.....	South Carolina.....	South Carolina.
2	William C. Paine.....	Massachusetts.....	Massachusetts.
3	John S. Sanders.....	Virginia.....	Large.
4	Samuel McKee.....	Missouri.....	Utah.
5	Moses J. White.....	Mississippi.....	Mississippi.
6	William H. Echolls.....	Alabama.....	Alabama.
7	Leroy Napier, jr.....	Georgia.....	Georgia.
8	Marcus P. Miller.....	Massachusetts.....	Massachusetts.
9	Charles H. Ingraham.....	Ohio.....	Do.
10	Joseph Dixon.....	Tennessee.....	Tennessee.
11	William J. L. Nicodemus.....	Virginia.....	Maryland.
12	Royal F. Frank.....	Maine.....	Maine.
13	William G. Robinson.....	Canada.....	North Carolina.
14	James J. Van Horn.....	Ohio.....	Ohio.
15	Asa B. Carey.....	Connecticut.....	Connecticut.
16	Charles G. Harker.....	New Jersey.....	New Jersey.
17	Ruffin Y. Ashe.....	Alabama.....	Alabama.

List of officers, professors, and cadets—Continued.

No.	Names.	Where born.	Where appointed from.
18	John W. Dewey.....	Vermont.....	Vermont.
19	Thomas R. Tannatt.....	New York.....	Massachusetts.
20	Ed. P. Cressey.....	do.....	New York.
21	Robert C. Kennedy.....	Georgia.....	Louisiana.
22	Peter Hairston, jr.....	Virginia.....	Virginia.
23	Benjamin F. Phillips, jr.....	Georgia.....	Mississippi.
24	Stephen D. Beekman.....	New York.....	New York.
25	Charles E. Jesup.....	District of Columbia ..	Large.
26	Bryan M. Thomas.....	Georgia.....	Georgia.
27	George N. Bascom.....	Kentucky.....	Kentucky.
28	William H. Bell.....	Pennsylvania.....	Pennsylvania.
29	Andrew Jackson, jr.....	Tennessee.....	Large.
30	Selden S. Hetzell.....	District of Columbia ..	Do.
31	Solomon Williams.....	North Carolina.....	North Carolina
<i>Fourth Class.</i>			
1	William E. Merrill.....	Wisconsin.....	Large.
2	Chauncey B. Reese.....	New York.....	New York.
3	Samuel H. Lockett.....	Virginia.....	Alabama.
4	Orlando G. Wagner.....	Pennsylvania.....	Pennsylvania.
5	Martin D. Hardin.....	Illinois.....	Large.
6	Moses H. Wright.....	Tennessee.....	Tennessee.
7	Robert F. Beckham.....	Virginia.....	Virginia.
8	Francis L. Guenther.....	New York.....	New York.
9	Charles R. Collins.....	Pennsylvania.....	Pennsylvania.
10	Eugene M. Baker.....	New York.....	New York.
11	Allen L. Anderson.....	Ohio.....	Ohio.
12	George T. Peckham.....	New York.....	New York.
13	Robert White.....	Tennessee.....	Tennessee.
14	Ed. G. Bush.....	Illinois.....	Illinois.
15	John R. B. Burtwell.....	Alabama.....	Alabama.
16	Elias B. Carling.....	Maryland.....	Maryland.
17	Caleb H. Carlton.....	Ohio.....	Ohio.
18	Francis J. Crilley.....	Pennsylvania.....	Pennsylvania.
19	Roderic Stone.....	Maine.....	Minnesota.
20	Edwin H. Stoughton.....	Vermont.....	Vermont.
21	Theodore E. Ames.....	Massachusetts.....	Massachusetts.
22	Isaac S. Hyams.....	Louisiana.....	Louisiana.
23	Joseph Wheeler, jr.....	Georgia.....	New York.
24	Jonathan M. Hall.....	New York.....	Michigan.
25	John J. Upham.....	Delaware.....	Wisconsin.
26	James B. Lazear.....	Pennsylvania.....	Pennsylvania.
27	Henry A. F. Worth.....	Virginia.....	Large.
28	Samuel A. Foster.....	Maine.....	Maine.
29	Abraham K. Arnold.....	Pennsylvania.....	Pennsylvania.
30	Nelson A. Sowers.....	Indiana.....	Indiana.
31	Edwin Ilsley.....	Maine.....	Maine.
32	Luke G. Harmon.....	New York.....	New York.
<i>Fifth Class.</i>			
1	William H. Allen.....	Pennsylvania.....	Pennsylvania.
2	John N. Andrews.....	Delaware.....	Delaware.
3	John G. Ashe.....	North Carolina.....	North Carolina.
4	Jonathan Bacon.....	Texas.....	Texas.
5	George W. Bates.....	Missouri.....	Missouri.
6	William B. Beck.....	Pennsylvania.....	Pennsylvania.
7	John M. Bevill.....	Kentucky.....	Kentucky.

List of officers, professors, and cadets—Continued.

No.	Names.	Where born.	Where appointed from.
8	John P. Birdsall.....	Indian Territory	Large.
9	Jacob P. Bonesteel.....	New York.....	Wisconsin.
10	Harold Borland.....	North Carolina.....	Arkansas.
11	Nicholas Bowen.....	New York.....	New York.
12	Charles S. Bowman.....	Florida.....	Large.
13	Frederick F. Burlock.....	New York.....	Connecticut.
14	Pierce M. Butler.....	South Carolina	Large.
15	Alonzo Carroll.....	Virginia.....	Virginia.
16	Warren W. Chamberlain.....	New York.....	New York.
17	Theo. W. M. Coontz.....	Virginia	Virginia.
18	Samuel T. Cushing.....	Rhode Island	Rhode Island.
19	Theo. Edson.....	Massachusetts	Massachusetts.
20	Frederick Embich.....	Pennsylvania.....	Pennsylvania.
21	Henry W. Fowler.....	Louisiana.....	Large.
22	Wade H. Gibbes.....	South Carolina.....	South Carolina.
23	John C. Gilmer.....	North Carolina.....	North Carolina.
24	George J. Griffing.....	New York.....	New York.
25	Robert H. Hall.....	Michigan.....	Illinois.
26	Judson Haycock	Maine.....	California.
27	Charles E. Hazlett.....	Ohio	Ohio.
28	George S. Hollister.....	New York.....	New York.
29	Cornelius Hook, jr.....	Illinois.....	Illinois.
30	Ed. R. Hopkins.....	New York.....	New York.
31	Frank Huger.....	Virginia	Large.
32	Richard Y. Johnson.....	Ohio	Ohio.
33	William G. Jones.....	do.....	Do.
34	William H. Jordan.....	do.....	Do.
35	Josiah H. Kellogg.....	Pennsylvania.....	Pennsylvania.
36	Francis S. Kent.....	do.....	Do.
37	John M. Kerr.....	North Carolina.....	North Carolina.
38	Lemuel G. Knox.....	New York.....	Ohio.
39	John C. Landis.....	Missouri.....	Missouri.
40	Martin V. B. Lewis.....	New York.....	New York.
41	Charles E. Livingston.....	do.....	Pennsylvania.
42	Daniel D. Lynn.....	Indiana.....	Indiana.
43	Charles D. Lyon.....	New York.....	Michigan.
44	John A. Maitland.....	Pennsylvania.....	Pennsylvania.
45	William H. Marriott.....	Maryland	Large.
46	Salem S. Marsh.....	Massachusetts.....	Massachusetts.
47	James P. Martin.....	Kentucky	Large.
48	Wesley Merritt.....	New York.....	Illinois.
49	Anson Mills.....	Indiana.....	Indiana.
50	Lyman Mishler	Pennsylvania.....	Pennsylvania.
51	Robert W. Mitchell	do.....	Large.
52	Charles S. Morgan, jr.....	Virginia.....	Virginia.
53	George R. Myers.....	New York.....	New York.
54	W. W. McCreery, jr.....	Virginia.....	Large.
55	Walter McFarland	New Jersey.....	New York.
56	James A. McGowan	Pennsylvania.....	California.
57	Alexander J. D. McIntosh.....	Connecticut	Large.
58	Robert S. McNally	New York.....	New York.
59	Henry C. Parker.....	Louisiana	Louisiana.
60	Alexander C. M. Pennington.....	New Jersey.....	New Jersey.
61	Horace Porter.....	Pennsylvania.....	Pennsylvania.
62	Carroll H. Potter.....	Rhode Island	Rhode Island.
63	Albert M. Powell.....	Maryland.....	Maryland.
64	Stephen D. Ramseur.....	North Carolina.....	North Carolina.
65	Alamson R. Randal.....	New York.....	New York.
66	William W. Ricketts.....	Pennsylvania.....	Pennsylvania.

List of officers, professors, and cadets—Continued.

No.	Names.	Where born.	Where appointed from.
67	Oliver P. Ritnour.....	New York.....	Illinois.
68	Ed. D. B. Riley.....	Indian Territory	Large.
69	Dewitt C. Rugg.....	Indiana	Indiana.
70	Ed. W. Shoemaker.....	Iowa	New Mexico.
71	Benjamin F. Sloan, jr.....	South Carolina.....	South Carolina.
72	Rudolph S. Small.....	Pennsylvania.....	Pennsylvania.
73	Alfred T. Smith.....	Missouri	Illinois.
74	John J. Sweet.....	Illinois.....	Do.
75	James M. Tabor.....	Mississippi.....	Mississippi.
76	Lycurgus S. Talbot.....	Kentucky.....	Kansas.
77	John A. Tardy, jr	New York.....	New York.
78	Richard K. Taylor.....	Florida.....	Florida.
79	Winfield S. Thomas.....	Georgia	Georgia.
80	George W. Vanderbilt.....	New York.....	New York.
81	James M. Warner.....	Vermont	Vermont.
82	James M. Whittemore, jr.....	Massachusetts	Massachusetts.
83	Rigdon Williams.....	Ohio	Ohio.
84	James H. Wilson.....	Illinois.....	Illinois.
85	John M. Wilson.....	District of Columbia..	Washington Territory.

J. G. BARNARD,

Bvt. Maj. of Engineers, and Superintendent Military Academy.

HEADQUARTERS MILITARY ACADEMY,

*West Point, New York, September 30, 1855.**Letter explanatory of the Military Academy estimates.*

UNITED STATES MILITARY ACADEMY,

West Point, New York, October 11, 1855.

SIR: I enclose you herewith an estimate of funds for the fiscal year ending June 30, 1857, for the United States Military Academy.

The total under the head of "current and ordinary expenses" is somewhat less than last year. Of its items, that entitled "repairs and improvements" is slightly increased, as also some of the items for clerk hire. The first increasement is owing to an estimate being inserted for cutting down the front windows of the hospital (lower story) to a level with the piazza, in order to increase light and ventilation.

The proposed compensation for each of the three clerks employed has been increased, to bring them equal to what their services would command in other branches of the service or in civil life.

The "disbursing officer's and quartermaster's clerk" is a confidential officer, and keeps the accounts of disbursements for the whole Military Academy appropriation, besides acting as clerk to the superintendent. From his present pay, \$900 per annum, he has to pay house rent. I consider the increase proposed as but reasonable. The treasurer's clerk keeps the accounts of the cadets. He has heretofore received

\$500 by appropriation, and \$500 from the cadets' funds. I propose to relieve this latter fund from this charge, and meet the whole by the appropriation, increasing the total \$95.

I propose to increase the pay of the adjutant's clerk, a laborious officer, charged with all the records of the academy, from \$600 to \$750. The other items of current and ordinary expenses are about the same as for former years.

The introduction of gas-light is again estimated for, \$15,000. Also for building officers' quarters, \$20,000; and for barracks for dragoon detachment, \$10,000. The necessity of these appropriations is so well explained in the superintendent's letter (October 7, 1854,) accompanying last year's estimate, as to require nothing more from me.

An appropriation of \$10,000 is also asked for completing the stables (now commenced and nearly half completed) for the dragoon and artillery horses.

The necessity of the item of \$5,000 for repairs and additions to the professors' houses is explained in the letter of the late superintendent above quoted.

A gun pendulum is very essential at an institution like this, which teaches the theory as well as practice of gunnery, and was recommended (together with all the items above specified) by the Board of Visitors.

I have added an item of \$700 for a public clock, which it is proposed to attach to the barracks or to some one of the academic buildings. It has been a want long felt. The clock kept in the guard-room is not only out of the way, but a very poor one. That connected with the astronomical department is inaccessible, and indeed it is an astronomical clock, of little value for occasional reference. The result is, there is no *standard* of time here, and no one pretends to feel certain that his own clock or watch is right.

In reference to constructions carried on during the past year, under direction of the superintendent, it is proper to remark that the new riding-hall commenced in the spring is now nearly completed, the contractor being now well advanced with the roof, and will be ready for use in November. About one-half of the stabling for dragoon and artillery horses (as much as the appropriation admitted) has been built, and is now ready for occupation.

I am, very respectfully, your obedient servant,

J. G. BARNARD,

Brevet Major, Superintendent Military Academy.

General Jos. G. TOTTEN,

Chief Engineer, Washington, D. C.

Report of the Board of Visitors to the United States Military Academy at West Point, June, 1855.

SIR: The Board of Visitors invited "to attend the annual examination of the United States Military Academy, to examine into the actual

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state of discipline, instruction, police, administration, fiscal affairs, and other concerns of the institution, and to report the results of their examination to the Secretary of War," met at West Point, New York, on the 1st of June, in accordance with the regulations of the academy, and of the letter of invitation under which they acted.

The board having been organized, received the official visit and courtesies of the academic staff, and, under the escort of the superintendent and various officers, proceeded to visit the different departments of the institution, and thence to the review of the corps of cadets.

From the review, the board proceeded to the officers' mess-rooms to partake of the hospitalities of the superintendent. On the 2d of June, the annual examination of the cadets of the United States Military Academy commenced, and was continued daily, except on Sundays, until completed. The board met daily for the transaction of business. The examinations were held in the library, and were continued from 9 a. m. till 1 p. m., and from 3 p. m. till 5 p. m.

The board also attended the daily exhibition of the exercises in the different arms of the service. The cadets showed the skill, efficiency, and perfect training needful for all the varied emergencies of active service.

Committees on the subjects prescribed in your letter of invitation were organized. During the progress of the examination these committees have investigated all the subjects named, assisted by the officers, the books and records of the institution. A thorough knowledge of every part of the academy was thus obtained, not only in the general relations, but in the details of the practical workings of the whole system. The results of this system were seen in the proficiency of the graduating class.

The board are impressed with the importance of this institution to the common interests of our country. Its practical working has been displayed in training a large number of men for the public service, who have shown the results of that training in their skill and bravery as officers of the line and of the staff on the battle-fields of Mexico and in the professions and employments of civil life.

The utilitarian character of this institution, and the importance of fostering, improving, and even extending its benefits to a greater number than have enjoyed them heretofore, is no longer a question. It is believed that the glorious results of the campaigns in Mexico have removed the popular prejudices which were growing against this academy. The people had not seen distinctly before that era the practical effects of instructing and training cadets in time of peace to act efficiently in time of war.

The committee on discipline, after due investigation, give it as their opinion, that the system in the United States Military Academy is admirably adapted in all its parts to cultivate and form habits of order, system, punctuality, responsibility, subordination, obedience, and consequent efficiency. The system is fully organized, developed, and carried out into practice in each department, and works harmoniously in all its parts, as in one great machine that performs the duties re-

quired of it in the most perfect manner. No other institution in our country has the power to carry out in practice such a system of perfect discipline.

The United States Military Academy has holds upon the cadet by the bonds of honor, reputation, and his pledge under oath, his future position and rank in the service, his self-respect, and his regard for the feelings of his family and friends, which have a strength and power over him rivalled by no other institution, unless the naval school at Annapolis be excepted.

The board concur with the committee on discipline that the efficiency of the discipline is unexceptionable, and they offer but one suggestion that may tend to make it more perfect, viz: The Board of Visitors recommend that the authorities at Washington should always sustain the decisions of the academic board and of courts-martial, unless for good and special reasons.

A cadet reinstated in the academy after deliberate and careful examination, trial, and sentence of dismissal by the constituted authorities, exerts a baneful influence, that tends to paralyze and destroy the discipline of the institution.

The instruction at the Military Academy constitutes one of the chief claims to the confidence and respect of the country. The mathematics, and the application of mathematics to the exact sciences, which are so thoroughly taught in this institution, seem well calculated to develop gradually the powers of the mind and train it to habits of close inductive reasoning. The languages here taught habituate the pupil to note the minute shades of difference in the meaning of words and in the forms of expression. Many of the studies specially tend to cultivate the memory; thus reason and memory are strengthened by the taxing of their powers. But the course of instruction is such that memory cannot be substituted for the deductions of reasoning.

Merit and proficiency are the sole basis of standing in the classes. The impartiality, patience, and unwearied labor of the professors, instructors, and their assistants, in all the departments of the institution, deserve commendation. The board take pleasure in saying that, in their opinion, both the course and modes of instruction are those most approved in our highest institutions of learning.

Instruction in the several arms of the military service is given both theoretically and practically.

The moral and religious instruction by the chaplain and professor of ethics is deemed of great importance to the young men who are brought together here from every district of our country. The cadets have the benefit of good, sound religious instruction from the pulpit, and a Bible class is open to such as will attend on Sunday afternoons. The board regret that there is not prevailing a higher moral and religious sentiment, and a proper sense of accountability. This, however, is not occasioned by the lack of proper moral and religious influences. The good influences of the Christian are exhibited to the cadets in the daily walk and example of their chaplain, by several of their professors, and even by some among their comrades. The improvement to the course of

instruction recently introduced by the addition of another year, together with the evidences of Christianity and the reasoning on such subjects brought before the minds of the cadets, will, it is believed, tend to neutralize and in some degree to remove the evil. Such instruction will show the pupils of the Military Academy that there are other kinds of evidence than mathematical demonstration—kinds of evidence that are entitled to the most serious consideration, and that are the basis of almost all the opinions, decisions, and belief of mankind.

Among the new studies introduced by the addition of the fifth year to the academic course are history, rhetoric, composition, declamation, and constitutional and international law. These studies evidently will exert an important influence in enabling the young men to perform in future life their duties as officers in the public service, and to qualify them for intellectual intercourse with their fellow-citizens.

The Board of Visitors, after due consideration of the subjects referred to them in your letter of invitation, concur in the following recommendations of the several committees. Compliance with their recommendations may be expected to promote the usefulness of the institution, and add to the comfort of those connected with the United States Military Academy. The reasons that have influenced the board in making these recommendations may be found detailed in the reports of the committees and in the accompanying papers herewith transmitted.

The board recommend as follows, viz :

1st. That the authorities at Washington should always sustain the decisions of the academic board and of courts-martial, unless for special good reasons.

2d. A more thorough training in the use of the sword.

3d. A further acquaintance with the practical use of the instruments in civil engineering, and that two of each graduating class of the topographical engineers be detailed every year to perfect themselves in the use of the astronomical apparatus.

4th. A frequent practical instruction in the laboratory.

5th. A familiar acquaintance with minerals and rocks.

6th. That a period of time equivalent to the added year, and distributed through the course, be strictly appropriated to the instruction of the cadets in the Spanish language, in common English studies, in belles-lettres, history, federal and martial law, together with the laws of evidence, in the laws of nations, in the Constitution of the United States, in literature, and kindred studies needful to the education of the accomplished soldier.

7th. The relaxation of the "four-year detail" rule in favor of the first assistants in each department.

8th. That the hospital have new floors laid.

9th. The propriety of relaxing the regulations inflicting severe punishments for the first offence.

10th. Strict adherence to the requirements for admission.

11th. The appointment of two additional cadets from each State, corresponding with the number of the United States senators in Congress.

12th. Placing the assistant instructor of artillery in regard to pay on the same footing as a lieutenant serving with the light batteries.

13th. Additional pay to the cadets, and appropriations for the Military Academy.

14th. An appropriation to finish the artillery and dragoon stables, \$10,000.

15th. An appropriation for additions and improvements to officers' quarters, \$5,000.

16th. An appropriation for gas works, \$15,000.

17th. An appropriation for officers' quarters, \$20,000.

18th. An appropriation for the dragoon quarters, \$12,000.

19th. An appropriation for increasing the library, \$3,000.

All of which is respectfully submitted.

ISAAC DAVIS, of Massachusetts,

President of the Board of Visitors.

W. W. MATHER, of Ohio, *Secretary.*

JAMES G. L. HUEY, of Alabama.

JAMES W. ARMSTRONG, of Georgia.

JAMES JONES, of Louisiana.

GURDON S. COIT, D.D., of Connecticut.

H. SHUBART, of Pennsylvania.

JOHN F. CUSHMAN, of Mississippi.

STEPHEN LEE, of North Carolina.

ARNO WISWELL, of Maine.

CHARLES NEGUS, of Iowa.

A. B. HANSON, of Maryland.

FRANCIS VINTON, D.D., of New York.

Hon. JEFFERSON DAVIS,

Secretary of War.

Concurring generally in the foregoing report, it seems proper to remark upon the recommendation of the board, that the "authorities at Washington should always sustain the decisions of the academic board and of courts-martial, unless for special good reasons," that if it be intended to allege that such decisions have been set aside without such reasons, the allegation should have been sustained by specification, which would have permitted inquiry into its justice; or if it was intended as a declaration that the discretionary power vested in the Executive should be withdrawn, the special reason to sustain such an extraordinary exception to the general law should have been presented in the report. The Executive clemency is granted or withheld in each case according to the judgment of the Executive, and it is not the province of the board to review his decisions in such case.

The rule restricting tours of duty to periods not to exceed four years is deemed equitable and salutary in its effect upon the military character of the academy, and upon the military service generally. As the Military Academy is but a branch of the general service, its interests must be considered in connexion with the whole; and, if it were shown that the exception recommended would be a change beneficial to the academy, it would still remain to inquire what effect would be produced

on the general service by thus reducing the number of officers who could have the benefit of a tour of duty as instructors at the Military Academy, and by thus separating for an indefinite period a certain number of officers from their appropriate military duty with troops.

JEFFERSON DAVIS,

Secretary of War.

WAR DEPARTMENT,

September 20, 1855.

REPORT OF THE COMMITTEE ON FISCAL AFFAIRS.

To the Board of Visitors of the U. S. Military Academy :

The committee on fiscal affairs having attended to the duty assigned them, respectfully report :

Schedule marked A contains a statement of funds available, and disbursements made, by the superintendent of the U. S. Military Academy during the fiscal year ending June 30, 1855. From this statement it appears that the amount unexpended of the appropriation for the fiscal year ending June 30, 1854, is \$37,405 52; that the amount appropriated for the fiscal year ending June 30, 1855, is \$69,865; and that the sums received from other sources amount to \$42 82; making the total amount available for the year ending June 30, 1855, \$107,313 34.

The amount expended out of the above, to June 1, 1855, is \$49,840 19, leaving available at that date the sum of \$57,473 15.

Schedule B contains a statement of the rank, pay, and emoluments of the officers, professors, and employes of the U. S. Military Academy.

Paper marked C exhibits the authorized amounts paid by the treasurer of the U. S. Military Academy, showing the annual total amounts, the average amounts for two months, together with the average amount applicable for each cadet for all articles, from May 1, 1854, to April 30, 1855: also, a recapitulation of disbursements made by the treasurer of the academy on account of cadets, from May 1, 1848, to April 30, 1854.

The account of each cadet is settled once in two months, and from this paper it will be seen that the actual average expenses of each cadet during the last year, for every two months, were \$56 82; the amount received from the government of the United States, on account of each cadet for two months' pay, is \$48; showing a difference of \$8 82 between his pay for two months, and his actual necessary expenses, amounting to \$52 92, for the year. This amount must be paid by the cadet from his own resources, or by the assistance of his friends. It appears from the same paper, that the annual average expenses of each cadet for every two months, for the six years preceding the last, were \$54 58; showing a difference of \$6 58 between his pay for two months, and the amount expended on his account. The com-

mittee are satisfied, after a full investigation, that the funds appropriated by the government for the cadets are disbursed by the superintendent in the most economical manner, and we are unable to suggest any improvement. All articles are furnished the cadets by the order of the superintendent, and none are supplied by him except those which are in his judgment absolutely necessary. Upon entering the academy, each cadet is furnished with a pass-book, in which his pay and whatever may be deposited on his account are placed to his credit, and in which all articles furnished him are charged, thus showing him at all times the exact state of his account.

It is understood by the people that the cadets at this academy are educated at the public expense, and such was the intention of government when this national institution was established; but with the most rigid economy on the part of all concerned, it is evident, from the above facts, that the pay allowed by government for the cadets is insufficient for their support, and the committee would earnestly recommend such an increase of pay as may be deemed necessary for such purpose. As an additional reason, the committee would state that a majority of the cadets are understood to be the sons of people of small pecuniary means, who are unable to afford their sons but little if any assistance, and an additional amount of pay is required in order to place all, as far as possible, on terms of equality.

In confirmation of the views taken by your committee in regard to this matter, the communication of Lieutenant Smith, marked D, is referred to, and annexed to this report.

The sum of \$8,000 has already been appropriated, and in course of application for the construction of artillery and dragoon stables. This amount is sufficient only to build about one-third of the whole edifice, and containing about one-half the necessary number of stalls. By the estimate of the superintendent, the sum of \$10,000 more will be required in order to construct such a building as the necessities of the case demand, and in accordance with the plan.

There has heretofore been appropriated the sum of \$3,000 for improvements and additions to the professors' quarters. This amount has not been expended, for the reason that it is deemed altogether inadequate to accomplish the object contemplated. Many, if not all the houses occupied by the professors, were built some twenty-five or thirty years since; some of them are much too small, and they are all entirely destitute of many of the improvements of the present day, which are regarded as absolutely essential to comfort, health, and convenience. According to the estimate of the superintendent, an appropriation of \$5,000, in addition to the above, is requisite, in order to make such additions and improvements as are desirable and necessary.

The superintendent, in his annual estimate to be forwarded in September next, will ask for an appropriation of \$15,000 for gas-works. An offer has been made to build works for the above sum, including gas-generator, pipes, and ordinary burners, in every public building, and all the quarters on the plain, together with a sufficient number of street lights.

The sum of \$20,000 will also be asked for, to build officers' quarters. Such quarters will be absolutely necessary should the number of cadets be increased by the appointment of one for each Senator, or one additional cadet from each State, as is contemplated. Sixteen sets of quarters in the cadet barracks are now occupied by officers, and all of these rooms will be required for the accommodation of cadets, should such additional number be appointed.

It is also proposed to build quarters for the dragoon detachment near the new riding-hall and stables, now in course of erection. No detailed estimate has yet been made, but, in the opinion of the superintendent, the sum of \$12,000 will be required for this object. The proposed quarters are much needed, as those at present occupied by the artillery and dragoon detachment are over-crowded, and at a great distance from the new stables.

Your committee having availed themselves of all the information deemed essential in regard to the objects for which the above appropriations will be asked, and having duly considered the same, are fully convinced of their importance and necessity, and have no hesitation in recommending them to the favorable consideration of the board.

The books and vouchers in the office of the quartermaster and treasurer have been fully exhibited to us whenever required, and all the necessary information has been promptly afforded by Lieutenant Smith, the accomplished head of those departments, and his faithful and able clerks.

ARNO WISWELL.
CHARLES NEGUS.
A. B. HANSON.

WEST POINT, *June 15, 1855.*

A.—Statement of funds available, and disbursements made by the Superintendent of the United States Military Academy during the fiscal year ending June 30, 1855.

For what purpose.	Amount unexpended of the appropriation for the fiscal year ending June 30, 1854.	Appropriat'n for the fiscal year ending June 30, 1855.	Am't received from other sources.	Total available for fiscal year ending June 30, 1855.	Expended to June 1, 1855.	Available June 1, 1855.
Repairs and improvements.....		\$11,000 00	<i>a</i> \$14 52	\$11,014 52	\$9,765 21	\$1,249 31
Fuel.....	\$703 47	7,200 00		7,903 47	7,903 47	
Forage.....	452 29	1,760 00		2,212 29	1,283 59	928 70
Postage.....	47 06	50 00		97 06	32 72	64 34
Stationery.....	203 07	300 00		503 07	255 08	247 99
Transportation.....	289 62	1,800 00		2,089 62	1,890 33	199 29
Printing.....	156 46	1,000 00		1,156 46	225 90	930 56
Clerks.....		1,900 00		1,900 00	1,658 33	241 67
Miscellaneous and incidental expenses.....	13 10	1,850 00		1,863 10	1,595 15	267 95
Department of engineering.....	2,613 73	500 00		3,113 73	1,465 74	1,647 99
Do..... philosophy.....	115 89	210 00		325 89	187 61	138 28
Do..... mathematics.....	249 08	10 00		259 08		259 08
Do..... chemistry.....	213 03	850 00		1,063 03	405 90	657 13
Do..... ethics.....	158 69			158 69	48 62	110 07
Do..... drawing.....	52 06	235 00		287 06	10 91	276 15
Do..... practical engineering.....	100 00	250 00		350 00	3 50	346 50
Do..... infantry tactics.....	84 68	150 00		234 68	160 04	74 64
Do..... artillery and cavalry.....	158 81	660 00		818 81	220 03	598 78
Improvements and additions to officers' quarters.....	3,000 00			3,000 00		3,000 00
Gradual increase and expense of the library.....	20 59	1,000 00	<i>b</i> 19 55	1,040 14	428 04	612 10
Board of Visitors.....		3,000 00		3,000 00		3,000 00
Stables for artillery and cavalry horses.....	8,000 00			8,000 00	964 36	7,035 64
Purchase of artillery and cavalry horses.....	511 66		<i>c</i> 8 75	520 41		520 41

a Derived from sale of materials.

b Refunded by bookseller's assignee.

c Derived from sale of condemned horse.

A—Continued.

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REPORT OF THE

For what purpose.	Amount unexpended of the appropria- tion for the fiscal year ending June 30, 1854.	Appropriat'n for the fiscal year ending June 30, 1855.	Am't received from other sources.	Total available for fiscal year ending June 30, 1855.	Expended to June 1, 1855.	Available June 1, 1855.
Forage for artillery and cavalry horses.....	\$774 23	\$8,640 00	.....	\$9,414 23	\$7,807 32	\$1,606 91
Replacing artillery and cavalry horses.....	.....	1,000 00	.....	1,000 00	.....	1,000 00
Apparatus for warming buildings.....	2,500 00	.....	.....	2,500 00	.....	2,500 00
Cavalry exercise hall.....	1,988 00	20,000 00	.....	21,988 00	6,822 05	15,165 95
New equatorial telescope.....	5,000 00	.....	.....	5,000 00	277 71	4,722 29
Erecting barracks for engineer troops.,.....	10,000 00	.....	.....	10,000 00	.....	10,000 00
Enlarging and improving hospital of cadets.....	.....	6,500 00	.....	6,500 00	6,428 58	71 42
	37,405 52	69,865 00	\$42 82	107,313 34	49,840 19	57,473 15

QUARTERMASTER'S OFFICE, U. S. MILITARY ACADEMY,
West Point, New York, June 9, 1855.

R. S. SMITH,
Lieutenant and Quartermaster U. S. Military Academy.

B.—Statement of the rank, pay, and emoluments of the officers, professors, instructors, cadets, and employes at the United States Military Academy, West Point, New York.

No.	Office.	Rank.	Army pay per annum.	Academic pay.	Pay.	Remarks.
1	Superintendent.....	Brevet major.....	\$2, 076 00		\$2, 076 00	Disbursed by Pay department.
1	Professor of engineering.....	.....	.....	\$2, 000 00	2, 000 00	
1	Assistant professor of engineering.....	1st lieut. engineers and brevet captain...	1, 029 96	200 04	1, 230 00	
1	do.....do.....	2d lieut. engineers.....	1, 029 96	.....	1, 029 96	
1	Professor of natural and experimental philosophy.....	.....	.....	2, 000 00	2, 000 00	
1	Assistant professor.....	1st lieut. artillery.....	882 00	348 00	1, 230 00	
1	do.....do.....	1st lieut. infantry.....	882 00	.....	882 00	
1	do.....do.....	2d lieut. artillery.....	834 00	.....	834 00	
1	Professor of mathematics.....	.....	.....	2, 000 00	2, 000 00	
1	Assistant professor of mathematics.....	1st lieut. topographical engineers.....	1, 029 96	200 04	1, 230 00	
5	do.....do.....	1st lieuts. artillery, each.....	882 00	.....	4, 410 00	
1	Professor of chemistry, &c.....	.....	.....	2, 000 00	2, 000 00	
1	Assistant professor.....	1st lieut. artillery and bvt. captain.....	882 00	348 00	1, 230 00	
1	do.....do.....	1st lieut. artillery.....	882 00	.....	882 00	
1	Professor of ethics, &c.....	.....	.....	2, 000 00	2, 000 00	
1	Assistant professor of ethics.....	1st lieut. infantry.....	882 00	348 00	1, 230 00	
1	do.....do.....	1st lieut. artillery.....	882 00	.....	882 00	
1	do.....do.....	2d lieut. ordnance.....	1, 029 96	.....	1, 029 26	
1	Professor of drawing.....	.....	.....	1, 500 00	1, 500 10*	
1	Assistant professor.....	1st lieut. artillery.....	1, 050 00	348 00	1, 398 00	
1	do.....do.....	1st lieut. infantry.....	882 00	.....	882 00	
1	Professor of French.....	.....	.....	1, 500 00	1, 500 00*	
1	Assistant professor.....	1st lieut. infantry.....	882 00	348 00	1, 230 00	
2	do.....do.....	1st lieuts. artillery, each.....	882 00	.....	1, 764 00	
1	Instructor of practical engineering.....	Captain engineers, commanding company.....	1, 350 00	.....	1, 350 00	
1	Assistant instructor.....	1st lieut. engineers.....	1, 029 96	.....	1, 029 96	
2	do.....do.....	2d lieutenants engineers, each.....	1, 029 96		2, 059 92	

* Increased by Congress at its last session to \$2,000 per annum.

B—Continued.

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No.	Office.	Rank.	Army pay per annum.	Academic pay.	Pay.	Remarks.
1	Instructor of infantry tactics	Major of infantry and bvt. lieut. colonel..	\$1,644 00	\$356 00	\$2,000 00	Disbursed by Pay department.
3	Assistant instructors,	1st lieuts. infantry, each	882 00	120 00	3,006 00	
1	do.....do.....	2d lieut. infantry.....	877 00	120 00	997 00	
1	Instructor of artillery and cavalry.....	1st lieut. artillery and brevet major.....	1,644 00	.....	1,644 00	
1	Assistant instructor of artillery.....	1st lieut. artillery.....	882 00	.....	882 00	
1	Assistant instructor of cavalry.....	1st lieut. cavalry.....	1,125 96	.....	1,125 96	
1	Instructor of fencing.....	.....	.....	1,200 00	1,200 00	
	Cadets, each* .....	.....	.....	228 00	.....	
1	Surgeon.....	.....	1,788 00	.....	1,788 00	
1	Assistant surgeon.....	.....	1,518 00	.....	1,518 00	
1	Adjutant	1st lieut. artillery.....	882 00	363 96	1,245 96	Disbursed by superintendent.
1	Clerk to disbursing officer and quartermaster .....	.....	.....	900 00	.....	
1	Clerk to treasurer.....	.....	.....	500 00	.....	
1	Clerk to adjutant.....	.....	.....	500 00	.....	

* See Treasurer's report for detailed statement of accounts.

NOTE.—In addition to army pay, all officers receive an additional ration for every five years' service, the value of which is commuted at \$6 per month.

R. S. SMITH,
Lieutenant and Quartermaster U. S. Military Academy.

QUARTERMASTER'S DEPARTMENT, U. S. MILITARY ACADEMY,
West Point, New York, June 11, 1855.

REPORT OF THE

C.

Statement of authorized amounts paid by the treasurer of the United States Military Academy, exhibiting the annual total amounts, the average amounts for two months, together with the average amount applicable for each cadet for all articles, from the 1st of May, 1854, to 30th of April, 1855.

On what account paid.	May and June, 1854.	July and August, 1854.	September and October, 1854.	November and December, 1854.	January and February, 1855.	March and April, 1855.	Total amounts.	Average for 2 months.	Average amount applicable for each cadet for two months.	Remarks.
Band fund.....	\$102 50	\$119 00	\$124 75	\$123 25	\$110 62	\$103 50	\$683 62	\$113 94	\$0 50	Voluntary subscription by cadets for the support of a band of musicians.
Board at mess commons.....	3,445 26	4,130 61	4,697 74	4,921 15	4,304 66	3,836 28	25,335 70	4,222 62	18 68	Amount charged each cadet, being pro rata and fixed by a board of officers who examine and audit the accounts of the purveyor of the mess commons.
Washing.....	816 00	913 45	995 35	989 00	894 09	823 73	5,431 62	905 27	4 00	\$2 per month, winter and summer.
Commissary store.....	1,009 14	3,924 56	2,738 68	1,169 92	1,159 86	1,110 56	11,112 72	1,852 12	8 23	Conducted by the commissary of cadets. Articles furnished, viz: text-books, stationery, under-garments, equipments, room furniture, oil, candles, &c.
Commissary clothing department.	1,702 78	3,355 86	1,979 17	2,195 94	2,665 13	2,372 87	14,271 75	2,378 63	10 52	Conducted by the commissary of cadets. Articles furnished, viz: uniform clothing, citizens' clothing, and authorized military frock coats for cadets when going on furlough.
Commissary shoemakers' department.	452 49	956 11	592 62	544 26	364 25	394 57	3,304 30	550 72	2 43	Shoes and repairs done by the contractor under the inspection of the commissary of clothing.
Postage.....	94 43	79 29	117 21	101 52	77 88	105 04	575 37	95 89	43	Postage of letters and newspapers. One newspaper allowed to each cadet, provided he makes application for the permission.
Barber, shoe-blackening, varnishing, &c.	149 52	218 59	265 03	222 38	183 82	186 30	1,225 64	204 27	90	This embraces shoe-blackening, hair-cutting, varnishing, accoutrements, &c.
Sundries.....	50 50	538 25	.....	.....	.....	.....	588 75	98 13	44	Special permissions.
Baths taken by cadets.....	106 36	14 44	7 39	87 15	86 30	82 92	384 56	64 09	28	A small charge for each bath, only sufficient to pay the expenses of the bathing establishment.
Dialectic Society.....	30 00	.....	30 00	.....	.....	.....	60 00	10 00	4	Subscribed by the members of that society, under the sanction of the superintendent of the Military Academy.
Iron bedstead and table fund.	22 60	36 00	40 60	38 40	29 60	27 80	195 00	32 50	14	This is only charged to the 4th class for their use, at 20 cents per month, for the first year only, which is applied to keep the articles in repair.
Rules and triangles, (steel)...	60 30	.....	.....	.....	.....	.....	60 30	10 05	4	A small charge annually being necessary to replace and keep them in repair.
Lithographic department.....					95 47	3 00	98 47	16 42	7	Charge for lithographic works, written by the officers and professors to aid the instruction in their several departments.

SECRETARY OF WAR.

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REPORT OF THE

On what account paid.	May and June, 1854.	July and August, 1854.	September and October, 1854.	November and December, 1854.	January and February, 1855.	March and April, 1855.	Total amounts.	Average for 2 months.	Average amount applicable for each cadet for two months.	Remarks.
Damages to muster department.	\$9 35	\$1 72	.....	.....	\$12 14	\$1 25	\$24 46	\$4 08	\$0 2	This embraces damages of barracks, breaking window glass, &c.
Damages to ordnance department.	21 38	.....	\$56 08	\$13 39	29 36	3 55	123 76	20 63	9	Charge of damages of arms and accoutrements, loss of the same, &c., which reverts to the United States.
Damages to mess commons...	22 74	31 30	36 67	45 71	35 64	.....	171 46	28 57	12	Charge of damages of tumblers, plates, dishes, knives and forks, &c., which is signed by the cadets when the said damages are done, agreeably to the regulations of the mess commons.
Making fires and policing barracks.	132 75	111 39	156 48	206 70	211 93	201 38	1,020 63	170 10	76	Distributing fuel, policing barracks, attendance on furnaces. The amount is charged at each settlement according to the number of cadets at muster.
Dentist.....	93 75	.....	88 00	27 55	12 50	.....	221 50	36 91	17	For professional services when recommended by the army surgeon of the United States Military Academy.
Dancing master.....	.....	500 00	.....	.....	.....	.....	500 00	83 83	37	Amount subscribed by the cadets of United States Military Academy.
Cotillon parties.....	.....	336 10	.....	.....	.....	.....	336 10	56 02	24	Amount subscribed by the cadets of the Military Academy, and the parties given during the months of July and August. This is a voluntary subscription.
India-rubber cloak fund	24 75	.....	.....	35 50	.....	.....	60 25	10 04	4	Purchased for the use of the cadets—a small amount charged annually for their use, under the charge of the commissary department.
Cash on account and sundry subscriptions.	1,048 53	152 32	18 81	31 48	30 60	18 76	1,300 51	216 75	96	Subscription to newspapers, &c., which are authorized by the superintendent.
Balance of cash paid cadets..	7,042 68	308 98	67 58	149 44	2,000 38	396 61	9,965 67	1,660 94	7 35	When graduating they receive the balances due them, including their equipment fund; and the furlough class cadets receive the balance that may be due them to 1st July.
Total amounts	16,437 81	15,727 97	12,012 16	10,902 44	12,303 64	9,668 12	77,052 14	12,842 02	56 82	
Amount received from the government of the United States on account of each cadet for two months' pay.....									48 00	
Difference between his pay for two months and the amount expended on account of each cadet, which must be liquidated by him either after graduating or from his deposit on entering the United States Military Academy.....									8 82	

Total amounts.....	16,437 81	15,787 97	19,019 16	10,902 44	12,703 64	9,668 12	77,089 14	19,642 02	56 52
Amount received from the government of the United States on account of each cadet for two months' pay.....									48 00
Difference between his pay for two months and the amount expended on account of each cadet, which must be liquidated by him either after graduating or from his deposits on entering the United States Military Academy.....									6 58

C—Continued.

RECAPITULATION.

Disbursements made by the treasurer of the United States Military Academy on account of cadets, from May 1, 1848, to April 30, 1854—six years.

Periods.	May and June.	July and August.	September and October.	November and December.	January and February.	March and April.	Total amount.	Average for 2 months.	Average amount applicable for two months for each cadet.
From May 1, 1848, to April 30, 1849	\$17,758 31	\$15,600 38	\$12,035 00	\$11,621 58	\$10,838 60	\$10,140 43	\$78,039 30	\$13,006 55	\$56 62
From May 1, 1849, to April 30, 1850	17,718 61	14,396 38	10,988 97	9,804 00	9,757 49	8,865 03	71,530 48	11,921 74	55 72
From May 1, 1850, to April 30, 1851	18,308 79	14,928 03	11,627 34	10,588 78	11,016 58	9,371 34	75,840 86	12,640 14	54 73
From May 1, 1851, to April 30, 1852	18,623 82	13,938 86	11,007 74	9,903 41	10,589 04	8,931 67	72,994 54	12,165 76	52 89
From May 1, 1852, to April 30, 1853	17,934 23	14,751 38	12,353 93	11,375 29	11,283 98	9,610 98	77,309 79	12,884 96	53 53
From May 1, 1853, to April 30, 1854	19,751 45	14,827 78	10,778 28	9,785 53	10,493 26	9,166 74	74,803 04	12,467 17	54 03
Total amount.....	110,095 21	88,442 81	68,791 26	63,078 59	64,023 95	56,086 19	450,518 01	75,086 32	372 52
Annual average amount for six years.....	18,349 20	14,740 47	11,465 22	10,513 10	10,670 66	9,347 67	75,086 32	12,514 38	54 58
Amount of cadets' pay for two months.....									48 00
Average difference between his pay for two months and the amount expended on account of each cadet.....									6 58

TREASURER'S OFFICE, WEST POINT, New York, June 9, 1855.

R. S. SMITH,
Lieutenant, and Treasurer U. S. Military Academy.

D.

TREASURER'S OFFICE, WEST POINT,
June 11, 1855.

SIR: I have the honor to transmit an annual statement of authorized accounts of the cadets of the United States Military Academy, paid by me from the 1st May, 1854, to 30th April, 1855, and a recapitulation of payments as taken from the books of this office for six years from 1st May, 1848, to 30th April, 1854.

It will be seen from the annual statement, from 1st May to the 30th April, 1855, that the cadets' expenses for each two months average over the amount of pay received from the government the sum of \$8 82; and by the recapitulation of payments for six years from 1st May, 1848, to 30th April, 1854, the average expenses for each two months, over the amount of cadets' pay received from the government, is \$6 58; being a difference of \$2 24 over the former years, which is owing to the board being increased by the advanced prices of provisions.

The present pay of a cadet is \$24 per month; and even with the strictest economy on the part of the superintendent, cadets with that pay cannot be supported; they are compelled to resort to their friends at home for supplies, which only those in good circumstances can thus procure. The largest portion of the cadets at the academy having no such resort, are necessarily straitened in the very necessities of life, and are placed in a position inferior to the sons of the more wealthy.

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

R. S. SMITH,

Lieut. and Treasurer U. S. Military Academy.

Hon. ARNO WISWELL,

Chairman Committee on Fiscal Affairs.

REPORT OF THE COMMITTEE ON POLICE.

The committee on that portion of the duties of this board contained in the instructions of the Secretary of War, accompanying the official notices of appointment, beg leave to offer the following report as the result of their examination into the various subjects of their action, and of the inquiries they have proposed to the officers in command.

Your committee have faithfully visited, in company with the proper officers, all the barracks, mess-rooms, hospitals, stables, and other quarters usually opened to their investigation. After the ample reports made by their predecessors upon the new quarters, now occupied by the cadets, it will not be necessary at this time to indulge in repetition. The only question suggested is, whether the present mode of warming the apartments by flues is equal in a sanitary point of view to the practice formerly obtaining. They have found the kitchens, cabinets,

pantries, and other necessary parts of the mess-hall in a very favorable condition, and admirably fitted for the objects of their construction.

Your committee are informed that sixteen double rooms of the cadet barracks are at present occupied by officers on duty at this post, for whom there is no provision. Should the number of cadets be at any time increased, this arrangement will be inconvenient. The fact that certain officers are compelled to live without the limits of the post, and others with their families to board in the hotel, calls loudly on the national legislature to make a liberal provision for the erection of a sufficient number of comfortable dwellings for the professors and officers, and for the improvement and enlargement of those already occupied.

Your committee found the barracks, occupied by the workmen, artillery corps, and dragoons, composed of six rooms, very much crowded; the kitchen and mess-rooms all more or less in a condition requiring some repairs. They refrain from any special notice, because the erection of new barracks for dragoons, proposed by the superintendent and Brevet Major Porter, at an expense of twelve thousand dollars, will, in their opinion, remove every cause of complaint. The present dragoon barracks are so far removed from the new stables, that great advantage will result from erecting the proposed new barracks in the immediate vicinity of the riding-hall and new stables. Everything was found in perfect order, clean and comfortable.

Your committee visited the three stables occupied by the horses of the artillery and cavalry. No. 1 is in its usual good order. No. 2 has the north wall still sustained by the shores mentioned in previous report. No. 3 is in the condition mentioned by the committee of last year, being a low shed, open to the weather, cold in winter, hot in summer, and otherwise unsafe. The new stables being rapidly completed, are in location and construction far superior to the older buildings. The additional appropriation for the completion and extension of this building is imperiously called for. The committee have examined the plans and find them worthy of approval.

The new riding-hall is a solid structure of the most ample dimensions—two hundred and eighteen feet eight inches in length, seventy-eight feet eight inches in width, and when completed will be thirty-one feet three inches in height. It will soon be finished, and will require no additional appropriation.

Your committee cultivated the acquaintance of Drs. Moore and Barnes, the able surgeon and assistant surgeon of this post; and, in addition to the report of Dr. Moore, herewith appended, (marked A,) to which they respectfully invite the attention of the Board of Visitors, they have visited, very carefully, every part of the cadets' hospital, and of the hospital for the soldiers on duty at this post. The first has been remodelled in conformity with the suggestions of former reports, and we find it in the internal distributions into dispensaries, wards, bath-houses, &c., admirably adapted for the objects of its construction. Not yet having been supplied with all the furniture provided for in the late appropriation, the internal arrangements are uncomfortable in appearance.

The floors in this building—the first part that strikes the eye of one

accustomed to a well-constructed and clean hospital—are of a porous and soft wood, entirely unfit for the purpose, being also worn, defaced, and shrunken by long use. It should be immediately replaced by a harder material.

In its original construction and present admirable condition, the hospital for the United States troops at this point is a model of its kind, and leaves nothing, in the opinion of your committee, for special commendation.

JAMES W. ARMSTRONG.
JAMES G. L. HUEY.
JAMES JONES.

A.

HOSPITAL, WEST POINT, N. Y.,
June 14, 1855.

GENERAL: I had the pleasure a few days since of showing the two hospitals at this place, under my charge, to the committee of police of the Board of Visitors. I pointed out to the committee the condition of the floors of the cadet hospital. They are old floors, of white pine, and have been in the building many years, and are much worn. Besides, the fibre of the wood is so porous that fluids falling always produce an indelible stain. I think oilcloth would obviate these objections. When a patient now gets out of bed he steps upon the cold floor. This can be remedied by rugs, one to each bed. This hospital is much in need of a cooking range or stove. At present there is no way of cooking, excepting in an open fireplace, which mode is inconvenient, and consumes a great deal of fuel. I would suggest that the windows be furnished with curtains. Two bathing-tubs are needed. In using the shower-bath there is no vessel to catch the water; consequently the water runs over the floor and through it, damaging the ceiling below. A large tin tub, or something of the kind, is required, to be placed under the shower of water.

The second story of the hospital, for enlisted men, should have oilcloth over the floors, as the water, in washing the wards, gets through to the ceiling, and, of course, in time it will be injured. The piazza of this hospital is very much elevated, especially at the back of the building, and a patient, or indeed any person, falling off, would be seriously if not fatally injured, there being no ballusters to prevent the falling. This requires, I think, attention. I would suggest that, after the two hospitals are furnished with furniture, &c., a small sum of money should be annually appropriated, so as to enable the surgeon to keep his hospital in proper order.

Very respectfully, your obedient servant,

S. P. MOORE, *Surgeon.*

General ARMSTRONG,
Police Committee, Roe's Hotel.

REPORT OF THE COMMITTEE ON INSTRUCTION.

The committee on instruction hereby report to the Board of Visitors that they have given diligent attention to the duties assigned to them.

The first class, consisting of thirty-six members, were examined in engineering, both civil and military; in ethics and moral philosophy, and the constitution of the United States; in mineralogy and geology; in infantry, cavalry, and artillery tactics.

The committee join in the voice of their predecessors, echoing the universal praise awarded to the higher classes in the academy. Each subject was handled at the blackboard with consummate skill. It was evident to your committee that the mode of instruction consists not only in hearing recitations, but in much personal tuition on the part of professors and assistants.

The department of engineering especially appeared to your committee to be fully mastered, and the examination reflected the highest honor on the eminent chief of this department and his assistants.

Your committee are impressed with the wisdom of prolonging the term of study to a fifth year, so as to pursue to higher attainments the important subjects of international and constitutional law, military law, the law of evidence, the practice of courts-martial, history, composition, and elocution, and the Spanish language, which are among the acquirements necessary to an officer of the republic.

The graduating class have not enjoyed the benefits of this new arrangement of the fifth year's course in all its virtues, and, under the circumstances of the case, acquitted themselves with honor both to themselves and to their reverend professor.

The committee, in view of the added labors devolving on the professor of this department, are strongly convinced that the office of chaplain should be dissevered from it, and erected into a distinct responsibility. The care of souls is of itself sufficiently arduous to employ the exclusive time and labors of one man, while the duties of the professor, in the wide range of English studies which have been introduced in the fifth year's course, require the energies of the strongest, and the learning of the ripest scholar.

Your committee recommend to the Board of Visitors to advise the separation into two distinct offices of chaplain and professor of ethics, and in accordance with the repeated recommendations of previous boards.

Your committee heard with pleasure the examination of the first class in mineralogy and geology, conducted by the distinguished professor and his assistants. But the committee observed that, while the properties of a mineral were duly described on the blackboard, there was no evidence of a familiarity with the thing described. They would have preferred that each cadet be required to take the mineral into his hands, and show his practical acquaintance with it. This is required of him in the section-room. In no department of natural science do your committee believe there is more need of thorough and accurate acquaintance than in this. The manipulations of chemistry,

the discriminations of mineralogy, and the deductions of geology, demand much skill and study; while the wants of this age and country, the new and fresh recurring discoveries of mineral wealth, the unexplored domain, and the partially worked mines of our extended country, demand in their turn that a more entire, thorough, and complete education be given to the youth of our generation. No institution is more competent, none is more proper to bestow this rich boon on our countrymen, than the United States Military Academy.

Your committee recommend a more practical instruction in this department.

The examination in *tactics*, as might be expected, was gratifying and satisfactory; yet the practice of the infantry, the science in the artillery, and the skill in cavalry exercises, surpassed our high expectations, rivaling, we doubt not, any army in the world.

The cadets of the first class were learned in the department of *ordnance* and *pyrotechny*, showing in the latter branch many practical evidences of their handiwork.

But your committee were not satisfied with the experience of the cadets in the use of the sword, and recommend that the board advise a more thorough and extensive training in the exercise with this weapon, so necessary to the officer in every branch of military service.

Your committee proceeded to the examination of the second class in *philosophy*, *chemistry*, and *drawing*.

The committee cannot repress the expression of profound admiration of the examination in philosophy, which reflected honor alike on the learned professor, with his assistants, on the cadets, and on the grand subject itself. In each department of this wide subject, the knowledge evinced was thorough and exact. The beautiful sciences of *optics* and *astronomy* were especially illustrated by diagrams, and questions and answers, to the delight of your committee.

And the committee are happy to report, that each cadet is taught the practical use of the astronomical instruments, and is required to work out his own observations, to the satisfaction of the professor. Too much praise cannot be awarded to Professor Bartlett for the diligence and success whereby he has furnished his department. Your committee recommend that two of each graduating class of the topographical engineers be detailed to perfect themselves in the use of instruments.

In chemistry your committee were satisfied with the attainments of the class, so far as theoretic information goes. But they lament that they perceive no evidence of a practical knowledge of the work in the laboratory. Your committee were particularly gratified with the composure and clearness with which the examination in mineralogy, geology, and chemistry was conducted by the first assistant, Brevet Captain Boynton.

The drawing hall exhibited the rare proficiency of the pupils in the beautiful and important art of *painting* and *topography*.

Under the celebrated Professor Weir no cadet can graduate without some practical acquaintance with the subject, and our army will never

lack officers to sketch the portraiture of the objects which the commanding general may desire to study.

Your committee next attended the examination of the third class, (consisting of 48 members,) in the mathematics and French. The class attend to drawing also, chiefly with the pencil and pen.

The mathematical attainments of this class, under the tuition of its most able professor and his assistants, exhibited the fruits of close application and discriminating thought.

As the reasoning of the mathematics demands the nicest accuracy of logic, so the statement of the argument requires the exactest language. Your committee were charmed to observe that these conditions were scrupulously required, and faithfully observed. In no institution in our land are the mathematics pursued to the height and latitude in which they are familiarly studied at this academy. The abstruses and problems of the calculus were by the highest sections masterly demonstrated, while by the other sections the subjects were discussed in a creditable manner.

As the mathematics lie at the foundation of military science, and enter into the calculations of the multiform arts in civil life, so the necessity of a ripe knowledge and a familiar use of the mathematics exacts all the attention which they receive at this institution. The committee were pained to learn that the mathematical department was about to suffer the loss of the services of the first assistant Lieutenant Peck, through the operation of the "four-year detail;" and besides the pure mathematics, descriptive geometry, mensuration, and surveying, with drawings in civil engineering, &c., exhibited an advanced proficiency in the cadets.

Yet your committee suggest the need of a further practical knowledge in the use of instruments appropriated to field operations. They recommend to the board to urge this particular, so that the cadet may be thoroughly familiarized with the implements of his work.

The examination in *French* evinced the ability of the professor and his assistants, as well as the proficiency of the higher sections of cadets. The cadets were tried by members of the board, who selected passages from classic French authors, (as Voltaire,) which being read by the professor, were immediately translated by the cadets into English; and then being translated by the professor into English, were forthwith turned into classic French by the cadets. Your committee consider this test of scholarship an ample eulogium of the thoroughness both of the instruction and the study.

The fourth and fifth classes, consisting of 78 members, were examined together in mathematics and English studies, and the fourth class were further examined in French. These classes were joined in September last, those cadets above 18 years of age being assigned to the fourth, and those under 18 years ranged into the fifth class.

The experiment of a fifth year's course was commenced with the class of 1854, and is now launched on the tide of success. Your committee hail this change as a vast improvement, which promises to supply a want that hitherto has craved a remedy. It will furnish to the cadet a knowledge of history, of the laws of moral evidence, of English and Spanish litera-

ture, of important branches in the belles-lettres, of the federal laws and constitution, of the laws of nations, that go to complete the furniture of the soldier and gentleman.

It likewise provides an opportunity to the cadets for that more *practical* acquaintance with the arts, which the sciences they learn requires for efficient application.

The fifth class exhibited to the board their proficiency in elocution, which your committee pronounce to be a valuable acquirement, both to familiarize the cadets with elegant modes of expression, and to accustom them to the republican demands of public speaking. The soldier is not exempt from these necessities, but often is called to express his thoughts before authorities and assemblages of people.

The articulation of the cadets was imperfect, but the frequent exercise of their organs of speech in elocutionary trials will soon obviate this defect.

Your committee earnestly hope that the additional year to the course of studies will be chiefly devoted to enlarge the scope of the communication of the young minds, which are instructed for the urgencies both of peace and war.

They indulge the expectation of great utility to result from this improvement, which, through the repeated advice of preceding Boards of Visitors, is at length set in operation.

To give the board a view of the course of studies devised for the fifth year, your committee append a synopsis to this report, (Appendix A.)

Your committee beg to express their regret that the rule requiring the officers of the army to be relieved after four years' service at the academy, contains no exception of the chief assistant in the various departments of instruction.

The first assistants may be required, in case of the sudden death or sickness of the professor, to take his place. They are admitted to the deliberations of the academic board, and, in many other respects, they are regarded as needful to complete the organization of the faculty of teachers. But so soon as they are competent and most useful, they are ordered to their post. The order is likely to drive them from the army.

For these reasons, your committee earnestly recommend the board to ask a relaxation of the order in question, in favor of the first assistants in the several departments of instruction.

The committee of instruction offer the following resolution:

Resolved, That this board recommend, in their report—

1st. A more thorough training in the use of the sword.

2d. A further acquaintance with the use of instruments in civil engineering; and that two of each graduating class of the topographical engineers be detailed, every year, to perfect themselves in the use of the astronomical apparatus.

3d. A frequent practical instruction in the work of the laboratory.

4th. Familiar acquaintance with minerals and rocks.

5th. A separation of the offices of chaplain and professor of ethics.

6th. The strict appropriation of the added year to the course, for the instruction of the cadets in literature and law.

7th. The relaxation of the "four-year detail" in favor of the first assistants.

All of which is respectfully submitted.

FRANCIS VINTON, New York.

GURDON S. COIT, Connecticut.

STEPHEN LEE,

who concurs in all the above report, except the part recommending a separation of the offices of chaplain and professor of ethics, &c., to which he dissents, for the reasons contained in a report submitted by him.

MINORITY REPORT.

I, Stephen Lee, one of the committee on instruction, concurring in all the report presented by said committee, except that part recommending that the office of chaplain should be separated from that of the professor of ethics, &c., beg leave to make the following statement of the reasons for my dissent:

1st. That the duties of the professor of ethics, &c., now discharged by the chaplain, by bringing him in daily contact with many members of the corps of cadets, enable him to estimate, more accurately, the moral and religious condition of those whom he will have to address in the chapel, on the sabbath, and thus to do them more good.

2d. That the authority vested in him, as a professor of the institution, if discreetly used, (as it is believed to be now exercised) will insure to him an attention and respect, in the chapel, which can hardly be acquired in any other way.

3d. That the offices of chaplain and professor of ethics, &c., have never yet been separated; the preceding committees have recommended it, from which it may be fairly inferred that the present arrangement is considered a wise one.

4th. That the present chaplain has never complained of his duties being too burdensome, in the discharge of the two offices.

All of which is respectfully submitted.

STEPHEN LEE.

APPENDIX A.

The following is a synopsis of the course of studies pursued at the Military Academy :

	Department.		Text-books, &c.
FIRST YEAR.	FIFTH CLASS.	MATHEMATICS.	Davies' Bourdon's Algebra. Davies' Legendre's Geometry and Trigonometry. Davies' Descriptive Geometry.
		ENGLISH STUDIES AND LITERATURE.	Bullion's Grammar. Morse's Geography. Hale's History of the United States. Sargent's Elocution. Composition.
		USE OF THE SWORD.	
SECOND YEAR.	FOURTH CLASS.	MATHEMATICS.	Davies' { Descriptive Geometry. Shades, Shadows, and Perspective. Spherical Projections and Warped Surfaces. Surveying. Church's Analytical Geometry. Church's Calculus.
		FRENCH.	Bolmar's Lévizac's Grammar. } Whole year from Bérard's Leçons Françaises. } September 1 to Chapsal's Leçons et Modèles, } September 1. de Littérature Française.
		ENGLISH STUDIES AND LITERATURE.	Weber's Outline of Universal History. Sargent's Elocution. Composition. Blair's Rhetoric.
		USE OF THE SWORD.	
THIRD YEAR.	THIRD CLASS.	NATURAL AND EXPERIMENTAL PHILOSOPHY.	Barlett's Mechanics. Davis's Electricity and Magnetism. Bartlett's Acoustics and Optics. Gummere's Astron'y.
		SPANISH.	September 1 (every second day) till January 1, and from January 1 daily to June 1.
		FRENCH.	Bolmar's Lévizac's Grammar. Rowan's Morceaux Choisis des Auteurs Moderns.
		DRAWING.	Human Figure. Topography.
		CAVALRY.	Practical instruction in cavalry exercise.

APPENDIX A—Continued.

FOURTH YEAR.	Department.		Text-books, &c.
	SECOND CLASS.	CIVIL ENGINEERING.	Mahan's Course of Civil Engineering; Lithographic Notes on Architecture, Stone Cutting, and Machines.
		ETHICS.	Whateley's Logic. Wayland's Moral Science. Mahan's Intellectual Philosophy.
		CHEMISTRY.	Kane's Chemistry.
		DRAWING.	Landscape.
		CAVALRY.	Practical instruction in cavalry exercise.
FIFTH YEAR.	FIRST CLASS.	ENGINEERING AND SCIENCE OF WAR.	Mahan's Treatise on Field Fortification. Mahan's Lithographic Notes on Permanent Fortification; Attack and Defence; Mines and other Accessories; Composition of Armies, Strategy, &c.
		PRACTICAL ENGINEERING.	Practical instruction in fabricating Fascines, Sap Faggots, Gabions, Hurdles, Sap Rollers, &c.; manner of laying out and constructing Gun and Mortar Batteries; Field Fortification and Works of Siege; formation of Stockades, Abattis, &c.; Topographical Sketching in the Field, embracing rapid methods of reconnoitring woods, heights, defiles, fields, marshes, water-courses, fords, bridges, roads, and other communications, houses, villages, batteries, field-works, &c., &c. Recitations upon Field Fortification, Sapping, Mining, Pontoniering, and Military Reconnaissance.
		ARTILLERY AND CAVALRY.	Tactics for Garrison, Siege, and Field Artillery. Pyrotechny. Thiroux's Instruction Théorique et Pratique d'Artillerie. Notes on Gunpowder, Percussion Powder, Cannon, and Projectiles. Mordecai's Experiments on Gunpowder, by means of the Gun and Ballistic Pendulums. Cavalry Tactics for the United States Service.
		LAW AND LITERATURE.	International and Constitutional Law. Military Law. Rules of Evidence. The Practice of Courts-martial. History, reviewed. Composition. Elocution.
		MINERALOGY AND GEOLOGY.	Dana's Mineralogy. Hitchcock's Geology.
		INFANTRY TACTICS.	Rules for the Exercise and Manœuvres of the United States Infantry.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, November, 1854.

REPORT OF THE COMMITTEE ON DISCIPLINE.

The committee to which the consideration of the discipline of the United States Military Academy was referred, have the honor to report that after due investigation, and seeing the working of the system, they believe little improvement can be made. The system is founded mainly on the army regulations, and the rules and articles of war, by which all in the military service are governed, and it is so modified as to adapt it to the Military Academy.

It offers a system of rewards and of punishments, admirably adapted to secure the attainment of all the great objects of discipline.

Order, system, punctuality, responsibility, subordination, obedience, and consequent efficiency, are here found fully developed in every department; and each by itself in all its parts, and the whole united, works together harmoniously as one great machine, adapted to perform the duties required of it in the most perfect manner.

In no other institution in our country has there been such a perfect system of discipline carried out in practice. There are holds upon the cadet that insure from him obedience to the regulations of the academy. His honor, his reputation, his pledge under oath, his ambition, his position, and his rank after he shall have left the academy, are all appealed to in the most forcible manner. All that is required of him is plainly and concisely stated in the printed "Regulations for the United States Military Academy." His absolute and punctual obedience to those regulations is required. Any infraction that is discovered, any neglect of, or absence from any duty, is reported by the proper officers, is recorded against the offender, and is read out on parade in public, before the corps of cadets.

If by any means the delinquency reported be erroneous, or if there be any proper and reasonable excuse for the delinquency, the cadet has redress by making out a written statement of the facts. The demerit marks against him are then removed.

All the different kinds of offences and breaches of the regulations are classified, and a rate of demerit mark is assigned to each grade or class of offences. These are made to count by numbers higher and higher against the cadet in each succeeding year of his course in the institution, and finally, at the close of his academic course, the demerit marks of the whole time he has been in the institution enter as one of the elements to determine his general standing on the merit-roll. This merit-roll indicates the relative proficiency of each cadet, in the aggregate of all the requirements of the academy, and is the basis of his promotion not only in the different arms of the service, but of his rank on entering any one of them.

If the sum of all the numbers that represent the demerit marks for all the different infractions of the regulations during each half year, from December 15 to June 15, and from June 15 to December 15, exceeds 100, the cadet is dismissed from the institution, as one who has not only transgressed its requirements, but also as one who does not give reasonable hope of such habits of order, system, obedience, punc-

tuality, and subordination, as are necessary in every officer in the public service, whether he be in military command or in civil employments.

The government, which supports and educates these young men to prepare them for her service, must be expected to select from among them such only as give promise of future usefulness; who possess such qualities as may be expected to make them efficient and valuable officers; such as will, it is expected, be an honor to their Alma Mater, to the service, and to their country.

Such selection from among the pupils, the dismissal from the institution for infractions of the regulations of the academy, the merit-roll in conduct, the publication on parade of all infractions of the regulations the making of the conduct-roll, in connexion with the merit-rolls of proficiency in their studies, an element in determining their position and promotion in the public service, are among the means used to originate and maintain a state of efficient discipline in the United States Military Academy.

Again, it is looked upon as a disgrace to be sent away from the institution either for lack of the required attainments in study, or of obedience to any or all the requirements of the regulations. Every one strives from a laudable ambition to excel, and attain a high standing in study and in conduct, or from a fear of mediocrity, or of possible deficiency, and consequent dismissal. Neither high position in standing, in studies, nor in conduct, nor in soldiership, can be obtained without obedience to the regulations. Nor can the cadet ever remain in the institution, without conforming to all the habits that thorough military discipline requires.

The committee cannot add any suggestions that may be expected to increase or perfect the efficiency of the discipline, unless to recommend that the authorities at Washington should always sustain the decisions of the academic board, and of courts-martial, unless for evidently mistaken judgment, or other special good reasons. A cadet reinstated after a careful examination or trial before the suitable authorities, and dismissed from the academy, exerts a most dangerous influence to paralyze and destroy discipline. There have been instances within the knowledge of the committee in years long past, where cadets so reinstated felt that the official and political influence they could bring to bear would reinstate them in spite of the officers of the institution, and some such examples are known to have had a most pernicious effect.

The committee take especial pleasure in being able to commend all the officers in all the departments of the institution, for a full and impartial execution of every duty in which they take a part connected with the discipline of the United States Military Academy, and for their urbanity and gentlemanly deportment in all the relations that they sustain to the cadets, to each other, and to strangers with whom they are brought in contact.

W. W. MATHER.
H. SHUBART.
STEPHEN LEE.

REPORT OF THE COMMITTEE ON ADMINISTRATION.

The committee on administration beg leave to present to the Board of Visitors of the United States Military Academy the following report:

The discipline and administration of the United States Military Academy are so intimately connected, that it is not very easy to draw the line of distinction between them. The administration of the affairs of the institution may comprehend a wider range than the discipline, and as surely requires our attention.

The administration of the affairs of the Military Academy, organized and conducted as it is by the military and academical staff of the institution, seems to be admirably adapted to the proper government of its affairs. It combines in an eminent degree wisdom and great practical benefit. The calling to the aid of the institution, as professors in its various departments, the regular officers of the army, is well calculated to confer great benefits upon the Military Academy as well as upon the cadets, combining as it does in a high degree both theory and practice.

So far as we have had time at our command we have carefully examined the various departments of the Military Academy, and considered its military and academic organization. The rules and regulations heretofore adopted and laid down for the government of the institution seems to be well calculated to secure its good and salutary administration; and we believe they are enforced so far as the military and academic staff have their control. We would suggest that in applying corrections for crimes or misdemeanors, it is not always the severity of the law or rule in prescribing punishments for its violation, that secures the best subordination to the constituted authorities; but it is the *certainty* with which the law or rule is executed against offenders. To secure this important object, might it not be well to consider the propriety of modifying some of the rules or regulations of the Military Academy for the government of the cadets, so as to make the penalties less severe for the commission of a *first* misdemeanor, and let it be more rigid for the second offence, and thereby secure a rigid infliction of the penalty against those offending.

It would seem to comport better with the success of the Military Academy and the object of its organization, if those who have the authority to appoint young men as cadets would first ascertain that such applicants, *in all things*, come up to the standard of admission heretofore laid down, before appointments are made. By a strict observance of this recommendation many evils to the Military Academy may be avoided, and no injury done to applicants for the post of cadets.

We would recommend, that in addition to the one cadet now allowed to each congressional district, two be allowed to each State, corresponding with the number of United States senators in Congress. This would increase the number of cadets, but, as we are advised, not beyond the wants and demands of the army, which has recently been increased, and the demand for officers correspondingly augmented. The extension of the course of studies in the Military Academy to five years will consequently diminish the number of graduates; and it would

seem to afford an additional reason for this recommendation. Besides, when we consider the vast extension our geographical area within the few past years, and the exposed frontier of this nation in her territorial borders to be defended by our regular army, we do not believe this increase in the number of cadets will exceed the wants of the country for gallant and aspiring young officers of the army, even in time of peace. This mode of selecting cadets would seem to comport with the principles upon which our government is organized and administered.

The duty of the assistant instructor of artillery is, with the dragoons and horse, the same as a lieutenant attached to a light battery; and in consequence of his additional duties as instructor to the cadets, in the school-rooms and at the siege and seacoast batteries, his responsibility is such as to justify that he should be placed on the same footing, as to pay, as a lieutenant serving with the light batteries.

The necessity for an increase of the monthly pay of the cadets, the appropriations of \$15,000 for gas-works to light up the buildings and ground of the Military Academy, \$10,000 for the erection of new stables, \$5,000 for the completion of the repairs of the professors' quarters, \$20,000 for the erection of additional quarters for the officers, \$12,000 for the erection of quarters for the dragoons, and the sum of \$3,000 as an annual appropriation for the increase of the library, and several other recommendations, have all been sanctioned by the board, and are referred to more at length in the reports of the other committees, to which such matters more appropriately belong.

The administration of the Military Academy would seem to include the moral, intellectual, and physical culture and training of the cadets, all of which seems to have been well provided for in the organization of the institution, and faithfully carried out by the military and academic staff. The practical advantages and benefits of the Military Academy to the nation have been demonstrated to the world in every war in which our country has been engaged since the organization of that institution, in which our gallant army has had an opportunity to exhibit their military science and prowess. No argument would, then, seem to be required of us to show the importance of our government still extending to the United States Military Academy that fostering support and liberal hand which has raised to its present high position, and made it not only the glory of the army list, but the pride of the nation.

J. F. CUSHMAN.
CHARLES NEGUS.
ARNO WISWELL.

JUNE 15, 1855.

UNITED STATES MILITARY ACADEMY,
West Point, June 14, 1855.

SIR: In reply to your letter of the 9th instant, inviting me to make any suggestions I may think proper concerning improvements, addi-

tions, or modifications, which may seem expedient for the greater efficiency of the Military Academy, I have the honor to enclose you, 1st, an estimate from the quartermaster for appropriations desired for new buildings; 2d. A communication from Brevet Major Porter, instructor of artillery, containing some suggestions as to the requirements of his department; 3d. A communication from the librarian, representing the wants of the library.

In relation to the first of the communications, I would remark that the introduction of gas is a matter of economy to the officers and cadets, while after the first outlay it will be of no expense to the government. There are now few establishments in the country of equal magnitude in which this improvement is not adopted, while it is introduced in many of much inferior character.

Your own observation will have shown you how deficient we are in stabling for horses, and how out of place are the temporary stalls attached to the rear of the artillery laboratory. The new stables adjoining the new riding-house are already commenced, and the appropriation asked will enable us to complete the building, of which the plans have been approved by the War Department.

The item for repairs of professors' houses is demanded by the fact that all these houses were built thirty or more years ago.

The item of \$20,000 for officers' quarters is imperatively demanded by the fact that the greater number of the single officers now have their quarters in the cadet barracks, while many of the married ones are unprovided with suitable quarters.

Two assistant instructors, with their families, have been obliged to live off the limits of the Point during the past winter; two other officers and families have lived at the hotel, in each case paying for their quarters, while others are very inadequately provided for.

As it is desirable that the institution should be able to secure the best talent in the army in its academic staff, it is of no small consequence that abundant and suitable quarters should be furnished not only for single but for married officers.

The item of \$12,000 for barracks for the dragoon detachment will recommend itself at once to the board, who have observed the inadequacy of their present quarters, and the distance at which they are from the new riding-hall and stables.

The communication of the instructor of artillery and cavalry tactics explains itself. The ballistic-pendulum is absolutely necessary whenever experiments in artillery are made, and is important here for illustrating the theory of ballistics, while its cost is trifling.

The value of a complete museum of arms is, I believe, perfectly appreciated by the board, while the annual appropriation asked to provide it is very insignificant.

The recommendation in reference to the pay of the assistant instructor of artillery is sufficiently explained by Major Porter, and is warmly approved by me.

I would call your attention particularly to the communication of the librarian. Before receiving this communication, I had convinced myself that the annual appropriation usually made of \$1,000 is utterly

inadequate for maintaining the library of such an institution as this up to the state of the times in science, art, and literature. The sum now available per annum is not more than many private professional gentlemen, who make no pretensions to large or general libraries, expend in keeping themselves supplied with recent works on some *single* science or branch of knowledge.

The librarian, however, exhibits the matter so fully, that I will only refer again to his communication. I concur fully in the opinion that \$3,000 per annum are necessary.

The brief term I have discharged the duties of superintendent, together with the uncertainty of my position, must be my apology for abstaining from any more general remarks upon the condition or wants of the institution.

I would briefly say that I believe the system of instruction in use at the academy is excellent, and that it is faithfully and zealously carried out by the head of the several departments, and their assistants. It is proper, perhaps, in this connexion, to call your attention to recent extension in the term of studies by the addition of a fifth year. This change, so long recommended by the academic board and Board of Visitors, has at length been carried into effect by an order from the War Department.

The class which entered the institution last June was divided into two, one portion of which, as the fifth class, commenced a new programme of studies.

Through this change the academic board have been enabled to add a very thorough course of English studies, geography, and history, together with the Spanish language, to the curriculum of the academy.

I consider this to be one of the most important improvements towards perfecting the education imparted here which has been introduced since the foundation of the institution.

Taken from all ranks of society, without regard to wealth of their parents, or previous opportunities of instruction, (and it is the glory of the institution that they are so,) the large majority of the candidates for admission come here with scarcely a common country school preparation. Thorough as has always been the course of scientific and military studies, this want of a groundwork of English studies, geography, history, &c., has always been severely felt by the graduate in after life.

This defect is now remedied; and at the same time we have been able to teach the Spanish language, a knowledge of which has of late years become so important to our officers.

The code of regulations for the government of the academy based upon the general army regulations and articles of war, modified to our wants by near half a century's experience, is believed to be, in its main features, well adapted to the peculiar notice of the institution, and is enforced with great fidelity and impartiality. That the institution, taken as a whole, is free from defects, probably no one who has attentively studied the subjects of discipline and moral government of educational institutions would maintain. But the most prominent de-

fects which would suggest themselves to such a one would probably be found to have their origin either in the peculiar nature of the institution, or to be so incorporated with its actual present existence as to be not easily remedied.

That moral government and influences can be what they ought to be in any institution which takes youths of a tender age from their homes, and shuts them up in a microcosm of their own—isolated not only from domestic influences, but from that of society—is not believed. In such an institution the moral standard must be mainly that which grows up spontaneously among the youths themselves, and it is not likely to be very high.

Government must necessarily be more that of an external force *without*, than the result of a restraining principle *within*.

It is believed that this academy is quite as free from criticism of this kind as any of our large colleges, and probably more so than most of them.

In none, it is believed, is a code of regulations so rigidly and so impartially enforced; and in none is that peculiar system practicable which arises from the military organization by which the *cadets themselves* are the immediate agents in enforcing discipline among themselves.

In this point of view merely no institution could be more admirably devised to impart habits of obedience and subordination to authority, and at the same time qualify its pupils to exercise authority over others.

Before concluding, I would remark that while the army has been augmented and the demand for officers has become greater, the extension of the course of studies to five years will diminish the number of graduates, before scarce sufficient to supply the demand; and an increase of the number of cadets by allowing an additional one for each senator in Congress, as well as for each representative, is extremely desirable.

Respectfully submitted.

J. G. BARNARD,

Brevet Major, Superintendent Military Academy.

Prof. W. W. MATHER,

Secretary of the Board of Visitors.

WEST POINT, N. Y., June 11, 1855.

SIR: In compliance with the circular of the 9th instant from the superintendent, I have the honor to present the following suggestions for the benefit of the cavalry and artillery departments.

1st. The procuring a six-pounder gun pendulum.

2d. The extension of the museum of arms, so as to contain models of all arms that can be procured from other countries, as well as those of our own.

3d. The completion of the cavalry stables, and erection in their vicinity of quarters for the dragoon detachment.

4th. The placing of the assistant instructor of artillery, in regard to pay, on the same footing as the lieutenants serving with the light batteries.

1st. A six-pounder gun pendulum would at present add materially to the means of instruction, and by the adoption of the five-year course of studies, the subject of ballistics becoming much more extended, it will be almost an essential requisite for thorough instruction in this branch. The experiments which yearly would be performed here, in the presence and by the assistance of the cadets, would familiarize them with the use and value of this instrument, which is the basis of all improvements in the science of artillery. A six-pounder gun pendulum, similar to the one made by Major Mordecai, of the ordnance corps, with a suspension frame made of iron, and all the apparatus for its use, can be obtained for about \$600.

2d. The extension of the museum of arms, though not an essential requisite, would greatly enlarge the means of instruction, and tend to produce improvements in our own arms.

The small collection we now have is always an object of interest to the many strangers who visit this post, and is the means of disseminating information to the country. To the Ordnance department, to occasional contributions from officers and strangers, and to one workman in the department, the museum is indebted for its present varieties. But this has been forming for many years, and inventions of late date never are exhibited, but by models made at the post from, frequently, very incomplete descriptions.

A museum of arms, of value to the institution and to the country, would be soon established by an annual appropriation of from 200 to 300 dollars.

3d. The ensuing fall all that part of the new stables which the present appropriation will complete, will be occupied, and a portion of the horses will be under good shelter, whilst the remainder will continue to occupy the old stables, which are poorly ventilated, inconveniently arranged, and the walls of which need propping to be sustained. The old and the new stables are separated over a quarter of a mile, and consequently much time and labor is lost.

It is very desirable to have the men quartered near the horses, and the horses united at the same stables. The general plan of these quarters, stables, and exercise hall, is in the superintendent's possession, and, as far as the appropriations have been made, has been approved by the Hon. Secretary of War. I have but to call your attention to the miserable quarters occupied by the men, to make apparent the impropriety, if not the injustice, of quartering sixty men in two rooms, each 20 by 18 feet, and two small garrets. About \$9,000 are required to complete the stables, and \$12,000 to erect quarters, &c.

4th. The duty of the assistant instructor of artillery is, with the dragoons and horses, the same as a lieutenant attached to a light battery; and in consequence of his additional duties as instructor to the cadets,

in the section rooms, and at the siege and seacoast batteries, his responsibility is greater. The other officers in the cavalry department have the pay now asked for the assistant instructor in artillery, and it seems but an act of justice that he whose duties are as important, at least, as theirs, should be on the same footing. In January, 1853, this proposition in my own case was approved and recommended by the Chief Engineer to the chairman of the Committee on Finance, Mr. Hunter, in the Senate, but too late for any action; since then, it has not been brought, to my knowledge, to his attention. Considering the superintendent's letter as only applying to subjects in my own department, I have not touched upon other matters.

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

F. J. PORTER,

*1st Lieut. 4th Artillery and Brevet Major U. S. A.,
Instructor of Artillery and Cavalry.*

Lieut. JAMES B. FRY,
Adjutant Military Academy.

LIBRARY U. S. MILITARY ACADEMY,
West Point, New York, June 13, 1855.

SIR: I have this day received your communication of the 12th inst., requesting from me a report, and an expression of my opinion in relation to the condition and wants of the library, &c. In reply I have the honor to state, that in accordance with my judgment, in which I am fortified by the opinion of all who have had the means of becoming acquainted with the subject, the library of the Military Academy was founded by the government, with the design of furnishing to the professors and instructors in the institution the most ample references and the most complete means of acquiring knowledge on the various branches of science which they are expected to teach. Thus I conceive it to be the expectation of the government, and of every intelligent man in the country, that no work of merit should appear on any subject taught at the academy, without that portion of the academic staff to whom the study properly belongs making themselves acquainted with its contents; and that they may do this, the library must of course contain the work. Having accomplished this its principal end, I believe it to have been further the design and continued policy of the government that the library should contain at least such a collection of works upon general literature as one would expect to find in a college of respectable standing in the country. But to accomplish soon the first of these purposes, I would respectfully suggest that the annual appropriation now made by Congress is totally inadequate. We have now in the library, it is true, quite a respectable collection of works upon engineering and the science of war, upon astronomy and philosophy, upon pure mathematics, and upon chemistry and geology, but daily new discoveries and new publications, in the French, German, and English languages, are pouring fresh light upon these subjects, of

which the academy should have the benefit, but of which it is, in a measure, deprived by the meagerness of the appropriation. The system adopted in the selection of new books is this: A list is kept by the librarian, upon which each professor or instructor can enter any book which he thinks it desirable the library should possess; but as many of these works are necessarily expensive, it is, of course, impossible upon \$600, the amount left after deducting \$400 for binding, for annual repairs, and for replacing books of reference worn out by use, to procure all that are suggested; and the list is from time to time submitted to the superintendent, who directs the purchase of those only which he considers most absolutely necessary. In this list, it is true, there is always included a small number of books not pertaining to the course of academical instruction; but when we consider the deficiency of our collection upon subjects of science kindred to those taught in the institution, upon history, upon national and municipal law, upon morals, metaphysics, statistics, &c., it will be seen that we are by no means enabled to keep up with the advance of the age.

I have conversed with several gentlemen of no pretension in such matters, who assure me that, independent of their professional libraries, it requires an annual expenditure of from \$400 to \$600 to keep their private collection upon a respectable footing, whilst our library, a much more general one and more extensively useful, spends no more.

I would, therefore, respectfully suggest that every means should be used to induce Congress to increase our yearly allowance to \$3,000. Nor do I think that any one can look upon this request as unreasonable, particularly when we consider that the money so expended is not lost to the government. The library, as a part of the academy, belongs to the nation; and should the present policy of a national military school be abandoned, the books could still be devoted to some other purpose, enhanced in value by the progress of time.

Our library, moreover, is constantly subjected to the inspection not only of our own citizens, but of men of letters from foreign countries, who are more or less favorably impressed with regard to our country, by the manner in which national institutions for the advancement of knowledge are fostered.

I would further suggest, that some measures be taken to urge upon Congress the propriety of some provision, either by legislation or otherwise, by which a copy of all books, reports, maps, surveys, or other matter, which may be published by government, or for the publication of which it may have furnished any facilities, be presented to the library of the academy. It is my impression that a copy of all works copy-righted in the country is by law presented to the Smithsonian Institute, and I think it no more than reasonable that our library should have the same privilege.

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

A. BAIRD,

1st Lieutenant 1st Artillery, Librarian.

Major J. G. BARNARD,

Corps of Engineers, Superintendent Military Academy.

RIVERS AND HARBORS, &c.

Most of the appropriations have been applied to the objects for which they were designed. The balances remaining are in course of application, save where difficulties of various kinds have thus far prevented their use; as these are removed, the grants will be expended in conformity with the laws providing them.

Work on the Washington aqueduct has been successfully prosecuted as far as the appropriation would admit, although the season's unhealthiness proved a more than usual cause of delay.

Such an appropriation is asked for the next year, as will, if it be granted in time, have a material effect in realizing the advantages of this important undertaking at an early day, while also conducing to the greatest economy in the construction of the aqueduct.

A statement of the year's progress on the several works is as follows:

Removing the rocks obstructing the navigation near Falls island, Cobscook bay, Maine.—All attempts to have this work executed by contract having failed, the engineer officer in charge determined to perform it by days' work. A suitable party, with proper tools and requirements, went to work on the 23d June last, and by the 19th of September had succeeded (the rock proving to be less refractory than was anticipated) in breaking it down to average low water, the full depth proposed. A balance of the appropriation remains in hand, available for future operations. There are several other rocks obstructing the navigation at this point, whose removal is requisite to make the navigation good. To effect this, an additional appropriation is necessary.

Breakwater at Owl's Head harbor, or at Rockland harbor, in Maine, as the War Department shall decide.—After deliberate and thorough consideration of the question of the locality to be chosen for this work, the decision required was in favor of Owl's Head. Immediate steps were then taken to effect a contract for the execution of the projected breakwater. The delay caused by correspondence on this subject, and the absence of the contractors, prevented the final execution and approval of the papers until the beginning of September, when the season had become too far advanced to commence operations at so exposed a position. Nothing more, therefore, could be done, but to collect materials and make every necessary preparation for a vigorous prosecution of the work during the calm summer months of next season.

The officer in charge urges the importance of an additional grant, sufficient to carry the work cut to Eagle ledge, which would be an excellent pier-head, and a powerful buttress.

Improving the Kennebeck river from the United States Arsenal in Augusta, Maine, to Lovejoy's narrows.—While using for a time the raking apparatus heretofore provided for this improvement, it was found that the bars of the river were covered with boulders, to the removal of

which the rake was not adapted. Holes were drilled in these stones, and by driving iron rods into them, (having wedges let into their lower ends,) it was found practical to lift them, as the tide rose, by the aid of flats, and float them away. By this process the river has been cleared of more than fifty large boulders, some of them of the weight of twenty, thirty, and even seventy tons. Many small stones have also been removed. Other improvements are needed to the navigation, but the present appropriation is not sufficient to be applied to these; it will, therefore, be expended in work upon the boulders, which is regarded as the most advantageous and economical use to which it can be put.

Protection of the Great Brewster island, in the harbor of Boston, Massachusetts.—Operations have remained suspended for want of funds, since September, 1854. The work, in its present unfinished condition, falls short of accomplishing the important object in view, and is even exposed to be severely injured by gales of wind.

Protection of Lovell's island and sea-wall on Deer island, Boston harbor, Massachusetts.—The walls built for their protection are nearly in the same condition as last reported.

Removing Middle Rock, New Haven harbor, Connecticut.—As reported last year, nothing has been done at this work since its abandonment by the contractor.

Continuing the improvement of the Hudson river above and below Albany, and not above Troy.—During the past year the operations for the improvement of this river have been confined chiefly to dredging and repairing the dikes between the city of Albany and New Baltimore. The latter part of last season two dredging-machines were at work on "Nine Mile Tree bar," near Castleton, and on "Mull's bar," about three miles further down, and excavated from the former 3,118 cubic yards, and from the latter 68,810, making a total of 71,928 cubic yards, which made the channel over these two "bars" or "shoals" 350 feet wide and nearly nine feet deep at ordinary low water. There has also been excavated from the "shoal" along the dike near "Van Wie's dam" 15,233 cubic yards, making a total of 87,161 cubic yards for the year. Three cargoes of rough stone have also been deposited in the break in the dike for the purpose of repairing this place. A sloop loaded with stone, which sunk near Austen's rock, in the middle of the channel, has been removed, together with her contents.

Repairing the public work at Litte Egg harbor, New Jersey.—The great changes in progress on this part of the coast from natural causes require, in the opinion of engineer officers who have examined the locality, that further investigations be made before deciding on any process of improvement. That examination it has not been possible for this department to have made as yet.

Improvement of the Patapsco river from Fort McHenry to mouth of said river.—The United States steam-dredges constructed for the waters of the Chesapeake bay, &c., continued to co-operate with the two steam-dredges belonging to the city of Baltimore in excavating the new channel of the Patapsco river, in the neighborhood of the Bodkin, until the beginning of December of last year, when the weather becoming unfavorable, the machine was removed to winter quarters at Sollers' Point. The dredge resumed work for the season on the 12th of May, having been previously put in thorough repair. The machine since that period has, in conjunction with the city dredge, been operating in the new channel of the Patapsco between the Bodkin and the mouth of the river, and will continue to do so as long as the weather will permit, after which it will be moved higher up the river to a less exposed position. Several very important shoals have been removed from the lower part of the river, and it is gratifying to find, from soundings taken at different times on the line of the channel, that the depth of water obtained by dredging has been maintained, leading to the hope that there are no disturbing causes at work to change the bed of the river after the dredging has been done. The amount of matter excavated by the United States dredge, and removed from the new channel during the year ending 30th September, 1855, is 45,780 cubic yards. In consequence of the steam-tug belonging to the city being found inadequate to the service of the three dredges, it became necessary in the month of June to hire a steam-tug on the part of the government, which has of course increased the expenditures of the improvement very considerably.

Removing obstructions at the mouth of the Susquehannah river, near Havre-de-Grace, Maryland.—In consequence of the inadequate amount of the appropriation for this work, and the want of a suitable dredging-machine, no progress has been made in removing the obstructions in this river.

Construction of a steam-dredge, equipment, and discharging-scows for the waters of the Chesapeake bay and Atlantic coast.—The dredge and appurtenances constructed under this appropriation has been and still is at work in the improvement of the Patapsco river below Baltimore, where it renders efficient service.

Improvement of James and Appomattox rivers below the cities of Richmond and Petersburg—James river.—During the past year the channel through the Warwick bar has been opened to the required depth. The opening of the channel through the Richmond bar, which is a ledge of rock, is going on successfully. The balance of the funds furnished by the government will be expended in the prosecution of this work.

Appomattox river.—No work has been done during the past year. The plan of operations to be followed was settled last winter. The arrangements to give effect to it include a dredger with discharging lighters for raising, transporting, and depositing 2,000 cubic yards of

earth a day, the plan for which was arranged in February. An engagement with a practical dredge-builder to furnish the dredge has been pending for several months. His presence on the spot to complete the arrangement is daily expected.

Survey of Rappahannock river, Virginia.—Surveys and soundings have been made through the Coast Survey, to the extent necessary for projecting plans for its improvement. When the maps are completed, the study of the best means of improvement will be taken up.

Re-opening a communication between Albemarle sound, North Carolina, and the Atlantic ocean.—By a law of Congress, passed near the end of the last session, the original law was amended by striking out the words "by the construction of a breakwater across Croatan sound."

The appropriation became thus applicable to any plan of improvement which the proper authorities might regard as best calculated to accomplish the object in view.

The plan proposed early in 1853, and approved by the War Department, requiring as its first step the excavation of a channel through Bodie's island, opposite Roanoke island, preparations have been made for making this cut. A steam-dredge was contracted for in June last, and scows have also been contracted for, and the work, it is supposed, will begin about the 20th of October. The cost of the steam-dredge, the sand-flats, and of a small propeller, to tow away the sand-scows, will be about \$16,000.

Completing the improvement of Washington harbor, North Carolina.—The small balance left of the appropriation for this work, September 30, 1854, has been nearly all expended in sawing off tops of stumps in the channel of the river, a little below the town, touching those only which come within 150 feet of the centre of the channel, and within 8 feet of the mean surface of the water. Nearly all the troublesome stumps have been removed. The sawing apparatus is worked by four or five men, and the monthly expenditures are therefore very small. A small balance still remains, which will be entirely expended this fall.

Improving Cape Fear river, North Carolina, at or near its communication with the ocean.—The works executed at Bald Head, in 1853-'54, for the protection of that point, as their direct object, and to increase the depth of water upon the bar as their ultimate end, have undergone a slight extension during the year, and the highly beneficial results noticed in my last annual report have been correspondingly increased. The principal expenditures of the year have been made in closing several small outlets of the Cape Fear, immediately south of New inlet. These were three in number in October, 1854, of which the smaller has been closed, and the two larger (which are greatly increased in width, and finally merged in one, by the many storms of November and December last) have been narrowed from 2,300 to 1,100 feet in width at high water, and from 1,200 feet to 700 feet at

low water. They will be closed, in all probability, during the coming winter. The next and principal operation in the plan of improvement is the closing of New inlet, which cannot be done without additional means.

Improvement of the harbor of Charleston, South Carolina.—The first experiments with the powerful steam-dredge built for opening Sullivan's Island channel not having been satisfactory, another of much longer duration was made this past spring and early summer with better success, though, owing to bad weather and the very exposed position in which the dredge had to work, she fell far short of the anticipations of the contractor, and the requirements of his agreement with the city of Charleston, by which, therefore, she was not received. However, after the completion of the last trial, being satisfied that though working slowly, the dredge would finally do the work, proposals were made to hire the boat, or to pay for the dredging by the cubic yard, but the owner of the machine and his agent demanded such unreasonable prices that it was impossible to accept them on behalf of the government, and the authorities of the city of Charleston having failed to purchase her, she was taken away. The balance of the appropriation available for the improvement not being sufficient to buy or build a dredging-machine, it is proposed to try raking with a powerful steam-tug as the only remaining alternative, though without any very sanguine anticipations of doing much by this process in carrying out this improvement, so vastly important to South Carolina, and, indeed, to many of the southern States.

Removing obstructions in the Savannah river, at a place called the Wrecks.—Since September 30, 1854, the pile-work closing the upper end of Fig Island channel has been completed, and an embankment of moderate extent placed along the foot of the piles as a protection against the washing of a rapid ebb current. This work now serves to turn the volume of water which formerly passed through the Fig Island channel to the Front river. The increased volume and velocity thus given to the water flowing down the latter channel, tends to give permanence to the greater depth which has been obtained by dredging over the Wreck bank and along the southern edges of Garden bank. The greater part of the funds expended in the prosecution of this work of improvement, during the past year, has been supplied by the city of Savannah, as the appropriation of \$40,000, approved August 30, 1852, had been previously expended, with the exception of a small balance, in working the dredging-machines. The total number of cubic yards dredged from the shoals in the channel of Front river, since the commencement of this work of improvement, is 102,500 cubic yards, giving a channel full 10 feet deep at mean low water, or $16\frac{1}{2}$ feet at mean high water. To make this channel permanent, however, it is essential that the deflecting works proposed by the commission at the upper end of Hutchinson's island, and at the lower end of Fig island, should be constructed at an early day. But as the appropriation of \$161,000 for the Savannah river, approved March 3,

1855, is specific, it can, in its present form, be applied only to the removal of the obstructions placed in the river during the revolutionary war for the common defence, and the accumulations of sand and mud immediately over and around these obstructions or wrecks. In order that these flats and shoals, which have been caused by these sunken wrecks at other points of the Front river, may be removed, and in a permanent manner, I would most earnestly advise the department to urge upon Congress such a modification of the phraseology of the act of 3d of March last, as will make the amount applicable to the completion of the plan reported by the commissioners, and approved by the War Department in 1853.

The 6th of August last, the work of dredging was resumed on the Wreck bank, and has been prosecuted with as much regularity since as the weather would permit. The dredge-boat, tug-boat, and scows employed at this work, were chartered from the former contractor to execute work by the cubic yard for the period of six months; but experience has now demonstrated that the chartered machinery is too weak to dredge on the wrecks, to the same advantage as a machine of greater power. It is therefore advised that steps be taken to procure a dredge, or elevating machine of greater power, to be employed on the wrecks after the expiration of the charter now existing, provided the restrictive character of the act of appropriation be removed by further legislative action.

Survey of the river Ockmulgee, Georgia.—The survey is completed. The map also is finished, but is still in the hands of the draughtsman, whose work has been much hindered by sickness. As soon as the map is received, the report will be prepared and forwarded.

Improvement of the river St. John's, Florida.—During the year a survey of the river has been made by a coast survey party from its mouth as far up as Jacksonville, and the maps are now in course of preparation by that office. With the aid of these maps when completed, a plan for the best application of the funds available for this work will be prepared and submitted for the consideration of the department.

Sea-wall at St. Augustine, Florida.—Nothing has been done at this work during the year.

Improvement of the harbor of Mobile, Ala., and the Choctaw Pass at Dog River bar.—During the year 40,725 cubic yards of mud have been removed from the Dog River bar, increasing the depth of that channel one foot. The funds available having been exhausted, the machinery was laid up on the 3d March last.

Survey of the East Pascagoula river, Mississippi.—A temporary opening can be made through the sandy bottom of this entrance with the balance of the appropriation remaining from the survey, provided Congress authorizes its application to the improvement. To make this

opening one hundred feet wide with six feet water, as recommended by the engineer, will require a small additional fund, say \$2,200.

Construction of a harbor on Lake Pontchartrain, near the city of New Orleans.—The first section of this work, (a length of 1,500 feet,) much delayed by sickness and bad weather, was finished about the middle of March last. A small balance of the appropriation remains, applicable to the preservation of the work.

Opening a ship channel of sufficient capacity to accommodate the wants of commerce through the most convenient pass leading from the Mississippi river into the Gulf of Mexico.—This channel, opened two years since, is now, as was anticipated, nearly filled up. The sediment is less compact, however, than the original bottom. It will require a sum of about \$75,000 annually, to maintain a channel such as was excavated under the last grant of Congress.

Improvement of the navigation of the Colorado river, Texas.—During the second quarter of 1855, a gang of men was employed clearing that portion of the river opened, from the drift-wood left by the last rise.

Annual report of operations on the Washington Aqueduct during the year ending September 30, 1855.

At the date of my last annual report the work was suspended in consequence of the exhaustion of the appropriation.

An appropriation of \$250,000 having been made by Congress on the 4th March last, the agents and force formerly employed upon the work were reassembled as soon as possible, and operations were resumed at the Great Falls and upon works which had been before commenced.

An advertisement was issued calling for proposals for building culverts and graduation, to such extent as the amount of the appropriation justified.

The long time required by law for these advertisements consuming a great part of the most available season, it was thought to be good policy to devote a considerable sum to preparations necessary before any large force could be assembled upon the line, so as to save as much as possible of the working season.

The lands required for the aqueduct, from the Falls to the District limits, have been appraised by juries assembled under the law of Maryland for that purpose, and their awards, except in one case, have been confirmed by the courts.

They have been submitted to the Attorney General for his opinion, and, in most cases, the titles have been perfected, and the lands paid for. Some, however, remain unsettled.

The line of the aqueduct lies within half a mile of Chesapeake and

Ohio canal, which thus affords great facilities for the cheap transportation of materials. But the ground intervening between the canal and the aqueduct is generally a very rough, steep, and, in many places, rocky slope, covered with a thick growth of small wood.

There are few houses in the neighborhood, and but two, upon the whole work, which could afford shelter to the engineers and surveyors or workmen employed.

The surveys were made by parties living in an old packet-boat purchased for that purpose.

The preparations necessary for the rapid construction of this work, always supposed in the estimates, required the erection of a number of boarding-houses and stables, for the accommodation of a large force of men and horses. Landings for bricks, sand, cement, and other materials, on the banks of the canal, and roads for their transport over the uneven and difficult ground between the canal and aqueduct, were also required. Boats, derricks, cranes, wagons, carts, and horses were to be provided: none of these were to be hired in the sparsely settled country on the line, and those to be found in the city seemed to find full employment upon the public and private works there carried on.

Tools and implements for blasting and quarrying; iron, steel, cordage, blocks, steam-engines, and machinery for extensive operations, have all been provided at considerable expense, and are now in use.

All these preparations have consumed a large part of the money available for the work. Their collection and manufacture is necessarily slow and expensive; but these preparations once made, their cost is applicable to the whole series of operations in the construction of the aqueduct, and must materially reduce its ultimate cost, and accelerate its completion.

With the preparation, in houses, machinery, and implements now on hand, a very large force of men and teams can be profitably employed, and a large appropriation can be advantageously applied to the work.

There have been erected ten houses as quarters for the men, which will accommodate, upon different parts of the line, about seven hundred men.

Two offices, for engineers and superintendent, at the Great Falls, have been built.

One cement house, a carpenter shop, engine-house, machine shop, sheds, and a large stable, have been built at the Falls.

Several stables, at other points, are built or nearly finished.

The quarters have been put up principally with a view to the accommodation of the large force to be hereafter employed in laying the brick-work of the conduit. Several of them have been, in the mean time, rented to the contractors engaged in building culverts and embankments.

Those in use by the United States are properly furnished for the accommodation of workmen.

Four sites for quarries have been purchased for the work—two in fee, and two for temporary use only: one of them, at Seneca, has been opened, quarters built, a derrick erected, and it is furnishing the

stone for the head-walls and coping, and arch-stones of the culverts and other masonry of the work.

A constant study and revision of the first location has enabled us, with the advantage of experience, in construction and opening the ground to materially improve the line, both in economy and security.

Experience has shown that the tunnels not requiring arching are less costly than the construction of the brick aqueduct, in heavy side-hill rock cutting. Several short tunnels have, therefore, been located, and some of them begun.

I have adopted a circular culvert of four feet in diameter as the smallest to be used; and where the drainage seemed not to require so large a culvert, have, generally, by a slight change in the location of the line, been able to carry the drainage over the aqueduct, at points where it is entirely below the natural surface, thus removing the danger of injury from the embankments, always weak portions of a work.

Should any damage occur to the work at these points, it will always be at the surface, where it can be early detected, and cheaply repaired.

Injuries to culverts are always difficult and costly in repair, and they endanger the stability of the conduit above them.

The contractors who undertook the construction of the culverts and graduation have met with great difficulties from sickness among the men. The delay of two months required for advertising, and the time necessary for the examination and approval of their proposals and contracts, and the subsequent preparations for their work, threw them into the sickly season.

I had made all the preparations in my power to facilitate and hasten their work; built quarters at convenient points, and begun some of the culverts, by days' work, to be turned over to them to finish as soon as they could assemble a sufficient force.

Culverts Nos. 7 and 8, thus commenced, have been completed by the United States, as the contractor had not assembled a sufficient force to take charge of them.

No. 12 was begun and turned over to the contractor, with one abutment pit nearly excavated. This is a large culvert of thirty feet span, whose arch requires some 340,000 bricks.

One abutment has been completed, and the excavation of the pit for the other begun. It is of great importance that this culvert should be finished this fall. The embankment over it is one of the heaviest on the aqueduct; and it is the policy of the work to throw up the heavy embankments this winter, so as to secure for them the longest possible time for settling before constructing masonry upon them.

Efforts are being made to secure the completion of this culvert this season; but so much time has been lost by the contractor, that it will be difficult and expensive.

The contractors on both divisions have failed to prosecute their work with the rapidity desirable, and give the sickness among their men as the reason.

At one time the force employed by the United States fell off from the same cause, but the places of the sick were soon supplied; and the consequence is, that a large quantity of work has been done, where

not so important for the early completion of the aqueduct as that which has been let out to the contractors. This has led to the construction of a considerable portion of brick conduit, which, though necessary, might have been deferred till the culverts and embankment were finished.

The crossing of the canal at the Great Falls is completed, the arch extending far enough on each side of the canal to allow the temporary wooden trunk to be taken out and the canal restored to its full width, upon the first suspension of navigation.

The pit for the gate-house, which is in solid rock, is partly excavated.

A large portion of the deep cut in rock leading from the river through the gate-house to the first tunnel has been excavated, and part of it arched over.

Four tunnels have been begun, the cuts leading to them completed, and 827 feet of tunnels have been pierced.

The entrances to two other tunnels are nearly completed.

Below the second tunnel there occurs some of the heaviest and most difficult work on the line.

The aqueduct-bed has been excavated at the foot of a precipitous rocky bank, requiring heavy rock excavations and much masonry to form the rough trench to the shape of the brick conduit. This work has been completed, except the back filling of earth, which must be brought from some distance, as none is to be found on the spot. About 1,500 feet of brick aqueduct connected with the lower end of tunnel No. 2 has been completed. The arch will be covered up this winter.

One hundred feet of brick aqueduct has been completed in earth-cutting near tunnel No. 4, leading into the receiving reservoir at the Little Falls. Another section of 100 feet is begun, and excavation is making to carry this further.

Ten of the culverts and one overfall have been begun. Two of these (Nos. 7 and 8) have been built by the United States; two others have been so far finished by the contractors that the embankment over them can be commenced. Four are in progress, and two are suspended by the contractors for want of hands.

The overfall near the Great Falls will be completed this season. It is built by the United States.

Outside of the tunnels we have excavated over 15,000 cubic yards of rock; 21,000 cubic yards of mixed earth and stone, chiefly in foundations and water; made 11,000 cubic yards of embankment; puddled and rammed 2,100 cubic yards; laid 200 perches of cut and scabbled masonry, a large quantity of dry stone-masonry, and about 1,200,000 bricks. We have quarried and delivered 12,000 cubic feet of dimension stone, besides rubble, of which a large part has been cut for the masonry; have procured and used about 5,000 casks of cement, and 54,000 bushels of sand.

The appropriations for the aqueduct have amounted to	\$350,000 00
Of which there was unexpended on September 30...	147,790 53

Total expended to September 30, 1855.....	<u>202,209 47</u>
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The application of this sum may be classed as follows:

Application.	Amounts expended.		
	From commence- ment to Septem- ber 30, 1854.	From September 30, 1854, to Sep- tember 30, 1855.	Total.
Engineer service, land and law expenses.....	\$22,927 00	\$13,482 53	\$36,409 53
Building materials, furniture, tools, &c.....	10,789 95	7,909 28	18,699 23
Wagons, carts, boats, cars, and machinery....	7,572 95	8,322 69	15,895 64
Stock and forage.....	903 17	1,409 27	2,312 44
Powder, fuse, fuel, &c.....	1,095 78	1,137 18	2,232 96
Materials for construction, and construction of contractors	16,703 27	24,523 19	41,226 46
Labor and subsistence	36,236 30	45,069 24	81,305 54
Warehouse and miscellaneous.....	2,362 69	1,764 98	4,127 67
	98,591 11	103,618 36	202,209 47

SUMMARY.

Location has been improved; lands have been acquired; four tunnels have been pierced 827 feet; two others commenced; about 1,800 feet of brick conduit has been built; two culverts finished; two others nearly completed; the line in Maryland generally cleared; graduation begun.

Quarters, offices, stables, shops, machinery, horses, carts, wagons, tools, quarries, boats, bricks, sand, cement, and other materials and implements, have been provided, and every preparation made for the advantageous expenditure of a large appropriation and the vigorous prosecution of the work.

Much delay and loss was caused by the failure of a previous appropriation.

Cash account.

Appropriation of 1853.....	\$100,000 00	
Appropriation of 1854.....	.....	
Appropriation of 1855.....	250,000 00	
		\$350,000 00
Expended to September 30, 1853	\$14,986 70	
In the year ending September 30, 1854..	83,620 41	
In the year ending September 30, 1855..	103,602 36	
		202,209 47
Amount remaining on hand September 30, 1855....		147,790 53

Which will be expended before the end of the present fiscal year, June 30, 1856.

The amount required for the proper prosecution of the work during the year ending June 30, 1857, is \$1,000,000; of which it would be a great advantage to the work to have a portion appropriated early in the session of Congress, as the sum now on hand is not sufficient for the proper prosecution of the work next spring before the sickly season begins.

Respectfully submitted.

M. C. MEIGS,

Captain Engineers, Superintendent.

Brigadier General J. G. TOTTEN,

Chief Engineer.

All of which is respectfully submitted.

JOS. G. TOTTEN,

Brevet Brig. General and Col. of Engineers.

Hon. JEFFERSON DAVIS,

Secretary of War.

Total.
\$36,409 53
18,699 23
15,895 64
2,312 44
2,232 96
41,238 46
81,305 54
4,127 67
202,209 47

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REPORT OF THE COLONEL OF THE CORPS OF TOPOGRAPHICAL ENGINEERS.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, November 22, 1855.

SIR: In conformity with orders, and with long established usage, I have the honor to submit the following annual report in reference to the duties of this office.

The only estimates submitted from this office are for surveys, in which items are derived chiefly from the reports of officers on field duties, which will be found in the appendix.

In addition to these, items for the depot of instruments at Washington, and for depots in California and St. Louis, are submitted. These depots are so intimately connected with surveys, that the whole may with propriety be considered an estimate for surveys.

There are five steam dredge-boats on the lakes, with accessory discharging-scows, which have to be taken care of, and which, for want of adequate appropriations, are comparatively out of employment. These boats and scows have to be laid up during winter, and to be cared for. At least two persons are required on each boat as a guard; greater numbers, when wanted, can be occasionally and temporarily obtained. Grease for the machinery is also required. The laying up will occupy about six months. Either these boats should be sold, or means be provided for their preservation and repairs.

But if it be not contemplated to appropriate for the employment of these boats, authority to sell them should be given, and also authority to sell other public property, machinery, &c., &c., the proceeds to be carried to one general fund, out of which debts of any of the lake works could be paid.

In the laws for the several roads which have been directed to be made, there is no authority for the use, condemnation, and paying for such private property as the road shall occupy. This defect in the laws has been already the occasion of some embarrassment; a remedy is respectfully recommended.

A law of the 5th August, 1854, authorized the construction of an iron steamer for the lake survey. A contract for the same has been made with Merrick & Sons, of Philadelphia; the boat to be delivered for inspection at Buffalo during the month of May next.

Instead of making an epitome of the reports of the several superintending engineers of the works under the direction of each, the annual report of each, giving the most detailed information in these respects, is hereto appended. By this course the department will not only be the better informed in relation to these several works, but will be enabled the better to judge of the ability and vigilance of the several superintending engineers.

In conformity with this plan, I append hereto (see Appendix A) the report of Captain J. N. Macomb, in relation to the survey of the lakes. This work is one of great importance, the extent of coast is very great, and the amount of commerce and the number of lives involved also seriously great. Hitherto, because of the small amount of the annual appropriations, the work has not gone on rapidly. Hereafter larger appropriations will be asked for, in order to push forward the work, and in order to take advantage of the experience, industry, intelligence, and economy of management of Captain Macomb.

The report and estimate of Captain Macomb will be found attached hereto as Appendix A.

The western rivers being under the general direction of Major Long, corps of topographical engineers, brevet lieutenant colonel United States army, his report is hereto appended as Appendix B.

All the works on Lake Champlain, on Lake Ontario, and on part of Lake Erie, being under the general direction of Major Turnbull, of the corps, brevet colonel United States army, his report will be found as Appendix C.

All other works on Lake Erie being under the general superintendence of Captain Stansbury, his annual report is hereto annexed as Appendix D.

The works on Lake St. Clair and Lake Michigan being under the general direction of Major J. D. Graham, brevet lieutenant colonel United States army, his report is hereto appended as Appendix E.

The report of First Lieutenant M. L. Smith upon the survey of the canal route in Florida will be found as Appendix F.

The annual report of Lieutenant Colonel McClellan not having been received in time for the report of last fall, is added to this as Appendix G.

The construction of the following roads is under the direction of this office.

In Minnesota—

1. Road from Point Douglass to the mouth of the St. Louis river of Lake Superior.

2. Road from Point Douglass to Fort Ripley.

3. Road from Swan river to the Winnebago agency.

4. Road from Wabasha to Mendota.

5. Road from Mendota to the mouth of Big Sioux river.

6. Road from Fort Ripley to main road leading to the Red river of the North.

7. Road from the Falls of St. Anthony to Fort Ridgely.

These several roads are under the general direction of Captain J. H. Simpson, whose annual report is hereto annexed as Appendix H.

1. Road from opposite Council Bluffs to New Fort Kearny.

2. Road from Fort Riley to the Arkansas river.

3. Road from Fort Riley to Bridger's Pass.

These three roads are under the general direction of Lieutenant F. T. Bryan. No annual report has been received from this officer.

1. Road from Canada to Abiqua.

Ex. Doc. 1—18*

2. Road from Taos to Santa Fé.
3. Road from Fort Union to Santa Fé.
4. Road from Santa Fé to Doña Ana.
5. Road from Secalote to Albuquerque.

These five roads are under the general direction of Captain Scammon. No information has been received from him in relation to said roads, arising, probably, from his recent arrival in that country, and the uncertainty of the mails.

1. Road from Great Salt Lake City to the eastern boundary of California.
2. Road from Astoria to Salem.
3. Road from the Dalles of the Columbia to Columbia City barracks.
4. Road from Columbia City barracks to Fort Steilacoom.
5. Road from the Great Falls of the Missouri river to the road leading from Walla-Walla to Puget's sound.

These last four roads are under the general direction of Major Bache, with Lieutenant Derby, as executive officer in the field. The reports in relation thereto will be found as Appendix J.

The road from Great Salt Lake City to the eastern boundary of California was placed under the direction of Lieut. Col. E. J. Steptoe. Copies of his letters on the subject are hereto appended as Appendix K.

Road from Myrtle creek, in Umpqua valley, to Scottsburg. This road was placed under the direction of Lieutenant J. Withers. Copies of his letters in reference to its construction are annexed as Appendix L. [*]

The duties of the corps evidently show that its present numbers are not equal to the demands of the public service, and oblige me again to call attention to a report of 2d December, 1853, from this office, recommending an increase of four captains, ten first, and ten second lieutenants.

If reference be made to the increase of 1838, and to the reasons for that increase, as set forth in the report of the honorable Mr. Secretary Poinsett, and to the present duties and demands upon the corps, it can be clearly demonstrated that the increase now recommended is loudly called for. From the want of this increase, we are obliged to employ civil engineers and agents, and in many cases officers of other corps and regiments, in which it would be more desirable and more economical to employ regularly trained officers of the corps. These temporary employés are not, in my opinion, as efficient as regularly trained officers of the corps, and the experience they acquire on the duties is lost by the temporary character of their employments, which makes it an extravagant kind of service.

There are now five distinct military departments, to each of which, as parts of the military staff of these departments, there should not be less than one captain, one first, and one second lieutenant. There should also be more officers of the corps on the survey of the lakes; and each officer in the superintendence of civil engineer operations should have at least one assistant, an officer of the corps. The duties

* NOTE—Road from Steilacoom to Walla-Walla. (See Lieut. Arnold's report, Appendix O.)

in these several military departments require expenditures for which there are no appropriations, but for which estimates are respectfully submitted.

In conformity with former practice, there has been one officer of the corps in the general direction of the harbor works on each lake, with a civil engineer, as resident and local agent for each work. These residents are bonded agents, and have also heretofore been charged with the expenditures in relation to the particular work under the immediate care of each. It is not recommended that this arrangement should be discontinued, but that such an increase of the corps should be allowed as will enable the bureau to assign at least one officer of the corps as an assistant to the superintending officer.

The expression in the law of July 5, 1838, making the superintending engineer the disbursing engineer for the work under his direction, has been interpreted so as to make that engineer the disbursing agent only of the work under his immediate care; but a late view of the law makes that engineer also the disbursing agent for all these works, and in consequence his entire attention has to be given to his accounts, or he is obliged to ask for the services of a clerk. It is considered advisable to have this law so far altered as to make the superintending engineer the disbursing agent of the work only under his immediate direction.

The reports of the Board of Engineers on lake harbors and western rivers, and the decisions thereon received since the last annual report, are hereto added as Appendix M.

A letter from Captain T. J. Cram, with an estimate for topographical military surveys in the department of the Pacific during the ensuing year, is annexed as Appendix N.

Respectfully, sir, your obedient servant,

J. J. ABERT,

Col. Corps Topographical Engineers.

HON. JEFFERSON DAVIS,

Secretary of War.

APPENDIX A.

ANNUAL REPORT ON THE SURVEY OF THE NORTHERN AND NORTH-WESTERN LAKES.

MACKINAC, MICHIGAN, *September 29, 1855.*

SIR: I have the honor to present the following report, showing the manner in which the force under my command has been employed, and the progress which has been made in the survey of the northern and northwestern lakes, during the past year.

After the close of field operations in October last, the several subdivisions of the force resumed their duties in the office, which occupied

them throughout the season of necessary suspension of field-work in this northern climate.

Lieutenant Raynolds finished the computations for the longitude of the astronomical station on Round island, a copy of which was sent by me to the Topographical Bureau in February last; after which he and his assistants, Messrs. Lamson, Henry, and Gillman, completed the sheets of details of topography and hydrography of a large portion of the group of the Beaver islands and of the coast of the main land lying fifteen and twenty miles to the north of the same.

The survey is indebted to Professor G. B. Airy, of the Royal Observatory, for his kindness in furnishing, at my request, "corresponding observations," which enabled us to compute with greater accuracy the longitude above alluded to.

Assistants Hearing, Müller, Beghein, A. Williams, and Penny (who were with Captain Scammon on the survey of the St. Mary's river) were, with the exception of Mr. A. Williams, who accompanied Captain Scammon to New Mexico, occupied in drawing the maps of the St. Mary's and the sheets accompanying the report upon the obstructions to the navigation of that river, which I submitted to the bureau early in January.

In addition to my duties arising from being charged with the general supervision of the work, I was engaged in the office with the computations of the main triangulation and with the plotting of the off-shore hydrography from the surveys of the previous season. In these duties Lieutenant Rose, of the corps, was my immediate assistant.

In the spring the force was divided into five parties, one of which I took the immediate charge of on board of the steamer Surveyor, with a view of completing the main triangulation and off-shore hydrography in that section of Lake Michigan adjacent to the Beaver group, to which quarter I had ordered assistants Hearing and Lamson, with instructions to finish the topography and minute hydrography of the coasts of the islands and main land north and northwest of the same.

The party under the command of Lieutenant Raynolds, of the topographical engineers, was directed by me to repair to the south coast of Lake Superior, for the purpose of surveying such of the harbors as the means at his disposal would enable him to accomplish, commencing at Ontonagon and working to the eastward, embracing at each place some five or six miles of the neighboring coast in both directions, so as to give a perfect chart of the approaches. His work will afford the means of publishing at once harbor charts upon a large scale, and will eventually furnish the requisite details for parts of the general chart of Lake Superior.

Lieutenant Rose, of the topographical engineers, was directed, with his party, to take up the survey of the St. Mary's river at the Saut, the point to which the work had been carried at the end of the previous season, and to complete the same to Lake Superior, and to continue his operations for the minute topography and hydrography of as much of the adjacent coast of that lake as he could finish in the remainder of the season.

Before resuming my operations on the upper waters, I spent two

days in placing buoys to mark three of the more dangerous reefs in the western end of Lake Erie, in which duty I was accompanied by Captain Woodruff, topographical engineers, light-house inspector for that district. A report upon this subject was duly submitted to the bureau and approved at the time.

In accordance with the arrangements above enumerated, the several parties commenced operations in the month of May, and are still occupied with the field duties. Shortly after my arrival in the field, I was directed to make a resurvey of the lines of boundary between the private claims and the United States lands upon the island of Mackinac. This work I have recently caused to be commenced by assistant Lamson. It became necessary to apply to the surveyor general of this district, at Detroit, for the requisite copies of original field-notes of the surveys upon the island; these were promptly furnished by him, as has always been the case in regard to information asked for by the lake survey, from the records of his office.

During the season the small party on board the steamer Surveyor has extended the work of the general hydrography over four hundred square miles of the area to the northward and westward of the Beaver group, in the course of which work five new shoal grounds were discovered, and four of them minutely surveyed, two of them proving to be of a very dangerous character, being four and a half miles from the nearest land, and having as little as six and a half feet of water upon them; the other two are only remarkable as showing sudden changes of soundings, having as little as three fathoms, surrounded by depths of from ten to fifteen fathoms. One of the above-named reefs remains to be surveyed. I have also extended the main triangulation to the westward, to cover the shore-work and hydrography of the vicinity, and made arrangements for its extension to the southward with a favorable chain of triangles. We have, as heretofore, marked the reefs which we were surveying, and some of the other dangerous ones near the usual routes of commerce, with tripod water stations or conspicuous buoys, thus giving to the public an important benefit of the operations of the survey, before the engraved charts can be perfected. This incidental service has called forth repeated thanks from commanders and others concerned in the lake navigation. In the prosecution of the varied duties of this subdivision, I have been aided by assistant J. A. Potter and sub-assistant O. N. Chaffee.

The party in charge of Lieutenant W. F. Reynolds has executed a minute survey of the port of Ontonagon and its vicinity, (his examinations there covering upwards of a hundred square miles;) and he has since been engaged at Eagle Harbor and Eagle River, with the intervening coast, and some six or eight miles on both sides of the same, embracing about twenty miles of the development of the most intricate and dangerous coast of Keweenaw Point. Lieutenant Reynolds has also been engaged in making the requisite observations with the zenith telescope, for the exact latitude of Ontonagon and of Eagle Harbor, and also with such observations for longitude as he could obtain, in the short period of his duties at the two places. From the peculiarly abrupt character of the northern coast of Keweenaw Point, unexpected

difficulties were encountered in carrying on the operations about Eagle Harbor and Eagle River. As there is but a small extent of beach to be found there, it became necessary to open lines through the thick woods bordering the lake to get the requisite measurements for the establishment of points in the coast work; and owing to the impossibility of landing on that rocky coast, except when the water is smooth, the party was detained longer in that quarter than was anticipated. The time, however, was all spent there; for when work was interrupted on the coast the party was occupied in a reconnaissance of the neighboring heights, upon which several points were selected, commanding views of Isle Royale; these will be required in the general triangulation, which should be extended over that part of Lake Superior as soon as possible. Lieut. Raynolds has been aided this season by assistants Müeller and Henry, and sub-assistants Wright, J. Wallace, and G. Wallace.

Lieutenant G. W. Rose, in command of the party engaged upon the survey of the St. Mary's, has completed the details of the secondary triangulation, with the topography and hydrography of the section above the Saut, and has carried the work around Point Iroquois, to include some ten miles of the coast of the great southeasterly bay of Lake Superior. He has had for his assistants on this duty Messrs. Pinney, Penny, and N. A. Rose.

Assistant Harding completed the hydrography and topography and secondary triangulation of Beaver island, and then took up the same sort of work upon the north shore of Lake Michigan, where he is still occupied in pushing the work to the westward. He is assisted by Messrs. J. H. Forster, Beghein, and sub-assistant O'Brien.

Assistant Lamson furnished the details of shore-work and minute hydrography and secondary triangulation of the four remaining islands of the Beaver group, and was then placed upon the north coast of Lake Michigan, where his party was engaged in connecting the work of two preceding seasons in that quarter, by a survey of some ten miles of the development of that coast. After which I charged him with the execution of the resurveys upon the island of Mackinac, as above alluded to. He has been assisted during the season by Assistant H. Gillman and sub-assistant B. Williams.

The following abstracts from the reports of the several subdivisions, as far as received for the present season, will exhibit in detail the amount and kind of work done by each. It appears from these, that there have been one hundred and thirteen thousand seven hundred and five soundings made; and there are yet two parties to be heard from, in regard to the operations of the present month, which will probably add some ten thousand or more to the above.

Abstract of work by Captain Macomb's party, on board the steamer Surveyor, season of 1855.

- 3 triangulation stations built.
- 2 triangulation stations repaired.
- 2,198 soundings remote from shore.
- 382 sextant angles for locating soundings.

- 284 angles measured with theodolite.
- 3 water stations on distant reefs.
- 2 miles of line opened through woods.
- 4½ miles of levelling run.
- 50 buoys located.

Abstract of work by Lieutenant Raynolds's party, to end of August, 1855.

- 17 triangulation stations built.
- 263 sounding stations built.
- 18,679 soundings made, some of them ten miles from land.
- 3,831 theodolite angles.
- 768 sextant angles.
- 223 buoys located.
- 32½ miles of shore-line chained.
- 26 miles of shore-line sketched.
- 144 compass readings for magnetic variation.
- 6 observations for azimuth.
- 10 observations for time.
- 150 observations on stars for latitude (with zenith telescope.)
- 134 theodolite pointings for azimuth.
- 17 miles of line cut through woods.
- 44 stakes located as guides in sounding.
- 8 tripod water stations put out.
- 48 observations for time and placing transit in meridian.
- 38 culminations for longitude (9 of moon, 29 of stars.)
- 4 eclipses of Jupiter's satellites observed.
- 5 sets of observations for value of micrometer zenith telescope.
- 143 declinations of stars computed.
- 32 computations for latitude.
- 7 transits of stars for collimation.
- 39 stakes located for sketching.

Abstract of work by the party of Lieutenant G. W. Rose, in the river St. Mary's, season of 1855.

- 82 triangulation stations built.
- 335 sounding stations built.
- 2 tripod water stations.
- 437 buoys located.
- 20½ miles of shore-line run.
- 22 miles of levelling.
- 51 miles of sketching.
- 3 miles of meandering of streams.
- 2 miles of line of sight cut.
- 4,328 feet of distance accurately measured with rods for two bases.
- 11,463 theodolite readings.
- 151 sextant angles.
- 46,890 casts of the lead.
- 5 observations on Polaris for meridian.

Abstract of work by the party of Assistant W. H. Harding, to the end of August, 1855.

5 triangulation stations built.
 127 sounding stations built.
 81 buoys located.
 19,164 soundings taken.
 $42\frac{4}{5}$ miles of shore-line run.
 $13\frac{1}{4}$ miles of roads surveyed.
 3,262 theodolite readings.
 7 sextant angles.
 77 level sights.
 166 compass bearings, (for variation.)

Abstract of work done by the party of Assistant G. W. Lamson, for the season of 1855.

8 triangulation stations built.
 43 sounding stations built.
 2 tripod water stations put out.
 26,774 soundings made.
 1,321 theodolite angles measured.
 699 sextant angles measured.
 218 buoys located.
 $26\frac{1}{2}$ miles of shore-line run.
 $1\frac{1}{2}$ miles of line of sight cleared.
 59 compass bearings for magnetic variation.
 45 angles measured by repetition.
 $1\frac{1}{3}$ miles of meandering of streams.

General Remarks.

As the several parties of the survey have, during the season which is now drawing to a close, been engaged at points widely distant from each other, my duties as superintendent of the work have, of necessity, greatly extended my knowledge of the field by giving me opportunities for reconnaissance in the course of my visits of inspection, such as I have not before enjoyed. One of the most interesting results of this enlarged examination is the prospect which it has opened of effecting a good triangulation over a large portion of Lake Superior, and also of connecting our work upon the Straits of Mackinac with that upon Lake Superior, by a large triangle across the intervening land, by means of some heights recently examined, upon one of which at the head of Lake George I have built a station commanding views of twenty-seven and thirty-seven miles; and I am now engaged in selecting the point for the second station, on a height in sight of Mackinac, whilst Lieutenant Rose is engaged at the third station of the triangle at Point Iroquois, on Lake Superior.

There also seems to be a good prospect of determining the exact

position of Stannard's rock, by means of a triangle extending to it from points on the opposite sides of Keweenaw bay. To place a conspicuous station upon that rock and determine its position as above, would necessarily take much time, as but little can be done towards it, save in the most favorable weather; but the result is of such interest and importance to the commerce of the lakes, that no expense of time or labor should be spared to effect it. The survey which would be made of the rock and its vicinity in the course of this operation, would also determine the feasibility of erecting there a permanent beacon or light-house.

It is very gratifying to find the eagerness which exists among the lake navigators to be supplied with copies of the charts which the department has thus far been enabled to publish from the results of the lake surveys, and the anxiety with which further results are looked for. The demand for the charts must continue to increase, with the increasing commerce of the lakes, for this last must bring experienced sailors upon these waters, who ask but a perfect chart to make them as much at home here as they have been upon the ocean. The day has passed when it was considered sufficient that a knowledge of the lake dangers should be in the minds of a few old navigators, and by them be handed down, with more or less uncertainty, to their successors. The present day calls for a permanent and graphic record, in the form of the engraved chart, which shall show all who can navigate a ship the various routes by which they may pass through these great waters in safety.

These considerations lead me to ask that an increased force may be employed upon this work, in order that there may be less delay in furnishing the results so much needed. I would, therefore, respectfully request that an increased annual appropriation may be recommended, in accordance with the estimate with which I beg leave to accompany this report.

The item of \$4,000 for instruments is intended particularly for the purchase of an additional transit, a zenith telescope, two Gambey theodolites ("repeating," of ten inches diameter,) four chronometers, and four barometers, in order that such of the shore parties as may be stationed near primary points of the triangulation shall be equipped for making the requisite observations at those points. The great distances between such points on Lake Superior, and the shortness of the time in any one season, available for such observations, render it impossible that the primary triangulation should be carried on any longer entirely by one person.

I have the honor to remain, very respectfully, your most obedient servant,

JOHN N. MACOMB,
*Captain Topographical Engineers,
Commanding Lake Survey.*

Colonel J. J. ABERT,
Commanding Corps Top. Engineers, U. S. A., Washington, D. C.

ANNUAL ESTIMATE.

Estimate of funds required for the survey of the north and northwestern lakes (including Lake Superior) for the year ending June 30, 1857.

PARTY ON THE NEW SURVEYING STEAMER (NOW BUILDING.)

1 assistant, at \$4 per day, 183 days.....	\$732 00
1 assistant, at \$3 50 per day, 183 days	640 00
1 assistant, at \$2 50 per day, 183 days.....	457 50
1 chief mate, (sailing-master,) at \$2 per day, 183 days	366 00
1 second mate, at \$1 50 per day, 183 days ..	274 00
1 first engineer, at \$2 per day, 183 days.....	366 00
1 second engineer, at \$1 50 per day, 183 days	274 50
1 carpenter, at \$1 50 per day, 183 days.....	274 50
1 steward, at \$1 per day, 183 days	183 00
1 assistant to steward, at 83 cents per day, 183 days	151 89
1 cook, at \$1 per day, 183 days.....	183 00
20 men, (boats' crews,) at 70 cents per day, 183 days	2,462 00
3 firemen and coal-heavers, at 83 cents per day, 183 days.....	455 67
1 leadsmen, at \$1 per day, 183 days.....	183 00
400 tons coal, at \$6 per ton.....	2,400 00
Supplies of party for six months.....	3,000 00
Total for six months.....	\$12,403 06

PARTY ON STEAMER SURVEYOR.

1 assistant, at \$3 50 per day, 183 days.....	640 50
1 assistant, at \$2 50 per day, 183 days.....	457 50
1 chief mate, at \$2 per day, 183 days.....	366 00
1 second mate, at \$1 50 per day, 183 days ..	274 50
1 first engineer, at \$2 per day, 183 days.....	366 00
1 second engineer, at \$1 50 per day, 183 days	274 50
1 carpenter, at \$1 50 per day, 183 days.....	274 50
1 steward, at \$1 per day, 183 days.....	183 00
1 assistant to steward, at 83 cents per day, 183 days	151 89
1 cook, at \$1 per day, 183 days.....	183 00
3 firemen and coal-heavers, at 83 cents per day, 183 days	455 67
1 leadsmen, at \$1 per day, 183 days	183 00
15 men, (boats' crews,) at 70 cents per day, 183 days.....	1,921 50

200 tons coal, at \$6 per ton.....	\$1,200 00
Supplies for party.....	2,500 00

Total for six months..... \$9,431 56

SHORE PARTY FOR ONE MONTH.

1 assistant, at \$3 50 per day, 30 days	\$105 00
1 assistant, at \$3 per day, 30 days..	90 00
2 assistants, at \$2 per day, 30 days.	120 00
1 foreman, at \$1 50 per day, 30 days	45 00
1 assistant foreman, at \$1 25 per day, 30 days	37 50
1 cook, at \$1 25 per day, 30 days..	37 50
1 steward, at \$1 per day, 30 days..	30 00
4 leadsmen, at 90 cents per day, 30 days	108 00
4 chainmen, at 80 cents per day, 30 days	96 00
28 boatmen, (4 crews,) at 70 cents each per day, 30 days	588 00
Subsistence	650 00

Each party one month	1,907 00
Six months each party.....	11,442 00
Transportation of party and supplies.....	800 00
Tents and camp equipage	600 00
3 barges for each party, at \$275 each	825 00

13,667 00

7 parties in the field, (six months each) 95,669 00

ASTRONOMICAL PARTY.

1 chief astronomer, at \$6 per day, 183 days..	1,098 00
1 assistant astronomer, at \$3 per day, 183 days	549 00
1 time-keeper, at \$2 per day, 183 days.....	366 00
1 cook, at \$1 per day, 183 days.....	183 00
7 men, (1 boat's crew,) at 70 cents per day, 183 days	896 00
Subsistence	975 00
Transportation and camp equipage	600 00

Total for astronomical party	4,667 00
Allowances to five officers of topographical engineers for quarters, transportation, &c ..	2,200 00
Pay of computer and draughtsman, at \$4 per day	1,460 00
Office-rent and fuel.....	600 00
Steamers in ordinary six months.....	4,500 00

7 assistants in office during winter, at \$3 50 per day	\$4,352 00
7 assistants, (including one for astronomical party,) at \$3 per day	3,722 00
8 assistants in office, at \$2 per day	2,912 00
	\$19,746 00
	141,916 62
For contingencies, such as transportation of boats, smiths' work, lumber, timber, spike, iron, buoy-rope, anchors, paints, oils, leather, stationery, drawing-paper, &c., at 10 per cent. on the above	14,191 66
For additional instruments	4,000 00
For repairs of steamer Surveyor, new deck-beams of iron, new decks of best southern pine, and rebuilding upper works	12,500 00
Total	172,608 28

All of which is respectfully submitted, by your most obedient ser-
vant,

J. N. MACOMB,
Captain Topographical Engineers.

Colonel J. J. ABERT,
Commanding Corps Topographical Engineers U. S. A.

Survey of the Northern and Northwestern Lakes.—Monthly Report.

DETROIT, October 11, 1855.

SIR: I have the honor to state that the force engaged upon the survey of the northern and northwestern lakes was employed during the month of September, in the following manner:

In the early part of the month I was at work with my party upon the hydrography and triangulation in the northern end of Lake Michigan; but the weather did not long favor such operations, so that I came into Mackinac on the 10th, bringing with me the party of assistant Lamson, who had completed the connexion of the old surveys on the northern coast.

After attending to the correspondence at Mackinac, and causing the surveys of line, &c., on the island, to be begun, I went into the St. Mary's river with a view of selecting points for the proper connexion of the work upon Lake Huron with that upon Lake Superior. In this duty my party was soon successful in finding a point at the head of Lake George, commanding the heights near the coast of Lake Superior, some 27 miles distant, and the high land near the coast of Lake Huron, some 37 miles off, the two heights being about 32 miles apart, and perfectly

commanding one another. After establishing the station at Lake George, I ran up with the steamer Surveyor, and passed through the great canal into Lake Superior to the camp of Lieutenant Rose, about 30 miles beyond the Saut, and gave orders to clear the ground and build a station on the height of Point Iroquois. This tour of duty derived additional interest from the consideration that the Surveyor was the *first* government steamer to pass through the great canal and cleave the waters of the majestic lake above. We returned through the canal at night of the same day, (Wednesday, 19th,) and were, early in the morning following, at the head of Lake George again, where, whilst some of the party finished the carpentry of the station and cleared the trees from around it, I was occupied, with the remainder of the party, in measurements below at some of the shore stations of the St. Mary's river, for connecting the work with the new station, and determining the height of the hill on which it stands; this proved to be 470 feet above the river, and one mile distant from it. We next came around to the height north of Lake Huron, which we found to be four miles or more inland, and about 375 feet high; but the denseness of the forest and the distance inland prevented our doing more than to make an approximation to the selection of the most eligible position, when my presence was required in the western end of the field; but enough was done to establish the possibility of making this great connecting triangle. The remainder of the month was very stormy weather, during which I was occupied with my annual papers.

The party of Lieutenant Raynolds continued the operations about Eagle river, and finished in the last week of September, and came into Detroit, in accordance with my directions, at the commencement of the season. The following is an abstract of his work for September:

- 11 miles chained.
- 18 miles shore-line sketched.
- 5 miles of line cleared through woods.
- 887 pointings and double vernier readings of theodolite.
- 1 triangulation station built.
- 24 sounding stations built.
- 79 buoys put out for in-shore hydrography.
- 10 buoys put out for off-shore hydrography.
- 199 sextant angles read.
- 270 lines for in-shore hydrography.
- 6,280 casts of the lead.
- 30 lines sounded for off-shore hydrography.
- 208 casts of the deep-sea lead.
- 6,517 feet of line levelled in reconnaissance for base line.
- 3 eclipses of satellites of Jupiter observed for longitude.
- 1 culmination of the moon observed for longitude.
- 3 culminations of stars observed for longitude.
- 6 transits of stars observed for time.
- 2 elongations of stars observed for azimuth.
- 12 stars observed for latitude.
- 2 observations of sun for time.
- 96 compass readings for variation of the needle.

Lieutenant Rose had reached a suitable point for the termination of his season's work at the time of my ordering him to build the triangulation station on Point Iroquois mountain. On finishing this last, therefore, he came into the headquarters of the survey by the same steamer with Lieutenant Raynolds.

The following is an abstract of the work by Lieutenant Rose's party for the month of September, 1855:

- 1 large triangulation station on Point Iroquois.
- 44 sounding stations.
- 44 buoys put out.
- 15 miles of shore-line run.
- 5 miles sketched.
- 1,000 theodolite readings.
- 100 sextant angles.
- 6,000 casts of the lead.
- 1 observation on Polaris for meridian.

Assistant Harding continued the work on the north coast of Lake Michigan to the point five miles east of the Monistique river; but he was uncommonly interrupted in his work by bad weather.

The following is an abstract of the work of his party for September:

- 12 $\frac{3}{4}$ miles of shore-line run.
- 891 theodolite readings taken.
- 39 sounding stations built.
- 41 buoys located.
- 4,981 soundings taken.
- 144 line of soundings run.
- 28 compass bearings for variation.
- 17 sextant angles measured.

Assistant Lamson's work upon the north coast of Lake Michigan is summed up as follows, for the month of September:

- 87 lines sounded.
- 100 $\frac{1}{4}$ miles of lines sounded.
- 3,602 casts of the lead.
- 6 theodolite pointings.
- 12 vernier readings.
- 2 angles measured by repeating theodolite.
- 20 angles measured with sextant.
- 26 compass sights for variation.
- $\frac{1}{3}$ mile of streams surveyed.

This last abstract includes only the 9th of September; after which the party was engaged until the end of the month upon Mackinac island surveys, touching which a special report will be made after the completion of the map of the "lines, &c., on Mackinac," now in progress.

It will be seen from the above report that my expectations as to the number of soundings for the past season have been more than realized, for the two parties not heard from for last month, at the time of writing my annual report, give the number of 11,469 to be added to the sum

there reported, making the soundings for the season on the upper lakes amount to 125,174.

All which is respectfully submitted by your most obedient servant,

J. N. MACOMB,

Captain Topographical Engineers.

Colonel J. J. ABERT,

Commanding Corps Topographical Engineers.

APPENDIX B.

ANNUAL REPORT ON WESTERN RIVER IMPROVEMENTS, SEPTEMBER 1, 1855, BY LIEUTENANT COLONEL S. H. LONG, SUPERINTENDENT WESTERN RIVER IMPROVEMENTS.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, September 1, 1855.

SIR: I have the honor to report that during the third and fourth quarters of 1854, and the first quarter of 1855, being the first three quarters of the fiscal year beginning on the 1st of July, 1854, and ending on the 30th June, 1855, I served at Washington as a member of the board of engineers of lake harbors and western rivers; and during the second quarter of 1855, or the fourth quarter of the same fiscal year, I served in a similar capacity, and also in that of superintendent of western river improvements, having been required by order of the War Department to relieve Colonel J. E. Johnston of the duties of his late superintendency on the 28th March last.

The duties of the board in which I had the honor to participate have been set forth and explained in numerous reports made by that body, and submitted to the War Department through the Topographical Bureau.

The manner of relieving Colonel Johnston, and the nature and condition of the objects and duties transferred, are exhibited in certain memoranda, copies of which are appended to this report. (See Appendix, Doc. No. 1.)

In order to obtain reliable information concerning the public property in detail pertaining to the improvement of the western rivers, and to the nature, progress, and cost of the operations had in connexion therewith during the three quarters first above mentioned, I have had recourse to the records of this office, transferred to my custody at the time of relieving Colonel Johnston. Having attentively examined these records, I find much embarrassment in effecting either a systematic or satisfactory showing in relation to the subjects just mentioned, except in so far as relates to the disbursements on account of the particular operations for which Colonel Johnston served personally as disbursing agent.

The disbursements in question have reference to the following several

branches of the service, and are summarily exhibited in the subjoined schedule, viz :

Improvement of the western rivers at large.

For third quarter of 1854	\$1,737 22	
For fourth quarter of 1854.....	2,608 00	
For first quarter of 1855.....	379 86	
		\$4,725 08

Improvement of Mississippi river.

For third quarter of 1854	\$11 98	
For fourth quarter of 1854.....	70	
For first quarter of 1855.....	159 56	
		172 24

Improvement of Missouri river.

For third quarter of 1854.....	\$381 04	
For fourth quarter of 1854.....	22	
For first quarter of 1855.....	00	
		381 26

Improvement of Arkansas river.

For third quarter of 1854.....	\$7,350 65	
For fourth quarter of 1854.....	00	
For first quarter of 1855.....	1,148 92	
		8,499 57

Construction, repairs, custody, &c.

For third quarter of 1854.....	\$0 00	
For fourth quarter of 1854.....	1,434 39	
For first quarter of 1855.....	1,165 83	
		2,600 22

Total disbursements for the last fiscal year by Colonel Johnston.....		16,378 37
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The results exhibited as above are believed to be approximately correct, but have probably been modified in sundry respects on the final adjustment of Colonel Johnston's accounts in the Treasury Department.

With respect to the expenditures made by United States agents in their capacities as disbursing agents, the records appear not to contain the details from which the payments made by them can be adequately and correctly inferred.

The condition and progress of the works prior to the 22d September,

1854, are exhibited in Colonel Johnston's annual report of that date. In a subsequent report of the same officer, dated on the 20th October following, a notice is given of the sale of the large twin snag-boats No. 1 and No. 2, the net aggregate proceeds of which appear to have amounted to \$9,758 55, or a little over \$4,879 for each boat. The proceeds of this sale have been duly accounted for in the late transfer of public property from Colonel Johnston to the undersigned. (See Appendix No. 1, before cited.)

At the instance of my predecessor, the remaining large twin snag-boats No. 3 and No. 4, with their equipments, &c., and also the dredge-boats G. W. Jones and Gopher, No. 1 and No. 2, were subsequently directed to be sold by orders from the War Department, but the sales in both cases were postponed till Colonel Johnston was relieved from his duty as superintendent of western river improvements.

From the time when the snag-boats No. 1 and No. 2 were sold, as above, to the end of the 2d quarter of 1855, the progress of operations affecting the navigation of the western rivers seems to have been limited mainly to the improvement of the rapids of the Mississippi. A report of Major Floyd, on the 18th November, shows that these works were previously suspended for the season, and Colonel Johnston's inspection report of the 20th of the same month, both of which have been printed for the use of Congress, exhibits with sufficient clearness the progress and condition of the improvement.

During the ensuing winter months the attention of the late superintendent seems to have been mainly directed to such precautionary measures as he deemed advisable for the custody and preservation of the boats and other public property pertaining to the improvement of the western rivers.

From these premises, I proceed to a brief narrative of my personal superintendency from and after the time of relieving Colonel Johnston, and during the 2d quarter of 1855, or the 4th quarter of the last fiscal year.

From Document No. 1 of the Appendix, before cited, it may be seen that sundry expenditures had been incurred, under the direction of Colonel Johnston, and were still in progress, the liquidation of which devolved on me as his successor. These expenditures are, of course, blended with those under my official direction for the 2d quarter of 1855. An exhibit of the whole, including those of Colonel Johnston as before given, is presented in the following synopsis, to wit:

On account of Western River improvements at large.

For 3d and 4th quarters of 1854, and 1st	
quarter of 1855.....	\$4,725 08
For 2d quarter of 1855.....	308 09
Total	\$5,033 17

On account of Mississippi river.

For 3d and 4th quarters of 1854, and 1st quarter of 1855.....	\$172 24
For 2d quarter of 1855.....	29 65

Total \$201 89

On account of Missouri river.

For 3d and 4th quarters of 1854, and 1st quarter of 1855.....	381 26
For 2d quarter of 1855.....	78 81

Total 460 07

On account of Arkansas river.

For 3d and 4th quarters of 1854, and 1st quarter of 1855.....	8,499 57
For 2d quarter of 1855.....	8,009 58

Total 16,509 15

On account of construction, repairs, custody, &c.

For 3d and 4th quarters of 1854, and 1st quarter of 1855.....	2,600 22
For 2d quarter of 1855.....	2,364 13

Total..... 4,964 35

Total amount of expenditures on the objects above designated, for the last fiscal year, by Johnston and Long conjointly..... 27,168 63

To the foregoing should be added other objects of expenditure, exclusively under the direction of Lieutenant Colonel Long, which are as follows, viz:

On account of the survey of the Mississippi delta.

For 3d quarter of 1854.....	\$615 00
For 4th quarter of 1854.....	253 00
For 1st quarter of 1855.....	680 20
For 2d quarter of 1855.....	353 00

Total 1,901 20

On account of survey of Falls of Ohio.

For 3d quarter of 1854.....	490 00
For 4th quarter of 1854.....	161 00

For 1st quarter of 1855.....	\$161 00
For 2d quarter of 1855.....	00
Total	<u>\$812 00</u>

These two sums, added to the preceding amount, gives, for the aggregate amount of expenditures for the several objects above enumerated, in the last fiscal year, the gross amount..... 29,881 83

A summary of receipts, &c., touching the several objects above mentioned, to the extent of my personal accountabilities in the premises, is exhibited in connection herewith. (See Appendix, Doc. No. 2.)

All other objects of expenditure, for the same fiscal year, have been committed to the charge of sundry agents appointed by the War Department, and are comprised under the following several heads, viz:

1st. The Ohio, including Cumberland dam, in charge of C. A. Fuller, esq.

2d. The rapids of the Upper Mississippi, in charge of J. G. Floyd, esq.

3d. The Illinois river, in charge of G. A. Dunlap, esq., agent, and G. W. Long, esq., engineer.

4th. The removal of Red river raft, in charge of C. A. Fuller, esq.

The archives of this office as yet comprise no sufficient returns from which a correct view of the expenditures, on account of either of these objects, can be derived. The several agents named above have been required to prepare and forward to this office such annual reports, in reference to the particular objects under their charge respectively, as will enable me to make satisfactory showings in relation thereto. These reports are confidently expected in season to be incorporated with this report.

The proceedings had under my superintendency for the second quarter of 1855, next claim attention.

The manner of administration observed by my predecessor was continued; the functionaries in service retained the positions previously occupied by them; and the terms and conditions affecting the service remained unaltered until circumstances of time, means, and other contingencies demanded corresponding changes.

The following individuals were in employ merely as custodians of public property until the dates annexed to their names, respectively, when they resumed their appropriate duties as United States agents, &c., to wit:

J. G. Floyd, agent for rapids of Mississippi, April 16, 1855.

G. A. Dunlap, disbursing agent for Illinois, April 5, 1855.

J. C. Jennings, agent for harbor of Dubuque, May 31, 1855.

M. Ostrander, pilot for Mississippi, July 10, 1855.

The other functionaries in service at the same time were—

Geo. W. Long, engineer for the Illinois.

C. A. Fuller, agent and engineer for Ohio, including Cumberland dam, and for Red river.

Captain T. Duval, with officers and crew, commanding snag-boat Terror, in the Arkansas.

Lieutenant James W. Abert, corps of topographical engineers, assistant superintendent.

T. R. Sinton, clerk and accountant in office of Western River Improvements.

Geo. W. Long, esq., was continued on duties relating to the construction of a new dredge-boat for service in the Illinois river, and to the removal of the dredge-boat Gopher, &c., from Henepin bar to Alton. The new dredge was completed early in July, and has since been operating successfully in that river.

Early in April I learned that a careful survey had been made by agent Fuller, during low water of 1854, of the river channels, islands, &c., at and near Cumberland dam; and deeming it important that the best possible light should be thrown upon this portion of the river, I directed the agent to prepare and submit a report and drawings explanatory of the condition of things at this place. This was done accordingly, and copies of the documents prepared are hereto appended. (See Appendix, Doc. No. 3.)

Timely efforts were made for the vigorous prosecution of the Arkansas improvement, but the very low stage of this river, during the periods when the spring and summer floods usually prevail in it, has prevented the success confidently anticipated. Early in April the clerk and accountant of this office was despatched to the Arkansas for the purpose of procuring public funds deposited at Little Rock, and settling sundry outstanding claims for services, &c., rendered during the first quarter of the current year. He was at the same time instructed to inquire into the condition of the Arkansas, and into the progress of the operations for its improvement, and report thereon to this office. A copy of his report is appended hereto. (See Appendix, Doc. No. 4.)

The reports of Captain Duval, commanding snag-boat Terror, in the Arkansas, exhibit the following results, from which the quantum of work done in that river during the second quarter of the current year may be inferred.

Work done during second quarter of 1855.

Snags raised, reduced, and removed from channel.....	289
Logs, &c., cut on bars and shores.....	1,931
Impending trees felled.....	472
Stumps and roots blasted.....	3
Total of obstructions reduced.....	2,695

The extent from the mouth upwards through which the work above mentioned was carried was about 110 miles only, the river being at a stage too low to admit of operations farther up.

The river still continuing to fall, the boat was compelled to descend to its mouth about the last of May, or be liable to a protracted detention in the river by reason of its very low stage. She accordingly re-

mained at that point till the officers and crew were paid off and discharged, which was effected on the 31st of that month. The payments made at this time covered not only the expenditures incurred in the months of April and May, but of March of the preceding quarter. The settlements made on this occasion, and the reasons for suspending work, as also the disposition made of the snag-boat, are plainly set forth in the clerk's report hereto appended. (See Appendix, Doc. No. 5.)

During the months of April, May, and June, numerous other duties occupied my attention, the nature and objects of which were mainly as follows, viz :

1st. The adjustment of accounts, drafts, &c., in relation to the public funds transferred to my credit by Lieutenant Colonel Johnston. All results of this character have been exhibited in connexion with my accounts for the second quarter of the current year.

2d. The contract with Swan & Co. for the improvement of the rapids of the Mississippi having been abandoned, measures for reletting the work were instituted, and resulted in a new contract with J. H. Hager for the further prosecution of the improvement at a charge of \$9 per cubic yard. For more particular information on this subject I take leave to refer to the instructions of the superintendent to agent Floyd, dated on the 16th April, and to the annual report of the agent dated August 20, 1855. (See Appendix, Docs. No. 6 and No. 7.)

3d. Project of the superintendent dated April 23, setting forth sundry objects and purposes, to which his attention might properly be directed, on a tour of inspection, proposed to be undertaken at an early date in May. (See Appendix, Doc. No. 8.)

4th. Various duties relating to the improvement of Red river; to the removal of the instruments pertaining to the survey of the Mississippi delta from Carrollton, La., to Louisville, Ky., for storage and safe-keeping; to the adjustment of sundry outstanding claims relating to the survey, &c., &c., were particularly attended to. The views and proceedings had in relation to these subjects are explained in a report of the superintendent, dated May 5, 1855, in a report of agent Fuller, of same date, in instructions of the superintendent to this agent, dated May 7 and May 8, and more particularly in the annual report of agent Fuller, dated August 20, 1855. (See Appendix, Docs. No. 9, No. 10, No. 11, No. 12, and No. 13.)

5th. From the 10th of May to the 12th of July I was employed in making various examinations and inquiries in reference to the condition and exigencies of the several works under my charge, and in giving to the United States agents such instructions in reference to each as were deemed expedient and proper. For a full account of my proceedings in relation to these duties, I take leave to refer to my inspection report of June 20, and a continuation of the same date, July 20, 1855, copies of which are hereto appended. (See Appendix, Docs. No. 14 and No. 15.)

6th. On the 30th of June I visited Napoleon, and attended personally to the sale of the small twin snag-boat Terror, and on the 7th of the

month following bestowed similar attentions on the sale of the large twin snag-boats Bell and Sevier, (No. 3 and No. 4,) and in each case adopted such courses as were deemed compatible with fair dealing, and most conducive to the interests of the public. The results of the proceedings in these cases are given in the Appendix. (See Appendix, Doc. No. 16.)

7th. The snag-boats having been disposed of in the manner above explained, arrangements were promptly made for the repairs, re-outfit, &c., of the snag-boat Sevier, and for the resumption of the snag business in the Mississippi, between the mouth of the Missouri and Vicksburg. Captain J. T. Clemson was re-appointed to the command of this boat on the 7th of July, and a series of instructions were subsequently furnished for his guidance in the performance of the duties assigned him. Copies of his appointment, and of the instructions mentioned, are appended hereto. (See Appendix, Docs. No. 17, No. 18, No. 19, No. 20, No. 21, and No. 22.)

8th. Sundry preliminaries affecting the improvement of Red river have received due attention. These are sufficiently detailed in a report of agent Fuller, dated on the 27th July last, a copy of which is hereto annexed. (See Appendix, Doc. No. 23.) Other duties relating to the same improvement, and more especially to the preparation of suitable water-craft for its prosecution, have received due attention. The agent was directed in due time to repair to this port and superintend the construction, equipment, and outfit of the craft in question. His annual report, before cited, contains various useful items of information relating to this improvement. (See Appendix, Doc. No. 13.)

9th. Proceedings touching the improvement of the Illinois received due attention. Many details relating thereto are presented in the annual report of agent Dunlap, hereto appended. (See Appendix, Doc. No. 24.)

10th. On the 31st May instructions were given to J. C. Jennings, esq., United States agent for harbor of Dubuque, requiring surveys, drawings, and a report, explanatory of the manner in which the improvement of the harbor may be most advantageously carried into effect, in conformity to the method of improvement recommended by the Board of Engineers of lake harbors and western rivers, and approved by the War Department. The directions given, and the surveys, &c., that have been made, are contained in the Appendix. (See Appendix, Docs. No. 25 and No. 26, for the instructions, and Doc. No. 27, for the report, &c., the last being the annual report of the agent.)

11th. The unexpended balances of sundry appropriations for the improvement of western rivers, including that for the survey of the Mississippi delta, were transferred to my credit prior to the close of the second quarter of 1855, and have been duly credited in my accounts for that quarter.

12th. The disbursements and unexpended balances on account of the several objects above considered, for the fiscal year beginning July 1, 1854, and ending June 30, 1855, agreeably to the abstracts of Col. Johnston, to my personal accounts, and to the statements received from the United States agents, are as follows, to wit:

1. Western
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3. Improve
4. Improve
5. Constru
6. Mississip
7. Survey o
8. Improve
9. Improve
10. Improve
11. Improve
12. Amount fro

13. To the amo
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Deduct item 7

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Objects of expenditure—items.	Amount expended.	Unexpended balance.
1. Western river improvements at large.....	\$5,033 17	\$38 24
2. Improvement of Mississippi river.....	201 89	5,043 51
3. Improvement of Missouri river.....	460 07	1,574 94
4. Improvement of Arkansas river.....	16,509 15	1,911 65
5. Construction, repairs, and custody of craft.....	4,964 35	23,041 18
6. Mississippi delta survey.....	1,901 20	40,208 10
7. Survey of falls of Ohio.....	812 00	*93
8. Improvement of the Ohio, including Cumberland dam.....	2,985 23	1,706 78
9. Improvement of Illinois river.....	9,787 16	9,449 77
10. Improvement of rapids of Mississippi.....		55,550 57
11. Improvement of harbor of Dubuque.....	3,308 23	1,760 79
12. Amount from sale of two mud scows at Dubuque.....		330 00
Amount		140,615 53
13. To the amount of unexpended balances as above, may be added amount of proceeds from sale of service, payable on the first of November next		6,050 00
		146,665 53
Deduct item 7th, overpaid.....		93
Total of unexpended balances.....		146,664 60

* Due agent.

The above balances, with the exception of that relating to the delta survey, and that relating to the Ohio river, are likely to be nearly or quite exhausted during the current fiscal year, ending on the 30th June next, in payments for operations in progress during the year.

An estimate covering the expenditures likely to be incurred on account of the further prosecution of the works under my superintendency during the next fiscal year, beginning on the 1st of July, 1856, and ending on the 30th of June, 1857, now claims attention, and will be presented in the following order, viz :

Estimate for the ensuing fiscal year.

Construction and equipment of three large twin snag-boats, of improved construction, for service in the Mississippi generally, and in the Missouri and Arkansas occasionally, at a probable cost of \$30,000 for each boat, &c.....	\$90,000
Construction and equipment of two light-draught snag-boats with single hulls, for service in the Missouri and Arkansas rivers, at a probable cost of \$15,000 for each boat, &c.....	30,000
Construction and equipment of two machine-boats for service in Arkansas and Missouri rivers, at a probable cost of \$2,500 for each boat, &c.....	5,000
Construction of two quarter-boats for accommodation of crews of machine-boats, at \$500 for each.....	1,000
Total for constructions and equipments.....	126,000

Improvement of the Mississippi, below the rapids.....	\$90,000
Improvement of the Missouri.....	40,000
Improvement of the Arkansas.....	40,000
Improvement of the Ohio, including Cumberland dam.....	90,000
Improvement of the Illinois river.....	20,000
Improvement of the Des Moines rapids.....	60,000
Improvement of the Rock Island rapids.....	40,000
Improvement of the harbor of Dubuque.....	15,000
Improvement of the Red river, and requisite craft therefor..	100,000
Amount of appropriations required.....	<u>621,000</u>

It is believed that the several sums estimated as above can be expended to advantage within the ensuing fiscal year, and are respectfully recommended to the consideration of the government, in the assessment of their appropriations for the year in question.

Among the strongest arguments in favor of appropriations for the objects above mentioned, are the peril and destruction of human life and property annually occasioned by ruinous obstructions in the way of safe navigation, the removal of which may be effected at an expense comparatively moderate.

During the last fiscal year the number of lives lost by casualties of one kind or other, is no less than 124; the number of steamers wrecked 85, and the value of freights and other property lost incalculable; besides which, enormous sacrifices of health and labor have been incurred during the same year. (See Appendix, Doc. No. 28.)

The arrivals and departures of steamers at Cairo, the main centre of western navigation, during the last fiscal year, are approximately as follows, viz:

Months.	No. of arrivals.	No. of departures.
July, 1854.....	211	211
August, 1854.....	156	156
September, 1854.....	146	146
October, 1854.....	100 ?	100 ?
November, 1854.....	147 ?	147 ?
December, 1854.....	290	290
January, 1855.....	303	303
February, 1855.....	180 ?	180 ?
March, 1855.....	375 ?	375 ?
April, 1855.....	355 ?	355 ?
May, 1855.....	368	368
June, 1855.....	274	274
Total for the year.....	2,905	2,905

N. B.—The register from which the foregoing statements were derived has been subjected to frequent changes, both in the places where and the persons by whom it has been kept. Consequently it may be inaccurate and defective in many respects.

Efforts have been made to obtain statistical information in relation

to the condition of western commerce within the district of my superintendency for the last fiscal year. The results of inquiries instituted for this purpose are exhibited in the annual reports of the several agents, and may be regarded as approximately correct, to the extent of their bearings merely. (See Appendix, Docs. No. 7, No. 13, No. 24, and No. 27, before cited.) Statistics of this character have been more particularly required of Lieutenant Abert, my military assistant, in reference to the ports of Cincinnati, Louisville, and St. Louis. The inquiries and investigations of this officer have been far more comprehensive, and have led to results much more abundant and reliable, by reason of his having been favored with opportunities of consulting observations and registers more authentic, systematic, and comprehensive, than those to be found at other commercial points of less magnitude, and less accessible to trade. The results obtained by Lieutenant Abert are exhibited in the Appendix. (See Appendix, Doc. No. 29.)

I am gratified with the opportunity of introducing in the Appendix a proposition recently made by Eads & Nelson, of St. Louis, gentlemen of high standing and long experience in river operations, involving a method devised by them for carrying on the improvement of the Mississippi, for a period of ten years. The method appears new in many respects, and I regard it as worthy of special consideration. (See Appendix, Doc. No. 30.)

The manner of operations and the mechanical means and appliances contemplated to be used seem in the main consistent and reasonable, and the remuneration expected therefore is apparently within the limits of actual expenditures heretofore incurred in similar operations.

The employment of diving-bell boats, however, for the removal of sunken and partially imbedded logs, stumps, &c., seems somewhat chimerical, not only in so far as relates to the discovery of the localities at which such obstructions exist, but their removal when discovered. In my opinion their discovery may be effected by the use of one or more strong iron grapples of suitable construction, applied to the sweep-chain of a snag-boat, (an expedient not hitherto adopted,) more readily than in any other way; while their removal can be more expeditiously and economically effected by the same means than by the use of a bell-boat and its diving-apparatus. The diving-boats can be undoubtedly employed to better advantage in the removal of wrecks, especially when the obstructions to be removed are of sufficient value to defray the expenses of removal; but the snag-boat may be regarded as far more efficient, and better adapted to the extraction of sunken logs, trees, &c., than a diving-bell boat, the use of which would involve the tedious and expensive process of removing the sand in which the obstruction might be imbedded, and of dividing the latter into parts in order to effect its removal.

Nevertheless, there can be little or no doubt that the simultaneous employment of the diving-boat and the snag-boat would contribute more effectually to the improvement of the Mississippi than the use of either without the other.

In reference to the project of Messrs. Eads & Nelson it should nevertheless be observed, that as yet no sufficient example of improving

channels by the use of diving-bell boats has been afforded; on the contrary, craft of this character appear to have been employed merely for the purpose of detaching and raising valuable property from the wrecks, while the wrecks themselves have been permitted to remain in a condition quite as annoying to navigation as before.

The contract system may probably be applied to the improvement of the Mississippi to great advantage, and with greater assurances of producing beneficial results than that heretofore pursued; but a proper definition of the terms and conditions of the contract, and of the obligations, restraints, and immunities secured by it, would undoubtedly prove a very delicate, difficult and complicated task. (See Appendix, Doc. No. 30, as before cited.)

I now take occasion to reiterate some of my views in relation to a proper administration of the affairs of my superintendency, the adoption of which may prove useful in the event of new appropriations for the improvement of western rivers.

The selection and appointment of local agents, snag-boat captains, &c., demand the utmost circumspection and caution on the part of the appointing power. None but men of experience, ability and integrity, recommended by disinterested, competent and impartial judges, should be deemed worthy of such appointments. The agent in charge of surveys, delineations, constructions, &c., should be well versed in engineering. Every agent charged with the disbursement of funds should be a practical accountant. Every captain of a snag-boat should be well versed in the management of water-craft, and especially in the management of a snag-boat, and should be qualified to direct and supervise all disbursements incident to the operations of his boat. Every mate of a snag-boat should be qualified to manage the affairs and operations of the boat during the absence, sickness or other inability of the captain. The pilot and engineer should be duly qualified and commissioned for their respective stations. The boat's clerk should be an accurate and accomplished accountant and recorder, qualified, by education, experience and judgment, to transact all fiscal and clerical concerns pertaining to the service of the boat. All other functionaries, whether in the employ of local agents or snag-boat captains, should be well versed in the performance of the several duties of their appropriate stations.

The laborers employed should be in all cases robust, healthy, strong, active, and industrious, and in addition to these qualifications should possess quiet and peaceable tempers, kind dispositions, and be temperate and orderly in all respects.

A careful observance of the rules and regulations prescribed for the government of the western river service should be exacted from all concerned.

The rules and regulations just mentioned provide for the employment of one or more assistants, military or civil, to be appointed by the express approval of the Secretary of War, grounded on satisfactory testimonials, confirmatory of their capacity and fitness for such appointment, whose duty it should be to aid the superintendent in the performance of his official duties. The services of such an assistant will be

very much needed and even indispensable in the event of new appropriations.

Such an assistant might be employed to great advantage in directing and managing all transactions relating to the operations of the snag-boats in the rivers to be improved. He might be required to serve not only as pay agent for the forces employed on board of the several snag-boats, but as disbursing agent for all expenditures incident to the prosecution of the snag business generally. Like all other agents, he should receive his instructions, forward his estimates and requisitions, submit his accounts, reports, &c., to and through this office, whereby the superintendent would be relieved of the onerous and responsible duties of a disbursing agent, and be able to devote more of his attention to the paramount duties of inspecting, directing and supervising the numerous and diversified works of his superintendency.

The rule of the War Department requiring the announcement of a proposed tour of inspection, prior to the date of its inception, cannot always be complied with without inconvenience, and sometimes without detriment to the service. The day of departure can seldom be anticipated with any degree of certainty, owing to the irregularities in the departure of steamers. Moreover, emergencies frequently arise when the necessity of the case requires the inception of a tour, before instructions from the department authorizing it can be received. Occasions of this sort need no special definition. The nature, extent, and variety of the operations to be inspected, and their remoteness from each other, render the difficulties in the case sufficiently obvious. I would therefore respectfully suggest, that in all cases of non-compliance with the rule, the anomalies of each case be reported by the superintendent; and that the reasons thereof as explained by him, so far as they are consistent and proper, be accepted as a sufficient apology for the non-compliance.

Supplementary observations, comprising sundry desultory views and suggestions in reference to the improvement of the western rivers.

The district for improvement contains the following rivers, viz: the Ohio, the Mississippi, the Illinois, the Missouri, the Arkansas, and the Red river, embracing an aggregate extent of at least 7,000 miles; to which may be added the Tennessee, Cumberland, Wabash, and Yazoo rivers, increasing the extent of steamboat navigation to more than 8,000 miles.

The modes of improvement required embrace the following varieties, viz:

1st. The formation of wing-dams or jetties, for the purpose of diverting the low-water flow from passing off in broad and shoal sheets, and compelling it to pass through narrow channels of greater depth;

2d. The opening of channels across shoal bars for a similar purpose; and,

3d. The removal of obstructions from all channels frequented by

steamers and other craft, for the purpose of protecting the latter against injury and destruction.

The methods of improvement by lateral canals, and by slack-water or lock and dam navigation, are omitted in the classification as above, for the reason that there is but a single locality, viz : the Falls at Louisville, where the former is deemed advisable ; and that the latter, lock and dam navigation, ought not to be introduced into the navigable streams of the west ; because,

1st. It would obstruct and destroy the natural navigation of the streams to which it is applied ;

2d. Its dams retard the currents of the streams, and tend to the repletion of the pools and channels above them with sedimentary deposits ; and,

3d. It not only destroys the natural navigation, but tends to the injury, and eventually to the destruction of all kinds of navigation in low water, by filling up and obliterating the natural channels that previously existed at the places where it is introduced.

In reference to the adoption of lock and dam navigation on the navigable rivers of the west, there may be a single instance when it would be proper and advisable, viz : at the foot of a series of rapids in Tennessee river, called the Tumbling Shoals, the Suck, the Pot, &c., all of which might be transformed into a single pool of the requisite depth for navigation, by erecting a lock and dam twenty to thirty feet high at some suitable point below these formidable passes. Although the natural navigation would be impaired thereby, yet the navigation of the river would be improved and benefited in a far greater degree.

Our remarks will accordingly be confined to the three classes above designated, viz :

Wing-dams or jetties for the western rivers admit of but three advisable modes of construction, viz :

1st. Of rip-rap stone-work or dikes, formed of stone accumulated in ridges ;

2d. Of cribs of timbers properly framed, wharf-locked, and filled with stone, or with bushes and stone combined ; and,

3d. Of saplings, bushes, and piles combined, and weighted down with stone.

There are, apparently, very few instances on the western rivers where ranges of piles are likely to prove effectual, except in combination of one or other of the structures above mentioned.

The stone dams are more particularly applicable in cases where the river-bed is composed of rock, and when the low water currents are to be diverted from shoals to deeper portions of the bed, for the purpose of producing still deeper water at the latter. These may be continued downward to any considerable extent, and in any desirable direction, for the purpose of preventing the formation of shoals below the main dams. They are also applicable on a much more extensive scale in cases where the river-bed is composed of firm or coarse sand, in which the foundations of the structure should be much broader and more copiously filled than in the former cases. In all these cases the struc-

ture may be surmounted with crib-work, which will prevent their summits from being abraded by water-currents and drifting materials.

This mode of structure may also be adopted in the formation of revetments for the protection and preservation of the alluvial banks of the Mississippi, and even of the Missouri, against the abrasions of their currents. Its application to purposes of this sort will involve the necessity of procuring vast quantities of stone, especially when protection to any very considerable extent is needed, but the results produced (of which we have many examples) will be effectual and permanent.

The crib-dams may be also applied to rocky as well as sandy river-beds, but are more appropriate to the latter, in cases where water-currents are to be diverted from their passage in their sheets over sand-bars, and in both cases, when the water is to be prevented from spreading laterally from the channel through which it ought to flow, after passing the main dam or jettee.

The stone and bush dams are applicable only to river-beds of sand or silt, and in such cases are likely to constitute a more unyielding and permanent barrier than either of the other methods. In addition to the piles proper to be introduced in connexion with this method, crib-work may also be applied to advantage, for the protection of the tops of the dams.

Structures of the description above given are intended merely for the benefit of low-water navigation, and the greatest navigable depth that can be secured by their adoption in any case will not be likely to exceed three feet in extreme low water. The elevation of their crests above the lowest stage of the stream should depend on the quantity of water required to pass around the jettee and through the channel below, in every case, in order to insure the requisite depth in the navigable channel intended to be opened thereby.

In cases where sluices are to be formed in connexion with the lower extremities of jetties or wing-dams, the operation may be greatly facilitated in sundry beds, by the process of dredging, but in rocky beds the channel must be opened by the expensive process of blasting and removing the rocks from beneath the surface of the water; which last can be effected probably with greater economy, and to better advantage in all respects, by the use of drilling machinery worked by steam, than in any other way. This experiment is now for trial at the rapids of the Mississippi with fair prospects of satisfactory results.

Sluice navigation is believed to be practicable ascending as well as descending, under the following limitations, viz: the width and depth of the channel being sufficient to admit the free passage of a steamer, the ascent may be effected in all cases where the acclivity does not exceed three feet per mile, or $\frac{1}{1760}$. The improvement of the rapids of the Mississippi is predicated on the feasibility of this postulate. By equalizing the declivity of the Muscle shoals of Tennessee river, their ascent may be effected within the same limit. Colbert and Bee-tree shoals, on the same river, may be overcome in the same way. Letart's falls, on the Ohio, and numerous other rapids above that point, are known to be navigable on terms less favorable than those above intimated. The falls at Louisville have been ascended by steamers

in medial stages of the river, when the acclivity was even greater than that above mentioned. The shoals and rapids of the Cumberland river below Nashville may, without doubt, be surmounted on similar terms, whenever the volume of low water in it is sufficient to fill a channel of the requisite width and depth; the same is also true of many other streams and localities that might be mentioned.

In cases innumerable, the low-water channels across sand-bars become filled up and often obliterated by the influence of high-water currents upon the changeable beds of the rivers. Among the best remedies for evils of this sort is the process of dredging, which may be applied with good effect in aid of reopening the channels, whilst the streams are subsiding to their low-water stages.

With respect to the further prosecution of the snag business, and the seasons best adapted to this service on the several rivers to be improved, I take leave to repeat sundry views which I have already advanced in previous reports.

The craft best adapted to the improvement of the Middle and Lower Mississippi, (viz: from the mouth of Missouri to Cairo, and from the mouth of Ohio to the Balize,) consists of large twin snag-boats, and quarter-boats; the former for the removal of snags and other obstructions from the channels, and the latter for the accommodation of working parties employed in cutting trees, roots, &c. on dry bars, and in felling impending trees on the shores and banks.

Three twin snag-boats, of the class above intimated, will be a full complement not only for the service required in the Mississippi, but for occasional employment in the Missouri and Arkansas, whenever the water stages in the latter two rivers will admit of their efficient operation. Each of these snag-boats should be accompanied by a quarter-boat, to facilitate operations on dry bars and the river-banks.

The twin snag-boats should be similar in size, manner of construction, equipments, &c., to those heretofore in use, except that the massive wooden rollers on the main decks, which greatly incumber the boats and increase their draught, should be dispensed with, and a substantial declining platform substituted in their stead. The two customary iron rollers only, viz: one at the head and the other at the foot of the platform, should be retained. Moreover, for the purpose of maintaining transverse stiffness in the boat, a large iron rod or tie should pass entirely through the calibre of the axle of the main windlass, and be connected at both ends with samson-posts, while the latter should be firmly connected with the guards, on both sides of the boat, by iron stay-rods, passing from the heads of these posts to the exterior timbers of the guards. The object of this arrangement is not merely to give transverse stiffness to the boat, but to afford the means of *lining* the main water-wheel shafts, which may be readily effected by means of nuts and screws at the ends of the axle-rods. Another important object is secured by this arrangement, viz: the main windlass-shaft being subjected to enormous strains, is liable to be broken and precipitated upon the heads of the workmen, and thereby to occasion the loss of lives and other serious damages. The axle-rod will undoubtedly pre-

vent any catastrophe of this sort, by sustaining the windlass when fractured.

The single-hull or light-draught snag-boat should be similar in size, draught, &c., to the Gopher and Dragon, heretofore employed as snag-boats of this class. Being much smaller, of lighter draught, and better adapted to operations in shoal and narrow channels, than the twin snag-boats, they are of course better suited to the improvement of the Missouri, Arkansas, and other rivers of secondary magnitude.

Three snag-boats of this class may be employed to advantage, viz: two in the Missouri, and one in the Arkansas river, to which may be added a fourth now in preparation for service on Red river. One or more of the twin snag-boats may occasionally be used to advantage on the Missouri and Arkansas; but on Red river the only snag-boat that can be employed to any advantage is the light-draught, single-hull snag-boat.

Each of the light-draught snag-boats should be accompanied by a *machine-boat*, susceptible of being towed from place to place by the snag-boat. The machine-boat is composed of twin-scows firmly connected by beams, &c. Being destitute of steam power, it is worked by manual labor, applied by means of a winch and windlass, whereby a powerful force is brought to act upon obstructions that are to be removed. The shoal draught of the machine-boat admits of its being employed along the sides of main channels, in water too shoal to receive the snag-boat. In this way the machine-boat is made subservient to the removal of obstructions from the channels in very low water, and at the same time may be employed instead of quarter-boats for the accommodation of parties employed in cutting logs, &c., on the bars, and felling impending trees on the shores.

The cost and equipment of the several varieties of craft above mentioned may be estimated as follows, for each, viz:

A twin snag-boat, with equipments complete.....	\$30,000
A light-draught snag-boat, with equipments complete.....	15,000
A machine-boat, with equipments complete.....	2,500
A quarter-boat, with equipments complete.....	500

The seasons favorable for operation in the several rivers above mentioned vary with the periodical freshets that occur in each respectively.

In the Upper Mississippi the spring freshets occur almost simultaneously with the thawing and breaking up of the ice, so that no operations for its improvement can be prosecuted till after the subsidence of these freshets, which usually takes place about the middle or last of June. The same is also true with respect to the portions of the Missouri situated above the mouth of the Kansas river.

The lower portions of the Missouri continue favorable for operations from an early date in March till the occurrence of the summer flood of that river, which usually takes place between the middle and last of June. The season of operations is then interrupted till about the 1st of August, after which it again occurs and continues more or less favorable till the middle or last of October.

The stages of the Illinois are seldom so high as to prevent the process of dredging to advantage, from the breaking up of the river in the spring till the occurrence of low water in August or September following.

The Middle Mississippi is usually favorable for work from the subsidence of the summer flood of the Missouri, or about the 1st of August, till about Christmas, or the end of the year.

The Lower Mississippi continues favorable during the period last mentioned, and remains so till about the 1st of March following, when it is rendered unfavorable by the occurrence of the spring and summer floods, during which its stages are too elevated to admit of beneficial operations.

The Ohio becomes favorable for operations after the subsidence of its spring floods in April, and continues so till June, and often till July, when it is rendered more or less unfavorable by low water, and again becomes favorable early in October. This river is always favorable for the erection of wing-dams, jetties, &c., in low-water stages, except when the weather is too cold for such work.

The Arkansas continues favorable from about the middle of October till the last of June, annually, but during the residue of the year the water is generally too low, and the neighboring country too unhealthy, to admit of efficient operations.

The same is also true of Red river—the region through which it flows, especially that in which the raft is situated, being even more unhealthy than the valley of the Arkansas.

These observations, like those relating to the estimate and to the operations of the next fiscal year, are to be regarded as relevant to the cause of western river improvements only in the event of new appropriations for the objects comprised under that general head.

Respectfully submitted.

S. H. LONG,

Lieut. Col. Top. Engs., Supt. of W. R. Improvements.

Col. J. J. ABERT,

Chief Top. Engineers, Washington, D. C.

APPENDIX—Doc. No. 1.

Transfer of public property, &c., from Colonel Johnston to Colonel Long.

LOUISVILLE, March 27, 1855.

Mem. for Colonel Long:

On the 23d of November, 1854, I recommended the sale of the two dredge-boats, (except the dredging apparatus of the Gopher to be transferred to a new boat.) On the 8th of January, 1855, this recommendation was approved. The sales have not been made. Major Long has been directed to bring the Gopher to Alton, where he is superintending the construction of a new boat.

The "Terror" is at work in the Arkansas, under Captain Dilling-

ham. Thereon Duval has been appointed to succeed him, he being destined for service in improvement of the Red river raft.

The snag-boats Bell and Sevier are at St. Louis. Mr. Ostrander is custodian, (paid to the end of February,) his pay being \$50 per month, with four watchmen at \$25 a month each, paid to the end of December last; \$3 a week is due for the board of each of the five from January 1, 1855.

Office rent at \$18 per month is due from the 1st of January.

Commutation for fuel and quarters from March 1, 1855, is due Lieut. Abert.

Pay is due Mr. Sinton as clerk, (at the rate of \$1,000 per annum,) from March 1, 1855.

Postage is due from the first of the quarter.

A letter from the Third Auditor to Colonel Abert, (dated January 12,) will show, with the office records, the condition of the appropriations.

J. E. JOHNSTON,

Lieutenant Colonel U. S. Army.

Pay for the office messenger is due from the 1st instant, at \$12 a month.

J. E. J.

John G. Floyd, esq., is agent for the improvement of the rapids of the Upper Mississippi, located at Keokuk. Pay as agent in the working season \$6 per diem; in winter, as custodian \$50 per month for each work.

Colonel C. A. Fuller is agent for improvement of the Red river raft, pay \$6; also for the Ohio, located now at Louisville.

J. C. Jennings is agent for the improvement of Dubuque harbor; pay as agent \$4 per diem, custodian \$50 per month.

G. A. Dunlap is agent for improvement of the Illinois, located at Jacksonville; pay \$5 per diem in the working season. These are all disbursing agents.

Major G. W. Long is engaged in the construction of a dredge-boat at Alton; his pay is \$5 per diem, commencing on the 12th of February, from which date it is due.

Lieutenant Jas. W. Abert, topographical engineers, is assistant to superintendent of western river improvements; T. R. Sinton, clerk.

J. E. JOHNSTON.

Balance of appropriations.

Construction, &c.—In hands of C. A. Fuller,	
esq., deposited at St. Louis.....	\$7,004 31
Mississippi.—Balance in United States treasury.....	5,069 36
Missouri.—Balance in United States treasury.....	1,653 53
Arkansas.—Balance in United States treasury. \$6,421 23	
Deposited in Little rock.....	3,500 00
	9,921 23
Western rivers.—Balance.....	346 33

J. E. JOHNSTON,

Lieutenant Colonel U. S. Army.

Invoice of public property transferred by Lieutenant Colonel J. E. Johnston to Lieutenant Colonel S. H. Long, March 27, 1855.

INSTRUMENTS.

1 sextant,	1 surveying-chain,
2 box sextants,	2 measuring-tapes,
1 level,	1 tin paper-case,
2 pocket compasses,	7 chain pins,
1 transit,	2 glass rulers,
1 box of colors,	1 glass triangle.
1 brass scale,	

BOOKS, MAPS, CHARTS, &C.

4 volumes office records,	1 drawing, Falls of the Ohio,
2 volumes orders from Topographical Bureau,	1 drawing, plan and sections mud-scows,
2 volumes abstracts and accounts current,	1 drawing steamer General Butler,
4 inkstands,	1 drawing steamer Henry Clay,
1 file-hook,	1 map Des Moines rapids,
1 iron pen-rack,	1 map Rock Island rapids,
2 paper weights,	1 map of United States,
1 daily calendar,	1 map of Kentucky,
1 tin paper-case,	1 chart of Mississippi river,
1 tin safe,	2 writing desks,
1 pair shears,	3 book and paper cases,
1 eraser,	2 drawing-boards, with tressels,
1 drawing of snag-boat Hercules,	3 tables,
1 drawing, dredge Lavacca,	9 office chairs,
	1 screw-press.

J. E. JOHNSTON,
Lieutenant Colonel U. S. Army.

APPENDIX—DOC. No. 2.

Unexpended balances to be accounted for from and after July 1, 1855.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, July 27, 1855.

SIR: I have the honor, herewith, to submit my accounts for the second quarter of 1855, relating to sundry appropriations for the improvement of the western rivers, &c., from which it appears that the following balances remain in my charge for future use, to wit:

On account of construction, repairs, &c., of snag-boats, dredge-boats, &c., or for improvement of western rivers at large.....	\$23,041 18
On account of improvement of Arkansas river.....	1,911 65
On account of survey of the Mississippi delta.....	40,208 10
On account of the Mississippi river.....	5,043 51
On account of the Missouri river.....	1,574 94
On account of western rivers at large	38 24
Amount of balances.....	71,817 62
Credit, by amount overpaid on account of appropriation for survey of Falls of Ohio, deduct.....	93
Net amount of balances to be accounted for, from and after this date, (July 27, 1855).	71,816 69

I further take leave to report that of the net amount, as above, the sums deposited to my credit, and subject to my order, are as follows, to wit:

With the Treasurer of the United States, at Washington.	\$366 00
With assistant treasurer, at Saint Louis.....	55,352 33
With Captain Clemson, and others, in advance, for works in progress.....	750 00
With self, at Louisville, Kentucky.....	15,348 36
Net aggregate, as before.....	71,816 69

The rendition of my accounts has been unavoidably delayed till this date, by reason of duties requiring the attention of myself and clerk abroad.

S. H. LONG,
Lieutenant Colonel U. S. Army, &c.

Col. J. J. ABERT, *Chief Topographical Engineers.*

APPENDIX—Doc. No. 3.

Report on condition of works at Cumberland island.

LOUISVILLE, *April 16, 1855.*

SIR: Agreeably to your request, I have the honor herewith to submit a report of my survey at the foot of Cumberland island, made during the low water of September, 1854, together with a map showing the condition of the bars at and near the head and foot of the island, and the changes that have occurred since the date of the last survey, viz: in 1848.

From an inspection of the map it will be seen that the dry bar which formerly existed at the head of the Kentucky chute has been partially washed away, and a channel has cut out sufficiently deep for all the purposes of navigation. This change has been produced principally by the increased volume of water diverted by the dam, which was, in part, repaired during the summer of 1853, and by the work of the dredge-boat Gopher, employed at the same time in widening the channel along the Kentucky shore.

During the past low-water season there was thus formed an uninterrupted communication between the Ohio and the Cumberland rivers by means of this new channel; and, from a more recent examination, I find that the channel is gradually increasing in width, and will doubtless result in a permanent improvement, provided the dam at the head of the island be brought to completion.

The channel from the town of Smithland to the foot of the island is of sufficient depth and capacity for all craft navigating the river. After passing the foot of the island the water spreads over a broad surface, with a tendency to flow towards the Illinois shore, producing shoals and bars, which have proved a most serious obstruction to the navigation; so much so, in fact, that descending boats having business at Smithland, in order to continue their voyage down the Ohio, have been compelled to return by the channel at the head of the island to pass *over* the dam, and thence down the Illinois side of the island.

To remedy this evil I propose (provided the completion of the dam at the head does not obviate the difficulty) to build a jettee of stone, or crib and stone-work, extending downwards from the foot of the island as far as the point marked A, (see map.) The jettee to be of sufficient elevation to turn the water at a four-foot stage, prevent its spreading towards the Illinois shore, and, by the increased volume of water thrown in the proper direction, to wash out and keep clear a channel to the deep water below. The services of a dredge-boat to assist the action of the current might also be found expedient.

The present condition of the dam at the head of the island appears to be the same as at the date of the suspension of the work in the month of September, 1853, reported in my letter of the 4th of October to the Topographical Bureau, from which the following is an extract:

"The total amount of stone deposited in the dam at the date of the suspension of the work, viz: on the 24th ultimo, is 31,521 tons. This has been sufficient to close the V or gap permanently; to raise the dam between the V and the head of Cumberland island to the required height; to extend the dam on the dry bar about one hundred and twenty yards, and partially to raise the portion of the dam extending from the V to Dog island. The work remaining to be done consists in finishing the portion between the V and Dog island, and extending the dam over the dry bar a distance of nearly five hundred yards, which will require in all about fifteen thousand tons of stone."

The only changes that I have noticed have been caused by the practice, too frequently indulged in on the Ohio by fishermen and others, of removing the stone from the dam to make free passages for their boats both up and down. No less than three of these breaches

have been made at the Cumberland dam since the suspension of the work, to the manifest injury thereof; encouraging the formation of formidable breaches, which would require a large additional amount of stone to fill up. I take leave to call the attention of the bureau to these repeated cases of depredation on the property of the United States, both on the lower and upper Ohio works, and to ask if there be no authority of law by which a stop can be put to this wanton destruction of public property.

During the coming low water season I purpose to apply the unexpended balance of appropriation for the improvement of the Ohio river, including Cumberland dam—viz: about \$1,800—in repairing these breaches, and in strengthening the dam at such points as may seem to require it. Nothing further can be done towards the completion of this improvement until a greater amount of funds can be obtained for the purpose.

In connexion with this subject, I would remark, that the dredge-boat Gopher was built at a cost of about \$20,000, *entirely from the appropriation for the improvement of the Ohio, including Cumberland dam*; that she was turned over to the *Illinois* river, in October, 1853, in which service she still remains; that her sale was authorized by the Topographical Bureau, and that the late superintendent of western river improvements, Lieutenant Colonel J. E. Johnston, directed me to carry the order into effect at as early a date as convenient; the proceeds thereof to revert to the appropriation for the Ohio river, where they appear to belong. If the sale be made, the funds thus obtained might be profitably applied towards the completion of the improvement at Cumberland island.

In conclusion, I will submit the following estimate of the amount necessary for the completion of this work.

Estimate.

For completion and repairs of dam at head of island, 15,000 tons, at \$1 20.....	\$18,000 00
For constructing jetty at foot of island, 3,000 feet long, at \$3 60 per foot.....	10,800 00
For contingencies, including dredging, &c.....	6,200 00
Amount required.....	<u>35,000 00</u>

CHARLES A. FULLER,
United States Agent and Engineer.

Lieut. Col. S. H. LONG,
Superintendent Western River Improvements.

APPENDIX—DOC. No. 4.

Tour for funds, inspection, and payment.

LOUISVILLE, April 30, 1855.

SIR: Agreeably to your orders and instructions of the 9th instant, I have visited the snag-boat Terror No. 5, now operating in the Arkansas river, and respectfully submit the following report:

I arrived at the mouth of the Arkansas April 16th, and finding the river too low to be navigated with certainty as far as Little Rock, (where I was to obtain the amount turned over by Lieutenant Colonel J. E. Johnston, late superintendent, to you, on account of the improvement of Arkansas river,) availed myself of travelling by stage as the only sure way, and returned per same conveyance. Reached Napoleon April 19th, and immediately started up the Arkansas in search of the boat, which was at Burnet's Landing.

Finding, on my arrival at the boat, that the funds I had were not sufficient for settlement with the crew, and as they were shipped to be paid at the end of the season, (which is to terminate on or about the last of May next,) I did not pay them off. I, however, took up all bills of the boat for provisions, wood, &c., that were on hand, and placed the captain in funds for the prosecution of the improvement, the vouchers for all which, with an account current, are enclosed herewith.

As there is no prospect of a rise in Arkansas river before the middle of June next, and as the appropriation for the improvement of that river is nearly exhausted, and also as the obstructions in the river have been removed to Smith's cut-off, (which is as far as the boat can ascend the river,) a distance of about 110 miles, I would respectfully recommend that the boat be withdrawn immediately from the river and brought to Paducah to be laid up and repaired; the unexpended balance of the appropriation, after paying for the services rendered, being believed to be sufficient to repair the boat.

From a personal inspection of the boat the following repairs are needed: the bottoms and sides of the hulls require a thorough recaulking and straightening under the main purchase shaft; the main decks also need recaulking; and the upper decks want new canvass and paint.

The hulls could easily be kept straight by putting an arch of timber in each hull, say for 25 feet both forward and aft of the gallows frame.

During rain the officers' rooms are so leaky that their beds and furniture become thoroughly saturated; and the forecastles, under which the laborers sleep, also leak badly at similar times.

The repairs above contemplated could be effected at a cost of about \$1,500, and the boat would then be in as good a condition as when new.

I found the Arkansas river quite clear of snags as far as the boat had operated. The logs on the shores and bars, however, were very numerous, and I suggested to Captain Duval the propriety of cutting away their roots, so that when the water should rise they would float

and not become snags; also the propriety of felling impending trees on several caving banks.

THOS. R. SINTON,
Clerk, Office Western River Improvements.

Lieut. Col. S. H. LONG,
Superintendent Western River Improvements.

APPENDIX—DOC. No. 5.

Report on settlements, disposition of snag-boat, &c.

LOUISVILLE, June 9, 1855.

SIR: In obedience to your orders dated St. Louis, May 22, 1855, "desiring me to proceed to Napoleon as early as practicable, make the customary settlement with the officers and crew of snag-boat No. 5, provide for the safe-keeping of the boat, &c., at that point, &c., &c.," I would respectfully report that I have proceeded to Napoleon and made the customary settlements with the officers and crew of snag-boat Terror, No. 5, as follows, viz:

Vouchers' pay-roll	\$3,855 66
Contingent vouchers	196 72
Fuel vouchers	153 50
	4,205 88
From which deduct the amount previously advanced to Captain Duval by your direction	400 00
Amount of vouchers	3,805 88

To liquidate which I have drawn as follows:

On you at Louisville	\$2,619 42
On assistant treasurer at St. Louis	1,186 46
	3,805 88

Leaving a balance to my credit at St. Louis of \$813 54, for which please find check No. 4 enclosed; also the pay-rolls and vouchers referred to above; all of which I trust will be found correct and satisfactory.

I have intrusted the snag-boat Terror, No. 5, to the custody of Mr. Hicks King, at the compensation of \$100 per month, with four watchmen, at \$23 per month each, which was the best arrangement I could make at this time.

The four watchmen are necessary, from the fact that the boat leaks badly, and requires pumping almost constantly night and day. Mr.

King remains with the understanding that he is to be relieved during this month.

There is not the slightest chance to sell this snag-boat at Napoleon at private sale. Of the persons mentioned in your office, one lives in Memphis, and the other at the mouth of White river. I did not see either of them, but heard that they only talked about it, and made no offer for her.

THOS. R. SINTON,

Clerk, Office Western River Improvements.

Lieut. Col. S. H. LONG,

Superintendent Western River Improvements.

APPENDIX—DOC. No. 6.

Instructions to Agent Floyd to resume the works of his Agency.

OFFICE WESTERN RIVER IMPROVEMENTS,

Louisville, April 16, 1855.

SIR: In accordance with instructions this day received from the War Department, you are desired to issue the customary public notices calling for sealed proposals for the prosecution of the improvement of the rapids of the Mississippi. The time and place of receiving and opening the proposals will be such as you may deem it advisable to designate; a lapse of thirty days being allowed from the date of issuing the notices to that of opening the proposals.

"No time should be lost in advertising for proposals in accordance with the instructions" above referred to.

The manner of advertising is confided to your discretion, with the understanding that you forward to this office a copy of the advertisement as early as practicable, and subsequently a list of the bids elicited thereby, with your views as to the character and sufficiency of the bids generally.

Respectfully, sir, your obedient servant,

S. H. LONG,

Lieut. Colonel, Supt. Western River Improvements.

Major J. G. FLOYD,

Agent for Rapids of Mississippi, Keokuk, Iowa.

APPENDIX—DOC. No. 7.

Annual Report on improvement of Mississippi rapids.

KEOKUK, August 25, 1855.

SIR: I herewith submit a report of work and operations upon the improvement of the Rock River and Des Moines rapids of the Mississippi, during the fiscal year ending June 30, 1855.

No work has been done since last November, and my report of that month embraces all the operations of the season, and consequently my report now is but a summary of last season's work.

The contractors, Swan & Co., made their preparations, beginning in February, 1854, and begun work on the rapids in August following. As I have already stated, their preparations were not commensurate with the necessities and extent of the work they were engaged upon. And it was not in my power to control them in this respect, either in the amount of preparatory expenditures, nor in the number of hands employed, nor yet in the *number* of points worked upon.

There are objections and defects in the contract system, especially when Congress refuses to make adequate appropriations. It is no argument that there is an unexpended balance; because if the contractor were assured of continued appropriations, or saw a sufficient amount at once appropriated, he would feel justified in making his preparations of proper magnitude and extent, and fully adequate to *complete* the work. But of all things, the appropriations by Congress are the most uncertain.

The work upon the upper rapids was confined to two chains—"Campbell's chain" and "Sycamore chain." The former was considered the most dangerous to navigation. The work done has so far relieved the danger and difficulty there. No boat this season has sustained any damage upon that chain that I have heard of, and none have stuck where the work was done. The work upon "Sycamore chain" was not sufficient in amount to have made any perceptible difference to the boats.

At the lower rapids the obstructions, as heretofore described, consist of reefs of rocks, extending across the channel at various points, which require continuous blasting and removal. This will always render the work slower, more difficult and costly, than upon the upper rapids. The appropriation bill confined the expenditure of money upon the lower rapids to two chains—the "English chain" and "Lower chain;" and the operations were confined to two points of the "English chain," leaving from five to six feet depth, at *low water*, upon the points worked. About five thousand eight hundred cubic yards of stone were removed during the season. The contractors (Swan & Co.) have thought proper to relinquish their contract, and on the 8th of March last I received a letter, dated Washington city, February 19, 1855, they declining to prosecute the work any further, but saying they were willing to continue the work at a "living price"—not saying what that price was. I immediately forwarded their letter to Lieutenant Colonel J. E. Johnston, then in charge of the western river improvements, recommending him to give the preference to Swan & Co. at the same price that another contractor would do the work for.

They, however, made a proposition to the War Department to do the work for ten dollars per cubic yard. The Secretary of War declined their proposal, and ordered the contract to be thrown open to public competition.

Proposals for the execution of the work were accordingly invited, through the newspapers and otherwise.

On the 25th of May the bids were opened, and the proposals were found to run from nine to fourteen dollars per cubic yard of stone removed. There were three bids of nine dollars, one of which was accepted; and the contractor is now in active preparation for work, and will commence about the 1st of September. He designs to execute all his work by steam machinery, which promises the best results.

The following will embrace the answers to your inquiries, in order:

1st. Estimate of entire cost of improving both rapids according to the plan.....	\$1,500,000 00
2d. Amount that can be expended profitably in next year.....	200,000 00
3d. Nearest port of entry, Keokuk, Iowa; revenue collected for the fiscal year ending June 30, 1855,	753 30
4th. Amount in value of commerce passing both rapids annually	50,000,000 00
5th. Extent of navigation to be benefited, from St. Paul to New Orleans, 2,000 miles.	
Balance of appropriation unexpended June 30, 1855,	55,550 57

I cannot conclude this report without adverting to the great importance of knowing as early as possible whether the appropriations for the work will be continued.

If the money asked for should be granted by Congress, the contractor must have time to make preparations adequate to the work to be done; otherwise a whole season will be lost, and thus the work will be delayed from year to year.

JOHN G. FLOYD,
United States Agent.

Lieut. Col. S. H. LONG,
Superintendent Western River Improvements.

The agent has omitted to include in his report, as above, any statement showing the amount expended during the fiscal year to which it relates.

S. H. LONG, *Superintendent.*

APPENDIX—Doc. No. 8.

Project of duties on a tour of inspection, &c.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, April 23, 1855.

SIR: In anticipation of my doings on my contemplated tour of inspection, I take leave to submit for the consideration of the War Department the subjoined project, to wit:

1st. I propose to take measures for the sale of the snag-boats Nos. 3 and 4, at St. Louis. Offering the boats and their equipments at the highest price I can obtain over \$5,000 for each boat and its equipments,

stipulating, if practicable, that one of the boats be retained in service till the proceeds of the sale of both shall have been exhausted. If less than that sum be offered for either, I propose to sell one or both of the boats, &c., at the highest price that can be obtained for the same, at public auction.

2d. I propose to have the dredge-boat Geo. W. Jones, with its mud-scows and other equipments, conveyed from Dubuque to the Illinois river, there to co-operate with the new dredge-boat now in the progress of being constructed for the Illinois service. The new dredge will not be furnished with the means of locomotion from one place to another, and will require a steam-tug to answer this necessary purpose. The G. W. Jones can be made not only to subserve this object, but may be employed also as a dredge-boat in the Illinois river.

3d. Accordingly, I would suggest the propriety of delaying the sale of the Geo. W. Jones till after the appropriation for the Illinois shall have been exhausted.

4th. I propose to carry out the measure of dismantling and refitting the Gopher for the Red river service, as proposed and recommended in my report of the 21st instant.

5th. I propose to suspend operations for the improvement of the Arkansas river on or about the last of May next, when the appropriation for that river will have been nearly or quite exhausted; and on the termination of these operations to order the snag-boat No. 5 into the Ohio river, there to await further orders from the War Department.

The sanction or otherwise of the War Department to the measures above proposed, is respectfully solicited with as little delay as may be.

Respectfully, sir, your obedient servant,

S. H. LONG,

Lieut. Col. Top. Engs., Supt. W. R. Improvements.

Col. J. J. ABERT,

Chief Top. Engineers, Washington, D. C.

APPENDIX—Doc. No. 9.

Accompanying agent Fuller's reasons for not employing the Terror on Red river.

OFFICE WESTERN RIVER IMPROVEMENTS,

Louisville, May 5, 1855.

SIR: Your several communications relating to the works under my charge were received by the last mail.

In reply, I take leave to submit the accompanying report of C. A. Fuller, esq., signifying his views in reference to the fitness of snag-boat No. 5 (the Terror) for the Red river service. The draught of this boat, when new, was represented to be $2\frac{1}{2}$ feet. She was employed on the Ohio river under the direction of Col. Fuller, and on trial with the usual means of ascertaining the draught of boats, was found to

draw more than $3\frac{1}{2}$ feet. Subsequently the severe service performed by her on the Arkansas has contributed to increase her draught, so that she now draws nearly or quite four feet, by reason of sagging under the main purchase-shaft. The opinions of the agent in regard to the defects and imperfections of the Terror, (No. 5,) in other respects are unquestionably correct.

Accordingly, I concur with the agent in the propriety of adopting the dredge-boat Gopher to the Red river service, in the manner recommended in his report of the 21st ultimo, and in the construction of the two machine-boats proposed by him in the same or a previous report.

The period for successful operations in removing the existing raft above the head of Dooley's bayou will not probably recur till the ensuing fall, when the craft requisite to its removal can be in readiness for the service.

In the mean time much may be effected by preparing for the removal of the raft, and opening receptacles for the same, and for its new accumulation.

In accordance with the views of the honorable Secretary, in relation to the removal of the raft, and to the opening of the channels above mentioned, I deem it advisable that Col. Fuller proceed at once to the raft district, and commence operations for the contemplated improvement of the river in that neighborhood, and shall instruct him accordingly. Moreover, I take leave to advise that after he shall have made the necessary arrangements for the preliminary work just suggested, he be directed to return to this place, and attend to the preparation of the craft requisite to the removal of the existing raft above the head of Dooley's bayou.

Col. Fuller still entertains the opinion that the craft best adapted to the work on Red river consists of the dredge-boat Gopher, refitted and adapted to this service, together with the machine-boats proposed in the report before cited.

I would further suggest, that when the Terror shall have concluded her operations in the Arkansas, at the close of the present month, she be ordered into the Ohio, and sold on the best terms that can be had for her.

S. H. LONG,

*Lieutenant Colonel Topographical Engineers,
Superintendent Western River Improvements.*

Col. J. J. ABERT,

Chief Topographical Engineers.

APPENDIX—Doc. No. 10.

Reasons of agent Fuller for not employing snag-boat Terror on Red river.

OFFICE RED RIVER IMPROVEMENTS,
Louisville, May 5, 1855.

SIR: Having been advised by you that the Secretary of War has sanctioned the plan of operations proposed in my report of the 18th

January last, with regard to the "improvement of the Red river, in the vicinity of the raft," I propose to leave Louisville for that region immediately, and to commence the work of opening the mouths (or outlets from Red river) of Dooley's bayou, and preparing the raft now existing in the river above that point, for removing and stowing. The head of Elmer's bayou will also be prepared to receive raft, and a boom constructed to turn it into that receptacle.

I propose also to take with me my surveyor, Mr. Norvell, who has assisted me in making the surveys, that the lines of level and transit lines may be run, as suggested in the same report. He will also supervise the work whenever my duties require my absence from that locality.

I shall require a light-draught snag-boat, and one or more hand-machine-boats, with their yawls, tenders, &c., for removing rafts, stumps, and other obstructions. As there are none immediately available, and as they could not be procured before the middle of June next, which would be too late in the summer for efficient service, I propose that I may be authorized to have them prepared or constructed, and ready for service by the 1st October next. From the unhealthiness of the climate, I do not think it advisable to send a crew to that region at an earlier date.

I take leave to refer to my report to you of the 21st ultimo, in reference to the transfer and alterations of the Gopher for this service, and to reiterate my conviction that, thus altered and repaired, she would prove the cheapest and best boat that could be procured. The alterations, &c., could be made prior to the date at which she would be required, and at the same time the machine-boats could also be constructed.

As an impression appears to have prevailed that the Terror, No. 5, would be a suitable boat for this service, I take this occasion to state, that the same objections urged by me against the employment of Nos. 3 and 4, apply with almost the same force to No. 5. Being double hulled, she is entirely too wide for the narrow channels where she would have to be worked. Her draught of water is entirely too great, being about 3 feet 9 inches. She is very weak, and even were she suited in other respects, would require extensive repairs, including larger boilers, to fit her for Red river service. For these reasons I am fully convinced that she is totally unfit for the service above mentioned.

My funds for the purchase of tools, &c., being in New Orleans, and that being the most suitable point at which to make my purchases of saws, axes, rigging, &c., I would respectfully ask for an order to repair thither, and, having made the necessary purchases, to proceed to the raft region and prosecute the work of improvement.

CHAS. A. FULLER,
U. S. Agent and Engineer.

Lieut. Col. S. H. LONG,
*Topographical Engineers,
Superintendent Western River Improvements.*

APPENDIX—Doc. No. 11.

Directions to resume work in Red river.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, May 6, 1855.

SIR: Pursuant to instructions from the War Department, you are desired to proceed hence, via New Orleans, to the raft of Red river, and there resume operations for the removal of the raft as early as practicable.

While at New Orleans, you are desired to call on W. H. Williams, esq., custodian of public property pertaining to the survey of the Mississippi delta, at Carrollton, and receive from him such of the said articles as you may deem worthy of transportation to this place, and cause the same to be packed and shipped with care from New Orleans to Louisville, to the care of D. S. Benedict of this city.

You are, moreover, desired to dispose of all useless property to the best advantage, applying the proceeds to the paying of expenses that may be incurred in packing the articles to be sent; also to pay W. H. Williams for the storage and safe-keeping of said public property, &c., from the 1st day of April last, at the rate of \$15 per month, to the date of transferring the same to your charge. N. B.—The charge for shipment of said property will be paid per bill of lading, on delivery at Louisville. Accounts for payments made by you in relation to the property will be transmitted in duplicate to this office for repayment.

On your arrival at the raft district of Red river, you are expected to make proper arrangements for the further prosecution of the work committed to your charge in that vicinity, including such instrumental surveys, by compass, level, and chain, &c., as have been virtually sanctioned by the Hon. Secretary of War, in his endorsements on the report of the board on harbors and western rivers, dated 24th February, 1855, copies of which are herewith furnished for your information and guidance. In the performance of this service, you are authorized to make, or cause to be made, such journeys as are necessary and indispensable to the discharge of the duties assigned to your charge, within the limits of the raft district.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

C. A. FULLER, Esq.,

United States Agent for Red River raft.

P. S.—I herewith enclose for your use a copy of the inventory, archives, &c., pertaining to the public property receipted for, and left in the care of Wm. H. Williams, esq., at Carrollton, La. Please be careful in selecting, packing, and marking the packages proper to be shipped.

S. H. LONG.

APPENDIX—Doc. No. 12.

Instructions relating to craft for Red River service.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, May 8, 1855.

SIR: In conformity to instructions this day received from the War Department, you are desired to take prompt measures for the dismantling of the dredge-boat Gopher at Alton, and for conveying the same to Louisville, there to receive such alterations, repairs, and additions as may be required for operations in removing the Red river raft, &c.

You are not only desired to make such preliminary arrangements as are needful to the preparation of the Gopher for the Red river service, but for the construction of one or more machine-boats with adjustments, &c., adapted to the same service.

On the arrival of the Gopher at this port, she will be transferred to your custody and control, and you will be required to make payment therefor to the undersigned out of the appropriation for the improvement of Red river, at the stipulated price, viz: \$7,000, to be transferred from that appropriation to that for the improvement of the Ohio, including Cumberland dam.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

C. A. FULLER,

United States Agent and Engineer.

APPENDIX—Doc. No. 13.

Annual Report on improvement of Ohio and Red rivers.

OFFICE RED RIVER IMPROVEMENTS,
Louisville, September 1, 1855.

SIR: I have the honor to submit my annual report on the state and progress of the works committed to my charge, viz: the "improvement of the Ohio river, including Cumberland dam," and the "improvement of Red river at and around the raft," together with estimates for the prosecution of these works for the ensuing fiscal year.

1st. Ohio river, including Cumberland dam.

My receipts and expenditures for the year commencing July 1, 1854, and ending June 30, 1855, on account of this service, are as follows:

RECEIPTS.

Balance on hand July 1, 1854	\$1,992 01
Remittance from United States treasury, August 24, 1854.	2,700 00
Total received	<u>4,692 01</u>

EXPENDITURES.

Amount expended 3d quarter, 1854	\$984 55
Do.....4th quarter, 1854.....	1,572 08
Do.....1st quarter, 1855.....	277 85
Do.....2d quarter, 1855.....	150 75
Total expended	\$2,985 23
Balance on hand June 30, 1855.....	<u>1,706 78</u>

Pursuant to instructions from the Topographical Bureau, the unexpended balance above stated, viz: \$1,706 78, has been turned over to Lieutenant Colonel S. H. Long, superintendent of western river improvements.

Since the date of my last annual report but little has been done in furtherance of this improvement; the balance of appropriation remaining on hand being too small to warrant the commencement of any work, or the continuance of the repairs at Cumberland dam. A few breaches made therein by some individuals, for reasons not known, were filled by my directions at a trifling expense. With this exception the dam remains in the same condition as when last reported.

Early in September last, I made a survey and examination of Cumberland island and vicinity, with a view of ascertaining the effect of the improvement upon this locality, as well as the expediency of constructing a jetty at the foot of the island, to prevent the accumulation of sand in the channel caused by the spreading of the water in the direction of the Illinois shore. On my return to Louisville, September 29th, I received my appointment as engineer and agent for the improvement of Red river, with instructions to proceed thither immediately. The duties thus imposed obliged me to defer my report on the survey above alluded to till the 16th April last, when the report and accompanying map were duly forwarded, and to which I take leave to refer for any information required in connexion with this subject.

I have no changes to report in the condition of the dams on the upper Ohio. A detailed estimate for their completion, preservation, and repair was made by me on the 3d May, 1854, and to which I would respectfully refer for more particular information on this subject. The aggregate amount required for these objects will be stated in the subjoined estimate for the next fiscal year.

The works designed for the Ohio river improvement, being combined with snagging, dredging, &c., are of such a character that no estimate can be made for the completion of this improvement. In submitting my estimate therefor, I propose only an amount that can be judiciously expended during the next fiscal year.

ESTIMATE.

For the completion, repair and preservation of the works on the upper Ohio as per detailed estimate of May 3, 1854.....	\$115,000 00
For the completion of the improvement at Cumberland island, including the construction of a jettee at the foot.....	35,000 00
For snagging, dredging, and other improvements not included above.....	35,000 00
For contingencies, say.....	5,000 00
Amount required.....	<u>190,000 00</u>

To which should be added an estimate for the construction and equipment of boats particularly adapted to this river :

For one light-draught snag-boat complete.....	\$20,000 00
For one machine-boat complete.....	3,000 00
For one dredge-boat, with scows.....	14,000 00
Amount required for construction.....	<u>37,000 00</u>

2d. *Improvement of Red river at and around the Raft.*

My receipts and expenditures for the fiscal year ending June 30, 1855, on account of this improvement, are as follows :

RECEIPTS.

Amount placed to my credit with assistant treasurer, New Orleans, October 17, 1854.....	\$3,000 00
Remittance from United States Treasury, March 24, 1855.....	1,000 00
Amount placed to my credit with assistant treasurer, New Orleans, April 9, 1855.....	4,000 00
Amount placed to my credit with assistant treasurer, St. Louis, May 22, 1855.....	16,000 00
Total received.....	<u>24,000 00</u>

EXPENDITURES.

Amount expended 4th quarter, 1854.....	\$2,852 46
Amount expended 1st quarter, 1855.....	1,093 70
Amount expended 2d quarter, 1855.....	6,537 12
Total expended.....	<u>10,483 28</u>
Balance on hand June 30, 1855.....	<u>13,516 72</u>

On the 29th September last, I received my appointment as agent and engineer for this improvement; and at the same time an order from Lieutenant Colonel J. E. Johnston, then superintendent western river improvements, directing me to proceed as soon as practicable to the raft region, for the purpose of making a survey to determine the best plan of improvement of the navigation of Red river in the vicinity of the raft. The required survey was completed on the last of the following November; and on the 18th of January my report and map were forwarded to the Topographical Bureau.

On the 7th May, the Secretary of War having approved of the method of improvement recommended in my report, I was directed "to proceed to the raft of Red river, and there resume operations for the removal of the raft as early as practicable."

Pursuant to these instructions, having purchased the necessary tools and provisions, I repaired to the raft region, and commenced operations on the 3d June. The low stage of water then prevailing in Red river prevented my making the journey with the desired despatch, and also obliged me to leave my tools and provisions to be forwarded up that river, either by lighters or by very light-draught steamers, and to depend upon the planters in the vicinity of the work for the loan of such tools as were indispensable. To the liberality and kindness of Colonel J. B. Gilmer I am much indebted, for facilities furnished for commencing the work nearly a month in advance of the arrival of my supplies.

During the months of June and July a force of from thirty to forty-five men was employed, and the result of their work is as follows:

A substantial boom, 450 feet in length, has been framed, and in readiness to throw across the river near Elmer's bayou, for the purpose of diverting the next run of raft into that reservoir. The head of the bayou has been suitably prepared for the reception of raft, by felling all the standing timber, removing drift, logs, &c., and enlarging the opening out from Red river. All the standing timber in the proposed channel through Dooley's bayou to Shift-tail lake, a distance of twelve miles, has been felled and cut into proper lengths for removing. A portion of the existing two miles of raft in Red river, above the head of Dooley's bayou, has been cut, sawed, and prepared for removal and stowage. The force, reduced to thirty men, is now engaged on this portion of the raft, and is expected to complete this part of the work, and also to prepare the reservoir near the head of Dooley's bayou for its reception, prior to the arrival of the snag-boat Gopher, and machine-boat, now being made ready for this service.

The unhealthiness of the climate during the summer months, together with the appearance of cholera among the men, has somewhat retarded the vigorous prosecution of the work; but of my small force I have to report the loss of five by cholera and one by drowning. Since the commencement of operations the river has been unusually low, and in a remarkably favorable stage for the prosecution of the works begun.

On the 25th June I received orders to return to Louisville, for the purpose of preparing the requisite boats and machinery for operating on the raft and vicinity, whenever the river should be at a suitable stage. After making the necessary arrangements for the successful

prosecution of the work during my temporary absence, I left there on the 1st July, and arrived at this place on the 16th of the same month.

Previous to my departure for Red river, in May last, I was directed to take measures for dismantling the dredge-boat Gopher, and conveying her from Alton to Louisville, for alterations, repairs, &c. This has been done, and the boat is now on the dry-dock of the Louisville and Portland canal, where the proposed alterations, &c., are being made. A machine-boat is also in progress at the boat-yard of the Messrs. Howard, at Jeffersonville, Indiana. The Gopher, when completed, together with the machine-boat, and the requisite yawls, flat-boats, &c., will be all the craft required during the ensuing year for this purpose.

The balance of funds on hand, on the 30th June last, viz: \$13,516 72, has been reduced to \$5,524 74, by disbursements made since the rendition of my accounts for the 2d quarter of 1855. These disbursements include the amount (\$7,000) paid over to the appropriation for the improvement of the Ohio river, on account of the transfer of the dredge-boat Gopher to this service.

The balance last mentioned, added to the amount since deposited with the assistant treasurer at New Orleans, viz: \$73,796 31, gives \$79,321 05 as the unexpended balance of the appropriation, at this date.

The cost of repairs, alterations, &c., to the Gopher, together with the cost of the machine-boat, yawls, &c., and their conveyance to the raft, may be estimated at \$8,300; which will leave a balance of \$71,021 05, applicable to the prosecution of the work during the ensuing year. This will be sufficient, probably, to complete the improvement to Stumpy bayou, (see report of January 18, 1855,) and also to prepare the reservoir and boom for the stowage of the second run of raft.

To complete the improvement to the mouth of Twelve-mile bayou, the lower terminus of the new channel, an additional amount will be requisite, and for which I take leave to submit the following

ESTIMATE.

Improving Stumpy bayou, Soda lake, and Twelve-mile bayou.....	\$30,000 00
Preparing boom-bend, or other raft receptacle, constructing boom, and stowing new raft	15,000 00
Contingencies, including repairs and additions to boats and machinery	15,000 00
Amount required for the fiscal year commencing July 1, 1856, and ending June 30, 1857.....	<u>60,000 00</u>

The removal of the obstructions to the navigation of Red river, in the vicinity of the raft, is a matter of vital interest to the whole community, not only in the immediate neighborhood, but for hundreds of miles above this obstruction. About two years have elapsed since

any navigable communication has been had between upper and lower Red river. The large cotton crops of that region are still left on the hands of the planters, while at the same time the whole country is suffering for the want of the supplies required both for sustenance and for agricultural purposes. In many instances the indispensable articles have been hauled overland from the Mississippi river, at a ruinous expense. In supplying my own party during the past few months, I have been obliged to pay what otherwise would seem exorbitant prices for the common necessities of life. The cost of transportation to the military posts on upper Red river and tributaries has been very great, and caused principally by this formidable obstruction to the navigation.

Should the additional amount called for in this report be appropriated, I have every reason to believe that free and uninterrupted navigation can be had around the raft; that the public supplies for Forts Towson, Washita, Arbuckle, &c., can be forwarded at comparatively a trifling expense; and at the same time, by insuring navigation both to and from this region, the immense resources of the valley of upper Red river will be developed, and the valuable products of this alluvial district, pre-eminent in fertility, may be transported without hindrance to their desired market.

CHAS. A. FULLER,
United States Agent and Engineer.

Lieut. Col. J. H. KING, *U. S. A.,*
Superintendent Western River Improvements.

APPENDIX—Doc. No. 14.

Inspection report of June 20, 1855.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, June 20, 1855.

SIR: In accordance with your instructions I embarked on a tour of inspection on the 10th ultimo, and returned to Louisville on the 14th instant, having visited the several works under my superintendence in order of time and place, as follows, viz:

On the 11th I viewed the Cumberland dam, and became convinced of the propriety of continuing the enlargement and extension of this structure in the manner contemplated in the late report of agent Fuller, rendered on the 16th of April last; and of a crib-work dam proposed in the same report to be constructed at the lower end of Cumberland island. The channel between this island and the Kentucky shore is sufficiently commodious for low-water navigation, while at the foot of the island it spreads to a great width, and gives occasion to the formation of a broad and shoal bar, which may be effectually remedied by enlarging the dam, and thereby causing a larger volume of water to pass through the channel, and by the formation of the

crib-work dam for the prevention of the low-water currents from spreading at and below the lower end of the island.

The cost of this additional improvement, whereby an easy entrance may be effected into the mouth of the Cumberland river both from above and from below, during low stages of the river, will not probably exceed that estimated by the agent, viz: \$35,000, in the report before cited.

On the 14th I attempted preliminary arrangements for the sale of the snag-boats Bell, No. 3, and Sevier, No. 4, on terms acceptable to the War Department; and while inquiries of this sort were in progress, I visited Alton for the purpose of inspecting the operations there in progress for the improvement of the Illinois, and of directing the steps proper to be taken in furtherance of this improvement. The dredge-boat Gopher had recently been conveyed, agreeably to my instructions, from Henepin bar, where it had been ice-bound till about the date of her removal early in May, and was lying unemployed at Alton, awaiting orders for her transfer to the Red river service. The new dredge-boat ordered to be built at that place was so far advanced as to justify the expectation of its being ready for service in about a month; and the agent, G. A. Dunlap, was directed to send at once for the dredge-boat G. W. Jones, at Dubuque, and cause this boat, with its scows, &c., to be conveyed to the Illinois for service in this river.

On the 16th May I directed agent Dunlap to make prompt arrangements for the removal of the dredge-boat G. W. Jones from Dubuque to Alton, for service in the Illinois river, vacated by the dredge-boat Gopher. I shall have occasion to recur again to the condition and disposition of the dredge-boats, and other matters relating to the Illinois improvement, and will now resume the consideration of affairs relating to the snag-boats at St. Louis.

I returned to St. Louis on the 21st of May, passed an inspection of the snag-boats Bell, No. 3, and Sevier, No. 4, and took inventories of the public property on board of each.

The following are the inventories taken at this time, to which a few explanatory remarks on the condition of the items on board of each boat are annexed:

Inventories of public property on board of the snag-boats John Bell and A. H. Sevier, (No. 3 and No. 4,) as taken on board of the same in the harbor of St. Louis, prior to the sale thereof.

Classification of items for each snag-boat.	Remarks.
CLASS No. 1. Hulls, cabins, and upper works, including capstan and bars: purchase of windlass and fixtures; rollers and fixtures; steering apparatus; deck bell; spars, &c.	Two years old; sound, but more or less damaged in service.
CLASS No. 2. Engines and boilers, including line of shafts; wheel flanges; furnaces, chimneys, fire-engines, &c.	More or less injured in service.

Inventories of public property—Continued.

Classification of items for each snag-boat.	Remarks.
CLASS No. 3. <i>Equipments, &c.</i>, comprising one yawl, with four oars; two large anchors; two chain cables; one 12-inch hawser; twelve pieces assorted manilla cordage; twenty-five blocks, assorted; three boat-hooks and poles; ten chain-hooks; two large purchase chains; one and a half stopper chains; one set of stocks and dies; four dozen files; one grindstone; one wood-saw; twelve augers, assorted; one bellows and forge; one anvil; one vice; one sampson; two sledge-hammers; three hand-hammers; ten pair of smiths' tongs; ten set-hammers and swages; five heading-tools; two drills; two cold chisels; three mandrils; one drill-brace; four socket-wrenches; seventeen assorted wrenches; one cast-iron horse; two large shackles; two crow-bars; seventeen axes; twelve cross-cut saws; twelve shovels and spades; one jack-screw; one shackle-bar; two ship-scrapers; two fire-rakes; two fire-pokers; a lot of assorted bar-iron; eleven ship buckets; one dray-hook; five globe lamps; ten oil-cans, assorted; eight stoves, assorted; one writing desk; one medicine chest; one hand corn-mill, &c., &c.	More or less damaged in the service, having been used about a year. Anchors, chains, and chain-cables good; slightly injured; all fit for service. The 12-inch hawser almost new. One corn-mill damaged; the other, on Sevier, fit for use.
CLASS No. 4. <i>Cooking apparatus</i>, including one large cooking-stove and furniture complete; fourteen tin pans; one cook's saw; one cook's knife; one flesh fork; sauce-pans, ladles, dishes, &c.	Much damaged in the public service.
CLASS No. 5. <i>Cabin and dining-room furniture</i>, including one extension table; one ironing table; four sad-irons; four wash-tubs; thirty-eight crockery plates, assorted; four molasses cans; sugar-dish; cups and saucers; knives and forks; spoons; chairs; wash-basins, &c.	Much damaged in the public service; but mostly fit for use.

N. B.—Slight discrepancies may exist in the inventories of the two boats; but they are too inconsiderable to merit particular notice.

The landing at which these boats were laid by for the last winter was much exposed to the ravages of floating ice and other drift, and in consequence the hulls of the boats, and especially the larboard hull of the Bell, was much injured by being forced upon a rocky bound shore. The safe-keeping of the boats required extra aid over and above the force kept on board for their protection; and hence the cost of their preservation and custody has been much greater than it would have been at a more favorable landing.

The items designated in the inventories were, for the most part, well preserved in good condition and fit for service; a few of them having never been used, but most of them more or less damaged in the public service. The charges for their custody and safe-keeping were the same

those authorized and paid in part by my predecessor, Lieut. Colonel J. E. Johnston.

All services rendered by the custodian and others charged with the preservation of the boats, &c., together with the subsistence of all employed for this purpose, were paid for by me, to include the 22d May, 1855, and at the rates authorized by Col. Johnston.

Having made arrangements for further inquiries touching the private sale of the snag-boats, their equipments, &c., and having instructed Captain Dillingham to proceed to Alton, attend to the dismantling of the dredge Gopher, and to the conveyance of the same, when dismantled, to St. Louis, I embarked for the rapids of the Upper Mississippi on the 24th May, and arrived at Des Moines rapids on the day following.

The first object claiming attention at the rapids was, the examination of the bids made by sundry proposers for the further prosecution of the improvement of these difficult and dangerous passes. In conformity to public notices given by J. G. Floyd, agent, on the 24th April last, sealed proposals were to be received and opened on the date first mentioned. The number of proposals received was eight; the prices varying from \$9 to \$13 60 per cubic yard for blasting and removing the rocks from the channels of both rapids. The bid preferred by the agent was that of J. H. Hager, for \$9 per cubic yard; and upon this a contract was framed in due form, and forwarded to the War Department for ratification.

The unusually low stages of the western rivers generally during the current season, and especially of the Ohio, Upper Mississippi, Missouri, Illinois, and Arkansas, in which the customary spring and June freshets have not yet occurred, while they have been unfavorable for the prosecution of the snag business, and for that of dredging in the Illinois and at Dubuque, have been remarkably favorable for the improvement of the rapids of the Upper Mississippi. But in the mean time nothing has been done towards the improvement of the rapids, by reason of the abandonment of the contract for these works by Messrs. Swan & Co., the contractors for their execution.

With a view to the speedy resumption of these operations, the contract with J. H. Hager, above mentioned, was concluded and forwarded to the War Department for ratification.

Agreeably to a showing of the agent, J. G. Floyd, it appears that the work done towards the improvement of the rapids, under his direction, is as follows:

At Sycamore chain, Rock Island rapids, the quantity blasted and removed is about.....	500 cub. yds.
At Campbell's chain, Rock Island rapids, the quantity blasted and removed is about.....	2,900 "
At Brown's Patch, Des Moines rapids, about.....	1,500 "
At Centre Patch.....do.....do.....	900 "
Total removed, about	<u>5,800</u> "

Also, that the cost of removing the same, in conformity to contract with Messrs. Swan & Co., since abandoned, has amounted to..... \$34,930 00

It moreover appears that the amount already expended in furtherance of these improvements, on account of surveys and all other objects of expenditure to this time, is 9,820 00

Amounting to..... 44,750 00

And leaving for the balance in the treasury, still undrawn, this sum, viz:..... \$55,250 00

With this amount expended agreeably to the new contract with J. H. Hager, at least 5,500 cubic yards may be excavated and removed from the most dangerous passes of both rapids, and the navigation greatly improved thereby.

Major Floyd is of the opinion that the estimate of Lieutenant Warren, in his report of April 6, 1854, (see H. Doc. No. 104, 33d Cong., 1st sess., pp. 62 to 72,) is less by about 30 per cent. than the actual amount required to be excavated in the formation of a low-water channel two hundred feet wide and four feet deep.

In the present stage of the water, a boat drawing more than two feet cannot pass the rapids with safety, especially at the Sycamore and Campbell's chains of the upper rapids and several shoal places in the chains of the lower rapids. Several small steamers were now lying by at the head of the latter for want of a sufficient depth of water to carry them across the Des Moines rapids in safety.

Having passed an inspection of the rapids, I repaired to Dubuque on the 30th May, and inquired into the state of the work for the improvement of Dubuque harbor.

On examination I ascertained that very little, if anything, had as yet been done in execution of the plan of improvement recommended by the Board of Engineers of lake harbors and western rivers, and sanctioned by the War Department. The position of the causey had not yet been defined by any land-marks, and no excavations made near it for the purpose of widening and deepening the channel leading into the harbor by the main outlet, and waples cut, as provided by the board.

I accordingly directed the agent for this improvement, J. C. Jennings, esq., to institute the requisite surveys and demarcations, for the purpose of determining the proper position of the causey, channel, &c., with the view of having them located in such a manner that the materials to be excavated in opening the channels might prove sufficient for the formation of the causey. Mr. Jennings was also instructed to prepare careful drawings of his surveys, location of causey and channel, with the depth of all proper cuttings, soundings, &c., and forward the same to this office for approval, as early as practicable.

Whatever can be done with the unexpended balance of the appropriation for this work will be done in furtherance of the plan above mentioned.

The dredge-boat G. W. Jones was, by my order, transferred from the custody of Mr. Jennings to that of agent Dunlap, for service in the Illinois river, a few days prior to my arrival at Dubuque.

The articles transferred with the dredge-boat are exhibited in the following inventory of public property transferred from the custody of J. C. Jennings, agent for Dubuque, to George A. Dunlap, agent for the Illinois, by order of Lieutenant Colonel Long, on the 26th day of May, 1855 :

United States steam-dredge "G. W. Jones," (No. 1.)	1 sideboard.
2 scows.	2 walnut tables.
$\frac{1}{2}$ dozen knives and forks.	1 stand.
1 steel and carving knife.	6 cabin chairs.
4 table and 4 tea knives.	1 lamp, globe and chimney.
1 soup ladle.	2 candlesticks.
1 caster and 5 bottles.	1 medicine chest.
9 tumblers and 2 salts.	1 writing desk.
3 small glass plates.	1 oil-cloth on floor in cabin.
6 teacups and 7 saucers.	1 tin candlestick.
1 dozen large plates.	1 coal scuttle.
9 small plates.	1 wood saw.
$\frac{1}{2}$ dozen soup plates.	1 compass saw.
1 sugar and 2 slop bowls.	1 hand saw.
1 covered pitcher.	2 planes.
1 crockery teapot.	2 mortise chisels.
1 Britannia teapot.	1 small axe.
1 cream pitcher.	1 wood axe.
1 water pitcher.	1 slate.
3 waiters, small and large.	1 box sweet marjoram.
7 meat plates.	1 bottle cayenne.
1 covered vegetable dish.	1 paper tart. acid.
1 soup tureen, cover and stand.	$\frac{1}{2}$ barrel molasses.
2 gravy tureens.	Some coffee, beans, and rice.
2 vegetable dishes, uncovered.	16 sheets and 6 pillow cases.
1 milk pail.	4 towels.
1 butter pail.	4 towel rollers.
19 $\frac{1}{2}$ dozen tin plates.	9 comforts.
5 tin pans, assorted sizes.	6 mattresses.
2 iron and 1 tin saucepans.	6 pillows.
2 dippers.	2 table cloths.
1 cook stove.	1 anvil and 1 vice.
1 kitchen table and stool.	1 pair bellows.
1 cabin stove.	1 smith's furnace.
1 skimmer and cake knife.	1 sledge hammer.
12 iron spoons.	3 smith's hammers.
1 large spoon.	3 pair tongs.
3 iron kettles and 1 copper kettle.	3 punches.
2 steamers.	1 splitting chisel.
3 coffee pots.	1 fuller and 1 swedge.
	2 mandrils.

2 tin buckets.	5 heading tools.
1 flour duster.	2 cold chisels.
1 coffee can.	1 marling spike.
2 tea cans.	3 files and 4 augers.
1 cullender and 1 strainer.	6 wrenches.
4 flatirons.	2 tap borers.
2 sieves and 1 tin grater.	1 socket wrench.
1 pair waffle irons.	1 set of stocks and dies, incomplete.
1 coffee mill.	3 shovels.
1 rolling pin.	1 large and 3 small oil cans.
2 iron kettles.	1 5-gallon jug.
3 griddles.	6 coils of belting.
1 gridiron.	3 pair double blocks.
1 cleaver and 1 meat saw.	3 pair triple blocks.
1 pair steelyards.	2 snatch blocks.
1 flesh fork.	2 engine lamps.
1 tin lamp.	8 buckets.
1 iron ring for stove.	1 hawser.
$\frac{1}{2}$ dozen bake pans.	1 breast line.
1 teakettle.	1 chain.
1 glass jar.	4 anchors.
1 hominy masher.	2 screw pumps.
12 tin cups.	3 rope falls.
3 wooden tubs.	1 iron poker and scraper.
2 wooden buckets.	1 lot of scrap iron and bolts.
1 tin wash basin.	5 oars.
1 dust pan.	1 yawl and 1 skiff.
1 zinc washboard.	6 trustles for table.
1 dust and 1 scrub brush.	1 grindstone.
1 bench in wash-room.	1 ladder.
1 tin safe.	1 yawl davit.
2 wash bowls and pitchers.	$\frac{1}{2}$ box soap.
2 wash stands.	
1 refrigerator.	

Soon after the transfer was made, the dredge G. W. Jones, with two of her mud-scows in tow, started on their voyage down the river, crossed the Rock Island rapids with difficulty, and considerable injury to the bottom of the boat, but was arrested in her downward progress at the head of the Des Moines rapids, for want of a sufficient depth of water across them to admit of the passage of the boat.

The other two mud-scows, both of which were aground—one high and dry on a sand-bar, and the other on the same bar, but partially in the water—were left at Dubuque, and on the day of my inspection I gave instructions to agent Jennings to make sale of both of them on the most favorable terms that could be had, and apply the proceeds of the sale in aid of the service committed to his charge; the agent having been required to report all his proceedings in the premises, for approval, prior to his final action therein.

On the 4th day of June, I revisited St. Louis for the purpose of

ascertaining the practicability of effecting a private sale of the snag-boats, on such terms as would comport with my instructions received from the War Department.

Failing to accomplish this object, I relinquished all hopes of effecting a private sale, and on the 7th of June issued the following notice for publication in the Missouri Republican, and sundry other newspapers, the names of which are subjoined to the notice.

Sale of public property.

In accordance with instructions from the War Department, the snag-boats Bell, Sevier, and Terror, (No. 3, No. 4, and No. 5,) together with their equipments, tackle, &c., will be sold to the highest bidders at the points and dates following, to wit:

At Napoleon, Arkansas, on Saturday, the 30th day of June, between the hours of 10 a. m. and 2 p. m., the small twin snag-boat Terror, together with her equipments, &c., in lots or parcels, to be designated in printed handbills prepared for the occasion.

At Saint Louis, near the marine railway, on Saturday, the 7th day of July next, between the hours of 10 a. m. and 2 p. m., the two large twin snag-boats Bell and Sevier, together with their equipments, &c., in lots or parcels for each boat, to be designated as before, in handbills.

The items to be sold will be classed under the following general heads, for each of the boats, viz:

- 1st. Hulls, cabins, and upper works.
- 2d. Double engines and boilers complete.
- 3d. Equipments, including large purchase chains, anchors, chain-cables, cordage tackle, yawls, tools, &c.
- 4th. Cooking apparatus and other furniture.

The boats are scarcely two years old, sound and substantially built, and well adapted for use as cotton-boats, diving-bell boats, floating-mills, wharf-boats, &c., &c. Their engines are constructed in the most efficient manner, and are in good condition.

The Bell and Sevier are large twin snag-boats, about 150 feet long, 22 feet beam for each hull, exclusive of their snag-rooms and wheel-houses, and 12 feet between the hulls.

The Terror is about 133 feet long, 18 feet beam for each hull, and 10 feet between the hulls.

Terms of sale.

The Bell and Terror will be sold for cash, payable on the days of their sale. The terms of sale of the Sevier will be made known on the day of sale.

In all cases, the privilege of dismantling the boats of all articles sold to different individuals will be reserved for a reasonable time, in favor of the purchasers of said articles.

Individuals and companies wishing to purchase are desired to examine the premises and judge of their value.

S. H. LONG,

Lieut. Col. Top. Engs., Supt. W. R. Improvements.

ST. LOUIS, June 5, 1855.

On the 7th of June I revisited Alton, and ascertained that the dredge-boat Gopher had been dismantled by Captain J. K. Dillingham, agreeably to my directions previously given, and that the boat, with its remaining equipments, was conveyed to St. Louis, on her way to Louisville, for alterations and repairs, under the direction of agent Fuller, for service in Red river.

The articles pertaining to this boat prior to her being dismantled are exhibited in the following inventory of public property turned over by George A. Dunlap, United States agent for improvement of Illinois river, to Captain C. A. Fuller, United States agent for improvement of Red river, May 29, 1855, by order of Lieutenant Colonel S. H. Long, United States topographical engineers, superintendent western river improvements :

United States steamboat Gopher,	1 small lot iron, assorted.
(No. 2,) engine, tackle, &c.	1 10-gallon oil can.
1 blacksmith's forge, 1 anvil.	3 small oil cans.
1 vice, 1 set stocks, dies and taps.	1 jack plane.
1 sledge hammer.	1 engine lamp.
1 sampson block.	2 signal lamps.
5 files.	1 auger.
4 blacksmith's tongs.	2 shovels.
2 cold chisels.	1 shackle bar.
2 mandrils.	6 pair blocks, damaged.
1 ratchet wrench.	3 anchors.
2 carpenter's chisels.	1 head-line, 1 spring-line.
1 socket wrench.	1 yawl and 1 bar, 1 anchor chain.
1 monkey wrench.	1 sounding pole, 2 setting poles.
5 engine wrenches.	1 sounding lead, 1 poker, worker and scraper.
2 spars.	1 cleaver, 1 meat saw.
1 reel packing yarn.	1 wood saw, 4 stone jars.
1 pot and 1 kettle.	6 mattresses, 5 comforts.
1 step ladder.	5 pillows, 5 pair sheets.
7 fenders.	1 wash tub, two sieves.
1 grindstone.	1 medicine chest and contents.
2 buckets.	1 roller rule, 1 box wafers.
2 pump hose, &c.	1 molasses can, 1 set casters.
1 cooking stove and furniture.	2 oil table cloths, 12 tin plates.
9 knives and 9 forks.	1 cook-house lamp.
7 tin pans.	1 wash board.
9 tumblers.	1 wash stand.
5 dishes.	1 gravy strainer.
20 plates.	1 potato masher.
6 cups and 6 saucers.	

- | | |
|-------------------------------|----------------------------------|
| 1 coffee mill. | 1 pair snuffers, 1 rolling pin. |
| 6 tea spoons, 6 table spoons. | 2 salt-cellars, 1 sugar bowl. |
| 1 soup tureen and ladle. | 1 chamber, 1 cullender. |
| 1 gravy dish. | 8 pillow-slips, 5 mosquito bars. |
| 1 dining table. | 2 spittoons, 1 looking-glass. |
| 2 small tables. | 1 office desk, 1 inkstand. |
| 1 wash bowl. | 2 fuel voucher books. |
| 3 sets derrick guys. | 1 dusting brush, 1 table bell. |
| 2 ceiling lamps, damaged. | 2 coffee pots, 1 teapot. |
| 9 chairs. | 1 tin grater, two skimmers. |
| 1 fire safe. | 2 sad irons. |
| 3 tin canisters. | |

The items of which the Gopher was dismantled were as follows, viz :

Both of her dredge ladders, with their chains, buckets, adjusting wheels, windlasses, blocks, falls, &c.; both sets of her spur-wheels, pinions, axles, plumber, blocks, &c.; the drums, bands, and tightening rollers; the heaving-ahead apparatus, including spur-wheels, pinions, &c.; the mud-chutes and their adjusting apparatus; the four mud-scows belonging to the Gopher; the yawl mud-scow, and anchors pertaining thereto.

The new dredge designed for service in the Illinois was nearly completed, and was expected to be ready for service in about one week.

On the 11th of June my attention was more particularly directed to the state of things relating to the improvement of the Illinois river; when I learnt that the survey of this river, instituted as a preliminary to its improvement, had been extended continuously from its mouth upward 150 miles to a point about 4 miles above Copperas creek, and that no such survey had been made above that point, and between it and the head of navigation, as recommended by the board of lake harbors and western rivers, and approved by the War Department.

On that portion of the river not yet surveyed, there are at least three bars below Peoria at which dredging is needed, and some six or seven between that point and LaSalle; none of which appear to have been instrumentally surveyed, in connexion with the survey instituted in 1853, for the purpose of determining the widths, depths, meanderings, &c., of the river. I take leave to suggest the propriety of completing the survey and delineations of the Illinois, in conformity to the recommendation of the board and the sanction of the War Department as above, which may probably be effected, in connexion with the dredging operations of the current season, more economically and effectually than on any other occasion.

Agreeably to information given by G. W. Long, engineer for the Illinois, the quantity of work done by the Gopher in ordinary high water, and when not interrupted by passing boats, &c., was at the rate of 300 cubic yards per day, which will give for the average cost of dredging and removing per cubic yard about $12\frac{1}{2}$ cents, under the most favorable circumstances.

In a similar stage of water and under less favorable circumstances, the cost of dredging per cubic yard was about thirty cents, the work being much interrupted by passing craft, &c.; while the cost of similar operations on the lower bars of the river, viz: at Naples, &c., in a low stage of the river, amounted to something more than double the price last mentioned, viz: 60 to 75 cents per cubic yard.

The amount already expended on account of the Illinois improvement, surveys, preparing dredge-boats and scows, and working the same, &c., prior to this time, is about	\$18,954 53
And the unexpended balance still applicable to this service, unless already drawn out in part within the current month, is about	11,045 47

Amount of appropriation appropriated August 30, 1852	30,000 00
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S. H. LONG,

Lieut. Col. Top. Engs., Supt. W. R. Improvements.

Colonel J. J. ABERT,

Chief Topographical Engineers.

P. S.—I propose to resume my inspections in a very few days, in the prosecution of which I deem it necessary to be at Napoleon on the 30th instant, and St. Louis on the 7th proximo, in order to be present at, and supervise the sales of the snag-boats at those points.

S. H. LONG, U. S. A.

APPENDIX—Doc. No. 15.

Continuation of inspection report, July 20, 1855.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, July 20, 1855.

SIR: In continuation of my inspection report of the 20th of June last, I have the honor further to report, that after having made the needful preliminary arrangements for the sale of the snag-boats No. 3, No. 4, and No. 5, and accomplished various other official duties, I embarked for Napoleon, Arkansas, and resumed my inspections at the mouth of the Ohio on the 25th of the same month.

I found the Mississippi unusually low for the season, being only 15 to 20 feet above extreme low water, and its depth on the shoalest bars about 12 feet. At the point above mentioned four large steamers, viz: the H. D. Bacon, the Grand Tower, the Chancellor, and the Glendy Burke, had been recently wrecked on one or more rocks or rocky bars, situated in the middle of the river, about one mile below Cairo Point. The three boats first mentioned were all wrecked on the same

rock, while the fourth was wrecked on a similar obstruction, situated in the vicinity of Bird's Point.

The surfaces of these obstructions are said to be nearly or quite on the same level as extreme low water. Their positions and extent are not sufficiently known, and doubts are entertained as to their consistency and character in other respects, except in so far as relates to the dangers opposed by them to low-water navigation. It is reported that numerous flat-boats, laden with coal and other products, have been wrecked on the same obstructions.

The nature and magnitude of these obstructions are worthy of particular attention, and I would suggest the propriety of determining these questions, and of making proper examinations and investigations in relation thereto as early as practicable.

From Cairo downward to Napoleon the obstructions are again becoming quite as numerous and formidable as they ever have been in times past. The ever varying currents and channels of the river, annually give fresh occasions for new efforts in the removal of snags and other obstructions in the way of its navigation.

The obstructions cannot be removed by a single series of operations. Their removal, as heretofore, will require at least three successive operations every year, viz: The first at a stage of the river 10 to 12 feet above extreme low water; the second at a stage 5 to 6 feet above same stage; and the third at an ordinary low-water stage. The propriety and expediency of these several operations at different stages are obvious from the admitted fact, that at the stage first mentioned no one can determine where the channel across any sand-bar will be at the second stage; and at this last stage the position of the channel at the third stage is quite as doubtful as in the second stage, while every change of channel develops obstructions never before witnessed or known.

From the 28th to the 30th of June I was occupied in affairs relating to the sale of the snag-boat Terror, No. 5, her equipments, &c., and availed myself of the assistance of J. Y. Clemson, esq., late captain of the snag-boat Sevier, and of Mr. Sinton, clerk of this office. It was deemed advisable that the boat, with all her equipments and furniture, should be offered for sale in a single lot, and was sold to the highest bidder in this way. The sum obtained for the whole was \$5,550, which greatly exceeds the price which I had anticipated prior to the sale. A report of this sale is contained in my late report of the 14th instant.

On the 30th of June I embarked for St. Louis and proceeded by the river to that place, where I arrived on the 3d of July.

On this and my preceding downward voyage I obtained much information relating to the present condition of the Mississippi, and to the obstructions to its navigation, the details of which are embodied in the following synopsis of the points, bends, islands, beaches, &c., at which the obstructions to navigation are likely to be numerous and formidable during the current year, in that portion of the river situated between the mouth of the Missouri river and the lower end of Pawpaw island, 18 miles above Vicksburg.

Points and places designated.	Remarks.
Mouth of Missouri to St. Louis	A few sunken logs and snags; dangerous.
St. Louis to Chester.....	Snags scattering, but large and dangerous.
Chester to Grand Tower.....	Large, but scattering.
At Sandy island.....	Numerous and formidable.
Sandy island to Devil's island.....	Scattering and dangerous.
At Devil's island	Numerous and dangerous.
Devil's island to Sliding island	Scattering and dangerous.
Dog-tooth Bend.....	Numerous, large, and dangerous.
Bird's Bend	Scattering, large, and dangerous.
Cairo to Island No. 10.....	Do. do.
At Island No. 10.....	Numerous and very dangerous.
No. 10 to Flower island.....	Scattering and very large.
Flower island to Island No. 36.....	Scattering; in places dangerous.
Devil's Race-ground.....	Numerous, but small.
Devil's Elbow and Island No. 37.....	Numerous, firm, and dangerous.
Paddy's Hen and Chickens.....	Do. do.
Chute of Hen and Chickens.....	Numerous and very dangerous.
Memphis to Harkle Roads.....	Large, but scattering.
Chute of Brick island.....	Numerous and very dangerous.
Brick island to Council Bend.....	Scattering, but large.
Grand Cut-off island No. 55.....	Do. do.
Ship Island Chute.....	Numerous, but small.
Ship island to head of Montezuma Bend.....	Scattering and formidable.
Montezuma Bend.....	Few, but dangerous.
Montezuma to Old Town Bend.....	Scattering and large.
Islands Nos. 62 and 63	Numerous and very large.
Bends around Nos. 64, 65, and 66.....	Scattering.
Islands Nos. 67 and 68.....	Scattering, but dangerous.
Bend at Island No. 69.....	Scattering.
Laconia to Napoleon.....	Scattering, but formidable.
Bend at Bark island.....	Numerous and large, but loose.
Island No. 76 to Point Chicot.....	Scattering.
Point Chicot Bend	Very numerous and dangerous.
Point Chicot to Bunch's Bend.....	Scattering and generally large.
Stack Island Reach.....	Scattering.
Bend at islands Nos. 95, 96, and 97	Few, but very dangerous.
At Island No. 98	Numerous and dangerous.
Millikin's Bend.....	Scattering.
Bend at Pawpaw island.....	Numerous and dangerous.

The information contained in the above schedule was obtained in part from personal observation, but mainly from the representations of Captain Clemson and T. R. Sinton, esq., both of whom have served as pilots on the Mississippi.

The aggregate distance from the mouth of the Missouri to the lower end of Pawpaw island is by common estimation about 900 miles.

The method of improving this portion of the river to the full extent practicable, with existing means applicable to this service, will be considered in the sequel of this paper.

On the 7th July, the day designated for the sale of the snag-boats Bell, No. 3, and Sevier, No. 4, my attention was devoted to this object. The results of this sale have already been communicated in my report of the 14th instant before cited, and were briefly as follows, viz:

The snag-boat Bell (No. 3) with its equipments, &c., was sold to the highest bidder for the gross sum of \$6,001, which was paid in cash on

the 9th instant and immediately deposited to my credit in the sub-treasury at St. Louis, on the same day.

The snag-boat Sevier, (No. 4) with its equipments, was also sold to the highest bidder for the gross sum of \$6,050, paid by a note with good and acceptable sureties, payable to my order on the 1st day of November next, the use of the boat in removing snags and other obstructions from the western rivers having been reserved without charge till that date, in favor of the United States. It was moreover stipulated in reference to this sale, that the boat should be continued in the public service from and after that date (November 1, 1855) at a charge of \$50 per day in favor of the purchaser, for any number of days that may be desired for a longer prosecution of the work of improvement. The stipulations provided also for such repairs as might be deemed expedient for the efficient operation of the boat, &c., and for a fair remuneration for all losses and damages done to the boat and its equipments, over and above the ordinary wear and tear of a snag-boat, &c., while retained in the public service; said remuneration to be made by the United States in favor of the purchaser of the boat, its equipments, &c.

In the mean time I visited Alton, on the 4th and 5th July, for the purpose of inquiring into the progress made in furtherance of the improvement of the Illinois river, and had the satisfaction to learn that the new dredge was ready for service, and had been conveyed upward to the first or lowermost bar of that river, 18 miles above its mouth, and was about to commence operations at that point without further delay.

The construction of this boat will have cost something more than the original estimate for the same (\$2,500,) by reason of a reliance on the dredge-boat Geo. W. Jones (which has unexpectedly and unfortunately been detained at the head of Des Moines rapids by low water till the present time) for quarters for the accommodation of the officers and laborers required for working the dredge-boat. In consequence of this disappointment it became necessary to prepare other accommodations for similar purposes in connexion with the new dredge.

The object and design of the arrangement touching the sale and the disposition contemplated to be made of the snag-boat Sevier, were explained in my letter of the 23d of April last, and subsequently approved by the War Department. The terms and conditions of the sale as set forth in the contract with Messrs. Eads and Nelson, concluded on the 9th instant and forwarded to the bureau on the 14th instant, are sufficiently explained in the contract.

With respect to the operations for which the snag-boat Sevier has been retained in the public service, and for the speedy commencement and vigorous prosecution of which I have already taken sundry preliminary steps, I take leave to subjoin the following remarks and explanations :

1st. I made arrangements with the agent of the Floating Dock Company of St. Louis, for the docking of the boat and effectual repairs of both of its hulls, inclusive of the labor and materials required

for thoroughly recaulking the bottoms and sides of both hulls, at an aggregate cost not likely to exceed \$1,600, or at most \$1,700, all charges of docking, &c. included.

2d. I re-appointed James Y. Clemson, esq., late captain of the same snag-boat, to the command of the Sevier, and invested him with the authority recognised in "the rules and regulations" prescribed and adopted for the government of captains of snag-boats, &c.

3d. I directed Captain Clemson to hasten all needful preparations for the resumption of river operations at the earliest practicable date, and am encouraged in the belief that he will be able to resume work prior to the close of the present month.

4th. I have selected as the district in which the operations of the Sevier can probably be employed to the greatest advantage and with the most beneficial results, that portion of the Mississippi extending from the mouth of the Missouri to the lower end of Pawpaw island, (No. 103,) and embracing a distance of about 900 miles, and have deemed it advisable and proper to restrict the operations of the boat to the main low-water channel of the river, and to a width not less than 200 feet at any point in the channel; the operations to be commenced at a stage 10 to 15 feet above extreme low water, and repeated in a stage 5 to 6 feet lower, and again repeated if practicable at the ordinary low-water stage of the river.

NOTE.—The reasons of selecting the district defined as above are:

1st. It comprises the channel most frequented by, and of course the most important to western navigation.

2d. Its obstructions are numerous and greatly extended, and can be operated upon without intermission during all the low-water stages of the river.

3d. The depth of water in the main channels is everywhere sufficient to admit the operation of the boat, without any danger of being stranded upon sand-bars.

4th. In the event of the boat getting permanently aground on a bar the United States might be subjected to heavy costs, without benefit from her operations, by reason of her non-delivery in conformity to the contract.

5th. The boat can be kept more constantly at work and more readily and economically supplied with provisions in the Mississippi, than in any other of the western rivers.

In conclusion, I subjoin a hasty estimate of the cost of repairing and of working the Sevier from the present time to the 1st of November next.

Probable cost of docking and caulking the Sevier, say....	\$1,600 00
Additional repairs of decks, equipments, &c., say.....	400 00
Cost of working the boat, inclusive of pay, subsistence, fuel, and all other expenses, 3½ months, at \$2,600 per month.	9,533 33
Incidental expenses, say.....	466 67

Probable amount of expenses to November 1, 1855.. 12,000 00

Additional information concerning the works committed to my charge will be communicated from time to time as occasions may require.

S. H. LONG,

Lieut. Col. Top. Engs., Supt. W. R. Improvements.

Col. J. J. ABERT,

Chief Topographical Engineers.

APPENDIX—Doc. No. 16.

Report on sales of the snag-boats Terror, Bell, and Sevier.

OFFICE WESTERN RIVER IMPROVEMENTS,

Louisville, July 14, 1855.

SIR: I have the honor to report that, on my late tour of inspection, terminating on the 12th instant, I visited Napoleon on the 27th June, and attended to the sale of the snag-boat Terror, (No. 5,) with her equipments, furniture, &c., which was effected, agreeably to previous public notice, on the 30th of the same month.

The gross receipts from the sale of the whole amounted to five thousand five hundred and fifty dollars, (\$5,550) which sum has been duly paid and deposited in the sub-treasury at St. Louis to my credit, and will be duly credited to the United States in my accounts for the current quarter, (3d quarter 1855.)

A copy of the schedule of the property sold is as follows:

Schedule of public property pertaining to United States snag-boat Terror, No. 5, sold at Napoleon, Ark., on the 30th day of June, 1855, between the hours of 10 a. m. and 2 p. m., to wit:

Classification of items.	Remarks.
CLASS No. 1.	
<i>Hulls, cabins, and upper works, including main-purchase windlass, rollers, spars, deck-bell, stage-plank, and steering apparatus, with lines for mooring the same as now attached.</i>	Two years old; sound, but much damaged in service.
CLASS No. 2.	
<i>Engines and boilers complete, consisting of line of shafts, water-wheel flanges, (two extra ditto,) fire-pump and hose, engine bells, furnaces, chimneys, &c.</i>	More or less injured in service.
CLASS No. 3.	
<i>Equipments, &c., consisting of 1 yawl and oars; 2 anchors; 1 large grapple; 1 9-inch hawser, (new;) 5 pieces manilla rope, (new;) 1 coil 2½-inch manilla rope. (new;) 1 piece tarred rope, (new;) pieces manilla rope; 22 blocks, assorted sizes; 1 large purchase chain, 2¼-inch; 2 purchase chains, 2-inch; 1 swap chain, 1-inch; 1 chain-cable, ½-inch; 6 cross-cut saws; 1 wood-saw; 19 axes; 1 spade; 3 shovels; 2 marling-spikes; 1 crow-</i>	More or less damaged in the service, having been used about a year. Anchors, chains, and chain-cables good or slightly injured. All fit for service. The 9-inch hawser new.

Schedule of public property—Continued.

Classification of items.	Remarks.
bar; 4 boat-hooks and poles; 8 chain-hooks; 2 augers; 2 drawing knives; 2½ bales oakum; 2 powder-canisters; 1 box blasting-tubes; 1 slice or big chisel; 6 ship-buckets; 4 glass lanterns; 1 signal-lamp; 3 oil-cans; ½ barrel tallow; 4 reels packing-yarn; 1 barrel salt; 2 pigs lead; 1 hand corn-mill; 1 grindstone; 7 stoves, assorted sizes and qualities. <i>Blacksmiths' tools</i>, consisting of 1 forge; 1 anvil; 1 vice; 1 samson; 1 cast-iron horse; 2 sledge-hammers; 1 hand-hammer; 5 pair tongs; 1 set hammers; 2 swages; 3 heading tools; 2 punches; 1 splitting chisel; 1 iron square; 7 wrenches, assorted; 2 sets stocks and dies; 1 lot assorted iron; 1 piece of cast-steel. CLASS No. 4. <i>Cooking apparatus, &c</i>, consisting of 1 large cooking-stove and furniture; 35 tin plates; 32 tin cups; 8 tin pans, assorted; 1 cooking-knife, flesh-fork, cullender, &c. CLASS No. 5. <i>Cabin and dining-room furniture</i>, consisting of 2 stand-tables; 2 washstands; 1 dining-table; 3 tubs; 4 sad-irons; lot of chairs, assorted; 1 ironing-table; 32 plates, assorted; 12 cups and saucers; 16 spoons; a lot of assorted glass and crockery ware.	Much damaged in the public service. Much damaged in the public service, but mostly fit for use.

Moreover, I visited St. Louis on the 4th of July, and on the 7th of the same month attended to the sale of the snag-boat John Bell, No. 3, and Sevier, No. 4, which took place on the date last mentioned, agreeably to previous public notice, and resulted as follows, viz:

The gross receipts from the sale of the Bell, No. 3, its equipments, &c., amounted to six thousand and one dollars, (\$6,001) which sum has been duly paid and deposited in the sub-treasury at St. Louis to my credit, and will be duly accounted for to the United States in my accounts for the current quarter, (3d quarter 1855.)

For a copy of the schedule of the property sold in connexion with this boat, see Appendix, Doc. No. 14.

Also the gross receipts from the sale of the Sevier, No. 4, its equipments, &c., amounted to six thousand and fifty dollars, (\$6,050) payable in cash to the order of Lieut. Col. S. H. Long on the 1st day of November, 1855. A note of hand by Eads & Nelson, with good security, has been given in payment; and a contract providing for the use of the snag-boat till the 1st of November next, and for any desirable period after that date, has been prepared and duly signed and delivered.

For a copy of the schedule of the property pertaining to the snag-boat Sevier, see Appendix, Doc. No. 14.

S. H. LONG,

Lieut. Col. Top. Engs., Supt. W. R. Improvements.

Col. J. J. ABERT,

Chief Topographical Engineers.

APPENDIX—Doc. No. 17.

Re-appointing Captain Clemson to command of Sevier.

ST. LOUIS, July 7, 1855.

SIR: You are hereby re-appointed to the temporary command of the snag-boat Sevier, to serve as captain of the same during her continuance in the United States service, at a compensation of \$125 per month.

You are desired to recognise Mr. Hicks King as your first mate, whose compensation will be at the rate of \$120 per month.

You are also desired to recognise M. Ostrander as pilot of said boat, who will be held accountable for all charges on account of piloting the same, at a compensation of \$200 per month for the whole.

The employment of all other officers, laborers, &c., required for an efficient and faithful crew, will be subject to your approval and acceptance.

The rules and regulations for the government of yourself and crew will be the same as heretofore issued to the captains of snag-boats.

You are desired to take all proper steps for preparing the boat for efficient service, entering upon the duties of this appointment on the 10th day of the current month.

All needful instructions, whether on your application or otherwise, will be furnished from time to time, from the office of Western River Improvements at Louisville.

On your acceptance of this appointment you are desired and expected to repair forthwith to St. Louis, and enter on the duties of the same.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

Captain J. Y. CLEMSON,

Master Snag-boat Sevier.

APPENDIX—Doc. No. 18.

*Instructions in relation to the command of the snag-boat Sevier.*OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, July 18, 1855.

Item 1. When the repairs, outfit, &c., of the snag-boat Sevier, shall have been accomplished, and all accounts, &c., in relation thereto, shall have been prepared and properly disposed of for settlement, you will commence operations for the removal of snags and other wooden obstructions from the main channel of the Mississippi, between the mouth of the Missouri and the lower end of Pawpaw island, about eighteen miles above Vicksburg.

Item 2. The points of operation will be selected by yourself in the

exercise of a sound discretion with respect to the economy, efficiency, and usefulness of the work claiming your attention, taking special care on all occasions to avoid long runs or voyages through water-fields, in which little or nothing can be done.

Item 3. You are expected to remove all snags, &c., from the main channel only, to the width of at least 200 feet, and repeat the operation from time to time during the subsidence of the river, till it shall have fallen to its lowest stage, taking care always that the operations are confined to the channel most favorable for low-water navigation.

Item 4. In the selection of your officers and crew, (including Messrs. King and Ostrander, previously nominated,) you are desired to select and retain none but such as are of good behavior, industrious, and competent in all respects to perform the duties and services for which they may be selected. In the selection you are desired to disregard and repudiate favoritism and mere personal partialities in all cases, making faithfulness and competency combined, with robust constitutions and good behavior, the governing tests of all appointments.

Item 5. All officers, laborers, &c., entering the service, will be required to sign the articles of enrolment prescribed in "the Rules and Regulations for the government of the officers and crews of the snag-boats," &c.; a printed copy of which is herewith forwarded for your information and guidance.

You are desired to forward to this office, from time to time, a list of the officers and crew engaged, to be extracted from said enrolment, and exhibiting the names of the individuals employed, the capacities of their service, the compensation of each per month, the dates of their enrolment, their period of service, and the changes that may occur by discharges from service, or any other cause; retaining in your possession the original enrolment, with its signatures, &c.

Item 6. You are expected to make timely requisitions for provisions, and all other needful supplies, in duplicate, and to forward one of the duplicates to this office, and the other to Walker R. Carter, esq., of St. Louis, who is desired to annex thereto, in due form, the prices he will charge for each and every article included in the estimate, including the freight of the same delivered on your boat, and afterwards forward the estimate, with its prices annexed, to this office, for the approval of the superintendent.

Item 7. You are hereby authorized to discharge any officer or laborer belonging to the Sevier on good and sufficient cause therefor, and in such case you will at once report the reasons of such discharge.

Item 8. In these and all other respects you and the officers and crew of your boat are expected to observe and enforce a careful compliance with the "printed rules and regulations" before cited, and of all the directions and provisions contained therein.

Item 9. Should you require any additional information or explanations in reference to the duties assigned you, you are desired to apprise this office in relation to the same; you are moreover desired to forward all official communications by mail, with postage prepaid, letter-stamps for which will be forwarded from time to time on your requisitions therefor.

In conclusion, I subjoin my conviction that, with the boat repaired under your direction, the equipments and outfit of the same repaired in a manner to render the boat duly efficient, and with a crew of officers and men such as you would select, even more efficient service may be expected, while the boat remains under your command, than has heretofore been rendered by any snag-boat in the same period of time.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

Captain J. Y. CLEMONS,

Master of Snag-boat Sevier.

APPENDIX—Doc. No. 19.

On repairs and outfit of Sevier—payment for repairs—instructions for outfit.

OFFICE WESTERN RIVER IMPROVEMENTS,

Louisville, July 28, 1855.

SIR: Your report of the 24th instant is received this morning, and is very satisfactory.

The bill of J. D. Dagett, enclosed therein, and calling for the payment of \$1,549 15, is received, and a draft on the sub-treasury at St. Louis for that amount, payable to the order of the superintendent of the Dock Company, is herewith sent, and you are desired to present the same in payment of the bill.

You may not have been instructed on the subject of providing supplies for a period of two months only in any estimate for provisions: if so, the fault probably lies at my door. Nevertheless, such must be regarded as the rule in future, and estimates must be limited accordingly. That no inconvenience may result from delays in furnishing the needful supplies, you are desired to forward estimates early enough to obviate the inconveniences.

In forwarding requisitions for necessary funds in advance of accounts, you are also expected to observe a similar foresight.

Ardent spirits of all kinds have been interdicted by the War Department. However essential they may be in certain cases, I cannot formally sanction their purchase.

I would not have you wait till your enrolments are filled, but forward a manuscript list from time to time containing names, dates of enrolment, capacities of service, and rates of compensation, &c., of individuals already enrolled.

Fuel accounts, properly receipted for in your name, and used as sub-vouchers, covered by a general voucher of your own in your official capacity, may be rendered monthly, at the end of every month, and qualified by your certificate as *supervisor*.

A similar course may be pursued in reference to all contingent ex-

penses for fresh provisions, &c.; keeping the fuel accounts distinct from the contingent accounts.

A report on progress of work to the end of the present month will be wanted.

The question of ice is submitted to the judgment and pockets of the officers, &c.

I conclude by signifying my satisfaction at the prospect of beginning operations in the Mississippi river on Monday next.

S. H. LONG,

U. S. Army, Superintendent Western River Improvements.

Captain J. Y. CLEMONS,

Commanding Snag-boat Sevier.

P. S.—General supplies for subsistence, &c., will be furnished on approved bills and requisitions as heretofore.

S. H. L.

APPENDIX—Doc. No. 20.

Instructions relating to enrolments, substitutes, &c.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, July 31, 1855.

SIR: Your letter of the 25th instant, with the list of names, &c., taken from the enrolment, is received. That there may be no misunderstanding in regard to allowances made for service, I will observe that your pay, &c., is to commence on the 10th instant, the date of your acceptance of your appointment as captain; and that the pay of Mr. Ostrander, H. King, and the laborers retained from the custody of the Bell and Sevier, is to commence on the same date, (10th of July,) with deductions for lost time in each case of absence from actual service. In all cases of employing substitutes, it must be borne in mind that no individual already in employ on board of your boat can be admitted as a substitute for any one desiring leave of absence.

With respect to leave of absence for yourself, no such leave can be granted without express sanction from the superintendent; but with respect to similar indulgences to others of your command, you are desired to exercise a sound discretion, granting no indulgence except in cases of extraordinary urgency, and admitting no substitutes except such as are well qualified to fill the place vacated by the individual or individuals soliciting or requiring the indulgence.

In the list you have sent me, there seems to be some confusion and inconsistency in the dates of the enrolment. However, this will be remedied in the time-rolls, which will exhibit the days of actual service, and, as heretofore, will be regarded as the test for payments.

You are desired to report all cases in which substitutes may have

been employed, giving the names of the substitutes, their qualifications, duration of service, &c.

When you shall have obtained your complement of officers, laborers, &c.—which I would have you limit in number to the actual exigencies of the service, that you may be encumbered with no idlers on board, and none that cannot be employed to good advantage in prosecuting the duties assigned you—please forward a supplemental list, as before, for my use.

As yet I have received no bill of supplies and delivery of the articles heretofore required of W. R. Carter, esq. Your certificate to the correctness of his bill and the delivery of the supplies on board of your boat, will be followed by prompt payment from this office.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

Capt. J. Y. CLEMONS,

Commanding Snag-boat Sevier.

APPENDIX—Doc. No. 21.

Sundry instructions.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, August 1, 1855.

SIR: Your two letters, dated on the 27th ultimo, have been received; also three several accounts for supplies of provisions, medicines, &c., amounting in the aggregate to \$1,035 83. The accounts will be prepared in due form and returned to Mr. Carter for signature; after which, with your signature as *supervisor* on the back of each, they will be promptly paid.

Your proceedings in all cases seem to merit my approbation, except in that of the recaulking of the decks of the Sevier.

I send you a copy of my answer to a letter, this day received from Messrs. Eads & Nelson, on this subject; from which you can infer the light in which I view the transaction.

In order to help me out of the embarrassment, I wish you to give me your individual and confidential opinion as to the actual cost of having the decks adequately repaired in the manner suggested by me, with cotton caulking, and seams duly pitched, and this done by the hands on board, under the direction and with the help of the carpenter. I wish to make a fair allowance to Eads & Nelson, and no more. The boat is now fitted for at least a year's constant service, whereas we shall not be likely to want the boat more than five, or, at the utmost, six months.

As you are about to be employed on different parts of the river, you are desired to inform this office, from time to time, of the points at which you will be able to receive communications hence with the greatest certainty and despatch.

Whatever may be the stage of the river now or hereafter, you are desired to exercise a sound discretion in selecting the points or places of operation for its improvement, with the understanding that the boat must be kept constantly at work, with the least practicable outlay, and to the greatest possible advantage. The stages of the river will be constantly under your observation, and your knowledge of its condition and changes will enable you to select the points of operation far more judiciously than I could do, even were I present with you.

S. H. LONG,

Lieut. Col., Supt. Western River Improvements.

Capt. J. Y. CLEMSON,

Commanding Snag-boat Sevier.

APPENDIX—Doc. No. 22.

Instructions in regard to rations, &c.

OFFICE WESTERN RIVER IMPROVEMENTS,

Louisville, August 2, 1855.

DEAR SIR: From a fair analysis it appears that your estimates for supplies for breadstuffs and meat rations are nearly equal to each other, and cover the subsistence of 35 individuals during a period of nearly three months without any allowance for fresh meats, &c. The number of employes above mentioned is greater by five than that you mentioned as necessary to operate with the boat without cutting trees, logs, &c., on the bars and banks. If the force be limited to thirty, the estimate would cover a period of more than $3\frac{1}{2}$ months. The meat and bread ration is estimated at $1\frac{1}{2}$ pounds for each per day.

The following list comprises the items properly comprehended in the bread and meat rations respectively:

Bread rations.—Pilot bread, crackers, beans, rice, potatoes, flour, corn-meal, hominy, sour-crust, and vegetables.

Meat rations.—Mess pork, mess beef, hams, sides and shoulders, fresh meats of all sorts, cod-fish, mackerel, butter, lard, and eggs.

The rations for each individual, including $1\frac{1}{2}$ pounds of breadstuffs and $1\frac{1}{2}$ pounds of meat-stuffs, will be $2\frac{1}{2}$ pounds per day for both.

S. H. LONG, &c.

Captain J. Y. CLEMSON.

P. S.—The rations as above estimated are deemed sufficient to cover the unavoidable losses and waste incident to river service.

APPENDIX—Doc. No. 23.

Report on expenditures and progress for second quarter of 1855.

OFFICE RED RIVER IMPROVEMENTS,
Louisville, July 27, 1855.

SIR: I have the honor herewith to transmit through you, to the Topographical Bureau, my accounts for the second quarter of 1855 relative to the improvement of Red river in and around the raft; from which it appears that the amount expended during the quarter is \$6,537 12, and that the balance on hand applicable to the service is \$13,516 72.

My expenditures for the quarter covered the following operations, viz: the purchase of tools, provisions, &c., at New Orleans; their transportation, together with 30 negroes, hired at \$30 per month, from New Orleans to the head of the raft; the construction of a boom, and preparation of Elmer's bayou as a receptacle for the expected new raft; the cutting in part of standing timber in Dooley's bayou, and some cutting and sawing of the two miles of raft to be removed from the river above the head of the bayou.

On the 1st instant I left the raft region for Louisville to prepare the boats, &c., requisite for the work, and arrived at this place on the 16th instant, having been detained by sickness on the route.

Since my return I have settled all accounts incurred for the removal, &c., of the Gopher from Alton to this place, and have made arrangements for the alterations and repairs thereof, as well as for the construction of a hand-machine boat for this service.

The amount paid for the Gopher, viz: \$7,000, is not included in the expenditures for the second quarter.

CHAS. A. FULLER,
United States Agent and Engineer.

Lieut. Col. S. H. LONG,
U. S. Army, Superintendent Western River Improvements.

APPENDIX—Doc. No. 24.

Annual report on improvement of the Illinois river.

JACKSONVILLE, ILLINOIS, *August 20, 1855.*

SIR: In conformity to your instructions, dated on the 3d August, instant, I respectfully submit the following statement:

1st. The engineer's report for the improvement of the Illinois river proposes the opening of a channel two hundred feet wide, and three feet deep, at the lowest stage of the water.

In order to the complete execution of this plan, there remains yet

about 150,000 cubic yards of clay and sand to be removed ; this work, judging from experience in regard to the portion already done, would cost fifty cents per yard, or the sum of \$75,000.

In addition to this sum, \$15,000 will probably be required for dredges, scows, tackle, and contingencies, making in all the sum of \$90,000.

2d. The expense of keeping the dredge "George W. Jones," and the new dredge "Jefferson Davis," in commission from July 1, 1855, to July 1, 1856, and for compensation of agent, civil engineer, officers and crews of boats, fuel, subsistence, repairs, and contingencies, will probably amount to the sum of \$15,000 ; or, should Congress make the requisite appropriation, double the amount of dredging could be effected for the sum of \$30,000, within the annual season of active service, comprising eight months.

3d. The "Illinois river improvement," of which I am the agent, is embraced in the United States collection district of Louisiana.

Alton is the nearest port of entry ; but although I have requested it, I have not yet been advised of the amount of revenue collected at that port during the last fiscal year ; when so advised I will hasten to report it.

The main United States revenue connected with the river trade is through the ports of entry of Chicago and St. Louis. The annual amount of commerce to be benefited by the improvement of the Illinois river, according to the best information I have been able to obtain, may be stated at \$42,345,000.

This sum, I have no doubt, will fall short of the true amount.

G. A. DUNLAP,

U. S. Agent, Improvement Illinois River.

Lieut. Col. S. H. LONG,

Superintendent Western River Improvements.

The foregoing report is not only defective in the several respects therein noticed, but by reason of its containing no showing of the expenditures incurred during the last fiscal year, and of the unexpended balance of the appropriation remaining for disbursement at the end of that year. From the records of this office, it nevertheless appears that the balance in question is \$9,449 77, while the same records are deficient in the details from which the expenditures for the same year can be inferred.

S. H. LONG,

Superintendent Western River Improvements.

P. S.—Agreeably to a statement kindly furnished by John Fitch, esq., surveyor and collector of the port of Alton, the total value of imports for the year is \$54,666, and the amount of duties collected thereon is \$16,398 90.

S. H. LONG.

APPENDIX—Doc. No. 25.

Instructions for re-survey, &c., of Dubuque harbor.

DUBUQUE, May 31, 1855.

SIR: You are desired to execute a survey of Dubuque harbor, and of the river, islands, sloughs, &c., adjacent thereto, and also of the new town of Dunleith, on the Illinois side of the river, and of their relations to, and connections with, the Illinois Central railroad. The sites of both towns will be connected by a line extending, by courses and distances carefully determined, and by soundings, levels, &c., carried entirely across the river, its channels, sloughs, &c. The position of the line must be, as nearly as practicable, coincident with the most favorable direction of a causey and bridge connecting the towns of Dunleith and Dubuque, and that of the causey such as is most favorable for the enlargement and deepening of the harbor above it.

The method of improvement will be conformable to that recommended by the board of lake harbors and western rivers, and approved by the honorable Secretary of War.

You are, moreover, desired to prepare accurate drawings of your surveys in plan and profile, or section; the plan to be drawn on a scale of 20 inches per mile, 264 per foot, or 22 feet per inch. The horizontal scale of the profile to be the same as that of the plan, and the vertical scale of the same to be 10 feet to the inch. The profile to represent a section on a right line, extending from the main shore at Dubuque to the railroad at Dunleith, in the direction most suitable for the causey, and also for a bridge, connecting Dubuque with the railroad.

In fixing upon the location of the causey, you will give it such a position as will be likely to render its construction as economical as practicable, and afford the best facilities for using the materials excavated from the channel, in the formation of a roadway on its summit, 30 feet wide, and at least 3 feet above the surface of the highest flood known to have occurred in the river.

You are, moreover, desired to ascertain the most favorable terms on which the two mud-scows left in your custody can be sold for cash, payable at the time of sale, and report said terms as early as may be.

You are expected to enter at once on the duties assigned you as above, and to report from time to time your doings in the premises, that additional instructions may be issued for your guidance as occasion may require.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

J. C. JENNINGS, Esq.,

U. S. Agent for Dubuque.

APPENDIX—Doc. No. 26.

Explanatory instructions.

ALTON, June 4, 1855.

SIR: In further explanation of the operations I have in view for the improvement of Dubuque harbor, I take this opportunity to observe—

1st. That the object of the surveys directed to be made is to determine with precision the best location for the causey from Dubuque landing, at or a little below Waple's cut, to the river-side of the outer island.

2d. That the position of the causey be fixed in such a manner, that portions of Bass island and of the outer island, sufficient to form the causey, be left on the lower side of Waple's cut, and of the main outlet, across the outer island, and that the causey be formed by excavations therefrom.

3d. That when the surveys and the drawings explanatory thereof shall have been made and approved, the excavations, removals, and also the formation of the causey, should be commenced at the most suitable points, and prosecuted with the utmost diligence and economy till the unexpended balance of the appropriation, now in your possession, shall have been nearly or quite expended, but by no means exceeded.

In regard to the disposition of the mud-scows, they can be sold on the most reasonable terms, either for pile-drivers, drill-boats, mud-scows, or for any other purposes, for half their prime cost, if no more can be had for them, and the proceeds of the sale be applied to the formation of the causey, unless prohibited by the War Department, of which you will be seasonably apprized.

S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

J. C. JENNINGS, Esq.,

United States Agent.

APPENDIX—Doc. No. 27.

Annual report on the harbor of Dubuque.

DUBUQUE, Iowa, August 20, 1855.

SIR: In pursuance of instructions, I have the honor to submit the following report on the various matters called for, and suggesting themselves with reference to the work under my supervision and custody, viz: "the improvement of the harbor of Dubuque."

The surveys and estimates required have been completed, and the drawings illustrative thereof have been forwarded, per express, to your address, the receipt for which I enclose.

In selecting the line of causey set forth upon the plan, I found it

necessary to deviate in some measure from my instructions "to leave portions of the islands north of the causey, sufficient, when excavated and removed, for its construction," for the reason that the site of the contemplated improvement has been donated by the city to a company constructing the Jones street extension, who object to the needful encroachments upon their lands. Reflecting, however, upon the serious effects caused at all times by the river impinging upon the islands, and whatever embankments have been raised of similar material, although having paved surfaces, I am opinion that the most substantial and economical mode will be to use excavation from the adjoining bluffs, which has been used in the improvement above named with much success.

In computing the amount of filling requisite, I estimate that 10,000 cubic yards for the centre of it shall be taken from the west end of the north bank of the Waple's cut, where there is much material piled up, and at which point greater breadth of water-way is requisite and in executing the necessary dredging.

The connexion with the railroad at Dunleith is quite as near its present terminus as possible, for to change the position of the causey, from the foot of 1st street further south, would, besides occupying valuable grounds, form an angle too acute for the desired effect upon the harbor; whilst, to retain 1st street at the west end, and more northward at the east, would encroach upon the cut and outlet both, as well as contracting the angle of exit for the water, the most speedy passage for which ought to be obtained.

The figures, &c., upon the drawings are as full as I deemed necessary, and will, I trust, furnish sufficient information, and merit your approbation and approval.

Estimate for construction of causey.

16,945 $\frac{75}{100}$ cubic yards of bluff excavation, at 50 cents per yard.....	\$8,472 87
10,000 cubic yards of alluvion, at 20 cents per yard...	2,000 00
1,000 yards paving, at \$1 per yard.....	1,000 00
Contingencies, at ten per cent.....	1,447 28
Superintendency.....	1,447 28
	14,367 43
Dredging.....	5,000 00
	19,367 43

The item of dredging I add for the purpose of deepening the Waple's cut and harbor, which can be done by means of a Hawley's patent dredge.

Expenditures during the fiscal year terminating on the 30th June, 1855.

3d quarter of 1854.....	\$2,204 40
4th quarter of 1854.....	593 83

1st quarter of 1855.....	\$15 00
2d quarter of 1855.....	360 00
	3,308 23

Receipts during the fiscal year terminating on the 30th day of June, 1855.

August 25, 1854, treasury draft.....	\$500 00
September 25, 1854, treasury draft.....	3,000 00
November 4, 1854, treasury draft.....	1,516 00
Disbursements disallowed.....	53 02
	5,069 02
Expenditures.....	3,308 23
Balance, June 30, 1855.....	1,760 79

In the prosecution of the above plan of improvement, I estimate \$15,000 as the amount which can be profitably expended during the ensuing fiscal year, in promotion of the desired end.

With reference to the mud-scows, they were permitted to sink in deep water for the purpose of keeping them tight. They were sold by public sale to the highest bidder, on the 15th instant, and brought the sum of \$165 each.

In this connexion I would state that there is a quantity of iron, the remains of a dredge-boat, constructed out of a former appropriation to the harbor of Dubuque. It is but recently I obtained information of it, and believe there are about three tons in all.

For so far, there has been no collection made at the port of Dubuque. I have written to Galena, the nearest port of entry, during last year, for a return of the collections, and shall transmit it upon receipt.

From a schedule of statistics of the commerce of Dubuque, I find that the tonnage for 1854 is 97,633 tons; value, \$4,933,208 65.

Exports 11,736 tons; value, \$1,573,408 30.

The number of steamboats arriving at Dubuque, during 1854, 672; departures, 670.

JOSEPH C. JENNINGS, *U. S. Agent.*

Lieut. Col. S. H. LONG,

Superintendent Western River Improvements.

The views presented in the foregoing report, in reference to the manner of improving the harbor of Dubuque, are obviously at variance with the plan approved by the War Department, and with the instructions given to the agent in relation thereto. The assumption that an embankment or causey formed of alluvion, and reveted with a stone pavement, cannot resist the abrasions of the gentle currents of the harbor, seems quite gratuitous and unwarranted. Hence, the notion of getting excavated earth from the bluff, at 50 cents per cubic yard, for

the formation of the causey, instead of earth excavated from the contiguous islands, &c., at a cost of 20 cents per cubic yard, seems preposterous in a high degree.

Nevertheless, the views of the agent may be entitled to a respectful consideration, inasmuch as the cost of the improvement, agreeably to his plan and estimate, will not very greatly exceed that of the approved plan.

The commercial statistics expected from Galena, agreeably to the report, have been received, and are comprised in the following statements, viz:

Duties on merchandise withdrawn from warehouse.....	\$313 90
Marine hospital fees.....	453 84
Amount received on customs account.....	767 74
Deduct amount of inspection fees.....	250 00
Balance.....	517 74

S. H. LONG,
Superintendent Western River Improvements.

APPENDIX—Doc. No. 28.

Steamboat disasters for the year beginning July 1, 1854, and ending June 30, 1855.

OFFICE WESTERN RIVER IMPROVEMENTS,
Louisville, August 23, 1855.

SIR: In obedience to your orders of the 28th ultimo, of which the following is a copy:

“OFFICE WESTERN RIVER IMPROVEMENTS,
“*Louisville, July 28, 1855.*

“SIR: That I may be furnished with all the statistics attainable, in reference to steamboat disasters and other casualties connected with the navigation of the western rivers during the fiscal year ending on the 30th June last, you are desired and expected to take special cognizance of all subjects of this nature, and obtain all authentic information in relation thereto, to the full extent of your abilities, consistently with other duties. The information solicited as above is particularly desirable, that I may be able to embody it with other matters to be treated of in my annual report of September next.

“S. H. LONG,

“*Superintendent Western River Improvements.*

“THOMAS R. SINTON, Esq.,

“*Clerk, Office Western River Improvements.*”

Ex. Doc. 1—23*

I would respectfully report that the following list comprises all the steamboat disasters that have occurred during the time specified; said list has been obtained from an examination of the files of the Louisville papers and other sources, and is, I believe, worthy of credence.

Steamboat disasters.

Date.	Names.	Places.	Remarks.
1854.			
July 3	*Peter Tellow.....	Hat island	Broke forty timbers.
8	*Fawn	Scuffletown.....	Loss not reported.
10	†Vienna.....	Chisler's Landing.....	Do.
22	*David White.....	Lawrenceburg.....	Do.
25	*Banner State	Below St. Joseph.....	Afterwards raised.
Aug. 5	†Cape May.....	Mt. Vernon.....	Total loss; five lives lost.
5	*White River.....	Woodbury, Green river..	Total loss.
14	†Alabamian.....	Florence	Loss not reported.
19	Ferry-boat Adelaide...	Portland bar.....	Do.
31	§Timan No. 3.....	Below Jefferson City....	Total loss; eighteen lives lost.
Sept. 18	*Rescue.....	Henderson island.....	Loss not reported.
27	†Cluna	Near Alexandria	Total loss.
Oct. 2	*Malta	Hurricane island.....	Total loss; twenty-one lives lost.
5	*T. P. Leathers.....	Morgan's Landing.....	Broke forty timbers.
11	†Princess	Near Natchez.....	Total loss.
18	*Isabel	Near St. Louis.....	Afterwards raised.
31	*St. Nicholas.....	Near Cairo.....	Do.
Nov. 1	*Wenona.....	In Missouri river.....	Loss not reported.
7	§Daniel Pratt.....	In Alabama river.....	Total loss.
9	*H. W. Summers.....	At Anderson's bar.....	Loss not reported.
11	*Savannah.....	At Hickman.....	Do.
13	*Saranac	do.	Afterwards raised.
16	†Forester.....	At New Richmond	Total loss
18	*Endeavor	At Island No. 8.....	Do.
29	†Grand Tower	Near Cairo.....	Do.
29	*Pacific	At Devil's Elbow.....	Do.
Dec. 9	†Gipsy	Near Red river	Do.
11	†Chancellor	Near Cairo.....	Do.
20	*Grand Prairie.....	At St. Genevieve.....	Loss not reported.
20	*Sallie West	At Turkey island.....	Do.
27	*James Park.....	At Devil's island.....	Afterwards raised.
28	†La Belle	Bench Creek, Ohio river.	Total loss.
1855.			
Jan. 3	*Westerner	Chain, Mississippi river..	Do.
5	*Little Bee.....	Yazoo river.....	Do.
14	†Garden City	Yellow Bend.....	Do.
21	†Fanny Farrar.....	Cumberland river	Do.
22	§Hartford	Five Mile bar.....	Five or six persons wounded.
25	*Eliza	Near Plum Point.....	Total loss.
Feb. 10	*Buckeye Belle.....	Hat island	Do.
8	†John Simmons	President's island	Do.
13	¶Cincinnati.....	Cincinnati.....	Do.
15	*Dresden.....	At Riddle's Point	Do.
15	†H. D. Bacon.....	Near Cairo.....	Do.
18	*James Robb	Devil's island.....	Do.
19	¶Latrobe.....	Below Pittsburg.....	Loss not reported.
20	*James Tralm.....	Campite, Red river	Do.
20	*James Watt	Petersburg, Ky.....	Total loss.
24	*Huron	Callehan's Landing.....	Do.
Mar. 1	*Luda	Red river	Do.
2	†Clarion	Below Dubuque.....	Loss not reported.
10	†Lucy McConnell.....	Wabash river.....	Do.
14	§Heroine.....	Bigbee river.....	Ten lives lost.

Steamboat disasters—Continued.

Date.	Names.	Places.	Remarks.
1855.			
Mar. 17	† Advance	Haskellsville, Ohio	Total loss.
24	† Bulletin	Mississippi river	Total loss; forty lives lost.
27	† Americus	Illinois river	Do.
28	† Huntsville No. 2.	Tennessee river	Do.
April 7	§ Reindeer	Above St. Louis	Scalding three persons.
8	* Evansville	Oil creek	Afterwards raised.
14	* Forest Rose	Bigbee river	Loss not reported.
10	* Agile	do.	Do.
8	* A. L. Shotwell	Sisters' island, Ohio river	Afterwards raised.
22	† William Knox	Flint island	Total loss.
22	† Tuanna	Yazoo river	Total loss; one life lost.
20	* Conewago	Upper Mississippi	Afterwards raised.
23	|| R. H. Eee	Illinois river	Total loss.
23	|| Gazelle	do.	Do.
11	* El Paso	Missouri river	Afterwards raised.
25	† Falcon	New Orleans	Total loss.
30	† Afton	Yazoo river	Do.
30	* Mary Cole	Missouri river	Do.
May 6	* Georgetown	Bellefontaine Bend	Total loss; loaded with United States stores.
9	* Exchange	Yazoo river	Loss not reported.
8	* W. N. Sherman	do.	Afterwards raised.
11	† Helen	Mobile bay	Total loss.
24	* Glendy Burke	Ohio City	Do.
24	* Keystone State	Mississippi river	Do.
June 9	* Australia	Glasgow	Loaded with United States stores; afterwards raised.
14	* Fashion	Three Mile island	Afterwards raised.
15	* Young America	New Bath	Loss not reported.
21	* Northerner	St. Genevieve	Afterwards raised.
15	* Molly Garth	Tennessee river	Total loss.
20	* Belle Golding	Devil's island	Do.
15	* Express	Missouri river	Do.
25	† Colbert	Tennessee river	Total loss; one life lost.
30	* Lexington	Stephensport	Total loss; twenty-five lives lost.

In all 85 steamboats.

- * Boats wrecked on snags, logs, and other similar obstructions.
- † Boats wrecked on rocks or indurated bars.
- ‡ Boats destroyed by fire.
- § Boats destroyed by explosions.
- || Boats destroyed by collisions.
- ¶ Boats sunk by floating ice, &c.
- ** Boat sunk by running in bank.

Abstract of above list.

Number of boats wrecked by snags, logs, &c.	47
Number of boats wrecked by rocks, &c.	11
Number of boats destroyed by fire	17
Number of boats destroyed by explosions	6
Number of boats wrecked by collision	2
Number of boats sunk by ice	1
Number of boats sunk by running into bank	1
Total	<u>85</u>

The foregoing boats were wrecked in the following rivers:

In Mississippi river	34
In Missouri river	8
In Ohio river	20
In Tennessee river	4
In Yazoo river	5
In Cumberland river	1
In Bigbee river	3
In Red river	3
In Alabama river	2
In Illinois river	3
In Wabash river	1
In Green river	1
Total	<u>85</u>

From the foregoing list, it will be observed, that during the last fiscal year more steamers have been wrecked on snags, logs, and other wooden obstructions, than from all other causes together; also, that the number wrecked on the Mississippi, Missouri, and Ohio rivers, for the same time, are more than two-thirds of the total number of wrecks.

I have been unable to obtain any authentic statistics of wrecks in the Arkansas river; the extreme low stage of water in this river for the greater part of the last fiscal year having rendered its navigation by steamboats almost impracticable, except as far as the back-water from the Mississippi river extended upward, (about one hundred miles.)

I could find no authentic returns of disasters to flat-boats, barges, &c. From personal observation during two trips from this place to Napoleon, Ark., on business for this office, I would observe that in the narrow and crooked channels of the Ohio river between Louisville and Cairo, and Mississippi river between Cairo and Memphis, the bars are thickly studded with wrecks of coal-boats. I feel confident that fully fifty of this description of boats have been wrecked during the last fiscal year between the points mentioned above, and doubtless quite as many have been wrecked between Pittsburg and Louisville.

In conclusion, permit me to subjoin an estimate of the probable value of a coal-boat and cargo delivered at Memphis.

Estimate.

14,000 bushels coal, at ten cents per bushel, at Louisville...	\$1,400
Wages of two pilots from Louisville to Memphis for conveyance of the same	200
Wages of fourteen laborers, at \$25 each, for conveyance of the same	350
Value of the boat when empty, say	50
	<u>2,000</u>

From the above, it will be seen that the amount of annual loss on coal-boats and cargoes alone, (viz: \$100,000,) is amply sufficient to

keep the Mississippi river clear of obstructions from the mouth of the Missouri river to the Balize, exclusive of the cost of the craft necessary for this purpose.

THOS. R. SINTON,

Clerk, Office Western River Improvements.

Lieut. Col. S. H. LONG,

Superintendent Western River Improvements.

APPENDIX—DOC. NO. 29.

Commercial statistics of Cincinnati, Louisville, and St. Louis for the last fiscal year.

OFFICE WESTERN RIVER IMPROVEMENTS,

Louisville, Ky., September 1, 1855.

SIR: Pursuant to your instructions of the 13th of August last, requiring me to visit the cities of Cincinnati, Louisville, and St. Louis, and to report on the following topics, to wit: "1st. The collection district in which each point is situated. 2d. The port of entry for each district. 3d. The amount of revenue collected at each port of entry for the last fiscal year ending June 30, 1855. 4th. The amount of commerce and navigation, arrivals and departures of steamers and other commercial craft for the same fiscal year. 5th. Any other circumstances affecting trade and commerce for the same year;"—I have the honor to submit the results of my investigations in relation thereto, which are briefly as follows:

The cities of Cincinnati, Louisville, and St. Louis are all ports of entry, situated within the collection district called the New Orleans district.

I first visited Cincinnati, Ohio, and to the kindness of S. B. W. McLean, collector of that port, I am indebted for the following information in reference to the interrogatories propounded.

Amount of revenue.

The amount of revenue collected at this, and also the ports of Louisville and St. Louis, arises from import duties, hospital dues, and the steamboat law. But I shall confine myself strictly to the requirements of your order, and will therefore give only the monthly statement of import duties, which are as follows:

Monthly statement of import duties.

July, 1854.....	\$3,096 80
August, 1854.....	7,512 85
September, 1854.....	18,107 65

October, 1854.....	\$6,013 05
November, 1854.....	1,575 35
December, 1854.....	2,933 00
January, 1855.....	13,176 85
February, 1855.....	5,726 80
March, 1855.....	11,836 50
April, 1855.....	9,700 55
May, 1855.....	23,520 35
June, 1855.....	4,169 60
Total amount.....	<u>107,369 35</u>

The total value of imports for the same period was... \$327,569 00

There has been a vast decline in the amount of imports compared with the preceding year. Hence the results of the last fiscal year do not give a just idea of the business transacted at this port. The great drought and financial embarrassments of this last year were most disastrous in their effects upon Cincinnati, and are in nowise more evident than by a comparison of the imports of this last fiscal year with the preceding, which amounted to the value of \$938,438 58, giving a difference in favor of the preceding year of \$610,869 58.

Domestic imports and exports.

For the following information I am indebted to the kindness of William Smith, esq., superintendent of the Merchants' Exchange, Cincinnati, Ohio:

The total value of imports for the last fiscal year ending June 30, 1855, is \$70,000,000.

The total value of exports for the same period is \$50,000,000.

The amount of imports and exports herein reported does not give an exact statement. There is a large amount of produce and merchandise received and shipped by wagons and steamboats of which the Chamber of Commerce can get no accurate account. Amongst these are coal and furniture. These last items amounted for Cincinnati, for 1854, to \$15,000,000.

Arrivals and departures of steamboats.

The arrivals and departures of steamboats at the port of Cincinnati for the last fiscal year have been as follows:

Date.	ARRIVED FROM—				Total.
	New Orleans.	Pittsburg.	St. Louis.	Other ports.	
July, 1854	6	27	22	226	281
August, 1854		4	8	177	189
September, 1854		1	7	104	112
October, 1854		13	8	121	142
November, 1854		10	19	163	192
December, 1854	8	19	20	189	236
January, 1855	28	64	13	199	304
February, 1855	25	10	7	50	92
March, 1855	25	59	20	191	295
April, 1855	32	72	24	209	337
May, 1855	17	57	31	204	309
June, 1855	16	31	20	156	223
Total					2,712

Date.	DEPARTED FOR—				Total.
	New Orleans.	Pittsburg.	St. Louis.	Other ports.	
July, 1854	4	16	21	235	276
August, 1854			15	177	192
September, 1854			28	107	135
October, 1854	2	1	20	121	144
November, 1854	11	8	20	159	198
December, 1854	18	18	19	170	225
January, 1855	34	54	29	204	321
February, 1855	12	17	9	51	89
March, 1855	22	60	46	187	315
April, 1855	11	69	53	196	329
May, 1855	12	58	38	204	312
June, 1855	7	36	25	160	228
Total					2,764

Total tonnage of steamboats and barges arrived at Cincinnati for the year ending June 30, 1855, is 77,593.

Average freight.

Rates of freight are constantly fluctuating, increasing at low stages of the river and decreasing at high stages. The average rates for the last fiscal year to New Orleans and Pittsburg, were as follows:

To New Orleans—Flour, per barrel, 54 cents; pork, per barrel, 87 cents; whiskey, per barrel, \$1 30.

To Pittsburg—Whiskey, per barrel, 70 cents; 100 pounds weight, 22 cents.

Tonnage of steamboats and barges built for the last fiscal year—total tonnage, 8,028.

I next visited Louisville, Kentucky, where I obtained the following results in answer to my inquiries:

Amount of revenue.

I am under obligations to Mr. H. W. Sands, esq., surveyor of customs at this port, for the following information:

Monthly statement of import duties collected.

July, 1854.....	\$4,740 50
August, 1854.....	2,320 20
September, 1854.....	1,634 20
October, 1854.....	3,102 20
November, 1854.....	1,344 57
December, 1854.....	1,760 85
January, 1855.....	3,693 18
February, 1855.....	3,909 90
March, 1855.....	4,228 45
April, 1855.....	4,518 90
May, 1855.....	4,618 03
June, 1855.....	457 40
Total.....	<u>36,328 38</u>

The total value of imports for the same period for which the above was collected is \$111,540 18.

Domestic imports and exports.

For the following information I am indebted to the favor of L. Woodbury Fiske, superintendent of Merchants' Exchange at Louisville:

The total value of imports for the last fiscal year is \$40,000,000.

The total value of exports for the same period is \$30,000,000.

At the various ports on the river, packages and bundles are received, which are distributed through innumerable channels, so their contents cannot be ascertained, and hence their value cannot be estimated. At Louisville the amount of bundles and packages for one year was 230,000—value, \$100 per package. Their value should be added to the amount of imports.

Arrivals and departures of steamboats.

The arrivals and departures of steamboats at the port of Louisville for the last fiscal year were as follows:

Date.	ARRIVED FROM—					Total.
	New Orleans.	Pittsburg.	St. Louis.	Other ports.	Cincinnati.	
July, 1854.....	8	7	36	46	109	206
August, 1854		2	16	48	89	155
September, 1854			14	43	69	126
October, 1854 ...	1	3	18	40	65	127
November, 1854..	2	6	31	58	70	167
December, 1854..	9	13	26	64	67	179
January, 1855 ...	43	30	15	78	86	252
February, 1855 ..	43	1	14	22	29	109
March, 1855.....	44	48	39	68	87	286
April, 1855	53	49	74	69	84	329
May, 1855.....	41	41	52	68	69	271
June, 1855	43	23	46	51	57	220
	287	223	381	655	881	2,427

Date.	DEPARTED FOR—					Total.
	New Orleans.	Pittsburg.	St. Louis.	Cincinnati.	Other ports.	
July, 1854.....	13	9	34	89	45	190
August, 1854			27	85	48	160
September, 1854			12	67	27	106
October, 1854....	7	2	26	45	47	127
November, 1854..	17	3	32	55	49	156
December, 1854..	34		23	67	51	175
January, 1855....	71	24	32	61	63	251
February, 1855...	37	11	10	31	19	108
March, 1855.....	43	33	64	63	65	268
April, 1855.....	36	46	82	89	64	317
May, 1855.....	34	33	77	62	64	270
June, 1855.....	25	21	44	46	36	174
Total.....						2,302

Total tonnage.

The total tonnage owned and belonging to Louisville, June 30, 1855, is—steamboats 76; tonnage 22,680 $\frac{14}{95}$

Rates of freight—Average for the year.

From Louisville to New Orleans and Wheeling:

To New Orleans—Pork per barrel, 40 to 80 cents; per 100 pounds, 20 to 45 cents.

To Wheeling—Flour, 25 to 50 cents; pork, 40 to 70 cents; per 100 pounds, 15 to 40 cents.

Steamboat building.

From July 1, 1854, to June 30, 1855—Total number of steamboats, 20; total tonnage of boats built, 7,760 $\frac{5}{95}$

Canal at the falls of the Ohio.

The statistics of the canal around the falls of the Ohio are so intimately connected with those of the commerce of western rivers that I deem it relevant to here introduce the following table in relation thereto, which was kindly furnished by Miss McHarry, of Shippingsport, daughter of the late manager of the canal:

	Steamboats.	Other craft.	Tonnage.	Tolls.
July, 1854.....	92	41	20,967.82	\$9,874 17
August, 1854.....	70	18	12,135.49	5,915 61
September, 1854.....	31	24	6,018.86	2,927 01
October, 1854.....	69	40	13,874.57	6,700 52
November, 1854.....	79	30	15,959.02	7,722 15
December, 1854.....	106	34	25,469.63	12,726 61
January, 1855.....	154	132	54,324.71	26,667 42
February, 1855.....	69	5	20,416.50	5,103 50
March, 1855.....	85	32	25,284.66	6,320 45
April, 1855.....	204	150	68,843.30	17,199 99
May, 1855.....	162	50	46,634.44	11,758 30
June, 1855.....	61	74	25,041.40	6,289 94
Total for the year.....	1,182	630	334,970.40	119,215 67

I lastly visited St. Louis, Missouri, when the following information was kindly furnished by Captain W. A. Linn, collector of customs at that port:

Amount of revenue.

The monthly statement of the duties collected at the port is as follows:

July, 1854.....	\$30,368 74
August, 1854.....	102,648 65
September, 1854.....	102,480 56
October, 1854.....	57,520 76
November, 1854.....	54,827 34
December, 1854.....	57,014 22
January, 1855.....	20,938 68
February, 1855.....	13,626 30
March, 1855.....	62,268 94
April, 1855.....	72,029 80
May, 1855.....	61,978 00
June, 1855.....	8,656 07
Total.....	644,358 06

The amount of duties for the preceding year was \$373,868 24; increased in the last year \$270,489 82.

Domestic imports and exports.

For the following I am indebted to Edward Barry, esq., secretary to the Chamber of Commerce at St. Louis :

The total value of imports from July 1, 1854, to June 30, 1855, is \$40,500,000.

The value of exports has not been obtained, on account of the variety of channels through which the exports are conveyed, and over which the Chamber of Commerce has no control.

Arrivals of steamboats.

For the following information in regard to the arrivals of steamboats, I am indebted to Mr. George Ransom, the harbor-master for this port, who kindly furnished me with the following statement :

	No. of arrivals.	Amount of tonnage.
July, 1854	318	79,573
August, 1854	197	52,672
September, 1854	275	61,110
October, 1854	251	52,861
November, 1854	282	57,907
December, 1854	226	42,815
January, 1855	208	43,859
February, 1855	71	21,346
March, 1855	320	67,109
April, 1855	371	109,639
May, 1855	418	121,134
June, 1855	315	101,415
Total	3,252	811,440

Total tonnage.

The total tonnage owned at and belonging to St. Louis, June 30, 1855, is 48,261 $\frac{8}{9}$ $\frac{2}{5}$.

Weight, average rates.

For the following information I am indebted to Edward Barry, esq., secretary to the Chamber of Commerce at St. Louis, who informs me that the average rate of freights for the last fiscal year was as follows :

To New Orleans—Flour, 50 cents per barrel; pork, 75 cents per barrel; whiskey, 90 cents per barrel.

To Louisville, 15 to 25 cents per 100 pounds.

To Pittsburg, 40 cents per 100 pounds.

Steamboat building.

For the following information in regard to the building of boats and barges I am indebted to the kindness of Captain W. A. Linn, United States collector at this port. It appears from the books of the custom-house that there were thirty boats built during the last fiscal year. Six of them were steamboats; the remainder canal boats and barges. The total tonnage, according to the list furnished me by Captain Linn, is $5,572\frac{2}{5}$.

In conclusion I will offer some remarks which relate to the fifth item of instructions contained in your order, viz: "Any other circumstances affecting trade and commerce for the same year," *i. e.* the last fiscal year. I will therefore select a few remarks from a carefully prepared report on "the subject of the improvement of the falls of the Ohio river," by S. B. W. McLean, esq., collector of the port of Cincinnati.

He says: "If the annual loss to the commerce of the country occasioned by the obstructions at the falls could be correctly estimated, it would amount to more than a million dollars, a sum equal to the interest on an investment of sixteen millions."

In reference to the general trade and commerce of the western rivers, I cannot do better than refer to that inestimable work on this subject (published in 1848) entitled "The West, its Commerce and Navigation, by James Hall, esq.," one than whom there is no other whose opinions will carry more force and conviction. This gentleman estimates the annual floating commerce of the West to be worth, in 1847, \$450,000,000. From the comparative results of five preceding years he finds that there is an annual average increase of about seventeen per cent. From these data we find the value of the commerce floating on the western waters to be at the present time \$1,070,000,000.

Judge Hall says: "We are happy to have our estimate corroborated by our friend Edward D. Mansfield, esq., one of the ablest and most accurate of western writers. In a memorial, recently prepared, to Congress, he supposes the whole value of the property shipped on the Mississippi and branches, including western produce shipped to New Orleans and eastern cities, shipments from port to port within the West, and foreign merchandise, coin bullion, and other articles received in exchange for our products, to be \$500,000,000."

This, by means of the same ratio of increase adopted by Judge Hall in 1847, would give for the value of the floating commerce of 1855, \$1,180,000,000.

Judge Hall estimates the number of steamboats on western rivers for 1847 at 1,100. The same ratio of increase was found to be true as that in reference to commerce. This would give 2,596 for the number of steamboats on western rivers in 1855. According to the estimate of Judge Hall, the average tonnage of each is 210 tons, which gives 545,160 for the total steamboat tonnage on western rivers for this year; and assuming the value estimated by our author, viz: \$80 per ton, we

have for the total cost of building and fitting out said steamers the sum of \$43,612,800.

Another considerable item is the passenger trade; and by referring to the report of the chief of Topographical Bureau, we find it stated that "the steam tonnage of the lake is 60,825; the value of passenger trade for that tonnage is \$1,250,000; hence, with the river tonnage of 545,160, as before stated, we obtain for the value of the passenger trade of western rivers for 1855, the sum of \$11,203,452."

Again, if we take Mr. Mansfield's estimate for 1847, wherein he states the number of passengers at 8,185,000, and as the passenger trade is confined to steam tonnage, if we assume it to increase in an equal ratio, viz: 17 per cent., we will have 19,316,600, for the number of passengers travelling on board of steamboats for the year.

The above results will give us some idea of the vast amount of commerce carried on through our western rivers, and from these results we can form an estimate of the deleterious effect commerce suffers for want of improvements of said rivers, for want of enlarging the canal around the falls of the Ohio, and neglect to remove those obstacles which the rapid currents and freshets of our rivers are ever forming and shifting, and to which their vast power and irregular action render them so peculiarly liable.

I here offer my sincere acknowledgments for the willing aid I have always received from the gentlemen who are mentioned in this report, who spared neither trouble nor pains to give me the information solicited.

JAMES W. ABERT,

1st Lieutenant U. S. Topographical Engineers.

Lieut. Col. S. H. LONG,

Lieut. Col. U. S. A., Supt. Western River Improvements.

P. S.—My report has been withheld till the present date, (September 13,) by reason of unavoidable delays in the collection and arrangement of the details exhibited therein.

J. W. ABERT,

Lieutenant Corps Topographical Engineers.

APPENDIX—Doc. No. 30.

Proposition of Eads & Nelson for carrying on the improvement of the Mississippi for a term of ten years.

ST. LOUIS, August 12, 1855.

We beg leave most respectfully to submit for your consideration the following suggestions, on the very important subject of the obstructions in the channel of the Mississippi river, and the means to be adopted for the complete removal of them.

We believe these obstructions are properly divided into four classes:

First. Snags and sawyers having their heads near the surface or above water.

Second. Stumps and logs firmly fixed in the bed of the stream.

Third. Sunken wrecks.

Fourth. Submerged rocks.

The first of these classes is by no means the most dangerous to steamboat navigation. Flat-boats and barges are frequently sunk by them, and the guards and upper works of steamboats are often seriously damaged by them; but of all the steamboats sunk, and those injured in the hulls requiring to be docked, we believe not one out of a dozen is from this cause.

This class of obstructions were very thoroughly removed in 1853 and 1854, by the United States snag-boats, and resulted in a vast deal of good to the commerce of the river. Fewer accidents, such as tearing away guards and injuring the cabins of steamboats, were chronicled by the press after their operations, than were ever known before; but the catalogue of total losses by sinking was no less, but even greater than before; not greater from what the snag-boats had done, but from what they had left undone, from inability to do it. This cause, and the increased number of boats navigating the stream, clearly accounts for the increased number of total losses during and since their operations.

For the removal of this class of obstructions, no better machine can be devised, in our opinion, than the boats built by government in 1853.

The second class are only dangerous at those parts of the river where the water spreads out over a large expanse, and the channel becomes lost among shoals and sand-bars. Meramac, Fort Chartres, Turkey island, Tower island, Bainbridge, Hat island, the Graveyard, Hacker's bend, No. 16, 21, Plum Point, 66, &c., &c., are places of this kind. At these points the bed of the river is entirely sand, and the channel is liable to frequent changes. The great width of the river, and the monotonous bars of dry sand on either hand of the pilot, prevent him from ascertaining with certainty and remembering on subsequent trips the exact localities of such stumps and logs as he may on former voyages have struck without damage to his craft; for they show no break on the surface to indicate their locality.

And herein we find the explanation why such a stump as that at Hat island should sink the Jesup and the St. Paul, besides injuring the hulls of nearly a score more; and why the log which sunk the Australia should sink the Buckeye Belle, and be ready to sink a dozen more. These are both at Hat island. The stump which sunk the Robert Fulton, at Bainbridge, is another instance of the kind, having sunk the General Pike, Consignee, and Oswego also; and is still waiting for more victims. The same may be said of the one which sunk the Metamora and Monarch; and many more instances of the kind can be mentioned. At the Graveyard are five, each of which has sunk a boat, and each of which is capable of doing the same again. Fort Chartres is now reported full of obstructions of this kind. The channel having taken a course unknown for years, has uncovered a perfect bed

of them. Plum Point numbers obstructions of this kind by scores, and the wrecks at the same place may almost be enumerated in the same way.

There are not less than thirty localities of this kind between St. Louis and Cairo alone, at each of which boats have struck these obstructions.

The only reliable means for the removal of this class is by the diving-bell. Three or four well appointed steam diving-bell boats can remove the worst of these in a twelve-month, from the mouth of the Missouri to the Balize. And as new ones become known to the pilots by the changes in the channel, the same force could be employed in their constant and speedy removal year after year.

The government boats have undertaken the removal of obstructions of this kind with their sweep-chains; but the best evidence of their inability to do much with them is the fact that they have tried many of those particularized in this communication without success, and also in the increase in the number of boats sunk during their operations and since.

A phenomenon well known to our river men may account for a part of the want of success which has attended the efforts of the snag-boats in this particular. We allude to the fact that we sometimes have, say ten feet on the shoal places we have referred to; and after the river has receded perhaps fully ten feet, as indicated by the banks, we still find five or six feet in the channel. A further fall of three or four feet on the banks causes but little less depth in the channel. In this we have an evidence that at certain times these obstructions are nearly or entirely covered with sand, and hence they must be attended to at seasons of low water, when they are uncovered by the washing out of the channel. Sweep-chains at any other time would not touch them. And they might frequently protrude enough above the sand to break a boat's bottom, and yet not sufficiently high above the sand to give a sweep-chain a hold upon their slimy surfaces. Such ones could be shattered into fragments with charges of powder, by the aid of the diving-bells, and be entirely removed.

N. B.—The following paragraphs with quotation marks have been interpolated at the request of Messrs. Eads & Nelson, by letter dated August 24, 1855, viz :

“By the aid of a small rope 300 yards long and half an inch in diameter, with two yawls or small boats, obstructions of the second class can be quickly found and with great certainty.

“Each end of the line is taken by one of the yawls, and in this manner kept across the channel and floated on through over the shoals where this kind of obstructions are most dangerous. The line has small weights of lead pressed on it to insure its sweeping the bottom. After thoroughly working over the bar and through the suspected district, the boats should be made to row back up to the head of the shoals to insure the line catching those obstructions which, from leaning down stream, might have escaped its descent. The steam diving-bell boat would be in close attendance, and would be anchored at once

over the spot indicated by the line and the obstruction immediately found.

"Each diving-bell boat should be provided with three or four powerful hoisting apparatuses, each capable of parting a chain made of $1\frac{1}{2}$ inch round iron. These chains could be readily fastened to the stump by the diver, and it be thus raised out. Where the chains could not be gotten around it, large grapples should be used.

"It will be seen at once how much more quickly an obstruction showing no break on the water could be found in a channel of three or four hundred yards in width, with a line stretching over two hundred and fifty yards of it, than with a sweep-chain of a snag-boat suspended from two points of its bow not over eighteen feet apart; the chain at the bight, or portion hanging on the bottom, not being more than twelve feet wide. The latter would have to make over eighty passages through the district to search the same ground the line would in one passage; while each passage of the snag-boat would have to be made with mathematical precision to avoid the danger of missing a stump by passing to the right one trip, and to the left of it the next. By sweeping the line through such a channel two or three times it could be made absolutely safe, a result which could not be obtained by the snag-boat with her sweep-chains in a month, if at all.

"Each diving-bell boat should be provided with the means of blasting such obstructions as proved too great for its hoisting capacity, and thus they could be rendered manageable."

A few years ago we were operating a diving-bell boat in the chute called the Graveyard, and during the season the New Orleans and Mentor struck obstructions in it and sunk. We immediately proposed to the underwriters of St. Louis to clear out its channel for three thousand dollars; but they deeming it a public work, declined the offer. Before the close of the season, the Pre-emption, Valley Forge, and Robert Lytle were sunk in it, and at least one hundred thousand dollars were paid for docking and repairing boats injured in it which did not sink. The chute finally became so bad in consequence of stumps, logs, and snags in it, and the wrecks of the Louisville, Pre-emption, and New Orleans, that large boats were dropped down through it by lines! One mile of the main channel of the Mississippi river! What a commentary upon our government! The next year the channel changed, and the horrors of the Graveyard were avoided by the "Middle Chute," a passage not very greatly better. The right-hand chute, called Doolan's Slough, was the channel a few years since, and contains the remains of five boats sunk by its obstructions. In the middle chute the Belle of Pittsburg, Felix Grundy, and some other boats, have been sunk. In these three passages formed by Powar's and Goose islands, about fifteen boats have been sunk. These passages can never be made safe except by the use of the diving-bell.

The third class sunken wrecks are abundantly strewn in and near the channel. Every year they receive fresh accessions to their numbers, and the last few years the number of boats sunk by them have greatly increased. Although they are much less numerous than the two preceding classes, they require a much more expensive boat, and

vastly more labor, skill, experience, and determination to effect their removal.

At Hat island alone are four wrecks, the Maid of Orleans, Pauline, Warren, and Monona, each of which has caused the loss of a steamboat. In Hacker's bend, the Pawnee was sunk by striking the Amazon, and has made a very dangerous obstruction. About 100 miles below Cairo, the H. D. Bacon sunk by striking the Chillicothe; we afterwards raised her. The Eliza sank recently at Plum Point by striking an old wreck. Last winter the Isabel sunk near St. Louis, by striking a wreck. At Turkey island a gauntlet is run by steamboats between the wrecks of the Rienzi and some other boat. The Paul Jones, sunk on Grand Chain, is a very dangerous wreck, and has injured several steamboats.

We have only mentioned some of the wrecks which have sunk boats on the Mississippi; but we doubt if their loss is equal to the sum total paid for repairs to others injured but not sunk by them.

To remove obstructions of this kind, a boat like our Sub-marine, No. 7, would be indispensable. This boat, just being completed at an expense of over \$50,000, has, in addition to her great lifting capacity, two powerful steam-pumps, capable of removing the sand from off these wrecks, which is absolutely necessary to be done before their removal can be effected.

The fourth class, submerged rocks, are, fortunately, not very numerous, although they have caused the loss of six or seven boats in the last few years.

At Cairo, the Grand Tower and H. D. Bacon were sunk last winter by rocks, which for many years before were too deep to injure our steam craft. The St. Nicholas struck one of them about the same time, and although prevented from sinking, incurred a loss to hull and cargo of near \$25,000.

At Beaver dam, boats have been often injured, and some sunk, by the rock there. On the Grand Chain, the J. M. White, John Hancock, Paul Jones, and some others, have been sunk by rocks, but it has been from being out of the channel. Buoys of boiler-iron would be of great service here to indicate the channel. They could be employed at many other places to point out obstructions with excellent results, until the dangers were removed. Blasting with powder would be the best means to remove these rocks, and the cost of taking off all that would be necessary would not exceed ten or fifteen thousand dollars. We have now enumerated all the difficulties to be overcome, and the best means, in our opinion, have been suggested for surmounting them.

If we look back to see what has been done already by the government for the cause, we believe we can clearly prove that *nine-tenths of the obstructions which have sunk steamboats on this river in the last five years are still in existence, and as dangerous as ever*; and the advantage gained by the removal of the one-tenth is greatly overbalanced by the great number of wrecks, dangerous to navigation, which have been added in the same period; thus making the river absolutely more dangerous at this time than it ever was before.

We believe this river never will be made safe until the work be confided to private enterprise, directed by skill and experience, and prompted by proper rewards and penalties. Sixteen years spent upon this noble stream in the pursuit of a business well calculated to give us an intimate knowledge of the difficulties to be contended with, warrant us in saying, most emphatically, that its channel can be made as safe as any other on this continent.

Constant watchfulness will be necessary for many years to come in promptly clearing all new channels of the obstructions exposed in the beds of them by the sand washing away which now covers them, and in the speedy removal of all new snags and sawyers.

To do this work properly, two snag-boats, four steam diving-bell boats, and one wrecking-boat, will be required. To build and thoroughly equip them would cost as follows:

2 snag-boats, at \$35,000 each	\$70,000 00
4 steam diving-bells, at \$20,000 each	80,000 00
1 wrecking-boat	50,000 00
	200,000 00

The expense of operating these boats for six months of the year, during low water, would be—

\$3,000 per month each for 2 snag-boats	\$36,000 00
2,000 per month each for 4 diving-bells	48,000 00
3,000 per month each for 1 wrecking-boat	18,000 00
10 per cent. per annum depreciation on capital ..	20,000 00
6 per cent. per annum insurance	12,000 00
5 per cent. per annum repairs	10,000 00
6 per cent. per annum interest on capital	12,000 00
Taking care 6 months of 7 boats when idle	6,000 00
	162,000 00

To this should be added a fair allowance to the contractors as profit; and, after the first year, the contractors should be liable to a penalty of say \$1,000 for every steamboat lost on the river by striking an obstruction in the channel.

After the second year a less amount of labor would perhaps be required, and the work could be done for from 10 to 15 per cent. less.

We would not recommend a smaller number of boats to be employed, as it would be all-important to operate at as many points as possible in seasons of low water.

On conditions similar to the above, we will contract to do the work for a period of ten years. And we would warrant a diminution of losses by sinking of 10 per cent. the second year; 17½ per cent. the third; 25 per cent. the fourth; 30 per cent. the fifth; 35 per cent. the sixth; 40 per cent. the seventh; 45 per cent. the eighth, and 50 per cent. the last two years of the duration of the contract, under pain of forfeiting the same; the increased number of boats navigating the

stream taken into consideration, together with any other facts bearing upon the case not calculated to shield us from neglect in the proper prosecution of the work.

If the removal of these obstructions be undertaken by the general government, a satisfactory result will not be obtained in the abatement of the most difficult of them, and in particular in the removal of sunken wrecks. Great experience and energy are absolutely indispensable in those having the immediate control of the boats; and unless urged on by interest to redouble their exertions when foiled in their endeavors, valuable time will be lost, and a useless expenditure of money result in nothing but failure. No matter how zealous and energetic the agent of the government may be, he cannot be on the different boats, managing and directing their operations in person, if he possessed the practical experience to constitute him capable of so doing; and, instead of obtaining those successful results which would attend the united exertions of an experienced company of individuals, directly interested in the profits and losses of the undertaking, he would have from the employment of salaried officers but poor success, and reap as the reward of all his anxiety and exertions, nothing but disappointment and annoyance.

Our firm is composed of four partners, each one of whom has served a laborious apprenticeship in the business we are pursuing; and if we should contract to do the work, we should begin it without the delay absolutely unavoidable on the part of the government, or of any other parties undertaking it, as we have all of the boats mentioned above ready for active service. To build them would involve a delay of nearly a year, in which time a loss to the commerce of the country would probably occur of an amount equal to what we would ask for the service of the ten years.

To do the work on this river to the extent done heretofore by government, when the snag-boats were in actual service, we would agree to prosecute and furnish the boats ourselves for \$75,000 per annum.

This would, however, result in an undiminished catalogue of sinkings and damages to hulls of steamboats.

We regret the length to which we have felt compelled to extend this communication.

Accept the assurance of the highest respect of your very obedient servants,

EADS & NELSON

Colonel S. H. LONG,

U. S. Army, Superintendent Western River Improvements.

OFFICE RED RIVER IMPROVEMENTS,

Louisville, October 1, 1855.

SIR: I have the honor to report that during the month of September last I have been engaged on duty at this place, in preparing the water-craft necessary to the improvement of Red river in and around

the raft, and that at the same time the work in the vicinity of the raft has been supervised by M. B. Newall, agreeably to my directions.

The snag-boat Gopher has been undergoing the requisite alterations and repairs at this place, and will be ready for her departure for Red river as soon as the stage of the river and the health of that region will permit. The yellow fever is now epidemic in that part of the country, and I did not think it prudent or advisable to send there a crew of men until the disease has disappeared.

The machine-boat constructed for the same service will also be in readiness to accompany the Gopher.

The work in the vicinity of the raft has been prosecuted with diligence since the date of my last report. A large portion of the raft requiring removal has been sawed, cut, and made ready for the Gopher and machine-boat.

Dooley's bayou has been operated upon to some additional extent in digging ditches across protruding points, digging down small islands, and chopping timber on the banks.

Finding by experiment that the fallen timber along the banks of upper Red river would burn readily, owing to the long hot and dry season, a small party was despatched from the head of the raft, up the river, for the purpose of destroying as much material for raft as possible. They returned on the 8th ultimo, having ascended about 450 miles, and report having burned enough to have formed at least three miles of compact raft. Owing to wet weather they were obliged to suspend operations; but will return again, should the weather prove propitious.

The hands have suffered somewhat from the flux, which has been prevailing in that region; one has died, making in all a loss of seven since my last.

Respectfully, sir, your obedient servant,

C. A. FULLER,
United States Agent and Engineer.

Lieut. Col. S. H. LONG,
*U. S. Army, Supt. Western River Improvements,
Louisville, Kentucky.*

APPENDIX C.

OSWEGO, September 1, 1855.

SIR: I have the honor to submit the annual report, required by regulation, of the progress of the several works under my direction on Lake Champlain, Lake Ontario, and Lake Erie.

BURLINGTON, VERMONT.

The work at this place is a breakwater 1,069 feet in length, and 35 feet in breadth on top, built of crib-work and ballasted with stone.

It is placed immediately in front of the wharves of the town in thirty feet water, and affords very good protection. In the year 1853 one hundred feet in length was added to the north end of the breakwater, but the appropriation was exhausted before the crib was completed, and it remains in an unfinished condition.

I repeat my recommendation, that two hundred feet in length be added to the north end of the breakwater to bring it under cover of a point of land to the north, and afford better shelter from northwesterly gales; an estimate for that purpose is herewith submitted.

Burlington is in the collection district of Vermont, which embraces the whole State; the port of entry is Alburgh. There is one light-house in the district, which is designated as No. 91, situated on Juniper island, Lake Champlain, south side of the entrance to Burlington harbor. The nearest fort is Fort Montgomery, at Rouse's Point, fifty miles from Burlington.

The duties collected in the fiscal year ending June 30,

1854.....	\$67,975 00
Value of foreign merchandise exported.....	1,066,001 00
Value of domestic produce exported.....	310,101 00
Value of merchandise imported and entered for warehousing and transportation to other districts.....	502,665 00
Amount of hospital money collected.....	277 00
American tonnage entered.....	21,592
American tonnage cleared.....	20,499
Foreign tonnage entered.....	12,194
Foreign tonnage cleared.....	9,589
Tonnage on outstanding enrolment for steam-vessels...	4,527
Tonnage on outstanding enrolment for sailing-vessels...	2,847

Estimate for completing the work of 1853.

1 foreman, 32 days, at \$2 50 per day.....	\$80 00
3 carpenters, 32 days, at \$1 50 per day.....	444 00
2 laborers, 32 days, at \$1 per day.....	64 00
	588 00

Estimate for adding 200 feet to present breakwater.

232 sticks round hemlock timber, 50 feet long, 12 inches small end.	
54.....do.....do.....48.....do.....do.....	
54.....do.....do.....46.....do.....do.....	
54.....do.....do.....44.....do.....do.....	
186.....do.....do.....40.....do.....do.....	
28.....do.....do.....38.....do.....do.....	
28.....do.....do.....36.....do.....do.....	
360.....do.....do.....34.....do.....do.....	
428.....do.....white pine.....35.....do.....do.....	

4,000 running feet white pine, to square 18 inches, in lengths of 35 feet and over.	
350 pieces white oak plank, 10 feet long, 3 inches thick, and 8 inches wide.	
9,000 white oak trenails, to square 2½ inches, and 2 feet long.	
1,600 perch of stone.	
1,000 pounds 8-inch wrought spikes.	
43,072 running feet hemlock timber, at 8 cents.....	\$3,445 76
14,980 running feet round pine, at 10 cents.....	1,498 00
9,000 cubic feet 18-inch square pine, at 15 cents.....	1,350 00
7,700 feet white oak plank, at 25 cents.....	192 50
9,000 trenails, at 7 cents.....	630 00
1,600 perch of stone, at 40 cents.....	640 00
Boat-augers, rope, &c.....	200 00
1 foreman, 120 days, at \$2 50.....	300 00
10 carpenters, 120 days, at \$1 50.....	1,800 00
14 laborers, 120 days, at \$1.....	1,680 00
Superintendent.....	1,460 00
1,000 pounds of wrought spikes, at 9 cents.....	90 00
	13,286 26
Contingencies 10 per cent.....	1,328 62
	<u>14,614 88</u>

SURVEY OF THE HARBOR OF OGDENSBURG.

This survey is nearly completed; the plotting is well advanced, and the map will be forwarded to the bureau as soon as possible.

HARBOR OF OSWEGO.

The operations of this year have been, in completing the work left unfinished last year; filling up the breach made in the fall of 1852, removing the temporary work built for its protection, and building crib-work inside of the remaining portion of the masonry, in case it should be thrown down and leave the west side of the harbor exposed. The west pier has been entirely re-built within the past three years, and, unless by an unforeseen casualty, will probably stand from five to seven years before requiring material repairs. It will become necessary to take down the remaining portion of the masonry, and replace it with crib-work, or to build a crib-work outside of it. The east pier of the harbor is kept in repair by private enterprise. The United States dredge-boat has been employed, at the expense of the corporation of the city, in dredging the entrance to the river, and has worked with good effect.

The harbor of Oswego is by far the most important on Lake Ontario, and its commerce is daily increasing. Since the establishing of reciprocity between this country and the Canadas, it has increased

materially; two daily lines of Canadian steamers have been established, the one from this place to Toronto connecting with the Collingwood route, through Georgian bay, to Lakes Michigan and Superior: this route is already much used in the transportation of merchandise and passengers. The other is from Oswego to Hamilton, connecting with the Great Western railroad, through Canada to Detroit, and no doubt will be eventually much used. From this great increase of trade and travel, the want of harbor-room becomes more and more apparent. The subject of an outer harbor having been discussed, and a plan projected by the Board of Engineers, I deem it unnecessary for me to say anything further on the subject.

Amount of duties in the fiscal year ending 30th June, 1855.....	\$245,112 48	
Value of foreign merchandise exported.....	1,239,306 00	
Domestic produce exported.....	2,541,169 00	
Value of merchandise imported, and entered for warehousing and transportation to other districts.....	990,348 00	
Amount of hospital money collected.....	951 99	
American tonnage entered.....	504,816	tons.
American tonnage cleared.....	506,052	"
Foreign tonnage entered.....	110,257	"
Foreign tonnage cleared.....	109,960	"
Tonnage for steam-vessels, on outstanding enrolment	519,908 $\frac{8}{5}$	"
Tonnage for sailing-vessels, on outstanding enrolment	23,309 $\frac{2}{5}$	"

I submit the following estimate for completing the present works at Oswego:

Continuation of wooden pier.

420 feet long, 30 feet wide, 4 feet below water, and 7 feet above, all of pine, except the upper course.

14 cribs, 30 feet long, and 30 feet wide, 4 feet deep.

Materials for one crib:

28 pieces pine, 12 by 12, 30 feet long, 840 feet, at \$120 per M	\$100 80
3,000 feet board-measure hemlock plank, 4 inches thick, for grillage, at \$8.....	24 00
50 pounds spike, for ditto, at 6 cents.....	3 00
48 1-inch round bolts, 3 feet long, 384 pounds, at 5 cents.....	19 20
48 white-oak trenails, at 3 cents.....	1 44
20 cords stone, at \$3.....	\$60 00
Deduct half for old stone.....	30 00
	30 00
Materials for one crib.....	178 44
14 cribs, multiply.....	14
	2,498 16

Superstructure, 420 feet long, 7 courses high—6 pine, 1 oak:

15,120 feet pine timber, 12 by 12, at \$120.	\$1,814 40	
2,520 feet oak timber, 12 by 12, at \$240..	604 80	
2,520 feet oak stringers, 12 by 6, at \$120..	302 40	
12,600 feet board-measure 3-inch oak plank, at \$25.....	315 00	
10,500 feet board-measure 3-inch pine plank, at \$14.....	147 00	
1,182 bolts, 1-inch round iron, 9,456 pounds, at 5 cents.....	472 80	
2,500 pounds 10-inch spike, at 6 cents.....	150 00	
1,200 pounds 7-inch spike, at 6 cents.....	72 00	
882 white-oak trenails, at 3 cents.....	26 46	
10 mooring posts, at \$10.....	100 00	
495 cords stone, at \$3.....	\$1,485 00	
Deduct half for old stone.....	742 50	
	742 50	
		\$4,747 36
		7,245 52

Labor and superintendence.

30 laborers, 56 days each, 1,680 days, at \$1.	\$1,680 00	
2 overseers, 56 days each, 112 days, at \$2.	224 00	
6 axe-men, 56 days each, 336 days, at \$1 25.	420 00	
6 carpenters, 56 days each, 336 days, at \$1 50.....	504 00	
1 master-carpenter, 56 days, at \$3.....	168 00	
1 general overseer and clerk, 56 days, at \$2.	112 00	
Blacksmithing and ship-chandlery.....	500 00	
Agent, 56 days, at \$4.....	224 00	
		3,832 00
Total for building.....		11,077 52
Removing old work, and preparing foundation.....		3,000 00
		14,077 52
Contingencies, 10 per cent.....		1,407 75
Total		15,485 27

SODUS BAY, CAYUGA COUNTY.

This beautiful sheet of water is fifteen miles west of Oswego, and is one and a half miles in length, north and south, and an average width of one thousand feet. The water is deep, the shores are bold, and affords great facilities for wharfing.

This bay, at the time of the survey in 1845, was separated from the lake by a gravelly beach, with an outlet about 150 feet in width, and one and a half feet deep. Subsequently, this beach was washed away by violent storms and submerged by the high water of the lake.

The plan for improving the entrance to this harbor, adopted by the board of engineers and approved by the honorable Secretary of War, was two parallel piers commencing on the bar and extending into the lake to a depth of fifteen feet water, the south end of the piers to be connected with the shore by rip-rap work, for the purpose of accumulating the beach again if possible. This work was commenced last season; 240 feet in length of the west pier was built, and the rip-rap to the west shore of the bay was formed; the accumulation of the shingle was very rapid, and before the close of the season a beach was formed 600 feet in length, varying from ten to fifty feet in width; a channel of eight feet in depth was also excavated between the bay and the lake.

This bay is in the collection district of Oswego; the nearest fort and light-house is at Oswego; the terminus of the Lake Ontario, Auburn, and New York railroad is upon the east side of the bay, which, when completed, will no doubt attract business to this harbor, possessing, as it does, the great advantages of depth of water, space, and perfect security against storms from any quarter. Nothing has been done at this work this season, as the appropriation was exhausted.

I submit an estimate for its completion.

East pier.

35 cribs, at \$302 42.....	\$10,584 70
52,500 feet, board measure, 3-inch pine plank, at \$10.	525 00
1,530 pounds 6-inch spike, at 5 cents.....	76 50
	11,186 20

Rip-rap to east side of bay.

1,560 feet in length, 218 cords stone, at \$2 50.. ..	545 00
	11,731 20

West pier.

35 cribs, at \$302 42.....	\$10,584 70
52,500 feet, board measure, 3-inch pine plank, at \$10.	525 00
1,530 pounds 6-inch spike, at 5 cents.....	76 50
	11,186 20

Recapitulation.

East pier.....	\$11,731 20
West pier.....	11,186 20
	22,917 40
Contingencies 10 per cent.....	2,291 74
	<u>25,209 14</u>

SODUS BAY, WAYNE COUNTY.

Nothing has been done at this work this season, the appropriation having been exhausted; and it is in a very decayed condition, except that portion of the channel and harbor pier which was rebuilt in 1853. The remainder of the east harbor pier, which is down below the surface of the water, must be rebuilt, and the entire west pier, from the beacon-light to the beach, is so much decayed that it must be rebuilt.

This bay is in the collection district of Oswego; there is a light-house on the west bank at the entrance of the bay, and a small beacon-light at the north end of the west pier; the nearest fort is Fort Ontario, at Oswego.

The commerce of this bay is, at present, not of much consequence, owing chiefly to the want of a communication with the interior. But the Sodus Point and Southern Railroad Company, organized in 1852, under the general railroad law of the State of New York, propose to construct a road on the broad gauge, from Great Sodus bay, on Lake Ontario, by the shortest and most direct route practicable, to a connexion, through a portion of the Canandaigua and Elmira railroad, with the New York and Erie railroad, at the village of Elmira; only about thirty-five miles of road remains to be built to effect this connexion. This road is already begun, and when completed will, no doubt, attract a good proportion of trade to this bay, for which it is so peculiarly well adapted to accommodate, as to space, depth of water, facilities for wharfing, and perfect security in storms.

As a harbor of refuge, it is of great importance to the commerce of the lake.

I submit the following estimate for this work :

East harbor pier.

Hemlock, 240 pieces, 12 by 12, 30 feet long, at 12½ cents..	\$900 00
Hemlock, 275 pieces, 12 by 12, 14 feet long, at 12½ cents..	481 25
Oak, 130 pieces, 12 by 12, 30 feet long, at 25 cents.....	975 00
Oak, 130 pieces, 12 by 12, 14 feet long, at 25 cents.....	455 00
Iron, 7,000 pounds 1½-inch, for bolts, at 5 cents.....	350 00
4,000 pounds 6-inch wrought spikes, at 7 cents.....	280 00

Plank, 34,000 feet 3-inch pine plank, at \$15.....	\$510 00
Harbor superintendence, &c.....	3,048 75
	7,000 00

West channel pier.

Hemlock, 480 pieces, 12 by 12, 3 feet long, at 12½ cents.	\$1,800 00
Hemlock, 640 pieces, 12 by 12, 18 feet long, at 12½ cents.	1,440 00
Oak, 220 pieces, 12 by 12, 30 feet long, at 25 cents....	1,650 00
Oak, 220 pieces, 12 by 12, 18 feet long, at 25 cents....	990 00
Iron, 15,000 pounds 1½-inch, at 5 cents.....	750 00
6,000 pounds 6-inch wrought spikes, at 7 cents.....	420 00
Plank, 65,000 feet 3-inch pine plank, at \$15.....	975 00
Labor and superintendence.....	4,015 00
	12,040 00
East harbor pier.....	7,000 00
	19,040 00
Contingencies 10 per cent.....	1,904 00
	20,944 00

GENESEE RIVER.

Nothing has been done at the mouth of this river this season, the appropriation being exhausted. In 1853 the west pier, 1,943 feet in length, was entirely rebuilt, and at present is in very good condition. The east pier, 2,034 feet in length, is decayed to the water's edge, and breaches in it below the surface of the water. In moderate gales of wind it is entirely submerged, which renders the approach of vessels to the entrance of the river very dangerous. It requires to be entirely rebuilt.

This harbor is in the collection district of Genesee—port of entry Rochester; there is a light-house on the high ground just west of the pier, and a small beacon-light at the lake end of the west pier; the nearest fort is at Oswego; there is a railroad terminus at Charlotte, and considerable trade is carried on coastwise and with the Canadas. From its peculiar position, being about midway of the lake, the whole commerce of the lake is interested in this harbor being preserved.

Estimate.

Pine timber, 12 by 12.....	\$6,600 00
Oak timber, 12 by 12.....	4,730 00
Pine plank, 3-inch.....	2,000 00
Stone ballast	800 00

Wrought-iron spikes, 6-inch.....	\$400 00
Iron bolts, 1½-inch.....	2,000 00
Labor and superintendence.....	5,000 00
	21,530 00
Contingencies 10 per cent.....	2,153 00
	23,683 00

OAK ORCHARD CREEK.

Nothing has been done this season at this harbor for the want of means. The west pier is 844 feet in length, and 20 feet wide; 290 feet of this was built in 1853, and is in good condition; 150 feet in length was repaired: the remaining portion is very much decayed and requires to be rebuilt. The east pier is 734 feet long, 20 feet wide, is in a very decayed condition, and requires rebuilding. It is intended that the piers shall be extended into the lake to a depth of 15 feet. This harbor is in the collection district of Niagara; Charlotte is the nearest port of entry; the nearest light-house is at Genesee river, and the nearest fort is Fort Niagara.

At present there is no regular trade from this harbor; but it is within ten miles of the Erie canal, and a survey has been made for a railway to connect with the interior.

Being midway between Genesee river and Niagara river, it is important to the commerce of the lake as a harbor of refuge.

Estimate.

West pier—20 cribs, at \$860 98.....	\$17,219 60
East pier—18 cribs, at \$860 98.....	\$15,497 64
Repairs	3,743 65
	19,241 29
West pier.....	17,219 60
	36,460 89
Contingencies 10 per cent.....	3,646 08
	40,106 97

HARBOR OF BUFFALO.

No work has been done this season at this harbor for the want of means. Last season the rebuilding of the protection-wall, which was thrown down by a storm in 1843, was completed. I respectfully renew my recommendation to rebuild the wall about the light-house: the present wall is built of small stone, and exhibits signs of yielding. I

also recommend the renewal of the tow-path in character with the wall, and for its greater security. It is now in a very dilapidated condition, having been frequently run into by vessels. It should be taken up to the depth of the foundation, if practicable, faced with masonry similar to the wall, filled with concrete, and paved with flagging. This, I think, would finish permanently this harbor as at present projected.

The harbor of Buffalo is in the collection district of Buffalo Creek. There is a light-house at the end of the south pier. The nearest fort is Fort Porter, at Black Rock. Situated as this harbor is, at the terminus of the navigation of Lake Erie, the whole commerce of the lake is interested in its being preserved; and there is a very pressing necessity of more extended harbor room.

I submit the following estimate for the completion of the present plan, as above recommended:

Estimate for removing and rebuilding the towing-path of south pier, Buffalo harbor, N. Y.

The old work to be removed, 5 feet deep, 20 feet wide, and 1,420 feet in length.

The new work to be faced with ashlar, (12-inch stones,) 4 feet high and 3 feet wide, with a coping 12 inches thick over the wall, a filling of concrete behind, and a flagging 10 to 12 inches thick, (edges picked square,) laid over the concrete.

Removing old work, 4,237 cubic yards, at 20 cents.....	\$847 40
Filling of concrete, 3,576 cubic yards, at \$2.....	7,152 00
Dressing ashlar and coping, 58,633 superficial feet, at 5 cents.....	2,931 65
Picking flagging, 29,480 running feet, at 5 cents.....	1,474 00
Setting face-wall and coping, 818 cubic yards, at \$2...	1,636 00
Setting flagging, 2,682 superficial yards, at 30 cents...	804 60
Cement for wall and coping, 272 barrels, at \$1 50.....	408 00
Sand, 2,720 bushels, at 2 cents.....	54 40
Stones, about 1,200 tons, at \$1 25.....	1,500 00
6 stone mooring-posts, (in place of those broken,) at \$20,	120 00
	16,928 05
Contingencies, 10 per cent.....	1,692 80
	18,620 85

Estimate for removing and rebuilding about thirty-seven feet of wall in front of light-house, Buffalo harbor, N. Y.

Removing old wall, 278 cubic yards, at 37½ cents.....	\$104 25
Laying foundation of concrete and masonry, 55 cubic yards, at \$2 50.....	137 50
Setting ashlar and coping, 102 cubic yards, at \$2.....	204 00
Filling rubble behind wall, 150 cubic yards, at 25 cents,	37 50

Setting flagging on top of wall, 35 superficial yards, at 30 cents.....	\$10 50
Dressing ashlar and coping, 2,570 superficial feet, at 6½ cents	167 05
Picking flagging, 385 running feet, at 5 cents	19 25
Stones, about 450 tons, at \$1 25.....	562 50
Tools, implements, &c.....	100 00
Cement, 60 barrels, for wall, at \$1 50.....	90 00
Sand, 600 bushels, at 2 cents	12 00
	1,444 55
Contingencies, 10 per cent	144 45
	1,589 00

Recapitulation.

For tow-path, south pier	\$18,620 85
For rebuilding wall in front of light-house.....	1,589 00
Total required.....	20,209 85

HARBOR OF DUNKIRK.

The plan projected by the Board of Engineers, and approved by the Secretary of War, for the protection of this harbor, consists of three breakwaters: "The principal or central one on a line drawn from Light-house Point to Battery Point. The second west, and inland of and parallel to the first; and the third east, and lake-ward of the main work, and slightly inclined to it, or in a direction of south 77° west from Battery Point. The west breakwater is limited towards the west by a point 300 feet from a line drawn from the head of the present west pier to Light-house Point, and towards the east by a northwest line drawn from the west end of the present breakwater, and is in length 1,000 feet.

The main breakwater is limited towards the west by a line drawn perpendicular from a point 500 feet on the prolongation of the line of the west breakwater, and towards the east by a length of 2,890 feet; and the east breakwater is limited towards the east by a line drawn from the central point at the landing tangent to the nine-feet curve, and towards the west by a length of 765 feet. These works cover essentially the entire exposed arc lying between the Light-house Point and on the west, and the nine-feet curve on the east. Protection is afforded not only to vessels lying in the inside harbor, but to those entering or leaving it by the channels; and besides, an outer harbor is formed between the old and the projected works that will serve as a harbor of refuge when provided with suitable moorings made necessary by the absence of sufficient holding-ground. Besides the two entrances of 500 feet provided for by the design between the works, there is one

between the shore-end of the east breakwater and the nine-feet curve. The works are founded in eighteen-feet water, and cover from the northwest winds an area of ninety-seven acres, having a depth of twelve feet and upwards." In a revised report of the Board of Engineers, it is recommended that present available means be applied to the construction of the west breakwater, which were complied with, but the work was not commenced until late in the season in consequence of the failure of the contractors to comply with their engagements. The first delivery of materials, due on the 1st of May, was not completed until the 12th of July; however, as the timber was delivered, it was framed and prepared for the cribs; but it was not until the 30th of June that a sufficient quantity of stone was delivered to sink a crib, and on that day the first crib was placed on the alignment of the west breakwater, but before it could be filled with stone a gale of wind came on which drove it from its place. The weather has been very boisterous for the most of the season, and very unfavorable for such operations. Up to the present time six cribs have been placed on the line, making a length of 180 feet, but the sixth crib was caught in a gale before it was filled with stone, and wrecked. The frames for six more cribs are in readiness, and which I hope to have placed before the close of the season.

The harbor of Dunkirk, being the terminus of the New York and Erie railroad, must necessarily become an important point in the commerce of the lakes; and from its position on the lake, midway between Buffalo and Erie, is very important as a harbor of refuge.

There is a light-house on the point of land west of Dunkirk, and the nearest fort is Fort Porter, at Black Rock.

The amount of tonnage arriving and departing from this place is 300,000 tons annually.

In 1854, the value of property received by the lake was \$10,400,000, and the value of merchandise brought by the New York and Erie railroad to be shipped from this point was \$15,000,000; there were also 30,000 emigrants shipped from here.

The whole commerce of Lake Erie would be greatly benefited by the completion of this harbor.

I submit the estimate of the Board of Engineers:

Cost of one crib 30 by 30, and 23 feet high.

46 side-pieces, 12 by 12, 31 feet long, 1,426 feet, at 10 cts.	\$142 60
23 stringers, 12 by 12, 30 feet long, 690 feet, at 10 cents .	69 00
69 ties, 12 by 12, 20 feet long, 1,380 feet, at 10 cents . . .	138 00
9 bottom-timbers, 30 feet long, 270 feet, at 10 cents. . . .	27 00
71 cords stone, at \$7	497 00
1,300 pounds 1½-inch drift-bolts, at 6 cents	78 00
1,530 feet B. M. 3-inch pine plank, at \$14	21 42
43 pounds 6-inch spikes, at 7 cents	3 01
1 snubbing-post	25 00
Carpentry and labor	85 00
Cost of one crib	<u>1,086 03</u>

Western breakwater, 33½ cribs, at \$1,086 03.....	\$36,201 00
Middle breakwater, 96½ cribs, at \$1,086 03.....	104,620 89
Eastern breakwater, 25½ cribs, at \$1,086 03	27,693 76
	168,515 65
Compensation of agent for 6 years and 183 days at \$4, and 182 days at \$2 in each year	6,576 00
	175,091 65
Contingencies, 10 per cent	17,509 16
	192,600 81

HARBOR OF ERIE.

The measures recommended by the Board of Engineers as necessary to give full value to the natural advantages of this harbor are—

1st. The modifications, repair, and extension of the present piers at the eastern entrance to secure the proper depth of water between the lake and the bay or harbor within.

2d. The construction of channel piers to form a western entrance at or near the breach in Peninsula Point, and the security of the beach on either hand.

3d. The checking of the abrasion and the restoring of the original water-line of the island as far as this may be practicable.

The Board of Engineers recommend that the eastern entrance be increased to 500 feet in width, by building a new south pier and removing the old one; and also to extend the north pier into twelve feet water. They also recommend the construction of piers and breakwaters to form an entrance at the west end of the bay; to close the present breach in the peninsula, and to protect the abrasion of the beach by brush-work. It is also suggested by them that the small balance of the appropriation on hand be applied to the latter object, as a measure of pressing necessity in view of the safety of this valuable harbor; and my operations this season have been confined to this object. The brush-work constructed last season stood through the winter without injury, and in some places had accumulated. The sand was to be entirely imbedded at other points. Although it has not accumulated so much sand, it has prevented the further abrasion of the beach. This work was continued this season north and south until the whole abraded portion of the northwest end of the island was covered. It has stood remarkably well through several severe blows from the northwest, and I think will eventually succeed, and may probably restore the original water-line. After completing this point, my attention was turned to stopping the breach. The brush-work was commenced on the south side at a point within the opening and extending across. The work had not been carried out more than fifty feet before its effect began to show; and, as it progressed, the success was most flattering. The beach accumulated, following the work very rapidly, as will be seen

by referring to the map. The season has been very unfavorable, westerly and northwesterly gales prevailing, for such work; yet it has reached within a hundred feet of the north shore, and I have no doubt will eventually succeed in effectually closing the breach.

I submit the estimate of the Board of Engineers for the completion of this harbor.

Eastern entrance.

North channel pier (extension to 12 feet water) 14½ cribs, 30 by 20 by 17, at \$800	\$11,466 67
South channel pier (new line for a channel way of 500 feet) 35½ cribs, 30 by 20 by 17, at \$800	28,533 33
Removing 580 feet of present south pier, 12 feet wide, to a depth of 12 feet, at \$20	11,600 00
	51,600 00
Contingencies, 10 per cent.....	5,160 00
Amount of eastern entrance.....	56,760 00

Western entrance.

North channel pier 55 cribs, 30 by 20 by 17, at \$800..	\$44,000 00
South channel pier 73 cribs, 30 by 20 by 17, at \$800..	58,400 00
North breakwater 76 cribs, 30 by 20 by 17, at \$670...	50,920 00
	153,320 00
Brush-work facing 4,620 feet shore, north of Barrack Point, 50 feet wide, 26,222 square yards, at \$1 25...	32,777 50
Brush-work facing 1,000 feet shore, south of Barrack Point, 50 feet wide, 5,555 square yards, at \$1 25....	9,943 75
	193,041 25
Contingencies, 10 per cent.....	19,304 12
	212,345 37

Recapitulation.

Eastern entrance.....	\$56,760 00
Western entrance.....	212,345 37
Total amount	269,105 37

Respectfully submitted by your obedient servant,

W. TURNBULL,

Major Topographical Engineers, Brevet Colonel.

Colonel J. J. ABERT,

Chief Topographical Engineers.

Ex. Doc. 1—25*

APPENDIX D.

OFFICE OF GENERAL SUPERINTENDENT OF PUBLIC WORKS,
Cleveland, Ohio, September 30, 1855.

COLONEL: I have the honor to submit to the Bureau of Topographical Engineers a report upon the state of the harbors upon Lake Erie, within the district under my care, for the year ending September 30, 1855.

The number of these harbors is nine, viz: Conneaut, Ashtabula, Grand River, Cleveland, Black River, Huron, Sandusky, and Monroe; extending from the eastern boundary of the State of Ohio to the mouth of the river Raisin, in the State of Michigan.

The appropriations made for these works in 1852 having for the most part been exhausted during the year 1854, active operations have been confined the present season to the completion of the west pier of the harbor of Cleveland.

My annual report of last year embraced so fully all the details respecting each of the works, that little remains this season except to recapitulate the substance of what was then said. Upon an inspection made for the purpose, it was found that the works remained very much in the condition they were in when that report was made, and I have seen no reason to materially change either the estimates or the recommendations I had then the honor to submit.

HARBOR OF CONNEAUT.

Since my last report, the planking and filling of the western pier has been completed, and the harbor, so far as the present piers extend, is in an excellent state of repair, with never less than nine, and generally ten feet of water, affording a valuable harbor of refuge for the navigation of the lake.

In the report of 1854, an estimate was submitted for extending both piers into the lake 150 feet each, in accordance with the recommendation of the board of engineers for lake harbors and western rivers, and which I herewith renew.

Estimate for continuing the improvement of the harbor of Conneaut.

For extending the piers at Conneaut harbor 300 feet...	\$11,524 81
Add compensation of agent one year.....	1,460 00
Total for Conneaut harbor.....	12,984 81

On the 30th of September last, there remained in my hands of the appropriation the sum of \$462 21; of which \$459 70 has since been expended, leaving a balance of \$2 51. The whole amount of work done with the appropriation (which was \$10,000,) has been 890 feet of pier entirely rebuilt upon the foundation of the old work; 120 feet thoroughly repaired; a new crane-scow built; and a complete survey and chart of the harbor made and transmitted to the bureau.

HARBOR OF ASHTABULA.

No work has been done upon this harbor the present season, the appropriation being exhausted. The fourth quarter of last year was occupied in finishing up what had been commenced. The harbor is now in a very tolerable state of repair, although some work requires to be done, especially upon the west pier, for which an estimate is submitted.

In 1853 an estimate was submitted by the then local agent, for continuing the improvement of this harbor by an extension of both piers into the lake. The same estimate was again made last season, with a slight increase of the prices of materials and labor, and with also an additional item for completing the repairs of the old work. This estimate is renewed.

Estimate of funds required for continuing the improvement of the harbor of Ashtabula, and completing the repairs of the old work.

For continuing the improvement of the harbor of Ashta-

bula, as per estimate of the local agent attached....	\$24,516 40
Completing the repairs of the old piers.....	4,500 00
Contingencies, 10 per cent.....	2,901 64

Total estimate for Ashtabula.....	31,918 04
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On the 30th of September last, there had been expended of the appropriation (which was \$10,000) the sum of \$9,346 15. Since that time \$562 58 has been expended, leaving a balance of \$91 27. With this sum 670 feet of pier have been constructed, 490 feet of which have been rebuilt upon the foundation of the old work, from a depth of from five to eight feet below the surface of the water; and two hundred feet have been faced up and thoroughly repaired. A survey and chart of the harbor has also been made and transmitted to the bureau.

HARBOR OF GRAND RIVER.

Operations upon this work were suspended at the close of last season, the appropriation being exhausted.

With the sum appropriated, (which was \$10,000,) 1,250 feet of pier have been rebuilt, 280 feet of which were constructed from a depth of from three to seven feet below the water, and the rest from the water line; 290 feet have been faced up and thoroughly repaired, including the outer end of the angle of the west pier, which was refilled with stone. A complete and minute survey of the harbor, river, and lake in its vicinity, has also been made, and the chart transmitted to the bureau. The whole appropriation has been expended.

With the annual report of last year I transmitted an estimate of the local agent of the work, providing for "the extension of the east pier 500 feet, in continuation of the present line of that pier; and also for

the extension of the west pier, from a point 160 feet from where that pier begins to 'flare' outward, for 400 feet, on a line parallel with the east pier as extended; and for pier work to connect the head of these 400 feet with the head of the present west pier."

The estimate was for the same plan of improvement as that transmitted the year previous, with a slight increase of the prices then estimated, owing to the general rise in the cost of labor and provisions that had since taken place. This estimate amounted to \$41,346 82.

The Board of Engineers did not concur with the local agent as to the propriety of the proposed extension and modification of the harbor, but confined itself to the extension of the east pier for 320 feet, to bring it out into the lake as far as the west pier, and to the addition of an item for the reconstruction of the isolated pier on which the beacon is placed.

The *pro rata* estimate of the board, based upon that of the local agent of 1853, was \$13,016 54, including the compensation of an agent for one year. The *pro rata* upon that same estimate made in 1854, with the enhanced prices for materials and labor, would be \$15,004 56, and was that submitted in my last report. From that estimate I see no reason for varying the present season, and it is therefore renewed.

A recent inspection of this harbor has resulted in the conviction that there is no immediate necessity for the reconstruction of the pier on which the beacon is placed. It is certainly in as good, if not better, state of repair than any part of the old work; and, with a little care, will last eight or ten years. Some portions of the west pier still remain which require facing up, to prevent the drifting of the beach-sand into the harbor; but by retaining the estimate for rebuilding the beacon-pier, funds sufficient for that purpose will be obtained without increasing the appropriation.

Estimate of funds required for continuing the improvement of the harbor of Fairport, (Grand River.)

Estimate of local agent in 1854, for 1,160 feet of pier.....	\$41,346 82
Pro rata for 380 feet, as recommended by the Board of Engineers.....	13,544 56
Add compensation of agent for one year.....	1,460 00
Total estimate for Grand river.....	<u>15,004 56</u>

HARBOR OF CLEVELAND.

Operations upon this work have been prosecuted this season with unremitting vigor. The exhaustion of the appropriations for the other works within the limits of my command, has enabled me to devote my whole personal attention to every detail of the construction.

In the winter large quantities of the finest oak timber were gotten out,

and delivered upon the work at the earliest period possible after the opening of the navigation in the spring. Selections were also made from numerous specimens of stone, with a view to secure a quality of the greatest specific gravity.

Last season 450 feet of new pier, twelve feet wide, was constructed, occupying a line on the natural bottom of the lake, *outside* of the present dilapidated structure, and at the foot of an inclined plane, which had been artificially formed of loose stone deposited along the outer or lake side of the old pier, with the very mistaken intention of securing it against the destructive action of the waves. The plan for the new pier was adopted by the Board of Engineers, in order to avoid the evil effects produced by this plane, (to which, beyond doubt, was owing the total destruction of the old work,) as well as to secure the advantage of presenting a vertical front to the sea, and of annulling its force more effectually than by the old system of rip-rapping.

As heretofore reported, this plan of the board created the necessity of either removing the old pier altogether, and thereby widening the harbor by the distance between the inner line of the old and that of the new pier, or of so building up the old pier as to form an interior face to the western side of the harbor at its present width, and then connecting the two piers by a planked covering, which would thus cause the two parallel piers to form one and the same structure.

The objections to taking away the old pier were then stated to be the great expense of removing at a depth of from ten to fourteen feet not only the old cribbing, but also the unnecessarily great deposit of stone which had been made in the construction of this pier, and which, by the destruction of the old cribs, had been spread over a wide surface, especially within the harbor; and secondly, the increased width which would, by this measure, be given to the harbor at its entrance, whereby the force of the river current would be in a measure deadened at the very point where its velocity was most needed to keep the channel open, and to resist and prevent the influx of sand from the lake.

For these and other reasons which were then adverted to, it was decided to rebuild the old pier, and to connect it with the new one by a planked covering, by which means a pier would be formed with a width at the lake shore of fifty feet, increasing, as has since been ascertained, to fifty-four feet at its northern extremity.

In accordance with this plan 150 feet of the inside pier has been rebuilt upon the old work, which was prepared by sawing off, two feet under water, the sheet-piling (by which that portion of the old pier had been originally enclosed) and bolting to the tops of the ties longitudinal timbers, upon which a superstructure was constructed, which for firmness and solidity of foundation cannot be excelled.

It was found that so much of the old piles as had always remained beneath the water without exposure to the air, were as bright, sound, hard, and solid, as if they had just been driven—unaffected by either worm or rot; whilst those portions of them which projected above the water were decayed and worthless. The piles were of oak, and had been driven about twenty years.

One hundred and twenty feet of the two new piers have been con-

nected by a substantial bridging, the tie-beams of which are supported in the centre upon posts capped with bolsters six feet long, and the whole has been planked.

In addition to this inside pier work the outside pier has been carried out 350 feet to the prescribed limits of its length, and the crib for the pier-head is framed and in the water, only awaiting favorable weather and a calm sea to be sunk and secured. Thus it will be seen that in the two past seasons 950 feet of pier have been built, 800 of which is upon the natural bottom of the lake, upon sandy and uncertain foundation, liable to settle unevenly and unexpectedly, rendering great care necessary to preserve its alignment, and to secure the proper and indispensable connexion of the cribs with each other. The whole has been successfully accomplished, and the result is a work which for perfection of workmanship and fidelity of construction has more than equalled my most sanguine expectations. The whole work is tied together in the most elaborate manner, and is thoroughly bolted with iron. A new method has been devised for tying the timbers together, which will, it is believed, add very materially to the strength and "oneness" of similar structures hereafter. A model of a crib with this modification is being prepared, and will be forwarded to the bureau for its inspection.

For the very successful accomplishment of my plans upon this work, I am much indebted to the zealous and very intelligent coöperation of my foreman, Mr. Nelson Burrington, from whose long experience in constructions of this character I have derived much practical information and advantage.

To complete this pier, 650 feet will have to be constructed along the inner face of the harbor, upon the broken and very irregular foundation of the old work. Four hundred and fifty feet of this will be in an average depth of four feet below the surface, and the remaining two hundred feet in a depth of ten or twelve feet. The whole will then require to be bridged over, by which means the two parallel piers will be connected, forming one structure between fifty and sixty feet wide. An estimate of this part of the work, in detail, is attached.

In my last annual report I gave a full description of the state of the east pier, upon which the beacon is placed, and which I herewith repeat:

"In a report to the bureau of March 2, 1854, I stated that the outer end of the east pier, which is constructed of cut-stone laid upon the old wooden structure under water, had been almost entirely demolished by a large steamer coming in contact with it in a heavy storm, whilst endeavoring to make the entrance of the harbor, and that the whole of this part of the work would have to be taken down and rebuilt. The portion of the pier which is damaged by this and a subsequent concussion of another steamer is sixty-six feet in length, by sixteen in width. It is so badly damaged that it will be necessary to take down the whole of it, and to rebuild it from the foundation. I submit an estimate of the workmanship and labor only, there being, as is believed, an abundance of block-stone remaining on hand, to answer the demand.

"An estimate is also submitted for replacing the wooden 'platform'

in front of the beacon, with a structure of stone, to correspond with that of the rest of the pier. This platform is described in a report to the bureau of August 11, 1853, and is designated on the chart of the harbor.

"The beacon-light on the end of the pier is a cast-iron structure, placed upon a foundation of cut-stone, fourteen feet square, which is surrounded by a wooden crib twenty-eight feet by thirty, filled with stone. It is proposed to remove this wooden crib, and to replace it with stone, connecting it with the platform, so as to form a pier-head of masonry forty-one feet wide by ninety feet in length. The wooden crib surrounding the beacon is in a state of decay, and should be made as solid as possible, so as to protect the foundation of the beacon, which, although well built, is of itself entirely too small to resist the shock of the sea in northeast gales."

Time has proved the correctness of the above remarks. The action of the winds and waves upon the head of this pier has, as was to be expected, continued to loosen the connexion of the stone-work, and it is now in a much worse condition than it was at the time that report was made. The necessity of repair is daily becoming more urgent; and unless measures are taken to remedy the evil, the whole end of the pier will ere long tumble into the lake. I therefore renew the estimate heretofore presented, the details of which are attached.

The appropriation for this work was \$30,000. With this sum 800 feet of pier has been built twelve feet wide on the natural bottom of the lake, in an average depth of $8\frac{1}{2}$ feet water; 150 feet (inside) has been constructed on the foundation of the old work, by sawing off the old piling two feet under water, and bolting the new work to it; 120 feet of the two new piers have been connected by a substantial bridging, consisting of long timbers notched and dovetailed into the new work, and supported in the centre by a structure for the purpose, and planked fifty-two feet wide; a new crane-scow has been built for the work; a boarding-house, lodging-house, and carpenter's shop have been erected, 300 feet of the east pier planked for a width of thirty-six feet, and a complete survey and chart of the harbor and its vicinity made and transmitted to the bureau.

Of the appropriation, \$25,000 has been expended, leaving a balance of \$5,000 to the credit of the work, a considerable portion of which will be needed to close up the labors of the present season.

Estimate of funds required for continuing the improvement of the harbor of Cleveland.

WEST PIER.

For completing the west pier its present length; connecting the two piers, and planking the whole, as per detailed estimate hereto attached.....

\$21,467 93

Contingencies, 10 per cent.....

2,146 79

Total for the west pier.....

23,614 72

EAST PIER.

For removing the old stone work on the outer end of the pier, (destroyed by a steamboat,) and rebuilding it, (labor only)	\$6,877 20
For tearing up the wooden platform in front of the beacon, and replacing it with a structure of masonry to correspond with the rest of the pier, and form a solid pier-head	15,152 50
For tearing away the wooden crib surrounding the beacon, to replace the same with a structure of masonry, connecting it with the pier-head proposed to be rebuilt as above	4,113 45
Total for the east pier	<u>26,143 15</u>

Recapitulation.

West pier	\$23,614 72
East pier	26,143 15
	<u>47,611 08</u>
Deduct appropriation on hand, say	5,000 00
Amount required	<u>42,611 08</u>

HARBOR OF BLACK RIVER.

As heretofore reported, the whole of the appropriation for this work, amounting to \$5,000, was expended last season. This sum was totally inadequate. By far the greater part of the harbor works were in a ruinous or dilapidated condition, and extensive repairs are yet required to place it in a proper condition. With the appropriation 360 feet of new pier has been rebuilt upon the foundation of the old west pier, nearly the whole of which is planked. This was all that could be done with the limited amount at command, leaving much still to be done to that pier—a new pier-head to be built, the east pier having been wholly untouched. This latter pier is very much dilapidated, and a portion of the northern or outer end of it, 300 feet in length, is wholly gone to a depth of six feet, with the exception of one detached part a few feet in length, which will have to be torn down. The rest of the old east pier, 700 feet in length, and running to the lake shore, can be repaired and strengthened so as to last for many years, if taken before the process of decay extends much farther. A pier-head is indispensable at the end of this pier to protect it from the lake storms.

A recent examination of this work has resulted in the conviction that the estimate submitted last season requires no change; and it is, therefore, renewed.

Estimate of funds required for continuing the improvement of the harbor of Black River.

EAST PIER.

To rebuild 300 feet of pier, 13 feet wide, from 6 feet below the surface.....	\$6,324 00
To repair and partially rebuild from surface 725 feet same pier.....	6,500 00
To face up 225 feet on inner end of pier, to prevent breach.....	862 50
For pier-head, 40 feet square, in 15 feet water, to rise 9 feet above surface.....	4,291 40
Total for east pier.....	<u>17,977 90</u>

WEST PIER.

To rebuild 210 feet on inner end of pier.....	\$2,340 10
To repair and face up 800 feet inside the harbor.....	4,000 00
To repair 120 feet, north end of the pier.....	1,250 00
To rebuild pier-head from surface of the water, 35 feet square.....	2,433 60
Total for west pier.....	<u>10,023 70</u>

Recapitulation.

East pier.....	\$17,977 90
West pier.....	10,023 70
Contingencies, 10 per cent.....	2,800 16
	<u>30,801 76</u>

HARBOR OF VERMILLION.

No provision was made in the appropriation bill for this harbor, but a small sum was placed at my disposal by the Light-house Board for repairs connected with the necessities of the beacon-light at the end of the west pier. This sum has been expended, and an account of it rendered to that board.

The piers of this harbor were designed and constructed on a more liberal scale than those of any similar work upon the lake, being twenty-four feet wide their whole length from the lake shore. Owing, however, to local causes, the wood-work, where exposed to the air, has decayed to such an extent as to require the removal of the whole pier above the water, and its reconstruction. The foundation is most excellent—firm, regular, and solid; it affords unusual facilities for re-

building upon it a very permanent work, either of wood or of stone. The east side is in a broken and ruinous condition, nearly one hundred feet of the outer end being gone to the depth of several feet below the surface, and the remainder in a wretched state. Neither of the piers was built originally of a sufficient height above the water; and they are, consequently, all the year (especially the east pier) piled up with flood and drift-wood, frequently to the height of six or eight feet.

In my last annual report I remarked: "That the piers should be extended farther into the lake will, I think, be evident from an inspection of the chart of the harbor, made from a survey this season. The deepest water found by the soundings taken in August, (1854,) is little more than 8 feet, although it is not doubted that the completion of the east pier, by confining and directing the current of the river in the spring, will enable it to sweep out the space between the piers and materially to deepen the water." The depth has been somewhat greater this season than it was last, from unusually heavy spring freshets; but owing to the partial destruction of the east pier, the force of the current was dissipated and weakened, and very little comparative good was effected. In the absence of all knowledge of the opinion of the board as to the farther extension of the piers, I have submitted no estimate for that purpose. If the piers are extended, the estimate will be increased by the cost of the extension. In any case two pier-heads will be required for their protection, and an estimate is accordingly submitted of their cost. These were not included in that of last year, and the estimate now submitted will consequently be increased by the sum required for their construction.

Estimate of funds required for continuing the improvement of the harbor of Vermillion.

WEST PIER.

To raise 125 feet of pier to a height of five feet, 24 feet wide.....	\$2,035 68
To rebuild from the water's edge 1,000 feet of pier....	14,600 16
To face up 400 feet of pier (inside).....	1,000 00
Pier-head 40 feet square, in 15 feet water, to rise 9 feet above surface.....	4,291 40
Total for west pier.....	<u>21,927 24</u>

EAST PIER.

To bring up 90 feet of pier to surface of water.....	\$1,132 48
To rebuild 350 feet of pier from surface, 6 feet high, 24 feet wide.....	7,909 60
To face up and repair 740 feet (inland).....	3,709 00
Pier-head for east pier.....	4,291 24
Total for east pier.....	<u>17,033 32</u>

Recapitulation.

East pier.....	\$21,927 24
West pier.....	17,033 32
Contingencies 10 per cent.....	3,896 05
Total for Vermillion harbor.....	42,856 61

HARBOR OF HURON.

Nothing has been done at this harbor the present season, the appropriation being exhausted. The whole amount appropriated was \$10,000, with which 630 feet of pier has been rebuilt from an average depth of 3½ feet, filled with stone and planked; and 90 feet raised to a height of three feet above the water, to prevent a breach between the new work and the shore. This appropriation, by order of the bureau, was expended wholly on the east pier, and the greater portion of the work had been done before it was assigned to my charge. I cannot, therefore, hold myself responsible for the manner of its construction.

Upon the west or light-house pier a new and substantial pier-head has been constructed upon the ruins of the old structure, which had been destroyed by the capsizing, in a gale, of the old beacon which was built within it. The pier-head rises nine feet above the water and is connected with 90 feet of new pier built from an average depth of eight feet. The amount expended was \$5,492 28, and the funds were furnished by the Light-house Board, to whom an account of the expenditure has been rendered.

In my last annual report, I called the attention of the bureau to the state of this pier. In such a ruinous condition is it, that the pier-head upon which the beacon is placed stands entirely isolated, there being no communication between it and the shore. The pier is gone, or nearly so, for 1,200 feet, and will require to be entirely rebuilt. The light-keeper is obliged to reach his light entirely by means of a boat. In rough weather this is frequently impracticable, so that upon the slightest indication of a blow he is obliged to light his lamps in the morning, leaving them to burn all the day, lest he should be unable to reach the beacon in the evening. The construction of this pier is also necessary for the preservation of this noble harbor, which is one of the best, naturally, on the lake. At present it is exposed to the fury of the northwest gales, which roll in a tremendous sea, bringing with it large quantities of sand, which is deposited within the piers, to the great detriment of the navigation. During the past autumn and previous to the spring freshets, which partially cleared it, the width of the channel was reduced to thirty feet, the deposits on both sides of it reaching entirely across the harbor, and coming nearly to the surface of the water.

A recent examination of this work has induced me to renew the estimate submitted in my last annual report, no change worthy of note having occurred since that time.

Estimate of funds required to continue the improvement of the harbor of Huron.

WEST OR LIGHT-HOUSE PIER.

To rebuild the west pier from an average depth of 5 feet, 1,200 feet of pier, 12 feet wide, and to rise to a height of 6 feet above the water.....	\$20,279 20
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EAST PIER.

To complete the east pier at the northern extremity by rebuilding 210 feet upon the old foundation, 8 feet be- low the surface, to rise 6 feet.....	\$4,120 58
To rebuild 120 feet to connect the inner end of the pier with the shore.....	1,831 84
To face up and repair 500 feet inside the harbor.....	2,500 00
To construct a pier-head 40 feet square, in 15 feet water, to rise 9 feet above the surface.....	4,271 40
	12,723 82

Recapitulation.

West pier.....	\$20,279 20
East pier.....	12,723 82
Contingencies 10 per cent.....	3,300 30
Total for Huron harbor.....	36,303 02

HARBOR OF SANDUSKY.

It will be recollected that the improvement upon which the appropriation for this harbor was expended, consisted in constructing a line of crib-work filled with stone along the axis of "Peninsula Point," a long narrow spit of sand intervening between the lake and Sandusky bay, of which latter it formed the northern boundary, and by which alone it was separated from the lake. The action of northerly gales had made serious breaches in this point, and threatened to wash it away entirely, it having decreased from this cause from 500 acres to 25 or 30 acres. The washing away of this point would have proved most disastrous to the harbor of Sandusky, and indeed would have totally destroyed it, changing its character from that of a well sheltered bay to that of an open roadstead, exposed to all the fury of northerly, northeast, and northwest gales. The channel at its entrance would have disappeared, and its usefulness as a harbor of refuge would have been forever gone.

To prevent further inroads from the lake it was determined to con-

struct a line of cribs along the crest of the spit, with the expectation that the weight of the stone with which the cribs should be filled would gradually sink them into the sand, until they would reach such a depth as would serve not only to create a barrier against the sea, but would also form a nucleus for a new beach, which would not be liable to wash away.

The experiment has proved eminently successful. In 1853 a line of cribs of rough timber, securely bolted, was constructed for a distance of 2,657 feet, the greater part of which distance was submerged from the lake to a depth of from three to six feet, and over which a very considerable current ebbed and flowed with every shift of wind. Before the close of the season the sand had accumulated on both sides of the pier, forming a hard and firm beach. The cribs continued to sink slowly in the sand as had been anticipated, and the following year such portions as required it were "built upon," so as to preserve their elevation above the beach; and an additional length of 375 feet constructed, making a continuous line of 3,032 feet of pier. Another breach still farther east was also closed in a similar manner, by a line of cribbing 325 feet in length, and with the same happy result.

The amount appropriated for this improvement was \$15,000, of which \$14,835 31 had been expended on the 30th of September, 1854, leaving a balance of \$164 69, which has been expended the present season. With this sum, 3,357 feet of cribbing have been put down and filled with stone.

An examination of the work the present season has fully demonstrated the efficacy of the mode of improvement adopted. The cribs having undergone the test of two winters, were found to stand firm and undisturbed in their alignment. Some parts of them have sunk more than others, so as to be completely covered by the sand, and should be renewed on top, as they will, without doubt, continue to sink until they reach a foundation more solid in its character. The sand-beach has materially increased in width and height, and is partially covered with a young growth of willows, poplar, and grass, which, by the spreading of their roots, assist in giving adhesion and stability to the new formation. But to render the security against any further encroachment complete, it is indispensable that the breakwater should extend continuously from one end of the peninsula to the other; for the latter, being composed wholly of sand, is liable at all times, unless protected, to be washed away in places, by the action of the waves, which having once effected a breach through any part of it, will continue to widen and enlarge the opening until the whole spit shall have disappeared.

An estimate of the cost of completing this part of the plan of improvement, which will require the present line of cribbing to be extended 4,000 feet, was submitted with my last annual report, and is now renewed.

However necessary, and indeed indispensable, the preservation of Peninsula Point undoubtedly is to the integrity of this harbor, it forms only a part of the plan for its permanent improvement. I do not know that I can better describe what is still required to be done, than by

quoting from the report of 1854 those passages which refer to this part of the subject. They are as follows:

"Between the main land and the small island at which the work was commenced last season, a cut or breach has been made many years since, nearly 3,000 feet in width. A careful survey and sounding of this cut was made in August (1854,) in connexion with one of Peninsula Point, a chart of which is herewith submitted. From this chart it will be seen that the depth of water through the cut is from four to six feet. The bottom is sand, and any work across the breach may well be expected to sink to about a uniform depth before it finds a solid foundation beneath the sand. This bottom or foundation is assumed to be eight feet below the surface of the water. It is proposed to connect, upon a line indicated upon the chart, the small island above referred to with the main land, by a pier or breakwater of crib-work filled with stone, 2,700 feet in length, 20 feet in width, to rise 6 feet above the surface of the water, so as to form a permanent barrier against any further incursion from the lake. The situation is a very exposed one, and in times of high winds the current rushes through the cut with almost resistless force, and with a velocity of three and four miles an hour. An attempt was formerly made to close this breach, by a structure similar to that now proposed, and a commencement was made at both ends at once; but the work was not finished, owing, I believe, to the absence of any further appropriation, leaving the middle of the breach, in the deepest water, wholly untouched. Being unsupported in the centre, the work was entirely destroyed by the waves, and there remain but the ruins of one single crib connecting with the main shore, to show that such a structure had ever been contemplated.

"A considerable portion of the north side of the island, which was at that time covered with a forest of heavy timber, has also been washed away, leaving the lifeless bodies of huge trees uprooted, and lying in the water. This process is still going on, and ere many years, what still remains of the island will share the same fate, and will entirely disappear or be converted into a bank of shifting sand.

"The construction of this breakwater will be a work of considerable difficulty, owing to the uncertainty of the foundation, and the exposure of the work to sudden destruction before it can be connected and bound together from one end to the other. If undertaken at all, the appropriation for its construction should cover the whole estimated cost at once, that there may be no interruption or delay for want of funds, which proved so fatal to the first undertaking. An estimate is also submitted for connecting this proposed breakwater with that already constructed, by a short pier across the small island, similar in its character to that adopted for the protection of Peninsula Point."

A recent examination of this locality has fully confirmed my conviction of the correctness of the views above expressed. The construction of the breakwater now proposed, of that across the island, together with the extension of the cribbing along the whole length of the spit, will give a continuous line of pier from the main shore to the extremity of Peninsula Point, at the entrance of the harbor; which will not only form a perfect barrier against the lake, but will so confine and direct

the current as to preserve, if not to increase the present depth of water in the channel.

No change in the plan of improvement being proposed, the estimate presented in my last annual report is renewed.

Estimate of funds required to continue the improvement of the harbor of Sandusky.

To complete the line of rough pier on Peninsula Point to its extremity, 4,050 feet of pier, at \$4 50 per foot	\$18,900 00
To construct an entire new breakwater-pier to close the breach between the northern extremity of Peninsula Point and the main land, 2,700 feet long, 20 feet wide, and 14 feet high; 90 cribs of 30 feet, at \$900 per crib	81,000 00
To connect the above breakwater by a line of rough cribs across the island, with the pier already built, 450 feet of rough pier, at \$4 50.....	2,025 00
Contingencies 10 per cent.....	10,192 00
Total for Sandusky harbor	<u>112,117 00</u>

HARBOR OF MONROE.

As heretofore reported, no part of the appropriation for this work was available for further repairs when I took charge of it; the small balance on hand being principally due for materials previously furnished. The whole of this work had been executed, so far as it had gone, by the local agent in charge, before its superintendence was assigned to me.

The amount appropriated was \$14,000, of which \$11,500 had been expended by the agent, leaving a balance of \$2,500, all of which was due for materials. There were no funds with which to carry on the work. The balance in my hands on the 30th of September last was \$1,325 09, of which \$1,261 94 has since been expended, leaving a balance of \$63 15.

The amount of work done by the agent was "400 feet of the south pier completed into the lake," and 700 feet of the north pier partially rebuilt upon the foundation of the old work from the surface of the water. The latter, however, was left in a very unfinished state, and the style of the workmanship is exceedingly rough and defective.

An attempt was made to widen the old pier, by extending the new work over it to the northward, so that whilst the southern or inner face of the new work rested upon the immovable foundation of the old pier, the outer or northern line, extending beyond this, rested upon the sandy bottom of the lake. The consequence was inevitable; the upper work of a very considerable portion of the pier inclines very much to the northward, from the insufficiency of the foundation on that side, and being supported in the centre of its width by the outside of the old work, has, in settling, raised the base of the inner face from its bed,

racking the pier, and making it necessary to take up portions of it from the water-line before it can be finished and planked.

A small appropriation for this pier (which is the light-house pier) was made at the last session of Congress, the expenditure of which is now in progress under the direction of an agent of the Light-house Board. How far this appropriation may modify the estimate heretofore submitted I have no means of knowing. In the absence, therefore, of any information on the subject, I renew that estimate, deducting from it the amount in the hands of the Light-house Board.

It will be perceived that the estimate retains the item for the extension of both piers into the lake, a distance of 150 feet each, "out to the maximum depth of lake navigation," as recommended by the Board of Engineers. What effect the operations of the Light-house Board may have on this recommendation I cannot judge. I have therefore submitted the estimate originally presented.

Estimate of funds required for continuing the repairs of the harbor of Monroe, Michigan.

To rebuild from two feet below the surface 350 feet of north pier, 18 feet wide	\$7,083 96
To repair 200 feet, and partially rebuild the same, at \$5	1,000 00
Planking work of 1853	310 00
To extend both piers 150 feet each, as per estimate of the Board of Engineers	10,060 00
Construction of pier-head for north pier.	4,762 20
Contingencies 10 per cent.	2,321 61
Total for Monroe harbor	25,537 77
Deduct appropriation expended under Light-house Board	6,000 00
	19,537 77

SUMMARY OF ESTIMATES.

Harbor of Conneaut	\$12,984 81
Harbor of Ashtabula	31,918 04
Harbor of Grand River	15,004 56
Harbor of Cleveland	42,611 08
Harbor of Black River	30,801 76
Harbor of Vermillion	42,856 61
Harbor of Huron	36,303 02
Harbor of Sandusky	112,117 00
Harbor of Monroe, Michigan	19,537 77
	344,134 65

In closing this report I beg leave to make a few observations, suggested by my experience since I have been on this duty, as to the principles that should obtain, in the construction of pier-work for these

harbors, and especially of those portions of them that are intended to remain beneath the water, to serve as foundations for future superstructures.

From what I have observed, the great original error consisted not only in the very loose, imperfect, and insufficient manner in which the cribs were put together, but more, perhaps, than all, in the character of the timber selected for the purpose. It seems to have been thought that any kind of timber would answer *under water*, and consequently basswood, chestnut, and hemlock were preferred, as being more easily worked. Now, it is true that any of these woods will "last," (that is, they will not decay) under fresh water, but what was overlooked was the *lack of strength* in these soft woods to withstand the weight and pressure from above and within, and the shocks and concussions to which the structures would be constantly exposed from without. In tearing up the old works at Conneaut, Ashtabula, and Grand River, where hemlock had been principally used, it was found that the wood, being open and porous, had become water-soaked, and, although sound, was much softened, and *cut and worn away* by the unceasing attrition of the sand and detritus in suspension, until both its substance and its strength had been, in a great measure, destroyed. The consequence was, that the pressure of the upper work, and the weight from above of the stone with which the cribs had been filled, acting upon the timbers thus softened and weakened, had very frequently burst the cribs open, breaking away the side logs, one by one, crushing the ties, letting out the stone, destroying the bond and continuity of the work under the water, thus exposing the superstructure to the attacks of the sea from beneath, causing it to sink irregularly, and loose its alignment, and ultimately involving the whole work in ruin.

Nor was this the only error. The timbers used were, for the most part, entirely too small: they were not squared, but consisted of round logs, of irregular sizes, pinned together with wooden pins, framed (or rather fitted) with an axe, and the cross-ties, which, in many instances, were mere poles, not even dove-tailed or fastened. The consequences have been just what might have been expected. By not squaring the timbers, interstices were left between the side-logs, into which the loose stones filling the cribs, being pressed by the weight from above, and shaken down by the agitation of the water, gradually forced themselves, and, acting as wedges, further separated the timbers, little by little, until the crib was destroyed. By the use of round timber, one great element of strength is totally lost: and that is, the adhesion of two pieces of timber whose planes coincide their whole length. In the case of the round timbers, they touched each other in perhaps a dozen points only, and consequently depended, for retaining their position in the crib, solely upon a few ties, and two or three wooden pins. It seems to have been overlooked or forgotten that the cribs *under water* were never intended to be taken up, but that they were placed there to serve in all time to come, as the *foundations* of successive superstructures which, as often as they decayed, would have to be renewed upon them. The insufficiency of these foundations has proved one of

the chief sources of expense in keeping up the lake harbors. By the failure of support from beneath, superstructures which, in many cases, were in good condition, and which, if undisturbed, would have lasted many years, have been totally destroyed; and in the endeavor to rebuild them, great expense has been frequently incurred from the necessity of tearing up the old and broken cribbing to a great depth, in order to secure a solid basis for the new work. Had the foundation remained firm, the rebuilding of the piers from the surface of the water, once in fifteen or twenty years, would have been an easy matter, and the cost of keeping them in a constant state of repair would be comparatively insignificant.

The experience derived from these manifest errors of the past has induced me to pursue a very different method in the constructions within this district, both above and below the water. Instead of small, round timber, imperfectly framed, and slightly pinned with wood, nothing has been used but white-oak of the best quality. The timbers are all one foot square, counter-hewed, so as to bring the faces into the closest possible contact; the ties being of the same size as the timbers. The whole has been carefully and accurately framed with double dove-tails, and heavily bolted with iron. Where new work has been rebuilt upon old and broken cribs, care has been taken to tear up the old work to a depth sufficient to secure as level and solid a foundation as possible, and this, in many cases, has not been obtained under eight or ten feet below the surface; not because the old timbers had decayed, (for in most instances they were as sound as when first laid down) but because they had been crushed and broken, being of a size and strength insufficient to resist the pressure to which they had been subjected.

In the construction of the new pier at this harbor, the whole length of which is laid upon the natural bottom of the lake, these principles have been rigidly adhered to. The work below water has been most carefully framed, and profusely bolted with iron. The cribs, before they reached the surface, have been secured to each other by long heavy timbers, breaking joints over the points where they butted against each other, and in this manner the whole upper work has been put together. The result is a pier 800 feet in length, which, although laid upon a foundation of shifting sand, does not vary in its alignment more than two inches. When the upper work decays, it is not too much to say that the portion below water will be found as firm and solid as when first laid down.

In intimate connexion with this subject is another of almost equal importance, and which has a direct bearing upon it. This is, the principles or policy that should govern in the appointment of local agents to take charge of the several works.

On the 18th of December last I made a report to the bureau on this subject by its order, from which I will take the liberty of making a few extracts, as the matter is, in my judgment, one of grave interest. In that report I said: "As the funds appropriated for all the harbors within my district (except that of Cleveland) have been expended, the appointments of the different agents will, I presume, cease, leaving the department to make such future arrangements as may most conduce

to the public good. The late order of the Secretary of War requiring all officers of the corps in charge of works to superintend their construction in person, and to make all the disbursements, affords, I think, a very fair opportunity to open for consideration the question whether, in most cases, these agents could not be dispensed with altogether; the immediate charge of each work being given to a foreman, who should be required to be a practical mechanic, of standing and experience, to be nominated to the bureau by the superintending engineer, who, for his own security, would be governed in his recommendation by the professional or mechanical skill of the individual in whose hands his own reputation would, to a certain extent, be placed. The foreman might receive a small additional compensation for his increased responsibility, and the salary of the agent would be saved to the work.

"Some such course would tend to prevent the appointment to the charge of mechanical constructions, of persons who more frequently than otherwise know nothing whatever of the duties they undertake, and are utterly incapable of either planning or directing the constructions over which they are placed, or of judging of the efficiency of those employed upon their work. An agent may be a very honest man, and yet be unfitted by previous pursuits, want of mechanical knowledge, or administrative talent, for the duty of overseeing and superintending operations which very frequently require the very highest grade of professional attainment. The consequence is, that the foreman, if he happen to be a man of any shrewdness, can have matters all his own way, slighting his work as he pleases, well knowing that the agent is incapable of discriminating between good and bad work. So that under the present system, unless the agent be either an engineer or mechanic himself, the foreman, after all, is the responsible man, so far as the actual construction of the work is concerned, and upon his knowledge and efficiency the character of the workmanship and the economy or extravagance of the expenditures in a great measure depend. In many cases, however, he is overruled even in the purely mechanical portion of his duties, by a conceited and self-sufficient agent, and is forced to work together in a manner that his experience and better judgment condemn, merely because the agent by whom he is employed is ignorant of the duties he has undertaken to perform. For these reasons and many others that might be urged, the foreman should be appointed by the superintending engineer, or at least he should have a controlling voice in his selection.

If the system of agents be adhered to, they should be the direct appointments of the bureau, whose selections would be made on professional grounds, and based upon the reputation of the person selected for excellence in the particular department in which he would be required to act. In its selections the bureau might be materially aided by the inquiries and local acquaintance of the superintending engineer, as to the person best fitted by professional knowledge, and a character for integrity, to fulfil the duties required of him. Some such course would prevent the appointment of incompetent persons, and would not unfrequently save to the government large sums of money, and to the department much mortification and reproach.

If not the direct appointment of the bureau, the agents should be selected only from its nomination, and not from that of members of Congress, who, not generally being mechanics themselves, are very apt to suppose that anybody, if he only possess integrity of character, can fulfil the duties of an agent, when in fact no idea can be more fallacious, it being clearly demonstrable that the heavy items for repairs upon nearly all our public works of this character have, in too many instances, been the result of defective superstructures, erected on still more defective foundations, under the supervision of ignorant and incompetent agents. To appoint to such a duty one of no mechanical knowledge or experience, or one whose previous pursuits in life have never before been turned in a direction calculated to fit him for such a charge, would be not only to hazard a whole appropriation, but is equally unjust to the superintending engineer, to the bureau, and the country.

This subject of agencies cannot but be one of the greatest interest to every officer of the corps in charge of a number of works, for the proper conduct of which he is responsible; and its bearing upon the credit and efficiency of his command will, I trust, be my apology for thus presenting views which have doubtless, long ere this, suggested themselves to the bureau.

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

Captain Corps Top. Engs., General Superintendent.

Colonel J. J. ABERT,

*Chief of Corps Topographical Engineers,
 Bureau Topographical Engineers, Washington.*

Estimate of funds required for continuing the improvement of the harbor of Conneaut for the ending June 30, 1856. Transmitted to the general superintendent by the local agent.

To extend both piers into the lake 150 feet each—

16,800 feet of crib-timber, at 14 cents per foot.....	\$2,352 00
22,680 feet of ties, at 14 cents per foot.....	3,175 20
10,800 feet of long timber, at 14 cents per foot.....	1,512 00
16,200 feet of longitudinal cross-ties, at 14 cts. per foot.....	2,268 00
500 feet of posts, at 14 cents per foot.....	70 00
9,600 feet of plank, at \$30 per M.....	288 00
1,200 feet of boards, at \$10 per M.....	12 00
950 cords of stone, at \$5 per cord.....	4,750 00
4½ tons of iron for bolts, at \$90 per ton.....	405 00
1,200 pounds of spike, at \$6 per hundred.....	72 00
1,950 days' carpentering, at \$1 50 per day.....	2,925 00
800 days' labor, at \$1 per day.....	800 00
450 weeks' subsistence, at \$2 50 per week.....	1,125 00
Smithing.....	150 00

Stone-scow	\$300 00
Crane-scow	750 00
Contingencies 10 per cent.....	2,095 42

23,049 62

Pro rata for extension of 300 feet as recommended by the Board of Engineers.....	\$11,524 81
Add compensation of agent for one year.....	1,460 00

Total for Conneaut harbor..... 12,984 81

*Estimate of funds required for continuing the improvements of the harbor
of Ashtabula, as submitted by the local agent.*

19,600 feet of crib-timber, at 14 cents per foot.....	\$2,744 00
27,460 feet of ties, at 14 cents per foot.....	3,844 40
12,600 feet of long timber, at 14 cents per foot.....	1,764 00
18,900 feet of longitudinal ties, at 14 cents per foot....	2,646 00
600 feet of posts, at 14 cents per foot.....	84 00
9,100 feet of plank, at \$30 per M.....	273 00
1,500 feet of timber, at \$10 per M.....	15 00
1,106 cords of stone, at \$5 per cords.....	5,530 00
5½ tons of iron, at \$90 per ton.....	495 00
1,500 pounds of spike, at \$6 per hundred.....	90 00
2,275 days' labor, (carpentry,) at \$1 50 per day.....	3,412 50
931 days' labor, at \$1 per day.....	931 00
535 weeks' subsistence, at \$2 50 per week.....	1,437 50
Smithing	200 00
Crane-scow	750 00
Stone-scow	300 00
Completing repairs of old pier.....	4,500 00
Contingencies 10 per cent.....	2,901 64

Total for Ashtabula 31,988 04

*Estimate of funds required for continuing the improvement of the harbor of
Grand River.*

30,800 feet of crib timber, at 14 cents.....	\$4,312 00
40,780 feet sawed ties, at 14 cents	5,709 20
19,800 feet long timber, at 14 cents.....	2,772 00
28,700 feet longitudinal and cross ties, at 14 cents.....	4,018 00
913 feet posts, at 14 cents	127 82
14,300 feet 3-inch plank, at \$30 per M	429 00

2,000 feet lumber, at \$10 per M	\$20 00
1,738 cords stone, at \$5	8,690 00
10 tons iron, at \$90	900 00
2,200 pounds spike, at \$6	132 00
3,735 days' carpentry, at \$1 50	5,602 50
1,463 days' labor, at \$1	1,463 00
825 weeks' subsistence, at \$2 50 per week	2,062 50
Crane-scow	750 00
Stone-scow	300 00
Smithing	300 00
Contingencies, 10 per cent	3,758 80
	41,346 82

Pro-rata of the Board of Engineers for 380 feet	\$13,544 56
Add compensation of agent for one year	1,460 00
Total for harbor of Grand river	15,004 56

Estimate of funds required for continuing the improvement of the harbor of Cleveland.

WEST PIER.

For rebuilding the old pier (inside) 650 feet, 450 of which is in 4 feet, and 200 feet in 10-foot water; 15 cribs, to rise 6 feet above the water:

Estimate for one crib in 4-foot water.

20 side-logs, 30 feet long, 600 feet, at 14 cents	\$84 00
39 sawed ties, 12 feet long, 468 feet, at 15 cents	70 20
700 pounds inch-iron bolts, at 4 cents	28 00
14 cords stone, at \$4 50	63 00
Carpentry and labor	250 00
	495 20
Fifteen cribs	7,428 00

For rebuilding 180 feet of same pier (the pier-head is deducted) in 10-foot water—6 cribs:

Estimate for one crib, in 10-foot water.

32 side-logs, 30 feet long, 960 feet, at 14 cents	\$134 40
63 sawed ties, 12 feet long, 756 feet, at 15 cents	113 40

SECRETARY OF WAR.

407

1,000 pounds bolt-iron, at 4 cents	\$40 00
25 cords stone, at \$4 50	112 50
Carpentry and labor	400 30

800 30

Six cribs	4,801 80
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For connecting the two piers and planking the whole :

157 connecting-ties, 60 feet long, 9,420 feet, at 14 cents.	\$1,318 80
3,780 feet timber, for support of connecting-ties in centre, at 14 cents	529 20
942 feet bolsters, for support of connecting-ties in centre, at 15 cents	141 30
800 feet timber for top-course, (west side,) at 14 cents	112 00
2,653 pounds inch-iron bolts, at 4 cents	106 12
Planking 680 by 57 feet, 38,760 feet plank, at \$33 per M.	1,279 08
50 kegs spike, at \$6	300 00
Carpentry and labor	3,500 00

7,286 50

Recapitulation of west pier.

Rebuilding old pier	\$12,229 80
Connecting the two piers and planking	7,286 50
Contingencies, 10 per cent	1,951 63

Total for west pier	21,467 93
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EAST PIER.

1. For tearing up and removing the shattered extremity of the east (stone) pier, and rebuilding it from the water's edge, 66 feet long, 16 feet wide, and 9 feet high, 9,504 feet masonry, (labor only,) at 50 cents per foot, the materials being on hand	\$4,752 00
Cramps, straps, and dowels	500 00
Tearing up old work	1,000 00
Contingencies, 10 per cent	625 20

6,877 20

2. For tearing up the wooden platform in front of the beacon on the
outer end of the pier, and replacing it with a structure of masonry
to correspond with the rest of the pier, and to form a solid pier-head
59 feet long, 25 feet broad, and 13 feet high, from the foundation:

17,700 cubic feet of masonry, at 75 cents per foot, in- cluding materials	\$13,275 00
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Tearing up and removing old work.....	\$500 00
Contingencies, 10 per cent.....	1,377 50

15,152 50

3. For removing crib surrounding foundation of beacon, and replacing the same with masonry, connecting it with the pier-head proposed to be built, as above, 30 by 25 feet, minus 14², (the size of the present foundation of the beacon,) and 9 feet high:

4,968 cubic feet of masonry, (including materials,) at 75 cents	\$3,739 50
Contingencies, 10 per cent.....	373 95

4,113 45

Recapitulation of east pier.

Repair of outer end of pier	\$6,877 20
Replacing platform with masonry.....	15,152 50
Repairing foundation of beacon.....	4,113 45

Total for east pier 26,143 15

SUMMARY.

West pier	\$23,614 73
East pier	26,143 15

47,611 08

From which deduct balance of appropriation on hand, say. 5,000 00

Total for Cleveland harbor 42,611 08

Estimate of funds required for the improvement of the harbor of Black River.

EAST PIER.

1. To rebuild 300 feet of pier, 1,300 feet wide, from 6 feet below the surface:

7,200 feet of long timber, at 14 cents.....	\$1,008 00
7,020 feet sawed ties, at 15 cents.....	1,053 00
195 cords stone, at \$5	975 00
2 tons iron, at \$90.....	180 00
3,600 feet plank, at \$30.....	108 00
Carpentry and labor	3,000 00

6,324 00

2. To repair and partially rebuild, from the surface of the water, 725 feet of the same pier \$6,500 00

3. To face up 225 feet on inner end of pier, to prevent breach :

2,025 feet of timber, at 14 cents \$283 50

600 feet ties, at 14 cents 84 00

$\frac{1}{2}$ ton iron, at \$90 45 00

Carpentry and labor 450 00

862 50

4. For pier-head in 15 feet water, to rise 9 feet above the surface :

9,360 feet of crib-timber, at 15 cents \$1,404 00

209 cords stone, at \$5 1,045 00

2 tons bolt-iron, at \$95 190 00

1,600 feet 3-inch plank, at \$30 48 00

1,480 feet 3-inch plank, for outside, at \$30 44 40

10 kegs of spikes, at \$6 60 00

Carpentry and labor 1,500 00

4,291 40

WEST PIER.

To rebuild 210 feet on inner end of pier :

3,360 feet of long timber, at 14 cents \$470 40

2,856 feet ties, at 15 cents 428 40

45 cords stone, at \$5 225 00

1,500 pounds iron, at \$90 135 00

2,310 feet 3-inch plank, at \$30 69 30

2 kegs spikes, at \$6 12 00

Carpentry and labor 1,000 00

2,340 10

To repair and face up 800 feet inside the harbor, at \$5. \$4,000 00

To repair 125 feet, end of west pier \$1,250 00

To build pier-head from surface of the water, 35 feet square :

3,840 feet of timber, at 14 cents \$537 60

42 cords stone, at \$5 210 00

800 feet plank, at \$30 24 00

1,800 pounds iron, at \$90	\$162 00
Carpentry and labor	1,500 00

2,433 60
Recapitulation.

EAST PIER.

Rebuilding 300 feet	\$6,324 00
Repair and partially rebuild 725 feet.....	6,500 00
Face up 225 feet	862 50
Pier-head	4,291 40
	17,977 90

WEST PIER.

Rebuild 210 feet inner end	2,340 10
Repair and face up 800 feet i side.....	4,000 00
Repair 125 feet, north end of pier	1,250 00
Rebuild pier-head from surface of water.....	2,433 60
Contingencies, 10 per cent.....	2,800 16

Total for Black River..... 30,801 76

Estimate of funds required for continuing the improvements of the Harbor of Vermillion.

WEST PIER.

For raising 125 feet 5 feet high :

1,800 feet of timber, at 14 cents.....	\$252 00
2,112 feet ties, at 14 cents.....	295 68
90 cords stone, at \$5.....	450 00
2,600 feet plank, at \$30.....	78 00
1,000 pounds spike, at \$6.....	60 00
Carpentry and labor	900 00

2,035 68

To tear up and rebuild from the water's edge 1,000 feet of pier, fill with stone and plank over 24 feet wide and 5 feet high :

15,000 feet oak timber, at 12 cents.....	1,800 00
17,568 feet oak ties, at 12 cents.....	2,108 16
5 tons bolt-iron, at \$90.....	450 00
30 kegs spike, at \$3.....	180 00

SECRETARY OF WAR.

411

568 cords stone, at \$4.....	\$2,272 00
23,000 feet 3-inch plank, at \$ 0.....	690 00
Smithing.....	500 00
Carpentry and labor.....	4,000 00
1 crane-scow.....	750 00
1 stone-scow.....	350 00
Tearing up old work.....	1,500 00

14,600 16

To face up 400 feet of pier, (inland).....	<u>\$1,0 0</u>
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EAST PIER.

To bring up 90 feet of pier to surface of water:

1,080 feet of timber, at 14 cents.....	\$151 20
1,152 feet ties, at 14 cents.....	161 28
1,000 pounds iron, at \$90.....	45 00
55 cords stone, at \$5.....	275 00
Carpentry and labor.....	500 00

1,132 48

To rebuild 350 feet of pier from the surface of the water,
6 feet high and 24 feet wide:

6,300 feet of timber, at 14 cents.....	\$982 00
7,440 feet of ties, at 14 cents.....	1,041 60
247 cords stone, at \$5.....	1,335 00
7,700 feet of plank, at \$30.....	231 00
3 tons of iron, at \$90.....	27 00
10 kegs spike, at \$6.....	60 00
Carpentry and labor.....	4,000 00

7,909 00

To face up and repair 740 feet inland, at \$5.....	<u>\$3,709 00</u>
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Recapitulation.

WEST PIER.

Raising 125 feet.....	\$2,035 68
Rebuilding 1,000 feet.....	14,600 00
Facing 400 feet, (inside).....	1,000 00
Pier-head.....	4,291 40

EAST PIER.

To bring 90 feet up to surface of water.....	\$1,132 48
Rebuilding 350 feet.....	7,909 60
To face up and repair 740 feet, (inland).....	3,700 00
Pier-head.....	4,291 40
Contingencies, 10 per cent.....	3,896 05
Total for Vermillion harbor.....	<u>42,856 61</u>

Estimate of funds required for completing the harbor of Huron.

WEST PIER.

1. To rebuild the west pier from an average of five feet below the surface of the water, 1,200 feet of pier, 12 feet wide:

26,400 feet of crib-timber, at 14 cents.....	\$3,696 00
22,080 feet of ties, at 14 cents	3,091 20
828 cords stone, at \$5.....	4,140 00
12,000 feet 3-inch oak plank, at \$30	360 00
6 tons bolt-iron, at \$90	540 00
10 kegs spike, at \$6	60 00
Tearing up old work and clearing foundation.....	2,000 00
Smithing, carpentry, and labor.....	6,392 00
	<u>20,279 20</u>

EAST PIER.

1. To complete the east pier by reconstructing 210 feet of pier at the outer end upon the old foundation, eight feet below the surface of the water:

5,880 feet of long timber, at 14 cents	\$823 00
4,872 feet of ties, at 14 cents	682 08
48½ tons bolt-iron, at \$95.....	142 50
10 kegs spike, at \$6	60 00
170 cords stone, at \$5.....	850 00
2,100 feet 3-inch plank, at \$30.....	63 00
Carpentry and labor	1,500 00
	<u>4,120 58</u>

2. For pier-head, 40 feet square, in 15 feet water, to rise 9 feet above the surface:

9,360 feet of long timber and ties, at 15 cents	\$1,404 00
209 cords stone, at \$5	1,045 00
2 tons bolt-iron, at \$95	190 00
1,600 feet 3-inch plank, at \$30	48 00
1,480 feet 3-inch plank for outside, at \$30	44 40
10 kegs spike, at \$6	60 00
Carpentry and labor	1,500 00
	4,291 40

3. To rebuild 120 feet at inner end of pier :

1,920 feet timber, at 14 cents	\$268 80
1,536 feet ties, at 14 cents	215 04
45 cords stone, at \$5	225 00
2,400 feet plank, at \$30	72 00
1,000 pounds bolt-iron, at \$90	45 00
1 keg spike	6 00
Carpentry and labor tearing up old foundation	1,000 00
	1,831 84

4. To face up 500 feet inside, at \$5

\$2,500 00

Recapitulation.

West pier	\$20,279 20
East pier	12,723 82
Contingencies, 10 per cent	3,300 30
Total for Huron harbor	36,303 02

Estimate of funds required to continue the improvement of the harbor of Sandusky.

1. For building a breakwater to close the breach between Peninsula Point and the main land; length, 2,700 feet; width, 20 feet; height, 14 feet; the breakwater to have a tier of longitudinal timbers through the centre of its whole length :

ESTIMATE FOR ONE CRIB OF THIRTY FEET.

30 by 3 by 14, 1,260 feet of long timber, at 14 cents	\$176 40
62 ties of 20 feet, 1,240 feet, (sawed,) at 14 cents	186 00
36 pounds bolt-iron to course; 14 courses, 420 pounds, at 4½ cents	18 90
(30 by 17 by 14) less 2,314, 4,826 cubic feet, 37 cords stone, at \$4	148 00

30 by 17, 510 feet 3-inch plank, at \$30	\$15 30
20 pounds spike, at 6 cents	1 20
Carpentry and labor	354 20
Cost of one crib	900 00
Ninety cribs, at \$900	\$81,000 00

2. For connecting the breakwater with the pier already built, by a short pier across the island:

450 feet of rough pier, at \$4 50	\$2,025 00
3. To continue the protection of Peninsula Point, by constructing 4,050 feet of rough pier to the extremity of the point, at \$4 50	18,900 00
Contingencies, 10 per cent	10,192 00
Total for Sandusky harbor	112,117 00

Estimate of funds required for continuing the improvement of the harbor of Monroe, Michigan.

1. To rebuild from two feet below the surface, 350 feet of pier, 18 feet wide:

9,450 feet of long timber, at 14 cents	\$1,323 00
7,514 feet of long ties, at 14 cents	1,051 96
338 cords stone, at \$5	1,690 00
6,300 feet of plank, at \$30	189 00
10 kegs spike, at \$6	60 00
3 tons bolt-iron, at \$90	270 00
Carpentry and labor	2,500 00
	7,083 96

2. To repair and partially rebuild 200 feet of present pier, at \$5

\$1,000 00

3. To plank 300 feet:

5,400 feet plank, at \$30	\$162 00
8 kegs spike, at \$6	48 00
Carpentry and labor	100 00
	310 00

4. To extend both north and south piers 150 feet each, according to the estimate of the Board of Engineers..

\$10,060 00

5. To construct a pier-head 40 feet square and 15 feet high, for the protection of the north pier and beacon :

7,680 feet of long timber, at 14 cents.....	\$1,075 20
1,420 feet ties, (sawed,) at 15 cents	213 00
2 tons bolt-iron, at \$90	180 00
145 cords stone, at \$5.....	725 00
1,200 feet 3-inch plank, at \$30	36 00
8 kegs spike.....	48 00
177 cubic yards concrete, (foundation for beacon,) at \$5.....	885 00
Carpentry and labor.....	1,600 00
	4,762 20
Contingencies, 10 per cent	\$2,321 61
	25,537 77
Deduct appropriation expended under Light-house Board	6,000 00
Total for Monroe harbor.....	19,537 77

APPENDIX E.

[No. 73.]

OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 29, 1855.

SIR: Having been prevented by illness from making to you, at the period required by the regulations, a report upon the work that was accomplished during the season of 1854, for the improvement of the several harbors within my command, I beg leave now to submit a report upon that subject, embracing the works of this character on Lake Michigan and Lake St. Clair.

I. LAKE MICHIGAN HARBOR WORKS.

1. *Chicago Harbor.*

The operations for the improvement of this harbor consisted during the last season in cutting a ship-channel, by the use of the steam-dredger, through the bar which barricaded the direct entrance of vessels drawing more than six to eight feet water; in repairing the machinery appertaining to this harbor, and in commencing the repairs of the piers, which were in a very dilapidated condition, from the general decay of the timber-work above the water-surface. Also in digesting a plan and submitting it, with a report, to the bureau, for the construction of a new light-house proposed for this harbor.

The operation of dredging, by which a new ship-channel was

formed, giving a direct entrance to, and egress from the harbor for vessels drawing as much as twelve feet, was fully reported upon in my No. 32, of the 19th of August last.

The accompanying map, (marked G No. 11,) projected on a scale of 200 feet to one inch, or $\frac{1}{2400}$, shows the condition of the bar across the proper entrance to this harbor, when I entered upon my duties here in April, 1854, and the accompanying chart, (marked G No. 12,) projected on the same scale, shows the remnant of that bar, and the capacity of the direct ship-channel when the operation of dredging ceased on the 22d of July following.

In regard to the repairs of the piers above the water-surface, I have to state, that but little progress was made towards effecting this object, owing to the lateness of the season when authority was received for commencing this work, and the difficulty then of obtaining the requisite materials at reasonable prices.

As the favorable season for resuming work is again nearly at hand, I propose to go on with it under the approved plan so soon as funds are received, for which an estimate is herewith submitted, (marked A,) amounting to \$7,708 16.

In relation to the new light-house intended for this harbor, I beg leave to refer to my report, No. 30, dated the 30th of July last, made in obedience to the instructions of the bureau. I presume it is unnecessary for me to add anything upon that subject.

2. *Waukegan Breakwater.*

The last season was occupied in obtaining, hauling in, and dressing oak timber sufficient to construct five cribs, each 30 feet long, 25 feet wide, and 25 feet high from bottom to top, being designed, under the general approved plan, for a depth of 20 feet of water. This oak timber could be obtained in no other way, at a reasonable price, than by making contracts for it standing in the woods, and cutting and hauling it as we required it, and having it dressed at our own yard.

I find it has cost less in this way than it would have done under the usual mode of contract, nor has it cost more than the usual price of pine. For this reason oak has been used for the portions of this work both above and below the water-surface.

Our next operation will be to put together the timbers for these five cribs and sink them in position so as to form a breakwater 150 feet long, in the beginning of the present season. Most of the framing of these cribs is already completed, and the whole will probably be completed during the present and the early part of next month.

Even this extent of breakwater will prove of much advantage to the general navigation of this lake, owing to the greater facility afforded to vessels, in a northerly or northeasterly gale, for reaching a safe anchorage behind it. The rivers which enter this lake from the west nearly all do so upon a course nearly east, or somewhat south of east. They are all so narrow at their mouths that vessels attempting to enter them from the northward in a strong northerly gale are frequently unable to luff quick enough for doubling the windward pier, and for want of

sufficient sea-room between the piers are often carried entirely to leeward of the harbor entrance and stranded on the lake shore.

Under the same circumstances, these vessels would experience no difficulty in reaching a safe anchorage behind such a breakwater as this. The ample room between it and the shore would enable them, by an easy course, to reach the anchorage affording the desired shelter. Equal facilities are afforded by the breakwater to vessels seeking shelter under a gale from the southward. A single glance at the map now in the bureau will demonstrate this.

I submit herewith an estimate, marked B, of funds now required for this work, amounting to \$1,789.

The season is now favorable for putting together and sinking these cribs. This estimate still leaves in the treasury, to meet the claim of Sweet, Ives, and Hawley against this work, the requisite sum of \$647.

3. *Kenosha Harbor.*

The work done at this harbor during the past season was confined to repairs necessary to its preservation, and to the raising the timber work of both piers, in certain parts, so as to bring them to a height of full five feet above the level of the water-surface, all in accordance, as far as the season would allow us to progress, with the approved plan communicated with your instructions of August 29 and September 19, 1854. The outer or eastern cribs, of both the north and the south pier, were built up from the water-level to a height of five feet above that level. The exposed faces of the outer crib of the north pier were defended by sheath-piling from any undermining effect of the lake current, a part with square oak piles 6 inches thick by 12 inches wide, and the remaining part with oak piles 12 by 12 inches.

Had the cribs been built originally with bottoms sufficiently open to allow the stone to settle down and occupy the place of the sand as fast as the latter was washed out and carried away, this sheath-piling would have been probably unnecessary. The plan ordered for all crib-work, since I have been in command on this lake, requires that the grillage bottoms of all cribs shall have interstices at least two inches greater than the greatest dimension of the largest stones used within the cribs, so as to allow the stone to pass freely through and occupy the place of any sand or other soil that may be washed by the force of the lake current from underneath the pier-work.

A section 90 feet long on the north pier, and another 100 feet long on the south pier, which were only 4 feet high above the water-surface, were raised an additional foot in height, bringing them to the established rule of at least five feet above the water-level.

There were put into the south pier thirty cords of gravel, which, in addition to a large quantity put in by the city authorities, seems, so far, to have stopped the interstices between the pier timbers, which were before great enough to allow the sand blown upon the piers to percolate through into the channel. The water-faces where most openings were also sheathed with plank-piling.

Three hundred and thirty feet of plank-piling of oak, three (3) inches thick, have been driven, capped and fastened, from the west end of the north pier, along the line A B C, as represented on map G No. 10, now in the Bureau of Topographical Engineers.

This has had the desired effect in preventing the water being driven by the force of westerly winds behind the north pier, so as to wash away the soil between that pier and the bluff shore.

The sheath-piling required at the east extremity of the south pier was not completed last season, as it was too far advanced, and the weather had become too boisterous by the time the rest of the work was finished. This and the necessary dredging will be attended to during the present and the next coming month. For these objects I have remaining on hand a balance of \$2,000 of the former appropriation, which will, it is believed, suffice to accomplish these objects. In order to save expense, I recommend that the agency for this harbor be at once discontinued, and that the materials on hand, over and above what may be necessary to complete the repairs of the south pier, above mentioned, be either sold or transferred to Chicago harbor for repairs of piers. I recommend this course because the pay of a custodian would amount to as much as the materials are worth before another appropriation could be obtained for continuing the work. The machinery can be taken care of at Chicago until required for use.

4. *Racine Harbor.*

Before receiving the instructions from the bureau, of the 1st of July last, for continuing the pier-work for this harbor, I had commenced a systematic survey of the channel between the piers and the bar at the entrance to the harbor.

The map herewith presented marked G No. 15, is the result of this survey, projected on a scale of $\frac{1}{1250}$, or 100 feet to 1 inch. So soon as this survey was completed, the work of extending the north pier, in a direction conforming with a prolongation of its most eastern section, was commenced in accordance with the instructions and plans accompanying your letter of the 1st of July, 1854.

With the available funds and materials on hand, (reserving the amount required for the necessary dredging,) we were enabled to construct and sink in position only two cribs, at the extremity of the north pier, each 32 feet long, 20 feet wide, and 23 feet high, (including settling on a clay bottom after being filled with stone to the water's surface.) They were placed in water full 16 feet deep. Their position, *a, b*, is shown upon the map.

So soon as the engine of the steam-dredge could be repaired, after the accident reported in my No. 32, of the 19th of August last, the dredging was commenced for deepening the channel between the piers at Racine. This operation was begun on the 29th of August, and terminated on the 31st of October.

During the greater part of this period the weather was boisterous enough to interrupt the work altogether, or to cause the dredge to work at disadvantage. We, however, succeeded in removing 9,080 cubic

yards from between the piers, depositing the stuff taken up, in deep water in the lake, which gave a channel of at least eight feet deep, by 100 feet wide, where there were previously an average of about 6½ feet only. Even this improvement was of great advantage to the commerce of Racine. It is to be regretted that there are not funds for continuing the improvements of this harbor the present season. It will be seen by my accounts for the 4th quarter of last year, that the balance of the appropriation then remaining for this work was only \$8 07, which has since been expended. The agency was discontinued the 31st of December last, under the department regulations of the 11th of October last.

There being no funds for paying a custodian to take care of the property appertaining to this harbor, I would recommend that the materials remaining on hand be sold, and that the machinery and tools, which are valued only at \$56, be also sold or transferred to Milwaukie harbor. The four scows with drop-bottoms, borne on the return for 4th quarter of 1854, lately forwarded to the bureau, belong to the steam-dredge, and are not included in the above recommendation.

5. *Milwaukie Harbor.*

The appropriation for this work is applicable exclusively to the improvement at what is called the "North Cut."

The proposed pier-work is divided into four sections. The piers, to be 250 feet apart, will project 930 feet into the lake, exclusive of the proposed cut. The work is divided into three sections. The 1st, 2d, and 3d sections are to be constructed at the expense of the city of Milwaukie. The 4th section will be constructed at the expense of the United States with the means now available from the last appropriation for this object; the whole to go on under the general superintendence of the superintending engineer of the United States, aided by the United States agent for that harbor, in accordance with the regulation of the War Department of June 4th, 1853.

We failed to obtain an advantageous proposal for furnishing the necessary materials for constructing the 4th section during the last season. This caused no inconvenience to the public interest, however, as this portion must follow after the first three sections. Early in the present month I concluded an advantageous contract with a reliable person for the pine timber required for the 4th section. The funds which I now have on hand for this work will be applied to the payment of this contract, and the commencement of the construction of the cribs to form the 4th section.

In October last an elaborate survey was made of this harbor and its vicinity, under my instructions, by agent H. W. Gunnison, who rendered his plot and notes of survey to this office. They have been found highly satisfactory. I herewith transmit a map marked G No. 16, constructed from this survey. The position occupied by the present piers, and that fixed for the new work, are correctly shown on this map. It will there be seen that dredging is highly necessary, in order to remove the silt which has been deposited off the entrance to the present

harbor, and within it between the piers, to restore the requisite channel of twelve feet.

I propose to use the United States dredge-boat for this purpose after finishing the dredging at Kenosha, provided the city authorities shall furnish the requisite funds for carrying on the work under the rule laid down by the War Department, as contained in your letter of the 16th of September last to the department, with the Secretary's approval endorsed on it, and transmitted to me for my government.

6. *Sheboygan Harbor.*

By the report of the Board of Engineers of the 17th of April last, an accurate survey of this harbor was recommended, and approved, as a preliminary step necessary to a decision on the plan to be adopted for applying the balance of funds on hand of the last appropriation. In compliance with the instructions of the bureau of the 26th of the same month, I immediately directed this survey to be made, and committed its execution to the agent for that harbor, D. Newland, esq., under the apprehension that he was an efficient surveyor and civil engineer. Owing to Mr. Newland's bad state of health, his survey was not completed until the latter part of September, and then when it came to be projected upon a map in this office, it was found to be so inconclusive and discrepant in several of its parts, that it could not be used as authentic. I have been compelled, therefore, to reject it, and have given the necessary written instructions to a competent surveyor, who will proceed at once to make the required survey. So soon as the map can be projected from it, it will be forwarded to the bureau with a report. In the mean time proposals can be invited for the additional timber and iron necessary for completing as many cribs, in extension of the present piers on such course as shall hereafter be decided on, as the funds available for this work will enable us to construct.

I have been officially informed that the city and county of Sheboygan propose to raise twenty thousand dollars to be applied to the extension of the piers to a proper depth of water, under such plan as shall be adopted in building out as far as the available government funds would reach. Hence the additional importance of the accurate survey now about to be commenced.

The outer cribs of the piers forming this harbor were levelled up to the proper height last autumn, but the agent did not succeed in obtaining the oak sheath-piling in time to have it driven along the exposed faces of these outer cribs. Should the city and county authorities succeed in raising the fund above alluded to, I would suggest that all necessary repairs and adjustments of the present piers should be made at the expense of that fund, and that the United States funds now available be applied to making the necessary survey, and the construction of a distinct section of the work. I have sufficient funds in hand belonging to this harbor for present purposes.

7. *Manitowoc Harbor.*

Under your instructions of the 27th of April last, the position and direction for the piers for the improvement of this harbor, in accordance with the approved plan, were marked out by me upon the locality designated, and proposals were immediately invited for the necessary materials for construction. Owing to the failure of the first contractor for supplying the necessary timber, a delay was caused, of about a month, in commencing the work. A new contract was made and fulfilled, and the work of constructing the cribs was begun the 10th day of July last, and continued until the close of the working season. Seven cribs, each 30 feet long and 20 feet wide, have been sunk in position and filled with stone. Two of these are upon the north side, and five are upon the south side, making the length of the north pier, at present, 60 feet, and the length of the south pier 150 feet, with a width of channel between them of 212 feet. These piers are upon a magnetic course of N. 85° 30' E., as observed the 9th of May, 1854. As the United States steam-dredge could not be withdrawn from the harbors of Chicago and Racine, for the purpose of sending her to so great a distance as Manitowoc, to dredge out a bed for the cribs there, these cribs had to be sunk upon the natural bottom, which being somewhat irregular, has caused the cribs to tilt a little in settling, notwithstanding they were constructed with open grillage bottoms, formed of transverse timbers laid parallel, and with spaces of one foot between them, consecutively.

I afterwards determined that the interstices of the grillage bottoms should always be, in their least dimension, not less than two feet and two inches, for the minimum size of stone used. These cribs have settled down generally as much as from 1½ to 3 feet, and now require to be built up as much as they have sunk, in order to preserve a height of 5 feet above the water-level. The funds appropriated for this harbor are all expended, except the sum of \$200, reserved to pay Messrs. Sweet, Ives, and Hawley, for 4,000 pounds of round bolt-iron, delivered to agent Temple Clark, for the use of this harbor, last season, and also reserving what was estimated as the balance that would be due to the said agent for his services to October 31, 1854, on a final settlement of his accounts with the Treasury Department. The agency expired on the last mentioned day, under the regulation of the War Department, of October 11, 1854. There is dressed timber enough on hand at Manitowoc to build the cribs up to the desired height above the water-level. There are also iron and stone enough on hand to be used in thus completing them. As the pile-driver, stone-scow, Manilla rope, and a portion of the tools will not be required at this harbor until another appropriation shall be made to extend the piers to the desired depth of water, and as there are no funds to pay a custodian for taking care of them, I recommend that I be authorized at once to transfer them to Sheboygan harbor, where they are needed, at their present value. The pile-driver and scow are new; and as they were substantially built, under the supervision of agent Temple Clark, their cost to

Sheboygan will be less than they could be procured for by contract. I recommend that the fund raised in this way be applied to the payment of the mechanics and laborers in building up the Manitowoc piers to the proper height. I respectfully ask an early decision on this point, as I defer procuring these necessary articles for Sheboygan by contract, until a decision is made on this subject.

Agent Clark was instructed in September last to make a survey of the mouth of Manitowoc river, and the adjacent portion of the lake, so as to show the facilities and obstructions for navigation in approaching and entering that river; and he was instructed to forward a plat, and the note-books of his survey, when completed, to this office, in order that a map might be projected from them. He has failed, although several times called upon, to forward the notes of survey. I am not enabled, therefore, to present an authentic map of this harbor. On visiting it, however, next month, I shall endeavor to make such a survey as will enable me to forward a reliable map to the bureau.

I have found it absolutely necessary, in order to have these harbor maps drawn correctly, and upon a uniform system, that they should be done under my own supervision, from the notes of survey, by competent draughtsmen employed for the purpose, in this office. This is also the most economical arrangement as regards cost, combined with accuracy.

8. *Michigan City Breakwater, Illinois.*

The only work which had been accomplished in reference to this improvement when I took my present station, in April last, was the collection of sufficient timber for the construction of two cribs of 30 feet length each, and certain tools and implements necessary for carrying on the work, and the building of a bridge-pier for the reception of materials convenient to the position where the cribs were to be sunk.

During the past autumn and winter a party was employed under the immediate direction of J. R. Bowes, esq., agent for this work, in dressing, notching, and fitting the timbers for the longitudinal face-walls, and the middle longitudinal stringers for the two cribs alluded to. In the bill of timber procured, that for the cross-ties was all cut to a length of 30 feet, which was originally intended as the width of the cribs designed for a depth of 25 feet of water.

At a subsequent period, however, a modified and approved plan of the Board of Engineers required that the original plan should be so curtailed as to reduce the length of the proposed breakwater from 2,000 to 1,090 feet, and the height of the cribs from 37 to 25 feet, to be placed in a depth of 19 feet, instead of 25 feet of water.

The agent informs me that his views were specially called for by the bureau in October last, in regard to the advantages and disadvantages of this last modified plan compared with the original one, and that they were rendered directly to the bureau. For this reason I authorized the agent to confine the work of dressing the timbers to the longitudinal pieces, leaving the length of the cross-ties as they now stand, viz: 30 feet, until the views invited were acted on.

As we must now proceed to dress and fit the cross-ties, I would respectfully ask that this matter be decided as soon as practicable.

The sinking in position of these two cribs involves a very important point in the future character of this breakwater, for the reason that they must form the base or nucleus upon which the work is in future to be extended.

They must decide the depth of water and the expanse of sea-room, or distance from shore, to be provided for the accommodation of the fleet of vessels designed to be protected from the effect of storms, when taking refuge behind it. Should these cribs be sunk in 25 feet water, they will form the initial base of a future breakwater, whose average distance, measured lakeward from the 12-foot curve, will be 1,000 feet.* Should they be sunk upon the *outer* curve of 19 feet of water, there will be an average distance of 800 feet between the breakwater and the 12-foot curve.* A vessel in rounding-to in a gale of wind should not be subjected to run into less than 12 feet before finding her final anchorage behind this breakwater; and 1,000 feet breadth of sea-room and roadstead is the least, I would respectfully submit, that ought to be provided, especially in view of a crowd of vessels which would often be seeking shelter at the same time, from a northerly or northeasterly gale, behind this work. For the reason given in treating of the importance of the Waukegan breakwater, vessels failing, for want of room in luffing, to make a harbor between the piers at the mouths of the rivers along the lake shore, would often be compelled to seek refuge behind the Michigan City breakwater. It would indeed often be their last resort and hope, situated as it will be, near the southern extremity of the lake. I would respectfully submit for consideration the question, is not this subject of *adequate sea-room and capacity of roadstead* of more importance in deciding this matter, than that the arc of protection (covering the pile-piers, or landings of the town) secured by the length originally given for 25 feet of water, should be scrupulously adhered to? The greater facilities for reaching the point of refuge by the extent of sea-room afforded, appears to me of leading importance. There is another consideration of importance which attaches to this question, namely, the greater and more unfavorable influence of ground-swell, or action of the reflux waves, upon vessels riding at anchor in the shoaler, than in the deeper water, secured by the respective positions proposed for the work. In neither case will the two cribs now to be completed afford anything more than a nucleus or commencement of the work. To render it efficient, it must be hereafter extended on either plan, and I would recommend that this commencement be in the deeper water. Should the depth of 19 feet be adhered to, however, I would recommend that the outer or most lakeward curve of that depth (see map) be occupied, as this will give 800 feet of sea-room between the breakwater and the 12-foot curve, in lieu of 400 feet, which is all that would be secured by the last modified plan of the board. In this last mentioned event, I would recommend

* See the map of agent Bowes, published with the documents accompanying the President's Message to 1st session of 33d Congress.

that the cribs be 25 feet wide, instead of 20 feet, as is now enjoined by the report of the board. The width of 25 feet will give more stability to the work—a stability which is especially required, exposed as it will be to the force of the open sea of the lake. This width will also be in accordance with the general principle laid down by the board, viz: that the width of the cribs at the base should be at least as great as their total height measured from the bottom to the flooring at top.

As before remarked, the cross-ties were all procured 30 feet long, and will require no change of length, if the cribs are to be placed in 25 feet depth of water. They will require to be cut but once, whether to reduce them to 20 or to 25 feet, in case it be decided that the cribs shall be placed in 19 feet depth of water. In either case, the portions thus cut off will be lost, as they will be too short for any use in the construction of the work.

The number and dimensions of the iron bolts for securing the timbers together will be the same for any given height, whether the width of the cribs be 20, 25, or 30 feet, because the number of joints to be secured will be the same. Hence the quantity of iron for bolts will be the same, for any given height, for either width. The difference in cost of completing these cribs will consist chiefly in the item for stone to fill them to the water-surface.

I subjoin estimates for completing the work according to each of the conditions—namely, of 25 and of 30 feet width—marked C and D:

Estimate C, for completing 2 cribs, 25 feet wide, 25 feet high, and 30 feet long, each, to be placed in 19 feet of water, amounts to	\$4,188 36
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Estimate D, for completing the same, 30 feet wide, 30 feet high, and 30 feet long, each, to be placed in 25 feet of water, amounts to	\$5,357 40
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The funds now available for this object amount to the sum of	\$5,393 16
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Shown as follows, viz:

In the treasury May 1, 1854, as per official statement. . . .	\$7,952 70
Disbursed during 1854.....	\$1,357 20
Disbursed 1st quarter of 1855.....	1,202 34
	2,559 54

Available.....	5,393 16
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Which exceeds estimate D by \$35 76.

As a clerk does not seem necessary for the agent at Michigan City, since his attention will now be confined to this single work, and as he, with other agents, is relieved from the labor and responsibility of disbursements, I am compelled, in view of the requisite economy, to recommend that he be discontinued.

The accompanying estimate E, is for funds now required for this work, amounting to the sum of \$3,515 46½, which I request to have

remitted as soon as convenient, as a portion of it is now due for work done; and it is necessary to push the work with vigor, to avail ourselves of the best part of the working season.

9. *New Buffalo, Michigan.*

Nothing has ever been done in reference to this contemplated improvement, except a very limited survey in 1845 by Mr. Wm. Gamble, and the collection of materials, consisting of timber, bolt-iron, and stone, preparatory to commencing the piers whenever a plan for the same should be decided on. The cost of materials thus collected and now on hand was \$4,766 83.*

The amount of the appropriation for this work now in the treasury, which will be unexpended after paying the custodian and all contingencies to May 31, 1855, will be about \$1,600.

As this sum is entirely too small to commence any construction, it appears needless to keep the materials, as they must deteriorate by lying exposed to the weather, until an additional appropriation can be obtained to justify the commencement of any sort of construction. I would recommend, therefore, that I be authorized to transfer those materials to this and other harbors where constructions are going on, or repairs authorized, at the cost, delivered, for which the same could be obtained by contract, or for which the kind of material required (where they differ in exact dimension) can be obtained by contract. Private individuals would not purchase them except at a great sacrifice by the government, and the works which can use them ought not to be taxed higher for them than they would have to pay, for what they need, to contractors who are ready to furnish the same.

I herewith enclose an estimate, marked F, of funds now required on account of this harbor, including custodian's pay to May 31, 1855, amounting to \$621 90, which I request may be remitted as soon as convenient.

I also submit another estimate, marked G, of the expenses of a survey amounting to the additional sum of \$665 50.

I recommend this survey be made during the present season, in order to obtain some definite and reliable information in relation to the force of the current in the stream at this place. Also, to ascertain if the estimate for a work suitable to the wants of the trade of this place cannot be very much diminished. From a personal inspection which I made in October last, I am inclined to think that this can be done by avoiding a deep cut through a sand-hill, in order to débouche into the lake, and, in lieu of it, to follow the course of the stream to a point much nearer to its present outlet.

The course of the stream before emptying into the lake has changed considerably since the last survey, which was made nearly ten years ago.

If the survey be approved, the sum required on account of this work will be \$1,287 40.

* See property return lately rendered to the bureau.

10. *St. Joseph, Michigan.*

In October last I inspected the piers at this harbor, with a view to employing to the best advantage the small balance remaining of the last appropriation, in the repairs required by the decision of the War Department of the 21st of June last. I found large portions of both piers in a very much decayed condition.

In the north pier were two very bad breaches, which required to be attended to first. One of them was repaired in the best manner that was practicable, by inserting new timbers and filling in with stone. The timber for repairing the other breach was prepared ready to be put in, but the season had become so far advanced that it could not be completed. This part of the work will be resumed so soon as the present working season becomes sufficiently advanced to allow of the work being most economically done. There remains now on hand the sum of \$679 68 appertaining to this harbor, to be appropriated towards these repairs and the necessary contingencies relating thereto. The agency and custodianship were discontinued on the 31st of July last, under the directions of the War Department of the 21st of the previous month. I was unable to make arrangements at an earlier period for having the custodian agent relieved and the property properly stored.

11. *Harbor of Black Lake, Michigan.*

In my No. 54, of the 15th of November last, I reported to you that the work of extending the bridge-pier lakeward was resumed on the 11th of October.

The work went on with activity until the 14th of December. Between this time and the end of that month, a party of men was employed in the woods in preparing timber and hauling it to the lake, so as to have it ready for use on the opening of spring. On the 31st of December the working party was discharged. Within this period the bridge-pier was extended out 190 feet, in addition to its former length, reaching nearly to twelve feet of water, and terminating on the crest of the middle bar, parallel to the shore. It occupies the position designed finally to be given to the windward or southern pier, as the work was located by agent J. R. Bowes. The width between the parallel rows of piles, forming the support of this bridge-pier, is twenty-two feet interior space, which allows room for occupying this space by crib-work twenty feet wide, after the usual manner, to be filled with stone, and thus finally form the more solid and permanent pier-work.

The bridge-pier is intended as a mere auxiliary in constructing the permanent work, and as a depository of materials while the final work shall be carried on. It seems to be a very judicious mode of proceeding at an exposed position like this, where the force of the waves of the open lake have to be encountered, unless some such defence against them be provided.

It appears to me, however, that it would be better that the lines of both the intended permanent piers should be thus simultaneously occu-

pied, and that, on reaching a depth of five or six feet of water, (sufficient to float small vessels loaded with materials) both the bridge-work and the permanent work should go on, and progress *pari passu*, until a channel between the permanent piers be formed of sufficient length and depth, of itself, to protect the further building of the permanent cribs. After thus attaining a certain length of channel, it would be quite practicable to defend the building up of additional cribs within this channel, against the action of the lake-waves, by temporarily alligning a certain number of the cribs transversely of the channel-way, to be pushed further and further out as the work progresses. This would not leave the weaker work (the bridge-pier) liable to be destroyed by the great power of the lake-waves in a storm, before reaping the advantage for which they were designed.

Such a catastrophe, I am sorry to be obliged to report, happened, during the past winter, to the bridge-pier at Black lake. On the 22d of January last, during one of the most violent gales, from north-north-east, ever experienced on this lake, the whole of the work which we had just erected, together with about thirty-four feet of that which was erected the season previous, was entirely carried away by the immense power of the lake-sea beating against it. Some of the piles were broken off, I am informed, at the surface of the soil, showing how faithfully they had been driven. At the same time there were lost 2,000 feet of plank flooring, 100 feet of cut lumber, and some other articles not precisely ascertained. Nearly all the balance of the appropriation had been expended upon the work. There remains, appertaining to it now, only the sum of \$232 50, out of which have to be paid charges for storage of tools and other property, repairs of harbor-boat, and some other contingencies, which, carried up to the 31st of May, will about exhaust this sum.

The property remaining on hand at this harbor is shown in the return lately forwarded to the bureau.

As there will not be funds to pay for a custodian to take care of it, nor even for storage, until another appropriation can be obtained, I recommend that this property be sold or transferred to other harbors, at a fair price, as may be found most profitable, considering the nature of the respective articles.

The agency and custodianship for this harbor were discontinued on the 31st of July last, under the regulation of the War Department of the 21st of June, 1854.

12. Harbor of Grand Haven, at the mouth of Grand river, Michigan.

No work has ever been commenced for the improvement of the entrance to this harbor, nor any materials collected in reference to the contemplated improvement, owing, no doubt, to the smallness of the sum (\$2,000) appropriated for it, which was not sufficient for the purchase of the requisite tools and machinery preparatory to the collection of building materials. Grand river is one of the best streams for the transportation of produce in the interior of Michigan. It is navigable for steamboats as far up as Grand rapids, 50 miles from its mouth in

Lake Michigan, and for batteaux 100 miles. It flows through the fertile counties of Ottawa, Kent, Ionia, and Clinton, whose agricultural and manufacturing products would always find a sure and ready market at Chicago and other commercial ports on the lake, if the egress and entrance at the mouth of the river were improved. The plan proposed has been to run out piers, in the usual manner, to a depth of 12 or 14 feet into the lake. The force of the current of this river, I think from a personal examination made between Grand rapids and its mouth in October last, would be sufficient during the spring and autumn freshets to keep the channel way between the proposed piers open.

The last survey made of this locality was by agent J. R. Bowes, in 1849. It is now in the bureau, and was printed with Senate Doc. No. 20, (Ex.) 1st session of the 31st Congress. During my inspection in October last, I observed that important changes had taken place since the period of that survey at the mouth of the river, and also in the contour of its southern shore just below the town, which I think render a new survey necessary before detailed estimates can be correctly made of the cost of this improvement, or plans for it judiciously decided upon. I would, therefore, respectfully recommend that the balance of appropriation remaining now in the treasury, (\$1,727,) or so much thereof as may be necessary, be applied to this object, and I would ask attention to my estimate for funds therefor, marked O, which accompanied my report No. 32, of the 19th of August last, amounting to the sum of \$1,056.

One-half of this sum, say \$528, would be required in May, and the other half in the month of June ensuing. If the amount now in the treasury is allowed to remain undrawn until the 30th of June, it will have to be carried to the surplus fund.

II. LAKE ST. CLAIR HARBOR WORKS.

1. *St. Clair Flats, Michigan.*

Three different channels connected with the South pass between this lake and the river of the same name were examined, estimated for, and reported upon by my predecessor, the late Captain Canfield, of the corps of topographical engineers, namely: the eastern, middle, and western channels of the South pass. The middle one was selected by the Board of Engineers as the most eligible to be improved, and the selection received the sanction of the bureau and the department.

The first appropriation for this work was necessarily expended in building a steam dredge-boat, to perform the first step in the contemplated work of reducing the bar so as to secure a channel 12 feet deep and at least 300 feet wide, (afterwards to be widened to 600 feet,) communicating between the lake and the river. No further appropriation having become available, however, for this work, there were no means for setting the dredge-boat in operation, and nothing has been done towards improving this channel. In November last I made an inspection of it, and found its condition unchanged since the survey of

Captains Canfield and Macomb, topographical engineers, made in November, 1852.

The public property appertaining to this improvement, consisting of this steam dredge-boat, and some office furniture and drawing instruments, were turned over to me by Captain Canfield's administrator in November last, at Detroit. The dredge-boat then lay sunk in that harbor, so deep that the whole of her engine was submerged. The vessel had been in this condition since the month of April, 1854. I immediately took steps to have her raised, pumped out, and caulked, which was accomplished in the month of December last. The engine and its appurtenances were found much rusted and out of order from the action of the water, and it will require an expenditure of between \$700 and \$800 to put them in good working order. There is no appropriation for such work, and the only way it can be done, so as to render the boat efficient for the dredging required as a part of the improvement at the mouth of Clinton river, will be to have the engine put in order at the expense of that appropriation, which as an unavoidable necessity I propose to do if approved.

2. *The mouth of Clinton river, Michigan.*

I reported to you on the 15th of November last (in my No. 55) the measures adopted in regard to this improvement, in concordance with the approved plan.

The oak piles contracted for were to have been delivered at the mouth of Clinton river by the 1st of April, 1855; owing, however, to the unusual prolongation of severe winter weather, the river remained closed with ice beyond its usual period, and the timber could not be rafted down as early as the time specified in the contract. In consideration of this unavoidable impediment, I have allowed the contractor until the 15th of May for the delivery of the piles, which is as early as the work can be commenced with advantage.

On the completion of this delivery the work will be commenced, with the funds now in hand, in accordance with my report of the 15th of November last, numbered 55.

All which is respectfully submitted:

J. D. GRAHAM,

Major Top. Engs., Brevet Lt. Col., Superintending Engineer, &c.

Colonel J. J. ABERT,

Chief Topographical Engineers, Washington.

P. S.—As the maps referred to in this report cannot be folded without injury, they are sent in a box, by express.

J. D. G.

Recapitulation of estimates of funds now required on account of Lake Michigan harbor works.

A.—On account of Chicago harbor	\$7,708 16
B.—On account of Waukegan	1,789 00
E.—On account of Michigan City	3,515 46
F.—On account of New Buffalo.....	621 90
G.—On account of New Buffalo, (additional for survey, if approved of).....	665 50
O.—(Accompanying report No. 32, of August 19, 1854.) For survey of Grand river, if approved of	1,056 00

J. D. GRAHAM,
Major Top. Engs., Brevet Lt. Col., Superintending Engineer, &c.
OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 19, 1855.

A.

Estimate of funds required on account of Chicago harbor, for May, 1855.

1. To meet balance as per accounts rendered for 1st quarter of 1855	\$3,800 00
2. For materials required for repairing the north and south piers above the water-surface, as per approved plan of the Board of Engineers	2,200 00
3. Workmanship, labor, assistance, &c	1,085 00
4. For a survey of the bar and channel, necessary since the opening of navigation	268 00
5. Contingencies, say 10 per cent. on items 2, 3, and 4.	355 16
Amount required	<u>7,708 16</u>

J. D. GRAHAM,
Major Top. Engs., Brevet Lt. Col., Superintending Engineer, &c.
OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 29, 1855.

B.

*Estimate of funds required on account of Waukegan breakwater, Illinois, for
the month of May, 1855.*

1. To pay for materials contracted for, and nearly all delivered	\$500 00
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2. For workmanship, labor, &c., in framing together and sinking cribs in position.....	\$850 00
3. For caulking and repairing timber-scows and harbor-boat.....	125 00
4. For repairing pile-driver.....	50 00
5. Expenses of survey to mark, by buoys, the correct line for the breakwater, in accordance with approved plan.....	50 00
6. Contingencies.....	214 00
Amount required.....	<u>1,789 00</u>

J. D. GRAHAM,
Major Top. Engs., Brevet Lt. Col., Superintending Engineer.
OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 29, 1855.

C.

Estimated cost of completing and sinking in position two cribs for Michigan City breakwater, each to be 25 feet wide, 25 feet high, and 30 feet long, to be placed in 19 feet depth of water.

1. For 158 cords of stone, at \$10, delivered.....	\$1,580 00
2. For 8,293 pounds of 1-inch square bolt-iron, at 5 cts.	414 60
3. For 1,000 pounds of assorted iron for general use, at 5 cents per pound.....	50 00
4. Repairing one crane-scow.....	150 00
5. Workmanship and labor in completing the dressing, fitting, and putting together the crib-timbers, and sinking them in position.....	860 00
6 Pay of United States agent from May 15 to August 31, 108 days, at \$4.....	432 00
7. White-oak plank for flooring.....	45 00
8. Iron spikes for fastening same.....	26 00
9. Teaming and blacksmithing.....	150 00
10. Office expenses for superintending engineer, and stationery.....	100 00
	<u>3,807 60</u>
Add for contingencies, 10 per cent	380 76
Amount required.....	<u>4,188 36</u>

J. D. GRAHAM,
Major Top. Engs., Brevet Lt. Col., Superintending Engineer.
OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 29, 1855.

D.

Estimated cost of completing and sinking in position two cribs for Michigan City breakwater, each to be 30 feet wide, 30 feet high, and 30 feet long, to be placed in 25 feet depth of water.

1. For 242½ cords of stone, at \$10.....	\$2,425 00
2. For 9,848 pounds of 1-inch square bolt-iron, at 5 cts.	492 40
3. For 1,000 pounds of other assorted iron, for general use, at 5 cents.....	50 00
4. Repairing one crane-scow.....	150 00
5. Workmanship and labor in completing the dressing, fitting, and putting together the crib-timbers, and sinking them in position.....	1,000 00
6. Pay of United States agent, 108 days, at \$4.....	432 00
7. White-oak plank for flooring.....	45 00
8. Iron spikes for fastening same.....	26 00
9. Teaming and blacksmithing.....	150 00
10. Office expenses for superintending engineer, including stationery.....	100 00
	4,570 40
Add for contingencies, 10 per cent.....	487 00
Amount required.....	<u>5,357 40</u>

J. D. GRAHAM,

Major Top. Engs., Brevet Lt. Col., Superintending Engineer.

OFFICE GENERAL SUPERINTENDENCE, &C.,

Chicago, April 29, 1855.

E.

Estimate of funds required for the month of May, 1855, on account of the breakwater for Michigan City, Indiana.

1. Disbursed for workmanship, labor, services of agent, pay of his clerk, &c., during first quarter of 1855...	\$1,262 34
2. Required for workmanship and labor, pay of agent, &c., to the end of May, 1855.....	500 00
3. Required for purchase of stone and bolt-iron.....	1,582 00
4. Required for repairing crane-scow.....	150 00
	3,494 34
Add 10 per cent. for contingencies.....	349 43
	<u>3,843 77</u>

Deduct balance on hand, as per account rendered to December 31, 1854	\$328 30½
Amount required	<u>3,515 46½</u>

J. D. GRAHAM,
Major Top. Engs., Brevet Lieut. Col., Superintending Engineer.
OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 29, 1855.

F.

*Estimate of funds required to May 31, 1855, on account of New Buffalo
harbor improvement, Michigan.*

1. Balance due on account of this harbor, as per accounts rendered to December 31, 1854	\$220 90
2. For pay of custodian of public property from January 1 to May 31, 1855, being 151 days, at \$1	151 00
3. Expense incurred in removing and piling anew the timber belonging to this harbor, which was necessary to keep it from rotting, done in March and April, 1855	150 00
4. Proportional part of cost of printing blanks, office ex- penses, &c.	100 00
Amount required	<u>621 90</u>

J. D. GRAHAM,
Major Top. Engs., Brevet Lieut. Col., Superintending Engineer.
OFFICE GENERAL SUPERINTENDENCE, &c.,
Chicago, April 29, 1855.

G.

*Estimate of cost of making a survey at the mouth of Galien river, and its
vicinity, with a view to a revised estimate of the cost of that harbor im-
provement.*

1. Services of a competent surveyor for 25 days, at \$5 per day, including his personal expenses	\$125 00
2. Services of eight men as chain-bearers, flag-men, oars- men, &c., for 25 days, at \$1 25 each per day	250 00
3. Services of a draughtsman for finishing map when the note-books and plots are sent in, 20 days, at \$4 per day ..	80 00

Ex. Doc. 1—28*

4. For purchase of materials for signal-flags and stations, stationery, drawing-paper, and repairs of instruments...	\$100 00
5. Transportation of harbor boat from St. Joseph, and repairs of same.....	50 00
	605 00
Add 10 per cent. for contingencies.....	60 50
Amount required.....	665 50

J. D. GRAHAM,
Major Top. Engs., Brevet Lieut. Col., Superintending Engineer.
 OFFICE GENERAL SUPERINTENDENCE, &C.,
 Chicago, April 29, 1855.

APPENDIX F.

REPORT ON SURVEY FOR SHIP CANAL ACROSS PENINSULA OF FLORIDA.

WASHINGTON, May 1, 1855.

SIR: The direction of the Florida canal survey having been placed under my charge in consequence of the ill health of Capt. C. Graham, to whom this duty was previously assigned, I have the honor to report the completion of the surveys undertaken under the appropriation for this purpose, together with drawings sufficiently in detail to illustrate the subjoined report, and delineate the lines of surveys.

These drawings consist of fourteen sheets, numbered from one to fourteen; also profile sheets to accompany, numbered in like manner from one to fourteen; together with a general map and profile, the general map embracing lines of survey; also certain portions of adjacent country necessary to a correct understanding of some remarks that follow.

I take occasion in this place to acknowledge the important and zealous assistance rendered by the following gentlemen, who were during the progress of the survey associated with me.

To Lieutenant W. F. Smith, topographical engineers, by whom was made the reconnaissance of Charlotte's harbor and a portion of the line of Pease creek, to determine the availability of that harbor for a terminus to the canal. In consequence of the views submitted by him, the further prosecution of the line of survey towards that point was abandoned; neither the channel leading into the harbor, nor the bay itself, affording as much water as at Tampa, and it being shoal at very considerable distances from the shores. Previous to the conclusion of the survey, this officer, much to my regret, was ordered to the military department of Texas.

To Lieutenant Bryan, also, of the corps, who was ordered on the survey at its commencement, and remained till its completion: the

laying off, running, cutting out and marking the line was done by, and under his direction, and the satisfactory manner in which the work is plotted, evidences the care with which this part of it was done. The energy exhibited in pushing the survey to a completion is particularly worthy of commendation.

To assistant and civil engineer Mr. A. E. Drake was committed the charge of the levelling; and it is with pleasure I mention the satisfactory manner in which this was performed, both as regards accuracy and rapidity, due as well to his experience in engineering as to interest in the work itself. Owing to the appropriation being exhausted, under which the survey was made, the office was deprived of his services before the completion of all the drawings.

With these remarks I proceed to the discussion of the question involved in the results of the survey, viz: the practicability of a canal across the peninsula of Florida.

The party was organized and work carried on under the following orders:

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, October 30, 1852.

SIR: The duties assigned to you are the survey of a canal route across the peninsula of Florida. The extreme points of said route are the waters of Espiritu Santa bay and the headwaters of the St. John's.

Having ascertained a place on the first sufficiently sheltered, and having a convenient access to the deep water of the bay, you will carefully examine the country between that position and the headwaters of the St. John's, as a point to which about two feet can be carried in navigating that river.

Then you will carefully mark out the line between these two points.

Then you will make an accurate survey of this line so as to exhibit the route in plan and profile. Then for about every three hundred yards of this main line, or more frequently or not so frequent, as the ground shall in your judgment require, you will make offsets to this main line, each not less than two hundred yards, which offsets are to be as carefully surveyed as the main line, so as to exhibit plan and profile, and so as to connect these offsets and profiles with the profiles of the main line, and with the same plane of reference.

J. J. ABERT,

Colonel Corps Topographical Engineers.

Col. J. E. JOHNSTON, or Lieut. M. L. SMITH,

Fort Brooke, Tampa, Florida.

Espiritu Santa bay being one of the extreme points of the proposed route under the instructions, the determination of the other will first be spoken of.

In examining the St. John's for the purpose of ascertaining to what point up the river two feet water could be carried, the following information was obtained: from the mouth 11 feet can be taken up to Palatka, 10½ to the mouth of the Ocklawaha, 8½ entering Lake George, 6 in leaving it, 4½ into Lake Monroe, 1½ to 2 leaving it, and a further

decrease of depth into Lake Harney. These depths vary, particularly in the upper portions of the river, when it is swollen from rains: thus, $6\frac{1}{2}$ feet may then be found at the outlet of Lake Monroe, nearly the same at its inlet, and some $6\frac{1}{2}$ to 7 at the outlet of Lake Harney; but those depths only are regarded which can be relied on during all seasons. Lake Monroe was therefore considered the limit of permanent 2-foot navigation; hence the other extreme point of the line mentioned in the instructions would be at or below this lake.

The precise point at which the proposed canal should connect with the river was decided from the following: Lake Monroe is shallow, being about 10 miles long by 4 wide; has a depth of from 12 to 14 feet in the middle, and shoals gradually to the shore; there is consequently no point at which the requisite depth is very near shore, and all parts of it are open and exposed to storm winds. To have the connexion anywhere on the lake seemed liable to these two objections: First, that the lock at the junction would be some distance from shore, hence present some difficulty of construction. Second, that the entrance to it would be liable to be choked from the effect which any such jettee would necessarily have upon the drift of the lake. Further, nothing is apparently gained by making the junction at the lake; and as the canal would practically be but a continuation of the river, the two should be united at a point offering natural facilities for it. Such a point is found anywhere below the lake, where the river is again narrowed to a proper width to give a well defined channel, and has firm banks; the shoal at the outlet to Lake Monroe is at the same time avoided. The valley of a small stream called the Weekivah, emptying into the St. John's some 4 miles below Lake Monroe, offers a rather straight and convenient depression for a canal from Tampa bay, and as at its junction the river has sufficient width and depth, the proposed route has accordingly been made to follow down the valley of this stream and join the St. John's.

The two extreme points being thus fixed, the general position and direction of the route becomes so, subject to such variation in directness as the physical features of the country and facts developed by actual survey require.

The accompanying maps, constructed on a large scale, together with a minute profile of the country, render any but a general description of the line unnecessary.

Description of the line.

The general profile across the peninsula shows a gradual swell both from the Atlantic and Gulf coasts to the middle, where is found a range of broken sand-hills varying in height above the average level of the interior from 100 to 125 and 150 feet, and in width from 1 to 3 and 4 miles. The country is flat, thickly sprinkled with cypress and bay-gall swamps, and much of it to the eye presents no distinct and well-defined system of drainage.

On the eastern side of the sand-hills there are two main depressions, touched by the line, which drain in opposite directions and overlap

each other : first, the valley of the St. John's, draining northward ; next the valley of the Kissimmi and its tributary head streams and lakes, draining south. On the west of the sand-hills there is a gradual slope to Tampa bay, sufficiently indicated by the direction of the various streams.

In passing from the valley of the St. John's into that of the Kissimmi, the latter is cut by the line so near its head sources, that the slight divide separating them requires no unusual depth of cutting, and the only serious natural obstacle along the line is presented in the sand-hills spoken of. This range was examined for several miles to the right and left of the point selected for cutting it ; one point only of it was found where the width and depression was as favorable as that decided upon, (known in that country as at the source of Horse Head creek,) but the increased distance given to the line caused it to be rejected. The greatest depth of cutting required here will be 80 feet, and the ridge, as far as could be detected by boring and other examinations, consists wholly of sand. The height of the established summit-level is 113 feet above ordinary low water at the mouth of the Hillsboro' river, and 101 feet above the water in the St. John's at the point of junction, giving 14 locks of 8 feet lift on one side of the summit-level, and 15 (2 having over 8 feet lift) on the other side. The soil is sufficiently favorable not to present any unusual difficulty ; proceeding from the St. John's the excavation would be in sand, mixed with clay and fine gravel in greater or less degree, until reaching Lake Weekiwah, where gravel as far as noticed disappears. Sand and clay, the latter not in large proportion, will thence constitute the soil to be excavated for remainder of the line, varied a little by gravel and alluvial along Hillsboro' river. With these few remarks descriptive of the line, I proceed to the consideration of those points directly touching the practicability of a canal along it.

A canal may be regarded as a stream conducted artificially from a higher to a lower point by a series of steps or levels, the source of the stream being the highest or summit-level ; if the length of this level is not short compared with some one near it, (in which case additional sources of supply are sought, and in general are readily found, since new streams constantly present themselves as you descend,) it is sufficient in the discussion of the subject to show a proper supply of water for the summit-level, and it carries with it proof of a proper supply for the levels below, since the water from leakage and lockage, which constitute the main expenditure, passes into the lower levels. In the case under consideration, the summit-level is, with one exception, the longest level on the line ; and if a supply adequate for this can be shown, the practicability of a canal will be proven, for all other points connected with a canal have reference to a greater or less cost of construction merely.

For the purpose of being as clear as possible in the discussion of an adequate supply, the subject will be taken up in the usual order, to wit : first determine the supply of water required ; second, show how and from whence this supply is to be obtained.

The unit of measure taken, and denominated the water prism, is the entire contents of the summit-level, which is 21 miles + in length.

Supply of water required at summit-level.

This ought to be sufficient to meet an expenditure due to the following requirements:

- 1st. Losses from evaporation.
- 2d. Losses from filtration and absorption.
- 3d. Losses from leakage at lock-gates.
- 4th. For the use of locks, according to the demands of trade, upon the summit-level.
- 5th. First year, for filling summit-level.
- 6th. Losses arising from emptying portions of a reach, for repairs of various kinds, from breaches, &c.

The expenditure from the more important of the causes enumerated being dependent upon the dimensions given to the canal and locks, the following communication from the bureau establishing them is inserted:

WASHINGTON, May 16, 1853.

SIR: * * * * Your consideration and plan will be bestowed upon the supposition of a canal 60 feet wide at top, and 6 feet deep; locks 110 feet long, 16 feet wide (in the clear.)

J. J. ABERT,

Colonel Corps Topographical Engineers.

Lieut. M. L. SMITH, *Topographical Engineers.*

Loss from evaporation.

Loss from evaporation must, from the circumstances attending and governing, be imperfectly arrived at: it is influenced by temperature, by dryness or moisture of the atmosphere, and very particularly by currents of air. Temperature, alone, would probably cause less inequality of variation than either of the other two named causes, since it is more uniform in its action over a large extent of country, and the changes are not so frequent and sudden.

The hygrometrical condition of the atmosphere will depend much upon the country the currents of air have passed over: for example, all are familiar with the exceeding dampness of the sea-breeze, and corresponding dryness of the air on the western prairies.

Whether the air be still, or in motion, makes the greatest difference, shown by the rapidity with which any article is dried when exposed to a brisk breeze, as compared with the time required when the air is comparatively still. During some experiments, made in England by Doctor Dalton, evaporation was said to be increased fifty per cent. by opening a window of his room. The uncertainty arising from this element alone must be apparent, when it is considered that, in point of actual fact, currents of air never remain the same two consecutive half hours, but are continually changing in direction, and varying in

force. Nevertheless, certain conclusions have been arrived at, which we proceed to state.

Doctor Halley fixed the evaporation at London, during an ordinary summer's day, at $\frac{2}{10}$ of an inch, which is equal, for a month of 30 days, to 6 inches; and the annual evaporation at 48 inches.

The result of the experiments made by Mr. Cotte at Montmorency, near Paris, (as given by Gauthy in his work on canals,) was to determine 41.575 inches as the annual evaporation; and 5.315 inches as that of an ordinary summer month.

It was ascertained on the Languedoc canal by Mr. Prim, the engineer, that during $10\frac{1}{2}$ months the average loss from evaporation monthly, over and above the rain that fell, was 3.044 inches; by averaging the quantity of rain along the entire line, a quantity is deduced for evaporation equal to 5.330 inches. (Andraossé.)

In a report made by Col. J. J. Abert, topographical engineers, to the governor of Maryland in 1838, upon the subject of a canal to connect the Chesapeake and Ohio canal with the city of Baltimore, the probable evaporation for that climate during the ten business months was assumed at 67.20 inches; an average of 6.72 inches per month.

The Board of Engineers of the Morris canal adopted 51 inches for the maximum loss of water by evaporation during the eight months (from April to December) it could be navigated, or 6.375 inches per month.

In the Encyclopedia Britannica is found a table constructed by Dr. Dalton, from which, knowing the dew-point and temperature, the rate of evaporation can be obtained.

For that portion of Florida under consideration the dew-point has been assumed at 55° Fahrenheit. I am not aware of any observations that have been made to determine what this point is ordinarily, and can only judge of it from the average heights of the thermometer at 9 p. m., when dew is usually perceptible. The Medical department, through its officers at the different posts, have obtained numerous and accurate meteorological observations, which have been kindly furnished me by Doctor R. H. Coolidge, now in charge of that branch of the Medical bureau. From these, the mean annual temperature at three different points near the line of survey is as follows:

Tampa Bay.....	72°.41	Fah.
Fort Meade, on Pease creek.....	71°.00	"
Fort Capron, or Pierce.....	74°.11	"

The two last of these points are south of the line of survey, and probably of a somewhat greater mean temperature. Most of the line, too, is north of Fort Brooke, which should also be considered.

The mean annual temperature for the entire line is assumed at 70° , and it is thought to be rather below than above the true temperature.

Applying, then, the dew-point, 55° , and temperature, 70° , to Doctor Dalton's table, we find a daily evaporation of 0.255 inch, or 7.45 inches monthly.

For the purpose of comparing the evaporations established for different points, they are recapitulated:

Evaporation at London, 6 inches per month.

Evaporation at Montmorency, 5.315 inches, ordinary summer month.

On Languedoc canal, 5.330 inches per month.

J. J. Abert, for climate of Baltimore, 6.72 inches per month.

On Morris canal, 6.375 inches per month.

For Florida, by Dalton's table, thermometer 70° , 7.458 inches per month.

During dry weather, thermometer averaging 86° Fahrenheit during the entire 24 hours, there is, under favorable circumstances, in the latitude of Washington, an evaporation during that time of 0.3 inch, or 9 inches per month. 86° is much above the mean temperature of the latitude under consideration, and with the thermometer at that height, evaporation would go on during the 24 hours; evidently, then, 9 inches is too much to allow for. In deducing the quantity 7.458 inches by Dalton's rule, it is believed the dew-point assumed is rather below than above the true one, which would increase the result obtained; hence it is concluded that, practically, 7.458 inches will represent the monthly evaporation with sufficient accuracy.

Evaporation, it must be remarked, does not constitute the most important part of the expenditure of water on a canal; hence, whether it is more or less by one or two inches per month, is really not of special importance, for if the supply and expenditure are so nearly equal as to depend upon evaporation for difference, it ought to be conceded at once that there is not an adequate supply.

The number 7.458 inches is accordingly taken, and it gives a loss from this cause of a prism—say 9 months, or $1\frac{1}{3}$ water prisms per year.

Loss from filtration.

This is a loss constantly varying with the nature and compactness of the soil, and a result which would apply to one section would by no means be applicable to another. As the losses both from this cause and evaporation can in general only be known by the diminution of water in the canal, it has been usual to combine them together, and estimate the sum at so many water prisms per year.

In the case of one canal only (the Languedoc) has a distinct loss by filtration been given; but it has not been found to apply to similar works in this country, owing, probably, to the greater care taken in its construction; hence the method of combining the two losses seems to be the only one that can well be pursued, and that gives but an approximate result.

Experiments made on the Chesapeake and Ohio canal by Mr. Fisk, show that it loses a little more than $1\frac{1}{3}$ its water prism monthly from these two causes. Now, the evaporation assumed as proper for that climate by Mr. Abert has been seen to be 6.72 inches monthly; from which it results that filtration is about fourteen times greater than evaporation.

Experiments on the Erie canal seem to indicate a loss from filtration still greater than this; but, being given in connexion with leakage from locks as well as losses from evaporation, the approximate quantity cannot

be given. As connected with this part of the subject, the following extract from J. J. Abert's report to the governor of Maryland is introduced:

"From experiments made on the Erie canal, and communicated to me by that distinguished engineer Mr. J. B. Jervis, it would appear that the least loss, from observations made at various places, was 100 cubic feet per mile per minute. This was not the measurement of loss from a distinct cause, but from all united, leakage of locks, evaporation, and filtration. The dimensions of this canal are 40 feet water-surface—28 at bottom, and 4 deep; which give for its prism of one mile, 26,595.5 cubic yards. The loss of 100 cubic feet per mile per minute, is equal to 160,000 cubic yards per mile per month; or supposing the navigation to continue nine months, (in that climate,) the total loss would be equal to 54 times its water prism per year: adding to this the loss of the prism in the canal at the closing of the navigation, gives a total loss of 55 of its prisms of water for all causes, except the demands of the locks for its trade."

These observations were made about 1833 or 1834; the canal had been in use a number of years, and its loss from filtration may fairly be considered to have been much less at that time than when first constructed. There is no good explanation of this difference of loss in the two canals, unless it be that the Erie being built first, was not as well constructed.

If the Chesapeake and Ohio canal be considered as a fairer sample of such works in this country than the Erie, and its losses taken as a basis of estimate, the following is deduced for loss from filtration:

Evaporation per year has been found to be $1\frac{1}{3}$ prisms; 14 times $1\frac{1}{3}$, say 19 prisms loss due to filtration.

The correctness of this result evidently depends upon similarity of soil in the two cases; and the question naturally arises, how will fine, compact sand mixed with small proportions of clay retain water? In answer, two facts are stated: 1st. That this soil in connexion with small brush makes a secure and tight dam. 2d. That around waste or flood-gates and other openings in earthen dams, where leaks are almost unavoidable, it is among the best things to render these openings water-tight. One reason of this would seem to be that, each grain of sand being solid, water can only find its way through the small openings or interstices between them; these interstices soon become filled by any extraneous matter brought by the water in filtering through, and the whole becomes a solid mass.

The summit-level established on this line is, with the exception of a very short distance at its western extremity, entirely in excavation. Now experiments seem to show that water can always be found at a distance below the general surface of the country not exceeding from four to six feet; this would bring the water-line in the summit-level below the depth at which water is found to permanently remain in the soil, so that instead of losing, the canal would receive a supply from the soil. This fact is again referred to under the head of "infiltration," and in connexion with certain data which, it is considered, render further remark at present unnecessary.

It is not, therefore, thought that *nineteen prisms* per year is too small a loss to be allowed for filtration, and is accordingly taken.

Leakage at lock-gates.

A liberal allowance should be made for this item, since, unlike filtration, it is least while the locks are new, and increases from year to year as the canal is used, until the gates are replaced.

The dimensions of the locks on the Chesapeake and Ohio canal are nearly the same as given for the canal under discussion; and the observations made upon them may be applied in the present case, particularly as it is a work executed in our country; and the manner in which, in its various details, it has been constructed, may be considered a sample of the way in which similar works would be completed. Mr. Fisk, the chief engineer of this canal, made many observations upon the leakage of the locks during a period of suspended navigation, when the gates were kept carefully closed for several weeks while repairs were being made: the result was, to fix the leakage due to a lock at twelve lockfuls per day. Engineers in this country have usually considered this as the proper amount to be allowed for leakage when calculating the supply of water needed. As it is a matter to be determined entirely from observation, there seems to be no reason for supposing a different quantity would be nearer the actual loss.

Twelve lockfuls' leakage per day, per single lock, would give twenty-four lockfuls per day, drawn from the summit-level, due to the locks at either end, or 8,760 *lockfuls per year*, which is equal to 3.85 water prisms.

Amount required for lockage.

It is to be understood, in speaking of this amount, that reference is still had to the summit-level only, with its two locks, one at either end.

This is the only portion necessary to consider, since the lower reaches receive not only what is drawn from this for the purposes of trade, but what arises from leakage at lock-gates and accidental wastage.

The quantity required for lockage is dependent upon trade, which necessarily varies from year to year; hence no absolute amount can be stated, as being neither more nor less what will be required. The rule is, to allow for the greatest possible activity of a lock during a certain number of hours, and take the amount of water expended during that time as the amount due to lockage. Thus: say that on an average a lock will be in use twelve hours a day during the year; that twelve boats per hour can be passed through, and each boat in passing the summit-level requires two lockfuls; the quantity drawn from the summit-level is at once known. There are three points, then, to be considered: First. The average number of hours per day that a lock may possibly be used. Second. The average number of boats that can be passed through a lock per hour. Third. The average quantity each boat may require for passing the summit-level.

First. The average *number* of hours per day a lock may be used. It

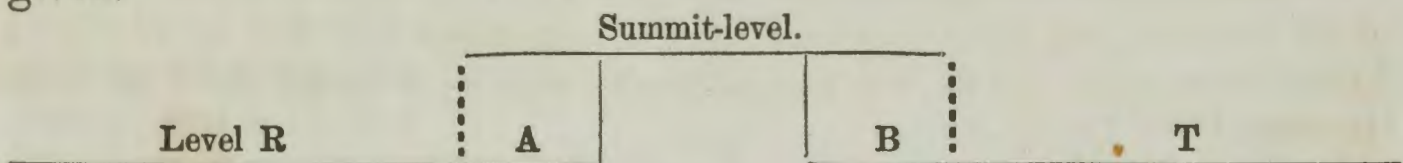
has been usual to take twelve as the number, and it is probably great enough to cover every case in the country. The only possible exception it is believed may be the Erie canal, on which the locks are in use day and night for weeks at a time, particularly during the fall just previous to suspended navigation, and while the western produce is on its way to market.

If the connexion of the Atlantic and Gulf by a canal across the peninsula of Florida is of sufficient importance to justify the construction of one, allowance for an active trade through it should be made, for it is intended to be a highway to the Gulf commerce similar to the Straits of Florida at present. Instead of twelve, twenty hours will be taken as the daily average time for the working of locks.

Second. The average number of boats that can pass through a lock per hour.

For a single hour a boat might, it is probable, be passed through every three minutes or so to the hour; in point of fact, however, each boat consumes from four and a half to five minutes: if four minutes be taken as the average, it is considered that the error will be on the safe side; this makes 15 boats per hour.

The average quantity assigned to the passage of a single boat into and out of the summit-level, has varied with different engineers according as they have supposed boats to pass in opposite directions with more or less regularity. To illustrate this the two extreme cases are given.



1st. Suppose a boat on the level R and one on the level T present themselves respectively at the locks A and B, both locks being empty; they enter the locks which are then filled, and both pass into the summit-level; thus far a prism of lift (or lockful) has been drawn from the summit-level for each boat; they pass, and each proceeds into the lock which the other has left full; the locks are then exhausted and the summit is passed. It is plain, that in this instance but two lockfuls (or one to each boat) has been drawn from the summit-level; this is called an alternate passage, and is the case in which the least water is used by a boat in a passage, namely, one lockful.

Alternate passages of boats could never be relied on except in cases of a canal having a trade equal to its utmost capacity, one half flowing in one direction and the other half in the opposite; this can never be the case, and would require a regularity of movement on the part of boats not attainable by trains on railways. This case evidently cannot govern. Let us now take the other extreme case. Suppose, after the alternate passage just spoken of, two boats to present themselves at the lock on the level R to make their passage, and none on the level T. The first boat finds the lock A empty, passes into it, the lock is filled, the boat then moves out and is on the summit-level. The second boat presents itself at A, which is full and must be exhausted before it can be received; this being done, the boat enters, A is again filled, and

the second boat joins the first. They then proceed to B, which is empty; this must be filled for the first boat to pass into, and then drawn off to lower the boat to the level T. The second boat consequently finds B empty, and another prism of lift is required for it to be passed in and be lowered. For this case four lockfuls have been required, two for each boat, and the locks left in the condition they were before the passage. This case is termed a consecutive passage, and undoubtedly shows a consumption of water to pass each boat which exceeds what would be found true in practice. Now the consumption may vary anywhere between what is shown in these two cases; and as the order in which boats will pass the summit-level must be a matter of chance, it is considered that the only absolutely safe allowance to make for each boat will be the maximum expenditure; two lockfuls are therefore allowed to each boat in passing the summit-level.

We have then the following quantities for the calculation: 15 boats per hour for 20 hours per day during 365 days, at two lockfuls per boat. $15 \times 20 \times 365 \times 2 = 219,000$ lockfuls, equal to 95.38 water prisms.

The requirements of the canal per year can now be stated; the unit taken still being the water prism of the summit-level.

For evaporation and filtration.....	20.33 water prisms.
Leakage at lock-gates.....	3.85 water prisms.
Lockage.....	95.38 water prisms.
For filling canal first year.....	6.00 water prisms.

Total.....	125.56 water prisms.
Or after first year.....	119.56 water prisms.

In obtaining the consumption of a canal for the purpose of deducing the required supply, it has been necessary to consider the summit-level only, (since the main losses from this level pass into the lower ones and compensate for the losses taking place there.) If, therefore, a supply of water adequate to the summit-level can be shown, we at the same time show a supply for the entire canal; for, as we descend, many additional streams are crossed which can be commanded if necessary.

By reference to the profile sheets, the waters which must supply the summit-level are found at an elevation of 128 feet above the waters of Tampa bay; the dividing ridge must of course be passed at an elevation somewhat lower, in order to command these waters for a supply; and this elevation has been assumed at 115 feet above Tampa bay, or 15 feet below the water forming the sources of the Withlacoochee and Ocklawaha. This level is maintained as long as is practicable, and not lose for feeders any of the small streams crossed on the course. The propriety of this is evident, since the higher the level the less excavation there will be; hence less expense. As before stated, the length of the summit-level thus established is 21 + miles.

Source of supply.

Having determined the amount of water needed by the canal, the

question presents itself next in order, can this amount be found, and can it be shown that it will be supplied yearly?

1. The profile map shows that no streams or lakes east of the ridge of sand-hills can be made use of; west of it there are Hawk creek, (a tributary of the Ocklawaha,) the Withlacoochee, (at the point of crossing mainly a swamp,) and Grassy creek; this latter fails during the dry months.

As both Hawk creek and the Withlacoochee have their origin in several large sheets of water lying in the same region of country south of the line, and receive their supplies entirely from them, together with rains when they occur, the safer and it is believed the only way, will be to throw the streams out of consideration and argue directly from these natural reservoirs themselves.

In following up the headwaters of the Withlacoochee and Hawk creek south, within a distance of about fourteen miles, some thirty-five lakes are found, varying in extent of area from two miles square to one-eighth of a section. These lakes range in depth from 10 to 45 feet, and have an aggregate area of 15,000 acres. They could be connected and made tributary to the canal by cutting about seven miles, and in almost every case the ridges separating the lakes do not rise more than from three to five feet above the surface of the waters to be joined. It is proposed to command the water of these lakes to a depth of six feet when connected.

Bordering these lakes, and in many instances in reality connecting them, are extensive swamps and marshes, usually covered for eight months of the year with water from one to three feet in depth. The area over which they extend will be about four times that mentioned for the lakes, and when the latter are connected will be likewise tributary to the canal. Let the swamps be supposed to average $1\frac{1}{2}$ feet in depth for nine months of the year; we have then lying during the entire year in these natural reservoirs or lakes, and subject to control, 16,000 acres of water six feet deep, equal to 129 water prisms of summit-level, and swamps holding water equal to 96 prisms more, making a supply equal to over 21 months; if to this is added the quantity held in swamps and marshes that can be made available, it equals the requirements for $4\frac{1}{2}$ months more.

This is mentioned and given in this unit, to show to what extent the headwaters of the two streams mentioned will serve as a great natural reservoir for the use of the canal, and it results that 21 months' supply for the canal in full operation can be retained. These lakes, ponds, &c., are, in my opinion, mainly if not entirely supplied by rains and surface drainage; hence it still remains to be shown that these natural reservoirs can be maintained, and not exhausted by use. The case would be quite different were these lakes, &c., fed by springs and living streams; hence not susceptible of being materially reduced.

The country that would be made tributary to the summit-level of the canal, if the lakes were connected as indicated, has an area of 198 square miles; the main drainage from this area will be by the two streams mentioned, but, in addition, many other ponds, marshes, &c., together with one stream, will empty their waters into it.

In the following investigation I shall limit myself to ascertaining the amount of supply which can be relied upon as never failing, and which will be therefore a minimum amount, the least that in any supposed case can be counted upon as certain. Should this prove to be more than sufficient for the requirements of the canal as determined, it will evidently be unnecessary to carry the investigation further, and show what surplus would probably exist under favorable circumstances.

The area that can be made tributary to the summit-level is $5\frac{1}{2}$ townships, or 126,720 acres.

There is some uncertainty as to precise quantity of rain to be relied on annually. Points quite near, however, to the line of survey have been taken, and the observations for rain compared; it results that at Tampa Bay the yearly fall is 57 inches, at Fort Meade 35 inches, at Fort Pierce 73 inches, Jacksonville 58 inches, giving an average for the four places of 56 inches. These observations are too limited to afford with much certainty a correct general rule; hence the annual fall of rain will be taken much below the average of the places given, to wit: 45 inches. The inquiry now arises, what proportion of this 45 inches downfall rain can be made available for the canal? A precise answer to such a question can never be given until the works have been actually constructed, and the amount collected absolutely gauged; hence it is only by giving experiments made at different localities, and the conclusions thence drawn, that even a partially satisfactory answer can be made.

If data were far more extensive and minute than exist, engineers would still be obliged to exercise very much their own judgment in fixing upon any proportion of downfall of water that could be collected, as soil, climate, and a broken or flat country would vary the results for any except the given places.

William Cubitt, an English engineer, states as his opinion that about one-half the annual fall of rain can be stowed in reservoirs and made available; a proportion very high, considering the land in England is generally cleared, under cultivation, and level, conditions calculated to cause much of the surface-water to be absorbed and evaporated before draining off.

It was calculated by Sutcliffe that little more than one-third of the rain which fell could be got into the summit-level of the Rockdale canal from the area tributary to it. The experiments of Mr. J. B. Jervis, made with reference to the construction of the Chenango canal, in the State of New York, led to the conclusion that about 40 per cent. of the fall could be collected; the rule of engineers has been to allow that one-third could be collected, and this has been followed by all in this country. Under ordinary circumstances there is no doubt but this rule would require to be modified for a more southern climate, as the tables of Mr. Jervis show that seven out of the twelve months are decidedly affected by the cold of winter; the proportion of rain collected during these seven being nearly three times greater than during the other five, which include the hot season of summer.

Thus the proportion of rain and snow collected from November to May, inclusive, was	.686
From June to October	.246
From June to October, by a second table.....	.319

For a climate such as Florida's, where there is no winter, it seems pretty evident that the rule of $\frac{1}{3}$ should be modified to apply, and it is thought $\frac{1}{4}$ will be more in accordance with the experiments than *one-third*.

But there is much of the area under consideration to which neither of the rules will apply, for it has been already stated that about 16,000 acres is covered by permanent lakes and ponds, and some 64,000 is swamp, which nine months out of the twelve are under water; consequently every drop of rain is collected as it falls on the first named area, and for three-fourths of the year on the second.

By comparing the rain tables at these points, Capron, Pierce, and Brooke, it appears that only $\frac{1}{11}$ of the annual fall of rain occurs during the three months referred to, when swamps are supposed dry, viz: March, April, and May; hence the quantity deducted will be $\frac{1}{11}$ of 45, = 4.09 inches.

This leaves but 41,720 acres for the rule of one-fourth of the rain equal drainage to be applied to.

The amount of rain collected on the summit-level may now be stated:

45 inches rain on 16,000 acres amounts to.....	80	water prisms.
40.91, say 40 inches rain on 64,000 acres, amounts to.....	286.5	water prisms.
$\frac{1}{4}$ of 45 inches rain on 41,720 acres, amounts to.	54.96	water prisms.
Amount.....	421.46	

The above amounts, it is obvious, must be corrected for evaporation and filtration, as the losses in the canal have been: to determine these, it is not proposed to apply the same rules heretofore used, for the simple reason that observation shows that they do not apply; but deduce these corrections from observed losses in the lakes, ponds, and marshes, while there.

To illustrate what is meant, a single case only will be cited: A lake near the 40th mile, having an area of some 130 acres, from the commencement to the close of the dry season in 1853, a period of nearly four and a half months, fell only about five inches; yet during the entire time there was a constant discharge, varying from nine to fifteen cubic feet per second. As the belief has been expressed that these lakes are due to surface drainage only, it is readily perceived that no rule of evaporation that has been mentioned can apply to it; and I take occasion to state, that what has been said of this lake will apply to every other there: they are plainly affected by wet and dry weather, rising during the rainy, and continuing to fall during the dry season, until long after there ceases to be any discharge at their outlets, yet never falling to the extent they ought to do, according to all rules of evaporation. During the year they vary in height from eight to twelve inches, those having no outlets varying, as they should, the least.

The apparent discrepancy, it is thought, may be accounted for from the constant infiltration which is going on after surface drainage has ceased.

Lakes and ponds occupy the depressions of a country, and there is necessarily a constant, although imperceptible, drainage into them from the adjacent high ground; hence, for those having no outlet, the yearly change in height may be considered as indicating the difference between infiltration and evaporation.

In accordance with the above, the amount heretofore found will be decreased by the mean observed yearly fall of the various lakes, to wit, ten inches.

16,000 acres covered to depth of 10 inches = 17+ water prisms.

64,000 acres covered to depth of $7\frac{1}{2}$ inches = $45\frac{1}{2}$ water prisms.

Total..... $62\frac{1}{2}$ prisms.

Correcting 421.46, the number of prisms previously found, by 62.5, there is left for the annual supply expected from the lakes, &c., 358.96 prisms.

Supply from infiltration.

This is a source of supply which can occur only in few soils, and that when it is of a rather porous nature, similar to the one under consideration.

In all the investigations connected with a canal across Florida, this source has been borne in mind by the various engineers, and in 1829 and '30, rather extensive experiments were made to ascertain what supply could be obtained from it.

These experiments being longer continued, and rather numerous, are more reliable than any made before or since, and will be made use of in the conclusions that follow.

Infiltration presupposes that the water which is leaving the surface and penetrating the earth is still above the excavation supplied by it.

If water kept its level under as well as above ground, then infiltration would continue until the entire body of water in the soil had sunk below the water-line of the canal. This, however, is not the case, since both friction and capillary attraction oppose its free flow. To what extent lateral filtration is modified by these two forces, will depend upon soil and temperature. The penetrating power of water is very great, since it is found at all explored depths; also finds its way through the most durable and compact masonry. Infiltration will necessarily be much greater in a flat country, like Florida, than in a broken one, where drainage is rapid. Extensive swamps and few streams are found in the former; numerous streams and few or no swamps in the latter. To obtain the amount which will appear, I have taken for data experiments made in the valley of the Santa Fé, Florida, in 1831, with a view to determining this question.

The character of the soil where they were made, and the depth below surface at which infiltration commenced, correspond so exactly with what was found on the summit-level of present survey, that I have no hesitation in applying the results to the case under consideration.

The experiments were conducted as follows: Shafts were sunk to depths varying from 20 to 30 feet; they were pumped dry, then allowed

to fill, the rise of water being noted at intervals until there was no change. Knowing the capacity of the shaft, and the area of sides and bottom, the rate of infiltration per second per square foot of filtrating surface became known. The mean of the experiments give a rate as follows:

A filtrating surface of *one square foot* yields *per hour* 0.75 cubic foot of water.

The question next arises, how long may this rate of infiltration be expected to continue?

In answer, the continuation of the observations is stated.

When the first experiments were made, the water rose in the shafts to within 5 feet of surface of ground: this was in June. It continued at this height during the months of July, August, September, October, and into November, except portions of July and August, when the water rose about one foot high in shaft.

If it is admitted that infiltration will continue the same under like circumstances, then at any time during the months named its rate would have been found as has been stated.

From the above, the following point is considered as established, to wit: that the water does not pass beyond the reach of a cut of 5 feet or more in depth, by sinking into the earth, during four months of the year.

How long the rate of infiltration would continue when the water is passed off as supplied, can only be arrived at from experiments having this question more directly in view than the ones mentioned above. Something similar to what is desired took place, however, while the shafts were being dug, which will be stated.

It was necessary, in order to keep them free of water, to make continuous use of the pumps while the men were digging. The operation of sinking one shaft was carried on during 60 days, and out of this number there appear to have been 29 working days.

The shaft was found filled every morning to within from $4\frac{1}{2}$ to 5 feet of surface, and required pumping out before the day's work could be commenced. The officer in charge estimated that, during a working day of $11\frac{1}{2}$ hours, the quantity of water thrown out by the pump was equal to nearly twelve times the capacity of the shaft, or at a rate of 1.2 cubic feet per hour per square foot of filtering surface.

Although any precise amount that may be fixed upon must be left to the judgment of the individual, still this may be safely stated—that, for all depths greater than 5 feet, the gain by infiltration will exceed the loss by filtration; and, from the observations made at the shafts, this excess will continue during the months of July, August, September, October, and November; and, from my own observations, I am able to add the three ensuing months—December, January, and February, making in all eight months of the twelve that this source can be relied on. After February streams become sensibly diminished, ponds and surface-water generally disappear, and the country remains dry until the rains set in, which is usually in June at latest.

The summit-level established on the present line of survey has a length, in even numbers, of 21 miles: 19 miles of this will be in exca-

vation, bringing the surface of water in canal below the line where filtration commenced, which is 5 feet from surface.

Inasmuch as the observations upon the shafts extended through a period of five months, and out of this time infiltration was noted during but two months, if only two-fifths of the infiltration found is considered, the amount deduced ought to be unobjectionable.

At the rate of 0.75 cubic foot per hour per square foot of filtering surface, 2 + summit water prisms would be supplied every 24 hours, or 480 + prisms for the 8 months, two-fifths of which is 192 *summit-level water prisms due to infiltration.*

In deducing the above quantity, infiltration is considered as taking place only from surface above water-line of canal.

The amount available yearly for the use of the canal can be thus stated:

Yearly supply from rains that can be made		
available	368.96	summit prisms.
Supply from infiltration	192.00	"
Total	560.96	"

The total requirements of canal were found to		
be yearly	119.56	"
Excess of supply beyond requirements, yearly,	441.40	"

The amount available for one year is as follows:

On hand in lakes, &c.	225	"
Yearly available supply from rains.	368.96	"
Supply from infiltration	192.00	"
Total	785.96	"
Yearly demand	119.56	"
Excess for one year	666.40	"

With a view of embracing, practically, the entire subject as far as connected with the present lines of survey, the requirements of a 12-foot canal are given and compared with the supply of water at command. The depth of 12 feet is assumed, for the reason that if Tampa is taken for one terminus, and the river St. John's used, 12 feet is the utmost capacity of that river up to the mouth of the Ocklawaha. If any point on the coast north of Tampa is taken for the terminus, then the harbors themselves, by their bars, present 12 feet as a limit.

The main expenditures of water result from lockage and leakage at lock-gates. Filtration will not be considered, but an excess of infiltration taken as a positive supply.

I propose to consider the locks as having the same length and width

as those on the St. Lawrence canal, viz: 200 feet from mitre to mitre, width of 45 feet in the clear, with a lift of 8 feet.

Applying the numbers heretofore found, and keeping the same unit of measure—that is, summit prism, with first dimensions given—the annual requirements will be—

For leakage at lock-gates	7.70	prisms.
For lockage, about.....	668.00	"
For evaporation	3.00	"
Requirements	678.70	"
Amount due to infiltration	192.	prisms.
Yearly supply from rains.....	368.96	"
Total yearly supply.....	560.96	summit prisms.
	678.70	
Deficiency	117.74	

It will be observed that the great expenditure appearing in the calculation is from *lockage*. The deficiency of 117.74 prisms may be avoided in two ways:

1st. By the construction of double locks.

2d. By decreasing the lift of the single locks from eight to *six* feet. The calculations showing this can be readily followed out from data given, and are not inserted.

Of the two methods proposed above, that of double locks would be preferable; for while economizing water similar to the decrease of lift, in case of crowded business on the canal, it would double the facilities for passing from one level to another.

In view of the above, it is considered that a supply adequate to a canal of the last-supposed dimensions has been shown.

Connexion with the Gulf.

In determining upon the proper terminus for the canal at Tampa, the bay was approached by two different lines, as suggested in your instructions; one terminating at the deep water of the river Manatee, the second at the deep water of Hillsboro' bay.

Line to the Manatee.

This line separates from the one to Hillsboro' bay at a creek known as "Fox Branch," and does not vary in the generally favorable character of the country passed over until it touches the streams flowing north into Tampa bay, viz: the Alafeá, Bullfrog, Little and Great Manatee rivers.

These streams are in general parallel with each other, and crossed by the line nearly at right angles; hence, after getting abreast of the head of Hillsboro' bay, the profile of the line presents a succession of

swells and depressions throughout its remaining length; the swells forming the divides of the streams mentioned, and the depressions the valleys of the streams themselves. This feature of the line is unfavorable, for it involves two important facts in the actual construction of the canal: 1st. Aqueducts and embankments to cross each stream; 2d. Considerable excavation to pass the ridges dividing the streams. After reaching the Great Manatee, the following objection is still encountered: The depth of water over the bar at its mouth is only nine feet less than might be required by vessels which would enter the bay; and there is no protected anchorage near except in the river. In general, by terminating at the Great Manatee, the canal would be increased in length, the cost of construction greater, and communication with the Gulf less perfect and more exposed than the character of the bay requires.

Line to the Hillsboro'.

From Fox branch this line continues in a direct course for the valley of the Hillsboro', which, when struck, is followed to a point near Higler's bridge, where it is proposed the river itself shall be entered and made use of to near its mouth.

To make the connexion between the bay and canal as perfect and rapid as practicable, the latter should evidently terminate at some point susceptible of being reached by all vessels trading in the bay, affording secure anchorage, also where the required depth of water approaches near shore. This point is indicated by the natural anchorage of the bay near "Ballast Point," $3\frac{1}{2}$ miles from the mouth of the Hillsboro', and has been selected as more nearly than any other fulfilling the desired conditions.

The manner of uniting with the bay is more particularly as follows: The canal is designed to enter the Hillsboro' about four miles above the town of Tampa, and the river is then used as far as the mouth. Starting just inside the bar, the canal leaves the river, following the low ground near the shore until it debouches into the bay at the anchorage near "Ballast Point." Between the mouth of the Hillsboro' and Ballast Point it is proposed that the canal shall be of sufficient depth and width to allow of all vessels ascending to the town of Tampa and meeting the boats in the river, instead of the boats proceeding to them in the bay, a position at times somewhat exposed.

The advantage of this is considered of a two-fold nature: 1st, it presents an extensive water front for trade, and a harbor in which communication between sea-going vessels and those trading on the canal will always continue uninterrupted; 2d, it will in point of fact place the wharves at Tampa upon the deep water of the bay; thus be of very important advantage to the town itself. This work it is conceived presents no obstacle in construction, as two locks each, with double gates—one at the point where the canal leaves the river, the other where it enters the bay—would enable vessels to pass in and out under all possible circumstances of tide, &c.

The objection to communicating with the ship anchorage through the mouth of the river and by the bay, is deemed to be two-fold: first,

the required depth of six feet could not be taken over the bar of the river with any certainty except at high tide; second, during the prevalence of storms, transit boat probably would not be able to descend to the anchorage at all; hence the communication between canal and bay would always be imperfect, and at times wholly interrupted.

The line of canal found practicable and recommended as proper to connect the head of navigation of the St. John's with Tampa bay is as follows: Starting from the St. John's at the mouth of Weekivah creek, the valley of this stream is followed up until near its head, then as direct a course as the nature of the ground will admit of is taken to the low depression of sand-hills which form the crest of the summit divide of the interior; from thence the course is direct for the valley of the Hillsboro', which is followed until the depth of water in the river is sufficient and its course direct enough to render it proper for the canal to enter it. This point is decided to be near Higler's bridge, some six miles from Fort Brooke; leaving the river as it enters the head of the bay, the western shore of the bay is followed to the terminus near Ballast Point.

Estimate of cost of construction.

In making out the estimate of cost of a work, the location of which is not absolutely fixed, the profiles, plans, and details of construction essential to a minute statement of items making up the cost, are necessarily wanting.

The case under consideration is a similar one; the survey has shown the practicability of a canal across the peninsula, and pointed out the line along which it should run to connect the points indicated in the instructions; but the exact cost of labor, of materials, of foundations for locks, hence of the locks themselves, &c., cannot be stated except in general terms, until works are actually planned upon the ground and ready to be commenced.

In the amounts which follow, prices are fixed which in similar works correspond to known cost, due allowance being made for a perfect and durable style of finish.

The nature of the entire work is simple, being, with two exceptions, excavation and embankment, having locks at rather regular intervals, usually single and never more than a flight of two, separating adjoining levels.

The exceptions mentioned are at the crossings of Reedy and Hitchapocasassa creeks. At the first, the bottom of canal passes five feet above the ordinary water-line of creeks, and an aqueduct crossing it should leave a water-way to stream of 50 feet in width; the embankment approaching and leaving it will have a total length of 500 yards, and an average height of 12 feet. As the reach passing this stream is a long one, it is desirable that works should be constructed for making the stream a feeder to the canal. A dam thrown across it a short distance above point of crossing, with gates for retaining or drawing off the water, and a feeder leading to canal, will together, with the aque-

duct and embankment, comprise the exceptional works indicated at Reedy creek.

At Hitchapocasassa it is not thought necessary to turn the water into the canal, the bottom line of which passes seven feet above ordinary surface of stream; a water-way of 75 feet in width should be given to stream.

Excavation and embankment.

The calculation for this is made on the supposition that one man can dig and throw into a wheel-barrow or cart 15 cubic yards in a working day of ten hours; that another man can wheel on a level the same amount during the same time a distance of 40 yards: when distance exceeds 40 yards, price must be increased in proportion. That a horse and cart can transport a like amount a distance of 1,000 feet in ten hours, or half the amount a distance of 2,000 feet in same time, up an ascent of 1 in 20.

The labor of a man is taken at \$30 per month; cost of boarding him \$6 per month. The labor of horse and cart is valued at \$1 per day.

There are six days to be deducted from the month, four Sundays and two rainy days, as lost time.

The 24 working days of the month will cost for a man \$36, and for a horse, cart, and driver, \$66. Taking the total amount of excavation along line of canal and arranging it according to cost per cubic yard of digging and hauling, we have the following:

Excavation of 1,445,314 cubic yards common earth, at 42 cents.....	\$607,031 88
Excavation of 1,031,968 cubic yards common earth, at 26 cents.....	268,311 68
Excavation of 669,141 cubic yards common earth, at 22 cents.....	157,211 02
Excavation of 5,510,761 cubic yards common earth, at 18 cents.....	991,936 98
Excavation of 2,086,764 cubic yards common earth, at 16 cents.....	383,382 24
Excavation of 1,135,200 cubic yards common earth, at 14 cents.....	158,928 00
Total for excavation.....	<u>2,567,301 80</u>

Locks.

The total elevation to be overcome in passing from the headwaters of St. John's to the summit-level of canal, as established, is 107 feet, measured from the surface of water in each. From Hillsboro' river to summit-level the elevation to be overcome is 119 feet; the locks are supposed to have a lift of 8 feet: this will give 14 between St. John's and summit, (the surplus 4 feet occurring at St. John's to allow for low stage of river,) and 15 between summit and Hillsboro' river:

adding the two necessary at the bay—one where the canal leaves the river near its mouth, the other where it terminates at Ballast Point—we find the total number of locks required by the work to be *thirty-one*.

In estimating the cost of one lock, the bottom and side-walls of chamber, head and tail bays, are supposed to be faced with granite brought from northern quarries; other materials from vicinity, distance not exceeding 10 miles; dimensions, as given in instructions, 110 by 16 feet in the clear. The calculation makes the cost between \$24,000 and \$25,000; the last amount is taken.

Thirty-one locks, at \$25,000.....	\$775,000 00
Aqueduct, dam, waste-weir and gates, at the crossing of Reedy creek.....	35,000 00
Aqueduct at crossing of Hitchapocasassa—stone quarried on the spot.....	20,000 00

Waste-weirs.

The number and size of these will be regulated by the number of small streams intersected by and received into the canal, and should be equal to keeping up as rapid a drainage of country during periods of unusual rains, as now exists by means of the streams themselves. The number required along the entire line will be about 35, and need not vary materially in size; the average quantity of masonry in each would be about—

45 cubic yards, which at \$14 per cubic yard.....	\$630 00
35 waste-weirs, at \$630, say.....	22,050 00

Feeders.

Until a more extensive survey has been made, the precise length in yards of feeders required cannot be given. In speaking of the quantity of water that could be supplied to the summit-level, it was stated that *seven* miles of cutting would connect the entire series of lakes and swamps to be made use of. Not to under-estimate, the total length of cutting for feeders will be estimated at 10 miles.

The feeder is supposed to be 28 feet wide at bottom and 6 feet deep.

Excavation of 469,211 cubic yards of earth, at 16 cents.	\$75,073 60
Clearing ten miles, at \$500.....	5,000 00
Ten gates for regulating supply, at \$1,000.....	10,000 00
Total for feeders.....	<u>90,073 60</u>

Grubbing and clearing of main line.

In consequence of the numerous small cypress swamps cut through by the line, the expense of this will be higher than if the country was more open.

Grubbing and clearing 107.33 miles, at \$300.....	\$32,199 00
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Retaining-walls.

In consequence of the sandy nature of the soil where the line of canal cuts the dividing ridge near Hawk creek, and the depth of the cutting required to pass it, it is believed the sides of the canal will need an artificial support to resist the tendency to fill in arising from infiltration; the total distance requiring such support has been estimated at 2,867 yards.

There were no indications of rock found nearer to this point than 12 miles on the Withlacoochee, in a northwest direction. Assuming that the stone requires transportation for this distance, the cost of revetment or supporting-walls per lineal yard will be about \$18; or for the 2,867 yards, at \$18, \$51,606.

The expense of these walls would be saved in part, from the fact that, being vertical or nearly so, the cross-section of open cut would be much diminished, hence the estimate for excavation lessened; but in consideration of there necessarily arising many contingent expenses in the execution of a work which cannot appear in an original estimate, it is preferred that the above amount stand as an additional item and disconnected from others.

Clearing and preparing banks of Hillsboro' river.

To prepare this river to serve as a continuation of the canal, it will be necessary to clear, smooth, and level the banks, in some places fill in and flag, in others cut away, in order to prepare a tow-path; in general, however, the banks will require comparatively little work, and it is estimated that \$4,000 per mile will be sufficient:

7½ miles, at \$4,000..... \$30,500 00

No item is inserted for ramming and dressing of embankments, as it is considered far better to transport over it, and this can usually be done.

Summary of Estimate.

Excavation and embankment	\$2,567,301 80
Locks	775,000 00
Aqueducts.....	55,000 00
Waste-weirs	22,050 00
Feeders	90,073 00
Retaining-walls.....	51,606 00
Clearing and grubbing.....	32,199 00
Hillsboro' river.....	30,500 00
Total	3,623,729 80
Add 2 per cent. for wear and breakage of tools..	72,474 58
Grand total.....	<u>3,696,204 38</u>

The line across the peninsula is naturally divided into four divisions, as follows: Starting from the St. John's, division No. 1 extends to the last of the series of locks necessary to ascend the valley of the Wekivah.

Division No. 2 consists of the long level stretching from Lake Wekivah, and terminates at the summit-level.

Division No. 3 is summit-level.

Division No. 4, the line between summit-level and Tampa bay.

The cost of construction will be distributed according to estimate, as follows:

Division No. 1, 17 miles 880 yards in length, and 10 locks.....	\$513,205 70
Division No. 2, 23 miles 1,053 yards in length, and 4 locks.....	504,703 36
Division No. 3, 21 miles 473 yards in length.....	1,671,294 96
Division No. 4, 46 miles 1,707 yards in length, and 17 locks.....	994,208 34

Having embodied the results of the survey connected with the line in the foregoing remarks and estimates, I will refer briefly to a line ran to the Ocklawaha river, and connecting with the one to Tampa.

A line of canal across Florida, to be most valuable to commerce, evidently should take as direct a course from the Atlantic to the Gulf as practicable. To ascend the St. John's to near its headwaters, and then cross to Tampa, is undoubtedly circuitous as a line of communication, to avoid the Straits of Florida, and the depth of water in the upper St. John's is such as limits navigation to boats of light draught. It would, unquestionably, be better to connect the canal with the lower portion of the river, at some point to which the depth of water carried over its bar can be brought; more especially so if distance, at the same time, is saved. With the above in view, also agreeably to your instruction, directing any lines to be examined that might be deemed favorable, the survey was carried from a point of the first line known on the map as Fox branch, to the headwaters of the Ocklawaha river.

Supposing the canal to reach the St. John's from Tampa, by continuing down the valley of the Ocklawaha, this route may be compared with the first, in a few words, as follows:

The summit-level will be 18 feet lower; it has the same sources of supply, and numerous lakes near the headwaters of the Withlacoochee additional.

The length of canal to be constructed will be increased some fifty miles, and the transit across the peninsula shortened by about twenty miles.

The expense of construction will be less in proportion to distance, since the sand ridge cut by the summit-level of the first line is in this not met with. The fact of avoiding the sand ridge, also being able to establish the summit-level lower, will decrease the estimate for construction about \$750,000 for an equal number of miles. This will make the entire cost of Ocklawaha route about \$400,000 more than first line, dimensions of the two being the same.

Taking up the data for supply of water already used, it can be easily shown that there is an abundance for a canal having a depth of twelve feet, and it is with a view to such a depth being desirable for the canal that the Ocklawaha route becomes of interest; its junction with the St. John's would be near Palatka, up to which point ten to eleven feet can be carried. That such a depth is essential to the undertaking of the work as a national object, seems pretty evident, for without it there would be two extra transshipments, together with time, labor, and consequent expense attending it. But, could vessels carrying on the coasting trade have a channel leading to the Gulf presented to them, absolutely free from the dangers incident to the navigation through the Straits of Florida, entailing no expense incident to a double handling of cargo, and by means of which the time of their arrival in the Gulf could be calculated with certainty, this time, too, being less than a voyage around Florida requires, it is believed that then, and only then, the elements of a successful line of water transit are shown.

If the river St. John's had the requisite depth up to the mouth of the Weekivah, then would the first be a more favorable line than the second, as regards original cost of construction; there is water enough to supply the summit-level on either line, should the canal have a depth of twelve feet.

The points of the river presenting the shoal water are as follows: Near the mouth of the Ocklawaha the depth shoals to ten feet; the outlet of Lake George has only nine feet, and this general depth continues for some three miles. The inlet of Lake George has on its bar ordinarily $6\frac{1}{2}$ feet: rains will increase, and wind may lessen this depth; beyond this, the river has a depth varying from fifteen to twenty feet, up to Lake Monroe; outlet of Lake Monroe, scant five feet. The bars at the entrances to the different lakes are permanent obstacles, unless constantly being improved; the expense attending such improvement would, doubtless, make the Ocklawaha much the cheaper route in the end, and the line in this case would pass near to and through a much more fertile and important part of the State, than if starting from the mouth of the Weekivah.

The conclusion in reference to the two routes is this: If a depth of only 6 feet is given to canal, then the first line is preferable; if the entire depth of water available in Lower St. John's is desirable to be carried across the peninsula, then the second or Ocklawaha route is preferable. It has already been stated that both are practicable, and can have a full supply of water.

I take occasion to remark, in this connexion, that the map shows a rather favorable line, starting from the harbor of Crystal river, and striking the St. John's at the mouth of the Ocklawaha. How favorable the ridge dividing the Withlacoochee and Ocklawaha rivers may be for crossing, is not known; but, before deciding upon any line as the best for crossing the peninsula, this one should be examined: want of funds prevented this being done by myself.

The object of a canal across Florida is too obvious to need more than a passing remark at this time. Attention has been turned to such a work since 1824, and examinations of different routes made. The

interest which such an improvement possesses for the country rather increases from year to year as the commerce passing the Straits of Florida increases, and accidents attending that navigation become more frequent and more generally known.

The subject may be briefly stated thus: Florida projects south beyond the general line of coast more than 400 miles, and so nearly approaches the West India islands, and the reefs and shoals skirting them, that a comparatively narrow channel, leading from the Atlantic into the Gulf, is left for the passage of vessels. This passage, known as the Straits of Florida, is the great thoroughfare for an important proportion of our commerce, which, from the fact just mentioned above, is compelled to take a circuitous and dangerous course in going into or out of the Gulf. The canal in question, by being supposed to take the place, to a certain extent, of the passage by the straits, ought to have its general importance valued:

1st. By the objections existing to the passage around Cape Florida.

2d. By the value of any new relations which its existence may establish between the extensive region now tributary to the Gulf and any favorable Atlantic port.

First, its advantages to commerce as compared with those offered by the Straits of Florida.

The value of the property yearly passing in and out of the Gulf cannot be stated with any nice degree of precision, resulting from two facts: 1st. That, in reference to the coasting trade, no record is furnished to the custom-houses of the kind of goods shipped; hence, from the outward manifests, no correct values can be ascertained. 2d. That the value of the productions of the States bordering and tributary to the Gulf are so greatly increased from year to year.

For instance, in a communication from the Secretary of the Treasury in 1852, (House Doc. 136,) it was estimated that the steamboat tonnage on the Mississippi had about doubled itself in the previous nine years; and if it is fair to judge by the constant emigration West, and the rapid settling up of new territory, it may be stated that this ratio of increase is still continuing. Since the date mentioned, the population and trade of Texas have been steadily but rapidly augmenting, so that at the present they contribute no inconsiderable portion to the commerce in question. From the above, it is readily perceived that, if positive data were at hand, any total value deduced would probably be too small.

The following extract from House Doc. No. 136, giving somewhat in detail the sources making up the total value of the Gulf commerce in 1852, is inserted as the most recent information officially published:

* * * * "The statement of the merchandise entering and leaving the American ports of the Gulf will be as follows:

" Foreign imports	\$20,000,000
" Coastwise imports.....	50,000,000
" Exports	115,000,000

" The shipping engaged in carrying on this trade and arriving at various Gulf ports is estimated as amounting to 900,000 tons, which,

valued at \$75 per ton, would be \$67,500,000 ; and as these vessels make the voyage *in and out*, the entire value of the tonnage which annually passes Cape Florida would be \$135,000,000, which added to the preceding amount of merchandise, would make a grand aggregate of \$325,000,000 of property which annually passes to and from the American ports of the Gulf of Mexico."

To the above amount must be added the increased value of imports, exports, coasting trade, and tonnage, during four years together, with the very valuable California trade and specie exports now passing through these same straits.

In a section of this report already submitted, the total value was put down at \$150,000,000 ; and when it is considered that in the above enumeration, extracted minimum amounts were always put down, the value of the property at present passing the Straits of Florida during one year may be safely assumed at \$450,000,000.

If to the above sum is applied the increased premium charged on all property passing into and out of the Gulf, and which shows in dollars and cents the estimated danger of a voyage between Florida and the West India reefs, one continued source of expense to Gulf commerce is arrived at, which a canal is designed to lessen ; for a constant argument in favor of a canal across Florida has been the many shipwrecks and great loss of property yearly occurring on those southern keys, and the consequent tax, in the shape of insurance, paid by all property bound to or from a Gulf port.

This premium will average during the year, on property passing either way, about $\frac{3}{8}$ of one per cent., showing a total yearly tax on the Gulf commerce, due to dangerous navigation, of one million six hundred and eighty-seven thousand and five hundred dollars, (\$1,687,500.)

It, of course, is not contended that this amount would be annually saved to the country were the work executed, for there is much of this commerce that, under existing circumstances, will continue in its present channel, and amongst it would be found the trade from the Pacific, and probably rather a large proportion of the foreign import and export trade.

It is not proposed to divide the figures representing this commerce, setting one amount aside as proper to represent the interest of the canal, and the other that of the Straits of Florida ; but simply to point out the relation which it is conceived exists between the proposed work and the commerce not only of the Gulf, but that of the country tributary to it, and allow each reader to draw final conclusions for himself.

The question next arises, what proportion of the shipping employed in the Gulf could avail itself of the short passage across the peninsula offered by a 12-foot canal?

In reply, it is assumed that all engaged in the coasting trade could, as well as those engaged in the trade flowing out of the various ports of Florida, Alabama, Mississippi, Louisiana, and Texas, leaving out those of New Orleans and Mobile, for, with the exception of the last-named two, 12 feet is equal to, and in general exceeds, the capacity of every port on the Gulf between the Tortugas and Vera Cruz.

The time gained during a voyage in and out of the Gulf, by using the

canal, may be stated as averaging six days; thus a gain of eight days by a vessel bound into, and of four by one bound out of the Gulf. To this time it will be proper to apply an interest of 6 per cent. on all assumed capital engaged in the trade. Take for example the value of the coasting trade, the imports coastwise, and the tonnage of coast trade. The total value of this may be put down at (\$200,000,000) two hundred millions, the interest on which for six days, at 6 per cent., amounts to (\$200,000) two hundred thousand dollars per annum.

The important and obvious connexion which the construction of this canal has with the Gulf commerce is from what precedes:

1st. Saving a large proportion of the insurance now imposed upon it by the Florida straits.

2d. Avoidance of a perilous navigation.

3d. An important saving of time; hence, of interest on capital engaged in this trade.

Again, it is believed that if this work is constructed, another relation between the canal and western and southern interests would be established, not less important than is borne by it to Gulf commerce as already considered.

It is an undoubted fact that all produce finding its market on the Gulf nets less to the producer than the same class of produce that finds its way to an Atlantic port.

On this principle all internal improvements which have been and are now being projected by the main Atlantic sea-port towns are tending towards the valleys of the Mississippi and tributary streams, and of the other rivers emptying into the Gulf.

These improvements, how numerous soever, are mainly local in their accommodations, for in general they are only remunerative when supported by the country through which they pass, and their influence does not extend many miles beyond the points of termination; thus the heavier and more common productions of cotton, sugar, tobacco, corn, &c., probably seldom or never ascend the Alabama, Mississippi, Ohio, or Tennessee rivers, for the purpose of taking the land transportation across to the Atlantic.

The rivers mentioned, as well as many others which will at once present themselves to the mind, are navigable during most of the year for vessels of deeper draught than now dot the coast from St. Mark's to the Rio Grande. In view of this fact, the canal once constructed, why should not light-draught vessels loaded on the Upper Missouri, Mississippi, Ohio, Tennessee, Arkansas, Red, or in fact on any of the rivers of the Mississippi valley or Gulf States, proceed at once without breaking bulk to any desirable Atlantic sea-port? The commerce of all the valleys mentioned tends to the Gulf, not excepting that of the Ohio, nine-tenths of which, including that concentrated there, goes down the river, (H. Doc. 136;) and a comparatively safe and protected navigation exists from the highest navigable waters of Missouri to New York.

Let the entire communication opened by this work for light-draught vessels be briefly mentioned.

Place a boat in either of the great northern lakes—Superior, Michi-

gan, Huron, Erie, or Ontario—and start it either towards the Atlantic or the western waters, for both are open to it; let it take the latter course—it can pass by three different routes into the Mississippi, and commences a most singular voyage: descending the Mississippi it passes into Lake Pontchartrain, and, keeping inside the various sea islands and reefs which almost continuously skirt the coast as you go east, thus forming a protected inland navigation, reaches the western terminus of the canal, crosses the peninsula, and again takes the inland navigation along the coasts of Georgia and South Carolina to Savannah or Charleston, with the exception of a short break on the coast of North Carolina. This interior communication continues thence uninterrupted to New York, up the Hudson river, across New York State by the Erie canal, and into the lakes whence the boat started.

An allusion, merely, to the commerce dependent upon this line of water communication, is needed to show its magnitude; hence the very general interest which would be felt in any improvement affecting it.

On entering the Mississippi the trade of the West and Northwest is met with that coming down the Missouri and its gigantic tributaries, the Upper Mississippi and dependent streams, the rivers of Wisconsin, Illinois, and Indiana, also the Ohio, and branches passing through or penetrating eight of the most fertile States of the Union—all at this point is concentrated, the rich freight being borne on in a ceaseless stream to the Gulf; descending to the Arkansas and Red rivers, from either side comes the great staple of the South to swell the amount; lastly sugar is added, until, on arriving at New Orleans, we find a swollen trade, requiring a steam marine of some seven hundred vessels to carry it on, and valued, together with vessels transporting it, at about one hundred and eighty millions dollars yearly, (\$180,000,000.)

At New Orleans commences the coasting trade, the great system of exchange between southern and more northern climates, the value of which has been already approximately given. Following this on to northern sea-ports, we pass by the Hudson river and Erie canal into the northern lakes, which, by being connected, constitute the great artery that has given commercial life to the main city of our continent; and so important is this, that to form and perfect this line of communication, a single State has expended more than would be required for the work under consideration. How much of the importance belonging to the great commercial lines mentioned would attach to a canal uniting the Atlantic and Gulf, must be left to individual judgment; but in looking over them, two important facts stand rather prominently forth: First. That whenever the Florida canal is constructed, with one exception, a safe water communication exists for light-draught vessels between every important city in the United States. Second. That a boat loading on the highest navigable waters of the Missouri may unload on the Atlantic seaboard.

There is another point of view under which this subject presents itself that possibly may be considered rather speculative than otherwise at present, but which, in the ordinary course of national events, may at some future day be of practical importance.

There is for all our commercial purposes but one pass between the Atlantic and Gulf, resulting: 1st. From the position of the passage by Cape San Antonio. 2d. The trade winds. 3d. The great current setting up the coast of the Spanish Main, and out of the Gulf through the Straits of Florida.

The comparative narrowness of these straits enables a few cruisers to effectually watch it, and a vessel entering or leaving could be overlooked by them from hour to hour for a distance of nearly 400 miles. The fact that vessels are thus compelled to pass along a narrow channel, has made it a favorite and successful cruising ground during times of disturbance since Gulf trade first existed; and in consequence of these facts, it has always been considered an exposed and weak point in our line of coast, requiring much care and expense to be bestowed upon its defence. Its importance as the outlet of a great commerce renders its fortification necessary; not made less so from the fact that the adjacent islands, with their secure and well defended harbors, belong to foreign powers.

It may doubtless be assumed as true, that should the United States become involved in a war with any maritime power, much of the solicitude which fears for the safety of an extensive commerce must create would centre around these straits.

The general propositions in reference to the canal, as connected with the safety of Gulf trade during war, are as follows:

1st. That any line which, at small expense and risk, enables the voyage by the straits to be avoided, will, in the event supposed, be of great importance.

2d. That the canal in question will tend to accomplish this; and while shortening the entire passage from South to North, will open a sheltered and protected navigation from New Orleans to New York; and one, too, which, under all ordinary circumstances, cannot be interrupted by an enemy's force, even supposing that force in complete possession of the waters bordering our coast. This position, it is believed, can be readily established, and in fact becomes almost self-evident, when it is considered that there would absolutely be but three short breaks in the entire inland still-water navigation between New York and New Orleans—one on the coast of North Carolina, the other two in the vicinity of Pensacola; hence measurably protected by the proximity of the Gulf squadron.

On the other hand, let the supposition be made that the straits, by any peculiar state of things, should become practically closed to our commerce; what other outlet to the enormous produce of the Mississippi valley and adjoining States does there exist? It is believed none exists, and for the following reasons:

1st. The lines now partially connecting the West and Atlantic are railroads; and these, to be profitable, must do a business mainly equal to the capacity of the roads.

2d. Railroads being built by private enterprise, are never intended to be constructed until they can be profitably supported by the business of the country through which they pass, or of that immediately tributary to them; hence their capacity is really represented by this business.

3d. The roads over which any portion of this trade passes are all worked nearly, and some quite to their full capacity, at present; yet no one believes that the resources of the sections through which any of them run are by any means developed to their full extent.

Two of these roads touch the Ohio valley; yet statistics show that nine-tenths of its own produce, together with what is concentrated there, takes its natural course down the river. What accommodation, then, could the commerce of the West and Southwest find if suddenly compelled to seek that direction? Evidently there do not, nor ever will, exist any communications that can take the place of the great thoroughfare of the Gulf, for private enterprise only meets the wants of the present, and makes no improvements based upon an uncertain future.

The passage around Florida is, then, the only line of communication existing; and if closed, the commerce now passing there would at the same time be cut off.

Finally, it is conceived that Florida has a peculiar interest in a work of this kind; at present her commerce is limited, because population is sparse, and the sparse population may be considered as resulting, among other causes, from these two: First, the difficulty of communicating from the interior to the coast; secondly, the vast quantities of land now covered with water, which a canal would serve to drain. The open marshes and wet prairies thus reclaimed, while ranking among the finest lands in the State, would, if estimated at a reasonable valuation, go no inconsiderable way in approximating to estimated cost of work.

But it is not necessary to allude to sectional advantages, as if they could be separate from general interests; what advances the prosperity of a part necessarily benefits the whole: and the converse of this is also true—what benefits the whole is an advantage to each section.

Hence the question of its public utility need rest only upon general considerations, and these are mainly embraced, it is thought, in the brief remarks submitted, to wit:

1st. The saving a heavy extra insurance of three-eighths per cent. upon the entire Gulf trade passing through it, together with capital invested in vessels carrying on this trade.

2d. Avoiding the dangerous navigation along the Florida reefs; hence, loss of life.

3d. Possessing a comparatively secure water communication between the Gulf ports and the North during peace or war, whether the command of the ocean be ours or not.

4th. An uninterrupted, and, it is thought, safe water communication for river craft and coasters between the Mississippi and Atlantic ports; in fact giving an Atlantic port to all western and Gulf produce.

The main objections to the work are the two following:

1st. The line of transit embraced in present surveys is too circuitous.

2d. The depth of water (limited by the St. John's and harbors on the western coast to 11 and 12 feet) is not as great as is desirable for an important ship canal.

The St. John's above its bar could be deepened; but in that event,

the terminus on the eastern side (canal having a greater depth than mentioned) would be the mouth of the St. Mary's, and would involve the necessity of deepening the inland passage between the St. John's and St. Mary's.

St. Mary's, or Fernandina harbor, is the natural terminus for any canal connecting the Atlantic and Gulf, for it is the last port on the Atlantic coast capable of admitting vessels drawing more than about 10 feet; hence the only point where trade would centre on its way eastward, and be met by vessels for distribution to home and foreign markets.

In concluding this report, the attention of the colonel of topographical engineers is respectfully called to the subject of the practicability of a ship-canal across Florida as it now rests. There are at least four lines across the peninsula which should be surveyed before any one can be decided upon as preferable to the others: two of these lines only have been run, and either one of the two remaining, if found favorable, would be preferred to those reported upon; for, in the first place, being nearer the base of the peninsula, there would be less deviation from the general line of the Atlantic and Gulf coast—hence a decrease of the length of water communication from south to north; next, the line of canal would be more direct, and would run across Florida at about its narrowest point.

In view of the above it is respectfully urged that an additional appropriation for continuing the Florida Canal survey be recommended, in order that the subject may be fully and completely discussed, and leave no unexamined points for future doubt.

It is believed that fifteen thousand dollars (\$15,000) might, if economically used, enable all desirable information to be obtained; twenty thousand (\$20,000) is, however, considered a much safer amount to estimate for, and is the sum named and respectfully urged to be recommended by you.

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

M. L. SMITH,

First Lieutenant Topographical Engineers.

Colonel J. J. ABERT.

APPENDIX G.

OFFICE OF THE TENNESSEE RIVER IMPROVEMENTS,

Knoxville, September 1, 1854.

COLONEL: I have the honor to submit the following report of the operations on this work during the current year.

Before the close of the working season of last year, timber for dams at the following shoals was contracted for and delivered, viz: For the completion of the improvement at Knoxville shoals, for the dams

Ex. Doc. 1—30*

at Chota, Booth's, Cancey creek, 1st and 2d shoals, and at Crescent island or Winton's shoals, which enabled us to resume work at an early day (12th of May) in this season; and the weather having been unusually dry, the stage of the water has been favorable to our work, which was prosecuted without interruption up to the 14th of August, when, finding that the appropriation was exhausted, I stopped it.

Knoxville shoals.

After the work at these shoals was suspended last year, it was found that the water, which had been diverted, by the dams, from the left to the right channel, had a tendency to return to its former course by forcing a passage through the upper island; to prevent which, I caused a dam to be built along the whole front of the island and to connect with the lower dam, making one continuous dam of 1,900 feet in length.

The dams at these shoals, and the removal of rock from the channel, have increased the depth of water sufficiently, and the boats pass them at the lowest stage of it, without difficulty. All that is necessary to complete the work, is to fill about 180 feet of the dam in front of the island with rock, which—the rock being already quarried—would not cost more than \$150.

Chota shoals.

The work at this point was confined to the lower shoal: at this obstruction a dam was built some years ago by the State of Tennessee. The position of the dam being nearly at right angles to the current, rendered it insufficient. I caused a new dam to be built, commencing near the boat channel, and 200 feet above the end of the old dam, extending to the right shore in a direction more oblique to the current.

A large portion of this new dam is in water varying from four to ten feet in depth. There were not sufficient funds to fill it with rock; but by placing several cribs, loaded with rock, against the tower face of it, I believe it is secured in its position; but to make it sufficiently close to turn the water into the channel, it should be filled with rock, which, the rock being already quarried, would require about \$250.

Besides the dam constructed at Chota, a large number of trees and rocks which were in the boat channel have been removed.

Booth's shoals.

Although I had procured timber for a dam at these shoals, after a close examination of the velocity of the current over them, I found it too great to admit of this mode of improvement. I therefore confined the operation to widening and deepening the channel, by blasting rock from it. The timber intended for the dam was used in the construction of the dam at Cancey Creek shoal.

Cancey creek, 1st shoal.

The dam built at this shoal last year was not of sufficient length; 260 feet have been added to it this year. To complete the work at this shoal, it will be necessary to blast some rocks from the channel, through a distance of about 250 feet below the end of the dam.

Cancey creek, 2d shoal.

The dam at this shoal, built some years ago by this State, has the defect of most of the State dams in the river, of being nearly perpendicular to the current; and in addition to this, there is an interval of near 200 feet between the end of the dam and the right shore, through which a large body of water escapes. The dam built this year commences at the head of the old dam, has a direction more oblique to the current for 200 feet, and then takes a direction still more oblique to the channel, and extends through a distance of 900 feet to the right shore. The whole length of the new dam is 1,020 feet. For the want of funds, this dam, as the one at Chota shoals, could not be filled with rock, which is necessary to render it secure in its place, and efficient in turning the water into the boat channel, for which purpose \$350 would be sufficient.

Crescent island, or Winton's shoals.

The works commenced last year at these shoals were two dams: one extending from the head of the main island to the island just above it, and another from the last named island to a tow-head 400 feet above it. These dams have been completed this year, and the boat channel, though a distance of near four miles, has a sufficient depth of water at low water.

In the original plan of improvement at this shoal, a dam was built, commencing at the upper tow-head, and extending obliquely towards the right shore of the river, but the water, after leaving the dam, escaped through the intervals between the islands before it reached the shallow parts of the channel. This defect is entirely removed by the dams constructed between the islands. This work may be considered complete.

Amount of work done between the 12th May and 14th August, 1854.—Dams built.

	No. of feet.	Average depth.
Knoxville shoals.....	950	120 feet not filled with rock 2 feet.
Chota shoals.....	850	not filled with rock..... 5 feet.
Cancey creek, 1st shoal..	260	complete..... 3½ feet.
Cancey creek, 2d shoal..	1,020	part not filled with rock... 4½ feet.
Crescent Island shoal....	450	complete..... 3 feet.

Amount of work done in 1853.

	No. of feet.		Average height.
Knoxville shoals.....	1,170	complete.....	3½ feet.
Lyons' shoals.....	1,350	old dam repaired.....	3 feet.
Lyons' shoals.....	325	built complete	2½ feet.
Williams's shoals.....	850	built complete	2½ feet.
Little River shoals.....	1,100	old dam repaired.....	2½ feet.
Little River shoals.....	1,700	new dam built complete..	2½ feet.
Cancey Creek shoals....	520	new dam built complete..	3 feet.

In addition to the above work done in the dams, a party was employed in 1853 and 1854 in removing rocks and snags from the channel, and impending trees from the banks of the river. This party completed this service as far as Chota shoals before operations ceased, on the 14th of August.

I beg leave to refer to the maps which accompanied my annual report of last year, for the positions of the dams referred to in the foregoing report, and to the estimates which accompanied the same report, for the probable cost of the dams and other improvements to be made, should the work be prosecuted further.

I am, very respectfully, your obedient servant,

J. McCLELLAND,

Brevet Lieut. Col., Captain Topographical Engineers.

Colonel J. J. ABERT,

Chief Corps Topographical Engineers, Washington, D. C.

APPENDIX H.

ANNUAL REPORT OF OPERATIONS ON THE GENERAL GOVERNMENT ROADS IN THE TERRITORY OF MINNESOTA.—By J. H. SIMPSON, Capt. Corps Top. Engs.

CONTENTS.

1. Operations on the road from Point Douglas to mouth of St. Louis river.
2. Operations on the road from Point Douglas to Fort Ripley.
3. Operations on the road from Wabashaw to Mendota.
4. Operations on the road from Mendota to mouth of Big Sioux river.
5. Operations on the road from mouth of Swan river to Long Prairie.
6. Operations on the road from Fort Ripley to Pembina.
7. Operations on the road from St. Anthony's falls to Fort Ridgely.
8. Tabular statement of fiscal condition of the roads.
9. Estimates.
10. Road-making in Territories; kind of roads required; contracts; system used; rights of way.
11. Tender of thanks to assistant engineers.
12. Appendix "A," correspondence in relation to road from Fort Ripley to Pembina.
13. Appendix "B," estimate of amount of timber and prairie on said road.
14. Appendix "C," copy of contracts and notice for proposals.
15. Appendix "D," correspondence with the department in relation to right of way. Attorney General's opinion.

OFFICE GENERAL GOV'T ROADS, MINNESOTA TERRITORY,
St. Paul, September 20, 1855.

SIR: I have the honor to submit the following report of operations for the past year. My last annual report bore date September 15, 1854; the present will embrace, in as concise a form as possible, all that has occurred since.

POINT DOUGLAS AND ST. LOUIS RIVER ROAD.

This road (see accompanying map, illustrative of all the roads) extends from Point Douglas, at the confluence of the St. Croix with the Mississippi river, to the mouth of the St. Louis river, at Superior, on Lake Superior, in Wisconsin. Its length, according to the original survey, was 190 miles; but in its construction it has already been shortened 9 miles, and may probably be shortened still more.

Operations on this road would have been commenced immediately on the receipt of intelligence from the bureau of the appropriation of July, 1854; but the act requiring a change in the location of the terminus from the falls of the St. Louis river in Minnesota, to the mouth of said river in Wisconsin, and the department requiring of me a report upon the proper mode of extending the road, I did not feel authorized to commence operations until the department could give its decision with regard to the extension, and this decision I did not receive till October 5. According to this decision, the extension was to commence at or near the 169th mile station, ($4\frac{1}{2}$ miles from the falls of the St. Louis river, the old terminus,) and to run in as direct a line as practicable to the mouth of the St. Louis river, the new terminus. Embraced also in this decision was the requirement that I should expend the appropriation of July, 1854, in the construction of this extension, and any balance which might remain was to be expended in any additional work which might be required on any part of the road from Point Douglas to the mouth of the St. Louis river. Feeling that the appropriation thus expended at but one extremity of the road, and that the most inaccessible, would be to retard the construction of the road, and not afford the benefit generally to the citizens along the route, and the people of the Territory, which they had a right to expect, I addressed, November 6, a letter to the department, of which the following is an extract:

"In the connexion, however, and with the greatest deference to my superiors, I would respectfully represent that it is of the utmost importance that a practicable wagon communication be at once effected between the head of Lake Superior and the valley of the St. Croix; and as this can only be accomplished by applying the late appropriation to *as great an extent of the road as possible*, commencing at its most northern terminus, the mouth of the St. Louis river, I would respectfully solicit the approbation of the department to such an application. The people of the Territory, as well as the citizens of Wisconsin, at the northern end of the road, are exceedingly anxious that the road should be opened as soon as practicable; and it is for this reason, and because

of the responsibility of my station, that I venture to make the application I do."

To this I received a reply from the bureau, under date of November 18, as follows:

"Present funds must be so disposed upon the roads as to produce the best general results; and should future appropriations be made, future work can be attended to."

Having thus full power to apply the appropriation so as to produce the best general result, and having by the 17th January, after a great deal of difficulty on account of the cold winter season, when it was done, effected the survey of the northern extension, through the services of William Rock, civil engineer, I on that day advertised for proposals for constructing the road *southwardly* from the northern terminus, the mouth of the St. Louis river, under one contract; and for constructing the road *northwardly*, from the 78th mile station, the number of the mile station from Point Douglas to which the road had been constructed under another contract. On opening the proposals I found Mr. Orrin W. Rice, of Superior, Wisconsin, to be the lowest bidder on the northern section, and Mr. John D. Ludden, of Stillwater, Minnesota, to be the lowest bidder on the southern section. To each of these gentlemen was awarded the contract for his respective section, and steps were taken to commence without delay the operations. Mr. E. A. Holmes, civil engineer, was despatched to Superior to start the work in that quarter, and Mr. William Payto, civil engineer, to the 78th mile station, to mark out and survey a change in the route, by which a contraction of seven miles was effected, and also to take charge of the work under Mr. Ludden's contract. But one engineer would have been sent to supervise both contracts, but the country intervening being 90 miles across, and of too impracticable a character, on account of dense woods and boggy swamps and marshes, to admit of his travelling the distance with sufficient alacrity to do justice to the whole work, it was deemed necessary to place one upon each section. Orders were given to open the road twenty-five feet wide; that is, to grub, clear, and level off a roadway or centre strip of 18 feet in width, and to cut close to the ground on each side a strip three and a half feet, thus making the 25 feet. The object of making the road at present thus narrow, was to get it through from the valley of the St. Croix to Lake Superior at the earliest possible moment, and thus construct a practical wagon road through a country over which not even a man on horseback can at present travel. It being got through in this way, the intention is to widen and otherwise perfect it, as the appropriation will allow.

Under these contracts, the road has been constructed from the 78th mile station, near Goose creek, to Snake river, a distance of $17\frac{1}{2}$ miles, and probably, at this date, four miles further;* and from the 170th mile station, about the beginning of the northern extension, to Superior, a distance of 20 miles—intermitting, however, the first 7 miles out from Superior, which, on account of the roads having been located

* Since forwarding the duplicate of this report, the engineer in charge has reported this road finished to the 103d mile station, making $24\frac{1}{2}$ miles finished under the contract.

in the winter, has, with the sanction of the department, been abandoned, and for that distance relocated. It is about three-fourths finished. Neither of the contractors have pushed on the work with that energy which was expected of them; yet, as the country where they are immediately operating is entirely destitute of facilities for work and of population, it is very possible they may have done as well as any other contractors would have done under the same circumstances.

In addition to the work specified, the route, according to the act of January 7, 1853, which required it to be located in the most convenient and direct course between the termini, (thus throwing out Cottage Grove as a point of the road,) has been re-run and staked out by Mr. Payte, between Point Douglas and the 19th mile station, and thus a contraction of a little more than 2 miles effected.

On the 12th May the proposals were opened for the construction of a bridge of one span of 175 feet over Snake river, and of a bridge of one span of 96 feet over Kettle river. Mr. T. J. Frazier, of St. Anthony Falls, being the lowest bidder, the contract was awarded to him, and, according to it, they are to be completed during the present year. Mr. Frazier was the contractor for the bridge of 150 feet span over Cannon river, now finished; and, as he has shown by the result that he is equal to work of this character, I have every reason to expect as favorable an issue from his present undertaking. (For a plan of the bridge over Snake river, see Plate 1.)

On the 30th June I opened the proposals for the opening of the road all the way through from the 103d mile station, on the corrected line, the termination of Ludden's contract of February 23, 1855, to the 170th mile station on the old line, the termination of Rice's contract of March 3, 1855, the whole distance being 58 miles. This I divided into two sections—the southern extending from the 103d (as above) to the 144th mile station, a distance of 32 miles, and the northern from the 144th to the 170th mile station, a distance of 26 miles. Mr. John D. Ludden being again the lowest bidder on the southern section, and Mr. O. W. Rice the lowest on the northern section, the contracts have been respectively awarded to these gentlemen. By these contracts, they are to have their sections completed by the 15th of December.

This road is now completed from the 21st mile station, below Stillwater, to the 95th mile station, at Snake river, (possibly 4 miles farther;*) and from the 170th (about $3\frac{1}{2}$ miles from the falls of the St. Louis river) to the 183d mile station it is about three-fourths finished.

Mr. Holmes being required at headquarters to take charge of another work, Mr. W. H. Newton, civil engineer, living at Superior, was appointed, May 1st, to relieve him of the charge of the northern section; and the latter resigning, Mr. Ethan C. Clarke, civil engineer, was appointed, July 23d, his successor, and I am happy to learn that he is devoting his whole time, personally, to the duties of his station.

For an account of the "fiscal condition" of this road see table in the sequel.

The last appropriation having been made for the completion of the

* Now finished to the 103d mile, according to report of engineer, before referred to.

road, and the means being sufficient to get it through as at present constructed, no estimate is submitted for any further appropriation.

POINT DOUGLAS AND FORT RIPLEY ROAD.

This road extends from Point Douglas to Fort Ripley, (formerly called Fort Gaines,) both situate on the Mississippi river, and is 146 miles long. So soon as information was received from the bureau of the appropriation of July, 1854, measures were taken to carry forward the construction of the road to completion with all the despatch the means available would allow. The portion between St. Paul and St. Anthony was, after due notice, September 19th, put under contract, Mr. Benjamin Parker, of St. Anthony, being the contractor; and the portion below St. Paul, across the marshes, between the city and Dayton's Bluff—a heavy job—was given to Mr. Patrick Nash, of St. Paul. To Mr. Maurice T. Murphy, of Mendota, April 13th, was awarded the contract for $2\frac{1}{2}$ miles of the road below Dayton's Bluff: all this under the appropriation of July, 1854.

On the 31st March, having received official intelligence of another appropriation, I took immediate steps to have the whole of the remaining unconstructed and uncontracted portions of the road put under contract. To Mr. Patrick Nash, May 16th, was awarded the contract for the portion between Point Douglas and the 19th mile station; to Mr. John Depue, of Benton county, May 31st, the portion between the 82d mile station, at Watab and Fort Ripley, a distance of 41 miles; and to Mr. Benjamin Parker, June 19th, the portion between St. Anthony and the 65th mile station.

These contracts have been finished in whole, as follows: Mr. Parker's, of September 19th, about the 1st of January; Mr. Murphy's, July 19th; Mr. Nash's, of October 3d, August 25th; Mr. Depue's, September 1st. Mr. Parker's contract, of June 19th, will be completed in a few days; and so will Mr. Nash's, of May 16th.

In addition to the work specified above, the bridge, of $137\frac{1}{2}$ feet, across Rum river, proving not to be sufficiently supported by the arch-braces, which had been originally put in two years ago, another set has been pinned and bolted to the trusses, so that now it is abundantly strong.

The whole road has now been constructed from the 10th mile station to Fort Ripley, excepting about 3 miles between 15th and 18th mile stations, the portions interdicted by Messrs. Dayton and Fridley through their respective premises, the first at St. Paul and the latter about 5 miles above St. Anthony, and the grading of the bank at Rice creek now nearly completed.

For an account of the "fiscal condition" of the road see table in the sequel.

According to the terms of the law, the appropriation of \$13,494 09 by Congress, at its last session, was for the *completion* of this road; but there yet remaining some few miles of grubbing to be done between St. Paul and Point Douglas, and some hills on other portions of the road to be reduced in grade, to make the road what it should be, and

the appropriation not coming up to my estimate submitted with my last annual report, to wit: \$18,190, I respectfully recommend that the difference, \$4,696, be appropriated by Congress at its coming session for the work. This amount will be sufficient for the purpose.

Mr. J. S. Sewall, civil engineer, has had the charge of the sections of this road embraced in the distance between Point Douglas and the 65th mile station, a distance of 88 miles; and Mr. Holmes the section included between the 82d mile station and Fort Ripley, a distance of 40½ miles.

WABASHAW AND MENDOTA ROAD.

This road extends from Wabashaw, two and a half miles below the foot of Lake Pepin, to Mendota, at the junction of the Minnesota with the Mississippi, and in its constructed state approximates 76 miles in length.

After the usual notices for proposals, I entered into the following contracts: On the 9th of October with Francis Dowdle, of St. Paul, for the construction of the portion of this road across Hay Creek marsh, about a mile above Red Wing; on the 19th of December with Mr. T. J. Frazier, for the construction of a bridge, of one span of 150 feet, over the Cannon river; on the 3d of January with Messrs. Whipple & Mason for the construction of a couple of bridges, and the causeway across Cannon river bottom, and the grading of the adjacent bluff; on the 6th of March with Mr. C. R. Read, of Read's landing, Pepin, for the construction of the portion between the 54th mile station, near Well's creek, and Smith's creek, about a mile below Pepin, a distance of 21 miles; on the 25th May with Messrs. Newton and McComb, of St. Paul, for the construction of the portion between Mendota and Cannon river, a distance of 36½ miles; and on the 1st of June with Mr. Read, for the construction of such portions as might be designated between Cannon river and the 54th mile station, a distance of 17½ miles.

Mr. Dowdle finished his contract June 22d; Mr. T. J. Frazier, the bridge over Cannon river, August 16; and Messrs. Newton and McComb, and Mr. Read, will doubtless be through theirs about the 1st or in the early part of October;* Mr. Whipple, of the firm of Whipple and Mason, dying, and Mr. Mason not appearing within the time specified in the contract for their work to be completed, and they having done nothing under their contract, the portion of road let to them was, agreeably to notice for proposals, included within the section awarded to Mr. Read.

The road is now in a travelling condition all the way through from Wabashaw to Mendota, and when Messrs. Newton and McComb and Mr. Read shall have completed their work, it will be in as good order as will be required.

The bridge over Cannon river is a fine structure, and answers well the locality for which it was designed. A plan of it will be seen in Plate No. 2.

* Messrs. Newton & McComb have completed their contract this 25th of September.

Mr. Sewall had the immediate charge of this road till May 21, when, the duties accumulating on this and on the Point Douglas and Fort Ripley road, it became necessary for him to confine his attention to the latter road; and Mr. De Witt Langford, civil engineer, was appointed to the charge of the former.

For a view of the financial condition of the road see tabular statement in sequel.

The balance of the appropriation available being deemed sufficient to complete the road, no estimate is made for any further appropriation.

BIG SIOUX AND MENDOTA ROAD.

This road extends from the mouth of the Big Sioux river, on the Missouri, in Iowa, to Mendota, at the mouth of the Minnesota river, in Minnesota, and is 279 miles long.

As the charge of it was not intrusted to me till late in 1854, and nothing could be done to any advantage in the winter, contracts were not entered into for the construction of any part of it till the next spring, when Mr. W. B. Dodd, of St. Peter's, being the lowest bidder on the Mankato and middle sections, comprising a distance of $45\frac{1}{2}$ miles between Mankato and the 235th mile station, and Mr. Patrick Nash the lowest bidder on the Mendota section, between the 235th mile station and Mendota, a distance of forty four miles, contracts were entered into with these gentlemen for the sections, respectively, on the 24th and 31st of May. In order that the road may be a good one, and it be got through from Mendota to Mankato in the shortest possible time, orders were given to grub twenty-five feet wide, and cut the trees down for a width of sixty-six feet. At the last report of the engineer in charge, Mr. C. F. Crehore, Mr. Dodd had completed about thirteen miles of his contract eastwardly from Kasota through the heaviest portion of the Big Woods, and Mr. Nash about twenty-eight miles westwardly from Mendota towards Kasota, making in all about forty-one miles completed. There yet remains about forty miles to be completed before teams will be enabled to get through with facility to Mendota, and some work will still be required between Kasota and Mankato before this portion of the road can be considered as finished. Neither Mr. Dodd nor Mr. Nash have pushed forward their respective sections with the vigor which was expected of them; but they still promise to get through their work this season.

On the 3d of September, after due notice for proposals, I entered into a contract with Mr. T. J. Frazier, the lowest bidder for the Blue Earth section of this road, which embraces the portion between the 176th mile station and Mankato, a distance of $13\frac{1}{2}$ miles, and the bridge of 280 feet in length and of five spans over the Blue Earth river; the whole section to be completed by the 1st of May next. There being no material available for the superstructure of this bridge near at hand but hard-wood timber, and it being impossible to get it in lengths suitable for chords of large span, it became necessary to design a bridge of comparatively moderate spans, and, on account of the quick-

sand character of the bottom, to resort to piles. A plan of this bridge will be seen in Plate No. 3.

A contract has also been entered into with Mr. Peter Cheadle, of Kasota, for the bridge over the Chankaska at Kasota, he having been the lowest bidder. This bridge will be of the trestle kind, 150 feet long and about 30 feet high, and will have five spans.

Mr. Crehore, as above stated, has had the immediate charge of the road; but the sections being wide apart, and it being impossible for him to do justice to the whole work under contract, I have been obliged to appoint Mr. C. H. Drew to the immediate charge of the upper or middle Mankato and Blue Earth sections, and to retain Mr. Crehore, at his own solicitation, on the Mendota section; his time while actually on the road to be only allowed.

The fiscal condition of the road will be seen under its proper head in the sequel.

The last appropriation having been for the completion of the road, and the funds available being ample for expenditure for at least another season, no estimate is made for any further appropriation.

SWAN RIVER AND LONG PRAIRIE ROAD.

This road extends from the mouth of Swan river to the (old) Winnebago agency at Long Prairie, and is 28 miles long. On the 8th of May, after the usual notice, I entered into a contract with Mr. S. B. Ohnstead, of Benton county, for the construction of the unfinished portions of the road; and, saving a mile or two, it is at this time entirely finished. It will be completed probably about the 10th of October next.

Mr. Holmes has, in addition to his other duties, had the charge of this road.

The financial condition will be seen by reference to the table in the sequel.

The balance on hand being deemed sufficient to complete the road, no further appropriations are called for.

FORT RIPLEY AND RED RIVER OR PEMBINA ROAD.

The act of March, 1855, appropriating money for this road, reads as follows: "For cutting out the timber on the road from Fort Ripley, via Crow Wing river, to the point where said road intersects the main road leading to the Red river of the North, ten thousand dollars." In order to the carrying out of the law intelligently and economically, there never having been any survey of the road, I directed Mr. Holmes early in June to make a reconnoissance of it; the extent of the reconnoissance to embrace a distance of at least 125 miles from Fort Ripley. As my letter stated, "the object of the reconnoissance was to determine the character of the road, its direction, the kind, character, and extent of the timber upon it, the streams it crosses, the soil, the surface, and all else that might be necessary to illustrate the road, and prepare it for contract." The reconnoissance was made, and a report was submitted

by Mr. Holmes. In that report Mr. Holmes presents his views as follows:

"The present road is extremely crooked, and in few cases runs where it would in case of a location being made at any future time. The whole object of the present one has been the keeping exactly on the line dividing timber from swamp, so as to have the least possible amount of cutting, and at the same time still manage to keep on pretty dry ground. At this season of the year, though covered with water at wet periods, the crossing of the swamps and mud-holes at the different streams constitutes by far the worst portions of the whole route. Cutting timber alone on the existing route would do little to improve the means of transit if these other places are left untouched; and in case of a location being made at any future time, would in many cases be rendered of no utility, unless the cutting was conducted with a view to a future location."

The reconnoissance thus evolving the fact that to cut the timber (all the law allows) on the road as at present located, would in no material degree advance the travelling condition of the road, and, for all the purposes of getting the best and shortest route, would be entirely nugatory; and feeling the imperative obligation of the law, except so far as it might be suspended, at the request of influential men in the Territory, by the War Department, under the existing state of things I addressed a circular to the Hon. W. A. Gorman, governor of the Territory, Hon. H. H. Sibley, Hon. H. M. Rice, Hon. N. W. Kittson, and Mr. Charles Cavelier, representing to them the facts of the case, and asking if they did not concur with me in the propriety of soliciting the government to suspend the application of the appropriation, until the law might be so changed as to admit of its application nominally to the highest results—the selection and survey of the best route, and the construction of a road that would be of service to the people. This correspondence, which will be found in Appendix A, was submitted to the War Department, and by it the suspension as suggested approved, with the requirement that I should make an estimate and plan for such a road as was needed.

There can be no doubt that, next to the road from Point Douglas to Lake Superior, the road "from Fort Ripley, via Crow Wing river, to its junction with the main road leading to the Red river of the North," or rather to Pembina, is one which, on account of its military aspects, not to say anything of its commercial advantages, is second to none in the Territory. The time is at hand when our population will be surging towards the British possessions in that quarter, and *pari passu* with this should be the establishment of a post or line of posts along our borders in that region, in order to the maintenance of peace among the Indians, and the preservation of our rights and honor as a nation in respect to a conterminous power, which has not been, according to official accounts, free from committing depredations on our territory, and overshadowing our people to their injury and degradation, because of the absence of any military power by which they could be restrained. Related to this is the opening and constructing of the road referred to, by which a most extensive and rich country in the valley of the Red

river would be developed, and a means of transit made available, by which troops and supplies could be thrown upon the frontier with facility.

Captain John Pope, of the corps of topographical engineers, in his brief but clear and well-ordered report of this country, which he explored in 1849, by direction of the War Department, says, (Ex. Doc. No. 42, 31st Congress, 1st session, page 25): "The whole region between the Sháyenne and Sioux Wood rivers, and particularly that portion along the Red river of the North, is the most remarkable country I have ever seen, for its singular uniformity of surface, the wonderful fertility of its soil, its peculiar fitness for the production of all kinds of grain, and the great healthiness of its climate."

Again, page 27, he says: "This vast valley of the Red river, extending three hundred miles from north to south, and about fifty miles to the west of the river, is among the most fertile tracts of country I have ever seen. From its very level character and great productiveness, it is peculiarly adapted to the cultivation of wheat, oats, barley, &c. Vegetables are produced most abundantly, and the potato attains a size and flavor rarely met with further south. Considerable quantities of wheat and barley are raised north of our frontiers, and the flour which is made at the Selkirk settlement, at the mouth of the Assineboin river, is exceedingly good."

Again, page 37, speaking of the Ottertail Lake country, to which this road might be made tributary, he remarks: "The whole region of country, for fifty miles in all directions around this lake, is among the most beautiful and fertile in the world. The fine scenery of lakes, and open groves of oak timber, of winding streams connecting them, and beautifully rolling country on all sides, renders this portion of Minnesota the garden-spot of the Northwest. It is impossible, in a report of this character, to describe the feelings of admiration and astonishment with which we first beheld the charming country in the vicinity of this lake, and were I to give expression to my own feelings and opinions in reference to it, I fear they would be considered the ravings of a visionary or an enthusiast."

I will in this connexion state, that through the whole valley of the Red river of the North, which has been represented to be so fertile, the river is reported by Captain Pope as navigable for steamers from a point eighty miles north of our frontier (or of Pembina) to the mouth of the Sioux Wood river, almost directly south, a distance by water of about 500 miles, 417 of it being entirely within Minnesota. Captain Pope sounded the river from Pembina to the mouth of the Sioux Wood river, and found the greatest depth of water (September, 1849) to be 15 feet, and the least 6, until he reached the mouth of the Sioux Wood, where he found it 4 feet. This fact, together with that of the tributaries of this river flowing through a good country, and some of them navigable, makes this portion of Minnesota at this time exceedingly interesting, and no time should be lost by our government in bringing it into notice and settlement, by the construction of good roads leading to it.

Again, in reference to the Hudson's Bay Company and its operations, Captain Pope uses (page 28) the following language: "The sole traffic

of the Hudson's Bay Company in this region has been in the furs and peltries obtained by the employed hunters and trappers, and their value for the years 1847, 1848, and 1849, has been about \$400,000 for each year. This vast amount of peltries has, to a great extent, been withdrawn from the territory of the United States, and it is quite impossible to say what amount has been paid for them to the hunters and trappers, as there can be no other than an arbitrary price for the goods exchanged for them. It is quite certain that, by affording proper facilities of communication between the Mississippi and the Red river of the North, and by giving protection to those residing within our borders, goods and supplies can be thrown into the country cheaper, and three months earlier, than by Hudson's bay. For the purpose of insuring a successful traffic, the policy of the English company has been, of course, to oppose anything like permanent settlement and cultivation of the soil, since the greater the dependence of the half-breeds for means of subsistence, the greater the amount of the fur trade and its consequent profits.

"Not content with their influence along the Red river of the North, the company has established a chain of trading-posts along our northern frontier, to connect with their settlements in Oregon. Every year numerous carts pass along these posts into Oregon, through two passes in the Rocky mountains, which are said to be very easy of access, and within the boundaries of the United States. The half-breeds who have accompanied these expeditions to the Columbia represent the whole country along the northern frontier of Minnesota to be exceedingly fertile, and the vegetation rapid and luxuriant. They have described to me the rich and beautiful valleys of several rivers flowing to the north across our boundary, but in terms which appeared to me so extravagant and romantic, that I have hesitated to state anything upon the subject in this report. The total want of interest manifested by the government of the United States in the settlements along the Red river of the North, and the present and constant influence of English troops and English traders, have convinced the people that it is far better to submit to the utmost exactions, and most lawless conduct of the Hudson's Bay Company, than, by opposing them, to be deprived of those articles of convenience and comfort which have now become necessary to them."

As germane to this subject, and as showing what is already being done in the face of difficulties, on account of bad roads, I extract the following from the St. Paul Democrat of the 14th August last:

"*The Pembina trade.*—The trade of the settlement at Pembina, and also that of the British settlement at Selkirk, is increasing in value to St. Paul every year. Our merchants should endeavor, by affording their mercantile brethren of the far north every facility to trade advantageously, not only to secure but to develop their business connexion with them. Already this year we are persuaded one hundred thousand dollars' worth of goods has been purchased in St. Paul to take north.

"Mr. Kittson has sent up to Pembina this summer goods to the value of \$28,000, and Mr. Rolette despatched a train of carts a day or two since, containing a \$10,000 stock of traders' goods. In addi-

tion to the purchases of these gentlemen, there are many small traders who invest to the extent of their capital. About sixty carts heavily laden with goods, purchased at St. Paul, have been despatched northward within a few weeks by the latter class of traders. The merchandise purchased for this trade consists mainly of dry goods—such as blankets, flannels, heavy cloths and muslins, stoves, tin-ware, and groceries. In return, the traders bring us furs of all kinds, and of the best quality; consisting of the skins of the buffalo, bear, otter-fisher, marten, and mink.

“In cattle and horses a heavy trade is also springing up, particularly with the Selkirk settlement. Large numbers of fine cattle have been brought down this year. Under the reciprocity treaty they are admitted free of duty; and as cattle are bought at low rates on the banks of the Red river, the trade is profitable, and will continue so for many years.

“A provision of the reciprocity treaty in relation to the shipment of goods through this country in bond, for the use of the inhabitants of the British provinces, promises to benefit our city. It has been the case heretofore that the Hudson's Bay Company monopolized the trade of the Selkirk settlement in cloths, powder, and other articles in demand in that region. The company's officers refused to sell these articles to the numerous traders on the British side, unless they would consent to the monopoly, by the company, of the fur trade. This they were of necessity compelled to do. Under the beneficial workings of the reciprocity treaty, however, the large class of small traders can import their own goods to New York from England, bring them to St. Paul in bond, and transport them hence to Pembina and Selkirk in carts, without the payment of duties. The intercourse between St. Paul and Selkirk will thus be largely increased to their mutual benefit.*

“A census was taken this summer of the population of the Pembina and St. Joseph's settlement. It was found that there had been a large increase; the population of the two settlements amounting to over two thousand souls. The Selkirk settlement numbers between ten and twelve thousand inhabitants. From this settlement the inhabitants of Pembina and St. Joseph's draw their supplies of grain; all the mills being located on the British side of the line—there being no inducements for the Americans to enter into agricultural occupations.”

I have been thus lengthy in setting forth the facts in relation to this Red River country in order to show the government and Congress the necessity of such an amount of appropriations as might be found required in order to open and construct a good road between Fort Ripley and Pembina. Already a good road has been made by the government between St. Paul and Fort Ripley, and there only remains the link mentioned of about 350 (the voyageurs say 415) miles to make the communication complete between St. Paul, the head of navigation on the Mississippi, and Pembina.

The amount necessary to make the survey and construct the road,

* I have been informed that the provisions of the reciprocity treaty do not extend to “Prince Rupert's Land.” Should this be the fact, the omission ought to be rectified at the earliest moment.

based upon facts derived by Mr. Holmes from a personal knowledge of the present route for about 125 miles from Fort Ripley, and from the half-breed voyageurs for the balance of the road, I estimate at \$133,849 20. The details of this estimate will be found in the sequel under its proper head; also a statement of the number of miles and the localities of the timber and prairie in Appendix B.

The financial condition of this road will be seen in the sequel under its proper head.

ST. ANTHONY FALLS AND FORT RIDGELY ROAD.

The order from the War Department placing this road under my supervision was received April 30th. The act of appropriation in relation to it read thus: "For cutting out the timber on the territorial road from falls of St. Anthony to Fort Ridgely, five thousand dollars." The act, then, requiring that the money should be expended upon a territorial road already existing, I on the 3d of May repaired to Minneapolis to make inquiries about it of Mr. John H. Stevens, one of the commissioners appointed by the legislature of the Territory to locate and survey such a road. Mr. Stevens informed me that the road had not yet been located, but would be without delay, and in the mean time that he would communicate with me by letter on the subject. No letter reaching me by the 10th of May, I addressed to him the following letter:

"ST. PAUL, May 10, 1855.

"DEAR SIR: I have been anxiously awaiting the letter you promised me at our interview on the 3d instant in relation to the intended location and survey of the territorial road between St. Anthony falls and Fort Ridgely by the commissioners appointed by the legislature at its last session. Having been charged by the general government with the application of the \$5,000 appropriated by Congress for cutting out the timber on the road, I am anxious to have it put under contract at the earliest moment; and in order to this I am desirous of getting a copy of the survey and report by the commissioners in order that proposals for the work may be made understandingly. Will you be kind enough to inform me what I may expect in relation to this matter, so that I may advise the department at Washington accordingly.

"Be pleased also, if in your power, to send me a copy of the territorial act by which the commissioners have been appointed and are authorized to act.

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

"J. H. SIMPSON,

"*Captain Corps Topographical Engineers.*

"Colonel J. H. STEVENS,

"*Minneapolis.*"

Some days after mailing this letter I met Colonel Stevens in the streets of St. Paul, when he informed me that he had received my letter, but that he had not been able to get the commissioners together. He would do so as soon as he could.

On the 6th of June, in my monthly report for May to the bureau, speaking of the road, I used the following language :

“ *St. Anthony Falls and Fort Ridgely road.*—The law appropriating money for this road reads thus : ‘ *For cutting out the timber on the territorial road from the Falls of St. Anthony to Fort Ridgely, five thousand dollars.*’ But no territorial road exists at present between these points, although commissioners were appointed by the legislature last winter to locate and survey the road. I conceive, then, that nothing can be done on my part towards carrying out the law till such a territorial road shall have been located, and so I have told orally, and also by letter, one of the commissioners, John H. Stevens, esq., of Minneapolis. Should any views of my powers and duty in this matter be wrong, I respectfully request that the department will advise me.”

On the 25th of June I received the following reply :

“BUREAU OF TOPOGRAPHICAL ENGINEERS,
“ *Washington, June 16, 1855.*

“SIR: Your letter of the 6th instant has been received. From this letter it appears that there is no territorial road from the falls of St. Anthony to Fort Ridgely; and as matter of clear propriety, the United States appropriation having direct reference to such a road cannot be drawn and applied.

“Should the State commissioners hereafter act in relation to this road, you will report facts and await orders.

“Very respectfully, your obedient servant,

“ J. J. ABERT,
“ *Colonel Corps Topographical Engineers.*

“ Captain J. H. SIMPSON,
“ *Corps Topographical Engineers, St. Paul, Minnesota.*”

The foregoing is all that has transpired in relation to this road; and as I have heard nothing further from any of the commissioners, nothing more has been done in the premises.

Having given a full account of the operations during the past year, I will now present the following tabular statement :

Ex. Doc. 1—31*

Tabular statement of the amounts which have been appropriated for the roads under my charge from the commencement, with an account of their present fiscal condition.

Name of road.	Amount appropriated.				Total amount appropriated.	Balance in hands of general superintendent this date.	Balance due general superintendent this date.	Balance in treasury this date.	Total balance remaining available.
	July, 1850.	Jan'y, 1853.	July, 1854.	March, 1855.					
From Point Douglas to mouth of St. Louis river.....	\$15,000 00	\$20,000 00	\$20,000 00	\$34,213 50	\$89,213 50	\$7,625 63	.....	\$34,717 53	\$42,343 16
From Point Douglas to Fort Ripley.. ..	10,000 00	10,000 00	10,000 00	13,494 09	43,494 09	1,157 13	.....	2,989 09	4,146 22
From Wabashaw to Mendota.....	5,000 00	5,000 00	15,000 00	13,871 76	38,871 76	.....	\$509 74	8,201 76	7,692 04
From Mendota to mouth of Big Sioux river	5,000 00	5,000 00	25,000 00	27,475 68	62,475 68	3,712 98	.....	40,362 62	44,075 60
From mouth of Swan river to Winnebago agency, at Long Prairie...	5,000 00	5,000 00	5,000 00	2,535 39	17,535 39	1,215 11	.....	.....	1,215 11
From Fort Ripley to main road leading to Red river of the North.....	.....	.....	.....	10,000 00	10,000 00	261 21	.....	9,400 00	9,661 21
From St. Anthony Falls to Fort Ridgely .....	.....	.....	.....	5,000 00	5,000 00	.....	.....	5,000 00	5,000 00

ESTIMATES.

The following are the estimates required for the service of the roads, and for which appropriations are recommended:

To complete the road from Point Douglas to Fort Ripley, the balance stated before between the appropriation of March last, \$13,494 09, and the amount required in my last annual report, \$1,819, or..... \$4,695 01

For the survey and construction of a military road from Fort Ripley, via Crow Wing river, to Pembina, on the Red river of the North, as follows:

Grubbing, clearing, and levelling off 360 acres, at \$120 per acre.....	\$43,200 00
Cutting down 568 acres, at \$40 per acre	22,720 00
Corduoying or logging 2,160 rods, at \$3 per rod.....	6,480 00
Earth work, 41,670 cubic yards, at 30 cents per cubic yard.....	12,501 00
Bridging (32 rivers,) 2,080 feet lineal, at \$8 per foot...	16,640 00
Add 20 per cent. for contingencies.....	20,308 20
Add for first survey	12,000 00

Total amount of estimate.....	<u>133,849 20</u>
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Of which amount I would recommend that Congress appropriate before spring \$30,000, in addition to the \$10,000 already appropriated, so that the survey may be commenced early enough to arrange for contracts during the summer.

ROAD-MAKING IN TERRITORIES.

Having had an experience of about five years in road-making in the Territories, growing out of about one year's experience in Florida, in 1839 and 1840, and of more than four years in the Territory of Minnesota, I feel that the results I have arrived at should be laid before the department; and I now present them only that they may be so far operative as they may prove valuable.

The cardinal idea upon which all appropriations for common roads in Territories have been made by Congress, and, as it seems to me, the correct one, is only to grant those which will be sufficient to open and construct the great thoroughfares sufficiently to answer the wants of the people until they erect themselves into a State, or, at any rate, until they are populous enough and efficient enough to make and foster their roads themselves. In order to this, only such a character of roads is necessary as will economically answer the object in view. The amount, then, for the accomplishment of this object is the maximum limit to which it is probable appropriations by Congress will ever extend. And now the question arises, what character of road will answer

the object in view? My experience suggests to me the following as fulfilling the conditions:

1. Roads in *dense* woods should be opened—that is, the trees felled for a width of at least 66 feet, and in some cases 100 feet, so as to let in the sun and wind, and also to prevent fallen trees from obstructing the road. In what are called “timber openings,” where the trees are sparse and low in height, a width of 33 feet, or 2 rods, will suffice.

2. The centre strip or road-bed should be at least 25 feet, and need not be over 33 feet in width, and within this strip the trees and brush should be thoroughly grubbed, and the spoil removed to the parallel side strips. The knolls or small hillocks should also be levelled off on this centre strip, and the small holes filled up.

3. The hills should never be allowed to have a grade exceeding 10 in 100, and, if at all possible, within legitimate means, should always be reduced to 8 in 100.

4. Whenever the bottom is soft and spongy, the road to be logged or corduroyed, and the logs thoroughly covered with suitable gravel or earth.

5. Wherever there is corduroying or embankment, the road-bed to be 18 feet *wide on top*. Alongside hills it should be 20 feet, the road dishing towards the bank.

6. Except in extraordinary cases, the ditches, both where there is corduroying and where there is not, to be 4 feet wide at top, 3 at bottom, and $2\frac{1}{2}$ deep.

7. The leading-off ditches to be generally of same dimensions as under head 6.

8. Bridges of spans of from 10 to 20 feet (see Plate 4) to be made as follows: The abutments to be composed of straight round timbers, at least 1 foot in diameter, disposed as follows: one timber of such length as may be required—probably 16 feet long—to be laid across the road, at the proper depth. On this, for wing-walls, at each of its extremities, a log, to be notched, and to extend as far back as may be required. On each of these wing-wall timbers, near their back extremities, a short tie, to be notched, as in plan. These will constitute the first or foundation tier of timbers. The remaining tiers will be disposed as the first, care being taken to make the notches so that the logs will lie snugly together. The stringers to be four in number, to be at least 14 inches in diameter, and to be flatted sufficiently to make them lie solid, and to sustain properly the flooring. The roadway to be 12 feet wide, and to be made of plank or puncheons of split or hewn stuff, at least 3 inches thick. If the split puncheons are used, then the round or convex side to be placed undermost, the portions where they will rest upon the stringers being spotted, (as choppers say,) so as to make them lie firm. The wheel-guards to be logs, flatted on the lower side, and so effectually pinned down as to keep the flooring in place. The rails to be 4 by 5, and properly braced from the abutment logs and intermediately, from the puncheons, extended.

9. Culverts to be made entirely across the road—that is, at least 18 feet long, *always at least* 2 feet in the clear, and generally as much larger as the locality requires. If of three logs high, they may be

flatted and pinned together; if higher, the abutments should be made of round logs, tied back to the earth, as explained under head 8. The stringers should be at least 5.

10. Bridges of spans from 20 to 30 feet, requiring one or more intermediate piers, to be made according to plans given in Plate 4, one or the other being used, as would best serve the locality and the river to be bridged. In No. 1 Fig. the timbers are of hewn or sawed stuff, and the flooring and the revetment of the abutment trestles of 3-inch plank. The latter may, however, be of puncheons. The ice-fender exhibited in section of pier to be used only when required. In No. 2 Fig. the timbers are like those described under head 8, except that those designed for the piers are disposed with greater care, and sufficiently chipped or hewn to make the joints fit true.

11. Bridges of larger span, requiring a truss arrangement, I have made generally according to the plan of Colonel Long, of the corps of topographical engineers, specimens of which may be seen in Plates 1, 2, and 3, varying them, however, in their details to suit localities.

CONTRACTS.

The system of contracts I have used may be seen by reference to Appendix C, where will be found a copy of one of my contracts, and, as constituting a part of it, the "Notice for Proposals" governing and explaining the contract. This notice (a slip from a newspaper which has advertised it) I have been in the habit of pasting in each triplicate contract, both as a corrective and for convenient reference.

When I first took charge of the roads in this Territory, I let the sections by the mile, as I believe officers of the corps have generally done; but this plan I found to work badly. The temptation of the contractor to slight his work, and, under any pressure you may bring to bear upon him, to harass and fatigue you into a reception of it niggardly done, I have uniformly found to be prejudicial to the public good; and I therefore have matured a plan by which he can be paid only for what he actually accomplishes, and the engineer can successfully require of him all the work which may be needed to give the road the perfection he may think proper. This plan is to base the bids for the work upon elements of measure, such as acre, cubic yard, rod, foot lineal, superficial foot, &c., &c., as may be more fully seen in the "Notice for Proposals" attached to the contract in Appendix C. This plan I have found to work efficiently; and although it throws more labor on the engineer than the old plan, on account of the necessity of measuring the work, yet in its results it is so far superior, I cannot but recommend it to the attention and trial of my brother officers.

RIGHT OF WAY.

The question of right of way under laws of Congress appropriating money for the construction of roads in the Territories, is one which must frequently occur to officers of the corps in the discharge of their duties; and as my experience has evolved a written opinion from the

Hon. Caleb Cushing, the Attorney General, on this subject, I think it proper, as a part of the history of the roads during the past year, to file with my report the correspondence I have had with the department in relation thereto. (See Appendix D, and Plate No. 5.) Up to this present time, there has been no practical difficulty in relation to this matter, except in the cases already mentioned of Mr. A. M. Fridley and Mr. Lyman Dayton, who have formally objected to the opening and construction of the Point Douglas and Fort Ripley road through their land; all the others being gladly willing to have the benefit of the roads on account of the enhancement of the value of their property by the passage of the road through them. Messrs. Dayton and Fridley objecting, and the opinion of the Attorney General being such as not to admit of any legal process by which they could be constrained to permit the road to be made through their premises upon the route as laid out by the general government, the road at these localities has not been constructed, and of course, commensurate with them, is not open to travel.

From the opinion of the Attorney General, it would appear that at present there exists no "process of law" by which private property can be appropriated for the construction of roads authorized by the laws of Congress; and that, therefore, the general government is powerless, except so far as the proprietors may consent to the construction of roads through their premises, or the road be one already authorized and laid out by direction of the Territory. It is not for me to suggest any project of law by which this difficulty may be met; but that it is one of serious moment, which should be remedied by the earliest legislation of Congress, must be obvious to every one solicitous of the public good.

TENDER OF THANKS.

Permit me, in conclusion, to tender my thanks to the several engineers who have been courteously assisting me in the prosecution of my duties, and whose names have already been mentioned in connexion with the particular roads of which they have had charge; and in particular let me bring to the notice of the bureau the merit and worth of my chief assistant, Mr. J. S. Sewall, who to rare scientific ability combines a love for his profession, which cannot fail to carry him to the highest form among the engineers of our country.

All which is respectfully submitted.

J. H. SIMPSON,

Captain Corps Topographical Engineers.

Colonel J. J. ABERT,

Chief Corps Topographical Engineers, Washington, D. C.

APPENDIX A.

CORRESPONDENCE IN RELATION TO ROAD FROM FORT RIPLEY TO
PEMBINA.*Colonel Abert to Captain Simpson.*BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, August 2, 1855.

SIR: I have the honor to submit a letter from Captain Simpson, of the 21st July, in relation to a road under his superintendence.

An appropriation of ten thousand dollars was made during the last Congress "for cutting out the timber on the road from Fort Ripley, via Crow Wing river, to the point where said road intersects the main road leading to the Red river of the North."

An examination of said road having been made, the road is represented as bad. It was opened by a small party, who, to save time as well as labor, took advantage of all openings and clear places, marshes, &c., that would enable them to advance without being obliged to cut their way. The road is in consequence crooked and over bad ground. When opened the road was unusually dry, and portions at that time firm are now bad and deep.

Captain Simpson further reports, that "the cutting out of the timber is not the improvement required, as the timber is but little in the way, but that bridges are required, and means for passing swamps and marshes, also the cutting down of steep places. That it is not a road that will be used when the country becomes settled; hence no practical utility will result from expenditure under the law."

Captain Simpson, therefore, recommends that expenditure under the law be postponed until the approaching Congress shall have had an opportunity of altering the wording of the law. He encloses letters on the subject from Governor Gorman, Hon. H. H. Sibley, Hon. Mr. Rice, and Hon. N. W. Kittson.

Captain Simpson further recommends, that he be required to make an estimate and plan for such a road as would be of some use to the country, to be ready by next fall; in the mean time all other work in relation to said road to be suspended.

Respectfully recommended that the course advised by Captain Simpson be approved.

Respectfully, sir, your obedient servant,

J. J. ABERT,

Colonel Corps Topographical Engineers.

HON. JEFFERSON DAVIS,

Secretary of War.

Captain Simpson to Colonel Abert.

OFFICE GENERAL GOV'T ROADS, MINNESOTA TERRITORY,
St. Paul, July 21, 1855.

SIR: I have the honor to forward to-day, in a separate roll, a tracing of the reconnoissance which has been made of the road from Fort Ripley, via Crow Wing river, towards the main road leading to the Red river of the North. This reconnoissance shows that the present travelled route is an exceedingly crooked and badly located route, and that to apply the appropriation of ten thousand dollars in cutting out the timber upon it would advance the travelling condition of the route but little, and would do nothing towards getting the shortest and best route. Mr. Holmes, the engineer who made the reconnoissance, speaking upon this point in his report, uses the following language:

"The present road is extremely crooked, and in few cases runs where it would in case of a location being made at any future time. The whole object of the present one has been the keeping exactly on the line dividing timber from swamp, so as to have the least possible amount of cutting, and at the same time manage to keep on pretty dry ground. At this season of the year, though covered with water at wet periods, the crossing of the swamps and mud-holes at the different streams constituted by far the worst portion of the whole route. Cutting timber alone on the existing route would do little to improve the means of transit, if these other places are left untouched; and in case of a location being made at any future time, would in many cases be rendered of no utility, unless the cutting was conducted with a view to a future location."

In view of these facts, I respectfully submit to the department if the interests of the public do not require that the application of the existing appropriations be suspended until the next session of Congress, when the phraseology of the law might be so changed as to admit of the location, survey, and construction of the shortest and most economical route. Feeling the imperative obligation of the law as it at present reads, and yet conscious at the same time of its incongruity in respect to the objects in view, I have believed it advisable to address a circular to Governor W. A. Gorman, Hon. H. M. Rice, Hon. H. H. Sibley, and Hon. Norman W. Kittson, requesting their views in the premises; and these views, which will be found to concur with mine, will be seen by reference to their letters in reply, forwarded herewith with the circular. I would especially call the attention of the department to the letter of the Hon. Norman W. Kittson, who has for many years been a resident of Pembina, and has repeatedly travelled over the road in question.

Should the department instruct me in the premises to suspend any further operations on this road, I would respectfully suggest if it would not be well, with the facts I already have, and those I may yet get from persons who well know the road beyond the extent of the reconnoissance made by Mr. Holmes, to accompany my next annual report with an estimate for the completion of this whole road? Or would it be best

to suspend this estimate until the whole survey shall have been carefully made?

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

J. H. SIMPSON,

Captain Corps Topographical Engineers.

Colonel J. J. ABERT,

Chief Corps Topographical Engineers, Washington, D. C.

Captain Simpson's letter to Gov. Gorman, Hon. Mr. Sibley, and others.

OFFICE GENERAL GOV'T ROADS, MINNESOTA TERRITORY,

St. Paul, July 12, 1855.

SIR: An appropriation was made by Congress at its last session, as follows:

"For cutting out the timber on the road from Fort Ripley, via Crow Wing river, to the point where said road intersects the main road leading to the Red river of the North, ten thousand dollars."

The application of this money I have been charged with by the War Department, and in order to its being done intelligently I have had a reconnoissance and map made of the road by my assistant, Mr. E. A. Holmes, civil engineer. This reconnoissance evolves the fact that to cut the timber on the road as at present located, would in no material degree advance the travelling condition of the road, and for all the purposes of getting the best and shortest route which the country affords, and which should be the only road upon which the money ought to be applied, would be entirely nugatory. Mr. Holmes reports upon this subject as follows:

"The present road is extremely crooked, and in few cases runs where it would in case of a location being made at any future time. The whole object of the present one has been the keeping exactly on the line dividing timber from swamp, so as to have the least possible amount of cutting, and at the same time manage to keep on pretty dry ground. At this season of the year, though covered with water at wet periods, the crossing of the swamps and mud-holes at the different streams constitutes by far the worst portion of the whole route. Cutting timber alone on the existing route would do little to improve the means of transit, if these other places are left untouched; and in case of a location being made at any future time, would, in many cases, be rendered of no utility, unless the cutting was conducted with a view to a future location."

The object of this letter, sir, is to ask if you do not concur with me in the propriety of urging upon the War Department the postponement of the application of the appropriation until the assembling of next Congress, when the phraseology of the law might be so changed as to

authorize and require the survey and location of the best and shortest route between the proposed points.

Be pleased to give me a reply at your earliest convenience.

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

J. H. SIMPSON,

Captain Corps Topographical Engineers

To Governor W. A. GORMAN, Hon. H. H. SIBLEY, Hon. H. M. RICE,
Hon. NORMAN W. KITTSO, and Mr. CHARLES CAVILEER, severally.

Governor Gorman to Captain Simpson.

EXECUTIVE OFFICE, MINNESOTA TERRITORY,
St. Paul, July 17, 1855.

I have perused the Hon. Norman Kittson's letter, as also the act of Congress making the appropriation of ten thousand dollars for cutting out the timber from Fort Ripley, via Crow Wing, &c. No man in this part of the Northwest is more familiar with the route of said road than Mr. K., and none whose opinion, in my judgment, is entitled to so much consideration. The map made by your assistant engineer, and Mr. K.'s letter, fully satisfies me that the work will be more beneficial to the Territory if suspended until the phraseology is changed by Congress.

Very respectfully, your obedient servant,

W. A. GORMAN.

Captain J. H. SIMPSON,

Topographical Engineers U. S. Army.

Hon. Mr. Sibley to Captain Simpson.

MENDOTA, July 14, 1855.

DEAR SIR: In reply to your favor of the 12th instant, in which you desire my opinion as to the expediency of representing to the War Department the propriety of postponing the expenditure of the sum appropriated for cutting out the timber on the road from Fort Ripley "to the main road leading to the River of the North," I beg leave to state that I have no personal knowledge of the topographical features of the country, and my opinion must, therefore, be of little or no value. If, however, as represented by Mr. Holmes, the disbursement of the \$10,000 set apart by Congress for that object can be attended with no practical benefit to the region traversed by the route proposed, or to the settlers, in consequence of the insufficiency of the sum, or because of the appropriation being clogged by an impracticable condition, it would seem but the part of common prudence to wait until Congress

adds an additional amount, or changes the phraseology so as to accomplish a beneficial result.

Very respectfully yours,

H. H. SIBLEY.

Captain J. H. SIMPSON,
United States Topographical Engineers, St. Paul.

Hon. Mr. Rice to Captain Simpson.

ST. PAUL, *July 20, 1855.*

SIR: In reply to the letter you handed me this morning, relative to the Pembina road, I have to say that I concur with you in saying that the money appropriated should be expended in the most economical manner, and so as to accomplish the object desired.

It is of the utmost importance to the people of Pembina that this road should be opened at the earliest possible moment, and it is to be hoped that you will be able to make an estimate for the amount that will be required to complete this road before the next session of Congress.

Very respectfully, your obedient servant,

HENRY M. RICE.

Captain J. H. SIMPSON.

Hon. Mr. Kittson to Captain Simpson.

ST. PAUL, *July 16, 1855.*

SIR: I have to acknowledge the receipt of your favor of the 12th instant, requesting my opinion in regard to the road between Fort Ripley and Pembina. In reply, I beg leave to state that I have frequently travelled over the entire length of this road, and am well acquainted with it; and feeling a deep interest in the contemplated improvements, I will state to you my views candidly.

By the map which you have shown me, it is obvious that the present route is extremely tortuous, and that, when the country becomes settled, it cannot be the route travelled; for, as fast as improvements go on in the country, the straightening of the road will be a matter of course. For the distance of about one hundred and sixty miles from the Mississippi, (being the distance through what is called the Woods,) the present route was cut out by a very small party on their way to Red river, and they were guided entirely by the openings, or where they would have less labor or cutting to do, frequently going some distance out of their way merely to take advantage of a small prairie patch or opening. The season was a remarkably dry one, and late in the fall; consequently, it was unnecessary to avoid the swamps, they

being dry, as well as the fords of the small streams. The timber in the road at present is no great obstacle to its being travelled, with but a few exceptions.

In view of this, I think that expending the present appropriation by government merely in cutting the timber in the road would be a useless expenditure, being but a slight improvement to the road. In my opinion the bridging of the creeks and swamps, the grading of a few hills, and the straightening of the road, are by far the most needed improvements. I therefore fully concur with you in urging the War Department to postpone the improvements on this road until some alteration in the phraseology of the law can be obtained from Congress.

In conclusion, permit me to say that I feel a deep interest in this road, and should wish to see the appropriation expended in such a way as to give the highest possible amount of improvement.

Very respectfully, your obedient servant,

NORMAN W. KITTSOON.

Captain J. H. SIMPSON.

Mr. Cavileer to Captain Simpson.

ST. PAUL, M. T., July 28, 1855.

SIR: Yours of July 12th, in reference to the postponement of the work on the road from Crow Wing to Pembina until the next Congress can have action thereon, was handed me some time last week; but, owing to a press of business and ill health, I have been unable to answer it sooner. I am yet too feeble to answer it in full, and can only say that I entirely concur with you in the postponement of the work.

Being well acquainted with the road now travelled, I think the mere cutting of the timber on it would be of no material benefit to us most interested in it, as there are swamps and creeks that need bridging, quite as essential as the widening of the road. But the great object aimed at is the shortening of the distance from this city to Pembina. I am satisfied that a survey of the route would show that it might be shortened over one-third, if not more, and on ground equally as good; thus making our travelling time some ten or twelve days less than by the road we are now forced to travel.

Hoping that the War Department may coincide with you, and the next Congress will take an early action on your suggestions,

I am, very respectfully, your obedient servant,

CHAS. CAVILEER.

Captain J. H. SIMPSON.

P. S.—I have just had a conversation with my fellow-citizen, the Hon. Jos. Rolette, of Pembina, who authorizes me to say that he concurs with me in the above.

C. C.

APPENDIX B.

ROAD FROM FORT RIPLEY, VIA CROW WING RIVER, TO MAIN ROAD LEADING TO RED RIVER OF THE NORTH.

Estimate of amount of timber and prairie land.

Fort Ripley to Wing river.....	50 miles timber.
Wing river to Leaf river.....	23 miles rolling prairie and brush.
Leaf river to Rush lake.....	2 miles timber.
Leaf river to Rush lake.....	8 miles prairie.
Rush lake to 2d crossing of Otter Tail.....	6 miles timber.
Rush lake to 2d crossing of Otter Tail.....	8 miles prairie.
2d crossing to 3d crossing of Otter Tail.....	2 miles prairie.
2d crossing to 3d crossing of Otter Tail.....	3 miles timber.
3d crossing of Otter Tail to Sand-bar lake	8 miles timber.
Sand-bar lake to Sandy river....	10 miles timber.
Sand-bar lake to Sandy river....	35 miles prairie.
Sandy river to Red river	30 miles timber.
Sandy river to Red river	50 miles prairie.
Red river to Pembina	180 miles prairie.

415

Total amount of timber 101 miles.
Total amount of prairie 314 "

415

The estimate of the above distances is made from the information obtained from the half-breed voyageurs traversing between Pembina and Crow Wing.

APPENDIX C.

Contract between Thomas J. Frazier, of the city of St. Anthony, in the county of Ramsey and Territory of Minnesota, on the one part, and James H. Simpson, of the corps of United States Topographical Engineers, agent of the United States, on the other part, as follows:

First. The said Frazier covenants and agrees, at the following specified rates, to do all the work which may be required by the engineer or agent in charge on the part of the United States, in the opening and

constructing of such portions of the Big Sioux River and Mendota road between mile station 176 and Mankato, a distance of $13\frac{1}{2}$ miles, more or less, as may be designated by the said engineer or agent.

1. The grubbing and clearing of the centre strip of the roadway, including filling up of small holes and levelling off hillocks or small knolls, for (\$25) twenty-five dollars per acre.

2. The cutting down of the trees and brush close to the ground, and clearing, including filling up of small holes and levelling off hillocks or small knolls, for (\$16) sixteen dollars per acre.

3. The cutting down of the trees and brush outside of the centre strip or roadway, for (\$10) ten dollars per acre.

4. The earth-work, when thrown up and levelled on the road, for (20) twenty cents per cubic yard; when hauled, five cents additional per cubic yard for the first hundred feet, and three cents for each succeeding hundred feet.

5. The rock-work, inclusive of excavation and the removal from the road-bed of all boulders or rocks measuring over half a cubic yard, for (\$1 25) one dollar and twenty-five cents per cubic yard, and six cents additional per cubic yard for every one hundred feet of haul.

6. The corduroying or logging of the causeways, for three dollars per rod of sixteen and a half feet lengthwise the road.

7. The timber in the bridges (except that over the Blue Earth) and culverts, for (15) fifteen cents per foot lineal; the flooring for eight cents per foot superficial; the railing for five cents per foot superficial—all measured in the structures.

8. The timber and lumber in the bridge over the Blue Earth river, for (\$50) fifty dollars per thousand feet, board measure; the piles, the cost of driving included, for (\$1 25) one dollar and twenty-five cents per foot lineal; the bolts for (22) twenty-two cents per pound; the stone-filling in piers for (\$1) one dollar per cubic yard—all measured in the structure.

Said work to be done in accordance with the notice for proposals, a copy of which is hereto annexed; and the bridge over the Blue Earth according to a plan furnished herewith by the party of the second part. The whole work to be done by the 1st of May next.

Second. And the said Simpson covenants and agrees to pay to the said Frazier for the said work, after the same shall have been completed according to contract, the several rates of compensation specified under heads one, two, three, four, five, six, seven, and eight, as above written. The payments to be made monthly on work received and approved, and ten per cent. to be deducted therefrom to insure the completion of the contract; said deduction to be forfeited to the United States in case of failure on part of the contractor to fulfil his contract.

This contract to be subject to the approval of the Secretary of War.

THOMAS J. FRAZIER. [L. S.]

JAMES H. SIMPSON. [L. S.]

Sealed and delivered this the 3d of September, 1855, in presence of—

DE WITT LANGFORD,
ALFRED J. HILL.

Notice for Proposals.

Sealed proposals will be received by the undersigned, through the post office or otherwise, till 10 o'clock on the 20th August next, for the construction of so much of the Big Sioux River and Mendota road, between mile station 176 and Mankato, a distance of $13\frac{1}{2}$ miles, more or less, as may be designated by the engineer or agent in charge on the part of the United States, inclusive of a bridge over the Blue Earth river, and for the construction of a bridge over the Tchankaska river, at Kasota, (Babcock's mill.)

1. Said road to be opened for a width of from 25 to 100 feet, as may be required; that is, all trees, brush, &c., to be cut down within this width.

2. A centre strip, of such width as may be required, to be thoroughly grubbed and cleared, (or the trees cut close to the ground and cleared as may be ordered,) the holes to be filled up, and the knolls levelled off.

3. The roadway, in places requiring it, to be embanked to such a height as may be ordered, and to be 18 feet wide on top. In places where ordered, these embankments to have a foundation of logs, laid close together, and extending 18 feet across the road.

4. Besides the side ditches, there will be leading-off ditches where ever necessary.

5. The hills to be reduced to such a grade as may be required.

6. Bridges to be made wherever required, and to be constructed, excepting those over the Blue Earth and Tchankaska rivers, as follows: The abutments to be composed of sufficiently flatted timbers, at least one foot thick, disposed as follows: one timber of such length as may be required, probably 16 feet long, to be laid across the road. On this, for wing-walls, at each of its extremities, a log to be notched and to extend back as far as may be required, generally probably about 6 feet. On these wing-wall timbers, another log to extend across the roadway, and to be notched on said wing-wall timbers; and then on this second cross timber a second set of wing-wall timbers, to be notched, and so on to the required height. The notches to be so made that the logs will lie snugly together. The stringers to be four in number, to be at least 14 inches in diameter, or larger wherever required, and to be flatted sufficiently to make them lie solid and to sustain properly the flooring. The roadway of the bridge to be 12 feet wide, and to be made of puncheons of split or hewn stuff, at least 3 inches thick. The wheel-guards to be logs flatted on the lower side, and so effectually pinned down as to keep the flooring in place; the rails, rail-posts and braces to be scantling, 4 by 5.

7. Culverts will be made wherever required. They will extend 18 feet across the road, and will be made of logs at least 12 inches in diameter, and sufficiently flatted to lie on one another. The flooring will be of split or flatted stuff at least 3 inches thick, and will rest on and be secured to six stringers, to be sunk into the abutment logs.

8. The kind of timber and other stuff to be used in bridges and in culverts will be the best which the locality or vicinage will afford, and which the engineer or agent in charge will specify.

9. The bridge over the Blue Earth will be 280 feet long, more or less, 16 feet wide, and be composed of five spans; the superstructure to consist of two trusses, each 10 feet high, to be formed of chords, posts and braces, properly framed together and secured by pins and bolts; the whole to be supported by tressels or "bents," which are to be framed upon piles to be driven to a proper depth, and cut off one and a half feet below the surface of extreme low water. The piles to be not less than ten inches at the smaller end, and to be driven by a hammer weighing not less than 1,500 pounds, and until five successive blows from a height of 15 feet shall cause the same to penetrate not more than one inch at each blow. The piles will be of white oak, burr oak, or red elm, and, if necessary to prevent splitting, be banded (whilst being driven) with an iron band. The trestles and superstructure will be of white oak, black walnut, or red elm. The trestles to be loaded at their bases with stone filling, if required. The flooring to be three-inch plank, well spiked. The whole amount of timber and lumber in the superstructure will be 70,000 feet, board measure, one quarter-inch, in lengths between 30 and 40 feet; in the trestles 25,000 feet board measure, one-quarter inch, in lengths between 30 and 40 feet; number of piles sixty, all more or less.

10. The bridge over the Tchankaska, at Kasota, will be a simple "bent" or trestle bridge, about 150 feet long, 16 feet wide, and from 26 to 33 feet high at the deepest portion of the river bottom. The number of the spans will be five; the bents will be composed, each of a sill-piece 12 by 16, two posts 12 by 12, (with batter) and a cap 12 by 12; the posts to be properly braced at the angles. Upon the bents will be strung corbels or bolsters 9 by 14, braced up from the posts, and upon these will be pinned the stringers, five in number, 9 by 14. The flooring will be three-inch plank, properly spiked down; the railing 4 by 5 scantling. The whole amount of timber and lumber involved in the whole bridge will be 30,000 feet, board measure, more or less. The timber and lumber will be white oak, burr oak, black walnut, or red elm.

11. The whole construction to be under the direction of the engineer or agent in charge on the part of the United States, and to be subject to such alterations and modifications by him as the case in his judgment may require.

The whole work will be divided into two sections: the Blue Earth section to include the road between the 176th mile station and Mankato, and the bridge over the Blue Earth; the Kasota section to only include the bridge over the Tchankaska.

Proposers will bid for each section separately, by name, as follows: First, supposing the Blue Earth section to be completed by the 1st of January next; and second, supposing it to be completed by the 1st of May next. For the Kasota section (the bridge over the Tchankaska)

they will bid, first, supposing it to be completed by the 15th of November next; second, supposing it to be completed by the 1st of May next; the right, in each case, being reserved of accepting or rejecting either bid, as may be deemed most advantageous to the public.

The bids will be made as follows: Blue Earth section.

1. For cutting down, grubbing and clearing the centre strip, or roadway, including the filling up of the small holes and levelling off the hillocks or small knolls by the acre.

2. For cutting the timber and brush in the roadway close to the ground, including the filling up of small holes and levelling off the hillocks or small knolls by the acre.

3. For cutting down the trees and brush outside of the centre strip or roadway, by the acre.

4. The earth-work (to be paid for but once, either as embankment or excavation, as may be deemed most equitable) by the cubic yard, as follows: 1st. Supposing it to be thrown immediately up and properly levelled on the road. 2d. The increase upon said bid for every hundred feet of haul.

5. The rock-work, inclusive of excavation and the removal from the road-bed of all boulders or rocks, measuring over half a cubic yard, by the cubic yard, as follows: 1st. Supposing it thrown immediately out. 2d. The increase upon said bid for every hundred feet of haul.

6. The corduroying or logging of the causeways, by the rod of $16\frac{1}{2}$ feet lengthwise of the road.

7. The timber in the bridges and culverts (except the bridge over the Blue Earth) by the foot in length of each piece; the flooring by the square surface foot; the railing by the foot in length of the rails, posts and braces; all measured in the structures.

8. The timber and lumber in the bridge over the Blue Earth by the thousand feet, board measure; the piles, the cost of driving being included, by the running foot; the bolts by the pound; all measured in the structure; the stone filling by the cubic yard.

On the Kasota section, the bridge over the Tchankaska will be bid for by the thousand feet, board measure, built in the structure.

The Blue Earth section to be commenced immediately after awarding the contract; and the bridge over the Tchankaska, if the bid for its early completion is accepted, also to be commenced immediately after awarding the contract.

The contract will be given to the lowest responsible bidder, and in case he should decline the contract or fail to sign the contract, after due notice that his bid has been accepted, the right is reserved of granting the contract to the next lowest responsible bidder, or to re-advertise for proposals. The right is also reserved of rejecting any unreasonable or informal bids. Approved bonds to be given if required.

The contracts to be subject to the approval of the Secretary of War.

Persons desiring to bid are referred to the office of the undersigned for further particulars, particularly in relation to the plans of the two large bridges.

The proposals should be endorsed, "Proposals for Big Sioux River and Mendota road."

J. H. SIMPSON,

Captain Corps Topographical Engineers.

OFFICE GOVERNMENT ROADS, MINNESOTA TERRITORY,

St. Paul, July 19 1855.

APPENDIX D.

CORRESPONDENCE IN RELATION TO MR. DAYTON'S INTERDICTING CONSTRUCTION OF ROAD TROUGH HIS PREMISES.

Captain Simpson to Colonel Abert.

OFFICE GENERAL GOV'T ROADS, MINNESOTA TERRITORY,

St. Paul, June 13, 1855.

SIR: I have the honor to report that yesterday the contractor on the portion of the Point Douglas and Fort Ripley road just below St. Paul, Mr. Maurice T. Murphy, was driven off from the construction of said road on the premises of Mr. Lyman Dayton by the said Dayton, for the reason that I would not consent to change the location of said road, E D C, (see accompanying sketch) so as to make it conform to a line L K I H G F, which he had marked out as the only line upon which he would allow the road to be made.

His objection to the government line is, that it divides his land, so that between him and McLean (see sketch) there will be a narrow, irregular strip, which will not be deep enough to admit of street blocks of 300 feet in extent, and hence the location of his line. It will be perceived, however, that while for a distance his own line will allow an arrangement of blocks, yet, for a distance of about 1,000 feet, it is just as objectionable on this score as the government line. But the great objection to his line is, that in the short distance in which it runs it is about 800 feet longer; is very unseemly in its angles; will cost more than the government line; and to locate the road upon it will be to do injury to his neighbor, Mr. McLean, who has a right to, and does insist, that if his (McLean's) proposition No. 1 is not accepted, the road shall be constructed on the government line, because said line is the shortest, and on the best ground.

The propositions of Mr. McLean herewith enclosed, it will be noticed, are reasonable, and such as it appears to me any well disposed gentleman would be willing to accept. But Mr. Dayton refuses to accept either; and has at length, after a great deal of anxiety and pains on my part to reconcile matters so as to suit both parties, and not do injustice to the public, driven off the contractor and party as trespassers.

The object of this letter is to ask the instructions of the department, so that I may be enabled to act legally and effectively in the premises;

and as the road is very much needed, and, in justice to the contractor, its construction ought not to be intermitted, I would respectfully request that they may be furnished me at the earliest possible moment.

I am, very respectfully, your obedient servant,

J. H. SIMPSON,

Captain Corps Topographical Engineers.

Colonel J. J. ABERT,

Chief Corps Top. Engineers, Washington, D. C.

Letter from Mr. McLean to Captain Simpson, submitting propositions.

ST. PAUL, May 27, 1855.

I can make no satisfactory arrangement with Mr. Drayton in reference to the road; I therefore make to you the following distinct propositions, and through you to him:

1st. I would prefer the road to be placed on the line, and will meet one-half the additional expense which it costs over and above the route originally run, so far as it follows my line.

2d. If this is not adopted, I wish it to be made on the original route which you ran: in this event it will cut off from three to five acres of Mr. Dayton's land, which will be south of the road. This land I will buy of Mr. Dayton at what three judicious men chosen by the parties say it is worth, or will unite with him in laying out a tier of blocks south of the road, and take lots in proportion to the land I furnish.

3d. I am opposed to his route, 300 feet from the line, being more ground and increasing the distance; and if this route is adopted, I am opposed to its passing through any part of my land east.

Yours respectfully,

NATHANIEL McLEAN.

Captain SIMPSON.

Colonel Abert to Captain Simpson.

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, July 14, 1855.

SIR: Your letter of the 13th June having been submitted to the Attorney General for his opinion, I send for your information and government a copy of that opinion.

Respectfully, sir, your obedient servant,

J. J. ABERT,

Colonel Corps Topographical Engineers.

Captain J. H. SIMPSON,

Corps Top. Engineers, St. Paul, Minnesota.

Opinion of Attorney General.

ATTORNEY GENERAL'S OFFICE,

July 7, 1855.

SIR: Your communication of the 28th ult., and the documents accompanying the same, present the following case:

The act of Congress of July 18, 1850, entitled "An act for the construction of certain roads in the Territory of Minnesota and for other purposes," enacts "that the following sums are hereby appropriated for the construction of roads in the Territory of Minnesota, to wit: (among others) for the construction of a road from Point Douglas, via Cottage Grove, Red Rock, St. Paul, and falls of St. Anthony, to Fort Gaines, ten thousand dollars, &c., &c., the said roads to be constructed under the direction of the Secretary of War, pursuant to contracts to be made by him." (See Statutes at Large, page 439.)

Further appropriations for the same object have been made from time to time since then, substantially in the same words. (See Session Acts, pages 150, 306, 638.)

None of these acts of Congress, nor any other which I am aware of, authorizes, in express terms, the Secretary of War, or those acting by his authority, to enter upon and take private lands for the purposes of the proposed roads.

Under the direction of the War Department this road has been laid out, the laying out accepted, and the work contracted for and completed to a certain point.

Meanwhile controversy has arisen between the department and Lyman Dayton, through whose land the road passes; said Dayton objecting to the line proposed, and suggesting another one, which, besides being less eligible in itself, is also objected to by Mr. Nathaniel McLean, through whose land it will run. The prosecution of the work is now suspended by this difficulty.

I do not perceive that any right exists here to take the land either of Mr. Dayton or Mr. McLean without the consent of the owner.

It is true that the United States may take private property for public uses, but it cannot be done without "due process of law," nor without "just compensation." (Const., Amend., Art. 5.) No form of law has been provided for the present case, nor any mode of giving compensation.

The right exists in the government as such; but it cannot be exercised by any particular officer of the government without authority of Congress.

The question is not relieved of difficulty by the fact of its arising in a Territory. The government, as proprietor, may of course construct a road through its own lands; but the land of any citizen of the United States in a Territory is just as much private property as if it were land in a State.

Nor is the question of the right of eminent domain simplified in any degree by the private property having been derived by patent from the United States, and lying in a Territory. Forms of law are as neces-

sary to the exercise of the right of ancient domain in a Territory as in a State.

The foregoing remarks are made on the case as it stands on the acts of Congress. It may be, however, that certain acts of the legislature of Minnesota are material to the subject.

By act of October 31, 1849, it was enacted by the Legislative Assembly of the Territory of Minnesota "that W. H. Dibble, Theodore Fereber, and B. W. Brunson, be appointed commissioners to lay out a Territorial road from Point Douglas, by way of Cottage Grove, to the town of St. Paul, on the most direct and feasible route, and report the location of the same to the secretary of the Territory." (Statutes of Minnesota, 1853; Priv. Acts, p. 55.)

It does not appear, from any evidence before me, whether this road was actually laid out or not; nor whether or not it is the same for which appropriation was made by Congress.

By Territorial act of the same year general provision was made for laying out Territorial roads, presenting the forms of law, according to which they might be established through the agency of special commissioners, and providing for the indemnification of proprietors whose lands might be taken for any such road. (Acts of the first Legislative Assembly of Minnesota, p. 83.)

Subsequently to this, when the laws of the Territory, including its own statutes and such laws as it derived from the State of Wisconsin, were enacted in a revised code, provision was made for the mode of laying out "county roads," (Rev. Stat. Min., ch. 13;) but no new provision, apparently, was enacted to "Territorial roads."

It may be that, by proceedings under these or other acts, the land of Mr. Dayton and Mr. McLean has been lawfully expropriated for the use of the road under construction. If it were not, then it is impossible, in my opinion, for the War Department to maintain forcible possession of the land of either, or to convert any part of it into a public highway, under a mere contract of construction, entered into by an officer of topographical engineers.

I have the honor to be, very respectfully,

C. CUSHING.

HON. JEFF. DAVIS, *Secretary of War.*

APPENDIX J.

POINT CONCEPTION, CALIFORNIA,
September 1, 1855.

SIR: I have the honor to present the following monthly report for August, agreeably to the general instructions of the bureau.

In addition to the assignment as a member of the Board of Engineers of lake harbors and western rivers, I am assigned, by special order No. 50 of the War Department, dated April 3, to the general charge of all military roads authorized to be constructed on the Pacific, and also to the general superintendence of light-houses on the same coast;

Captain Campbell Graham, topographical engineers, assigned to duty with me for light purposes, and Lieutenant George H. Derby, topographical engineers, for the immediate charge of the military roads. Captain Graham's duties were confined to those of light-house inspector of the 12th district. The progress of the survey for the military roads will be seen from Lieutenant Derby's letter of July 25, from Vancouver, Washington Territory, and July 30, from Astoria, Oregon Territory—the latest advices from him—copies of which are hereto annexed.

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

Major Topographical Engineers, Brevet Major.

Colonel J. J. ABERT,

Bureau of Topographical Engineers, Washington, D. C.

VANCOUVER, O. T., July 25, 1855.

MAJOR: I have the honor to inform you that I arrived at Astoria on the 22d instant. Leaving Mr. Bache with four men at that place, with instructions to commence cutting a track through the woods for the survey, I came on to this post for the purpose of procuring tents and animals from the quartermaster. Captain M. M. Clark, acting quartermaster, has kindly consented to turn over to me the animals and other property I require, and I leave for Astoria to-morrow morning. I stated to Captain Clark that the Secretary of War had promised to give authority in similar cases, and this authority will be required in this instance; otherwise the animals, &c., will be charged to the appropriation. Will you have the kindness, therefore, to make immediate application to the War Department for authority for me to procure from the quartermaster, mules and camp equipage, and from the commissary of subsistence, provisions such as I may require from time to time while engaged on these roads? Of course, I wish to draw these animals, &c., on my receipt, and turn them over to the Quartermaster's department when no longer required.

The provisions I should expect to pay for at the contract price.

From the information I have been able to collect, I judge that we shall have a very difficult and tedious survey to make between Astoria and Salem.

The woods are very thick, with a dense growth of underbrush, and the mountains are represented as almost impassable. I can see no object in making these roads *one hundred* feet wide, as directed by the instructions of the bureau. If the idea is that this width will prevent the road being encumbered by falling timber, it is a mistaken one, the growth being generally over a hundred feet in height. It will cost an immense sum to make a road of this width through heavy timber; the undergrowth is rapid, and the greater part of the avenue would be filled up in a short time. I would respectfully suggest that sixteen feet is quite wide enough for all practical purposes, and recommend

that the road be made of that width. I have been detained at this place for three days; but it was unavoidable, no boat leaving for Astoria since the time of my arrival. The survey will be carried on with the utmost speed consistent with the necessary accuracy.

I am to pay laborers sixty dollars per month; and in consequence of the reported discovery of gold at Fort Colville, they are hard to get, even at that price. I shall report to you my movements on the 1st of August.

I am, sir, with high respect, your obedient servant,

GEO. H. DERBY,

Lieutenant Topographical Engineers.

Major HARTMAN BACHE,

Topographical Engineers, Superintendent of Roads, &c.

ASTORIA, O. T., July 30, 1855.

MAJOR: I have the honor to inform you that I arrived at this place on the evening of the 27th instant, bringing with me two mules and one horse from Vancouver. My party is now formed, consisting of eight good men, and I have purchased two horses and a mule, making six animals for the pack. In consequence of the excitement about the gold discoveries of Port Colville the prices of labor have risen, and I have had to promise my men seventy-five dollars per month. It was difficult to obtain good men even at that price. We have been engaged in cutting a trail into the forest from this place, which is now practicable for some four miles. No one who has never seen one of the primeval forests can imagine the difficulties to be encountered. The trees are of great size, closely planted, and the entire country covered with a high growth of tangled underbrush, which renders it necessary to cut a path at every chain.

A trail has been cut from the turning of ours to the Tualatin plains, which I believe has not entirely grown up. This is represented as being a practicable route over which to construct a wagon road. Over this route we start to-morrow morning, and we shall proceed with all possible despatch through to Salem, using the whole strength of the party to open this trail, or some other if this should prove impracticable, so that it may be easily surveyed. The guide thinks we may get through in about two weeks. On arriving at Salem, having determined on the route to be adopted, I shall relinquish the charge of my party to Mr. Bache (my assistant) with orders to return to Astoria, making an instrumental survey, while, in compliance with your instructions, I shall proceed to Vancouver and make a preliminary examination of the routes from that post to Steilacoom and the Dalles. The return survey will probably take at least thirty days. I will report to you the nature of the country passed over and the routes that I shall have determined on on my arrival at Salem. Please to address your communications to me at Astoria. I have made arrangements to have my letters forwarded to me from this place. I am sorry to inform you that on unpacking the

level at this place we found the two blocks that protect the instrument on the top had dropped off, being badly glued, and the spirit-level cracked and useless. However, I think we shall have no occasion to use this instrument. It will cost enough to make a plane survey of this route without attempting a profile, which I cannot believe to be of much use. The slope level will answer to give an idea of the principal elevations and depressions to be passed over.

Please to inform me if the appropriation has been placed with the assistant treasurer at San Francisco. The three thousand dollars that I have will hardly complete the first survey.

I am, sir, with high respect, your obedient servant,

GEO. H. DERBY,

Lieutenant Topographical Engineers.

Major HARTMAN BACHE,

Topographical Engineers, Superintendent of Roads, &c.

P. S.—I wrote to you from Vancouver on the 26th instant, reporting my arrival, progress, &c.

APPENDIX K.

WAR DEPARTMENT,

Washington, September 19, 1854.

SIR: By an act approved the 17th of July last, an appropriation of \$25,000 was made for "the construction of a military road within the Territories of New Mexico and Utah, commencing at Great Salt Lake City, Parovan and Cedar City, to the eastern boundary of California, in the direction of Cajon Pass." It has been determined to have the work done by contract, and to intrust to you the duty of making the necessary contracts.

The amount of the appropriation it is presumed will not be more than sufficient to overcome the principal difficulties along the route indicated. From the best information the department can obtain, it is supposed these will be encountered at a certain point south of Cedar City, at the jornada, commencing at Muddy creek; and another terminating at the Mohave river, and in the passage of the mountains near the head of the Santa Clara; but you will have opportunities of obtaining more full and reliable accounts respecting the route before entering on the execution of these instructions. After informing yourself as fully as possible on the subject, you will make contracts with responsible parties for the construction of a practicable wagon road at these and all other difficult places, bearing in mind that the object is to obtain the best road that the money will make over the whole route.

For a work of this kind it is not expected there will be any competing bidders; but, on the contrary, you may find it difficult to find proper persons to take contracts. In such circumstances persons residing on the line of the road, or otherwise interested in its completion,

have been found to offer the best terms; and as this work must be of importance to the inhabitants of all the places mentioned in the act, the governor of the Territory or other prominent citizens will no doubt afford you efficient aid in finding reliable persons to undertake it.

Contractors would of course prefer to receive payment as the work progresses; and as they would thus avoid in great part the necessity of borrowing money or using their own means to pay wages and furnish supplies to laborers, they could do much more for a given amount so paid than for the same withheld till the completion of the work. The department would therefore be willing to adopt this course if it could be done with perfect safety, but the money cannot legally be advanced to contractors, nor can an officer be detailed to superintend the work and make payments, while the employment of a civil agent would perhaps cost almost as much as would be saved by making the payments promptly. It is possible, however, that you may be able to make some safe arrangement to avoid the long delay which will be incurred if payment be withheld until the entire work be finished and inspected; but if no such arrangement can be made, you will, in making the contracts, stipulate for payments to be made only after the completion of the work and inspection by an officer to be detailed for the purpose.

Very respectfully, your obedient servant,

JEFF'N DAVIS,
Secretary of War.

Brevet Lieut. Col. E. J. STEPTOE.

GREAT SALT LAKE CITY, UTAH TERRITORY,
February 1, 1855.

SIR: I have the honor to enclose a copy of a notice I caused to be published in the newspaper here, and the several responses or bids elicited by it. To this course I was forced by the conflicting opinions of persons who had travelled the route; no two agreeing what were the principal difficulties along it, and your instructions requiring positively that an *average* road be made over the entire distance.

Nearly all agreed, however, that a bridge over the Provo river was of first necessity; and accordingly, after rejecting all the proposals offered, I made a contract with *William J. Hawley* for the construction of his proposed bridge for \$7,000; also for the improvements in Provo bottom, as specified in his bid, for \$1,400—the whole to be finished by the 15th June next. The work on the bridge *actually done* to be paid for monthly; the other work to be paid for when completed and accepted. It is understood between us, that I am to make frequent inspections of the work both personally and by proxy, and that the contractor shall guaranty the bridge for a series of years. I intend to inspect it next week, and that Major Reynolds, Capt. Ingalls, and myself, shall visit it every week or ten days thereafter.

Finding that nothing reliable could be ascertained of the route be-

yond the rim of the Basin, I despatched, some four weeks since, a small but very intelligent party of quartermaster's men, to examine and report upon it. No white person has yet travelled the proposed "cut-off" from the head of the Santa Clara to the Muddy, but it will now be explored. I consider this probably the most important feature of the whole improvement, as it will cut off some 60 or 70 miles, and avoid the heaviest part of the present road, that down the Rio Vergen. On this side of the rim, the chief necessities seem to be bridges over Chicken creek, Provo and Beaver rivers; the latter being a small stream, but, like the Provo, at certain times impassable.

Governor Young and many others have advised me to expend the appropriation in improving the road between this city and Parovan, but I have not felt at liberty to depart from your instructions.

Nothing, it was thought, could be gained by endeavoring to employ those living in the extreme southern settlements, as they are generally too poor to give their time to such an undertaking unless money was advanced to them.

When the party sent out returns, I will advertise for proposals, specifying minutely as possible the work to be done; and as the competition will be considerable, it is hoped that very good terms will be obtained.

Very respectfully, your obedient servant,

E. J. STEPTOE,
Brevet Colonel Third Artillery.

HON. JEFFERSON DAVIS,
Secretary of War.

GREAT SALT LAKE CITY, UTAH TERRITORY,
March 28, 1855.

SIR: I have the honor to enclose copies of contracts made by me for the construction of the military road through Utah and New Mexico. Your letter of September 19 has authorized me to make any "safe" arrangement for prompt payments before the work done could be inspected by an officer detailed for the purpose. Believing that the inspections of two persons so practical as Major Reynolds and Captain Ingalls would be entirely satisfactory to you, I have entered into agreements involving the necessity of such inspections in addition to my own.

The contract with James B. Leach, you will observe, demands payment only after the whole work has been completed, inspected, and accepted. Discovering since that Mr. Leach could be materially aided thereby, I have agreed to pay him \$2,500 if he shall, before the 15th of next month, make improvements on the road equal in value to that sum. It is my intention to send Captain Ingalls or Major Reynolds to inspect such work, and, upon the report submitted, to make payments by draft.

Throughout this whole transaction I endeavored to act with all possi-

ble caution. That the road is not, by the act of Congress, located aright, no one living here will probably question; but with that I had nothing to do. This southern route to the Pacific is the only one reliable during the entire year, and is certainly entitled to the attention of Congress and of the country. It will, to the best of my knowledge and belief, require at least \$100,000 to make it what would be called in the east a tolerably good road. Permit me, however, to suggest that, if Congress shall appropriate more money for it, (as I hope and believe it will,) commissioners be appointed to locate it, and direct how it shall be constructed.

After payment shall have been made on the enclosed contracts, there will be a balance of \$600 due the appropriation. On my last inspection of the work at Provo, I agreed informally to give the contractor \$300 additional, if he should make certain improvements upon the banks of the stream and below the piers of the bridge. At the same time I promised to Elias H. Blackburn (one of the most prominent citizens of Provo) \$50 if he would supervise the entire work in that vicinity. These promises being redeemed, there will remain a balance of \$200 only, which I do not propose to disturb.

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

E. J. STEPTOE,
Brevet Lieut. Col. Third Artillery.

Hon. JEFFERSON DAVIS,
Secretary of War.

APPENDIX L.

FORT VANCOUVER, WASHINGTON TERRITORY,
February 6, 1855.

SIR: I have the honor, very respectfully, to state that the work on the "Scottsburg and Myrtle Creek military road" is being rapidly executed, and that all the contractors, with one exception only, are faithfully coming up to their stipulations. This one exception is of minor importance—being *contract No. 1, section No. 1, W. W. Chapman, contractor, \$800*, at the termination of the road. Inasmuch as this gentleman, like the other contractors, has given security to double the amount of his contract, he ought, in case of non-compliance with his bonds, to be compelled to the performance of the same. I respectfully request that you will inform me, as soon as possible, if I will be permitted to pay out of the appropriation a fee of a moderate amount to an attorney, to have the just rights of the government enforced. This man Chapman, in connexion with one or two others who failed in motives of self-interest in regard to the location of the road, has already made an abortive attempt to throw obstructions in the way of the contractors, by suing out an injunction to stay operations on two of the contracts. This injunction, through the energy of Hon. S. F. Chadwick, who appeared in behalf of the government, was set aside,

and the work has gone on well. I respectfully request that I may be permitted to make Judge Chadwick proper remuneration for his services.

I have drawn on the assistant treasurer at San Francisco to the amount of \$7,000, to defray the expenses that will soon accrue on the completion of one half the work. As he has not yet honored my drafts, I again earnestly request that the necessary authority be furnished him, in order to save me from further embarrassment.

On the 8th December, 1854, I forwarded you my proceedings up to that date. I would before this have sent on my quarterly accounts, but for the fact of my inability to procure funds from the assistant treasurer.

About the first of May, I will leave here to make the final inspection of the road. If, therefore, you will be kind enough to inform me on the points above mentioned, so that I can receive your instructions by the first to the tenth of May next, I will be truly much assisted in closing up the business of the appropriation in a satisfactory manner.

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

JNO. WITHERS,

1st Lieutenant 4th Infantry.

Hon. JEFFERSON DAVIS,

Secretary of War, Washington City, D. C.

FORT VANCOUVER, W. T., *June 15, 1855.*

SIR: I have the honor to report that I have just returned from a tour of inspection of the work on the Scottsburg and Myrtle Creek military road. The contractors, with only a few exceptions, have succeeded remarkably well. The work on contracts Nos. 1, 2, 3, 4, 6, 7, 10, 12, 14, and 15, has been entirely finished. The contractors on No. 5 and No. 8 having executed a great portion of their work, and being exceedingly desirous of finishing, without any recourse to law, I granted them an extension of ninety days. This, of course, is entered on the original contracts, and signed by all the parties. No. 9, the bridge across the Calapooia creek, is finished, except the iron stirrups at the foot of the king-posts; and the same is true in regard to No. 16, the bridge across Myrtle creek. The contractors were unable to procure the iron during the winter, but will have it within sixty days from the first of June. Nos. 11 and 13 only required a few days' labor on each.

The man Chapman, of whom I have formerly spoken, not only failed in his attempt to get out an injunction to stop operations on No. 4 and No. 5, but went to work and finished his own contract, No. 1. None of the contractors gave me any trouble. Seeing them evince so strong a disposition to finish their work as soon as practicable, and knowing the delays of the law, I deemed it most advantageous to the completion of the road to give those who were a little in arrears the short extension of time above mentioned, without any resort to reletting of contracts.

Finding I would have a few hundred dollars left, after defraying the expenses already incurred, I let one more contract, a copy of which I herewith enclose.

I paid those contractors who had finished their work entirely, and will pay the rest on the first day of September next, or before, if their labor is completed.

I directed those persons through whose fields the road was laid to make the necessary lanes immediately, or they would, every one of them, be prosecuted as trespassers.

The road, I am confident, is as good a wagon road now as any in the country, and will greatly facilitate the transportation of any government supplies that may be sent to Forts Lane and Jones by the way of Scottsburg. The only serious impediment to the constant passage of wagons over the route, is the Umpqua river. This being a stream of considerable size, with a great many rapids, and subject to very heavy rises in the winter season, ferries are not only dangerous, but at times impracticable. I would, therefore, respectfully suggest that bridges be placed at each of the three crossings of the military road. The cost of these three structures would amount, I think, to about thirty thousand dollars.

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

JNO. WITHERS,

1st Lieutenant 4th Infantry.

HON. JEFFERSON DAVIS,

Secretary of War, Washington City, D. C.

APPENDIX M.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND WESTERN RIVERS, *Washington, October 16, 1854.*

SIR: The papers in the case of the harbor of New Buffalo, Michigan, having been referred to this board for explanation respecting the fact noticed in the inquiry of the Hon. Secretary of War in his endorsement of your letter transmitting the report of the board of the 30th ult., I am instructed to make the following report thereon.

The part of the endorsement referred to is in the following words: "The chief of topographical engineers is called on for an explanation of the fact reported by the board for lake harbors and western rivers, to wit: that a large part of the appropriation for New Buffalo, Michigan, has been expended in procuring material, and yet that material is in such proportions as to render it unavailable for any part of the work."

Upon this the board has very respectfully to remark, that in the report to which this endorsement refers, it did not mean to convey the idea that the materials collected at New Buffalo were unavailable for the work in the sense of their being inapplicable or unsuitable, or that the disproportions noticed by the board were to the prejudice of the

work, and to have been avoided by the bureau when it was taking preliminary measures for its prosecution. The board in that report has said that the materials on hand are such as are suitable for crib-work; that they are useful, and in fact indispensably necessary to the construction of the piers which form part of the plan recommended by the board in its report of August 19; but that they cannot now be worked up, (i. e. put in place) because the several articles are not in due proportion to each other with respect to quantities; that with the stock on hand we could not frame and put in place one crib; and finally, that the board cannot devise a plan to which these materials alone (i. e. in the absence of other materials) could be applied in a manner conducive to the end for which the appropriation was made.

In considering the question of a plan for the expenditure of the appropriation under the limitations proposed in the instructions from the War Department, the board understood the word appropriation as including all the existing means at the disposal of the department, with reference to the plan which the board had recommended, and which it had estimated to cost \$46,805 25. These means consist of money in the treasury, \$2,813 17, and of materials supposed to be on hand, \$4,766 83.

These means the board considered jointly and severally, and in its report of August 19 it said, in the words of its instructions, that no part of the plan can be completed with the means at the disposal of the department so as to render it effective. The further instructions of the department to devise a plan for the expenditure of the appropriation in the manner the most conducive to the end for which it was appropriated, was supposed to have reference to an immediate and useful result; and it was in view of such a result that the board described the quantities, qualities, and dimensions of the materials on hand, in order to show that these materials (alone, as before explained) could not be applied in a manner conducive to the end proposed.

The best disposition of the moneyed means of the department, according to the judgment of the board, had already been suggested and recommended in the same report of September 27, namely, its application to the preparation of the machinery, boats, and scows; and the object of the succeeding part of the report, or that relating to the materials, was to show the department that the application of the balance in the treasury to the preparation of the materials could have no immediate useful result, or could be effective, although undoubtedly, in a general sense, such application of the money on hand would be conducive to the end for which the funds had been appropriated, as would also the further purchase of materials suitable for the work; those, especially, the absence of which the board had noticed in its preceding report.

Very respectfully, I have the honor to be, sir, your obedient servant,
JAMES KEARNEY,

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,
Bureau Topographical Engineers.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, October 30, 1854.*

SIR: The following report on Erie harbor is respectfully submitted by the board, in compliance with the memorandum of the bureau to give its attention to any harbors on the lakes which have not yet been the subject of special plan and report.

The measures necessary to give full value to the natural advantages of this harbor are:

1st. The modification, repair, and extension of the present piers at the eastern entrance, to secure the proper depth of water between the lake and the bay or harbor within;

2d. The construction of channel piers, to form a western entrance at or near the breach in Peninsula Point, and the security of the beach on either hand; and,

3d. The checking of the abrasion, and the restoring of the original water-line of the island, as far as this may be practicable.

The first efforts to create a proper navigable entrance into Presque Isle bay were conjointly made by the United States and the State of Pennsylvania, as early as the year 1825. At the time of the survey of Major Anderson, in 1819, supposed to be the first authentic survey, the east end of the bay was open to the lake for a width of 3,300 feet, the best water being but six feet, by a circuitous channel, the bay mouth of which was covered lakeward by a shoal, on which there were but two or three feet water. It was over this channel that the original piers were projected, in connexion with breakwaters or dikes to Presque Isle and the main land, with a view to the creation of an artificial entrance, at the same time that they (the southern one) closed the natural channel trending towards the lake shore.

These piers were in the first instance designed to be about 500 feet apart; but, from some cause not explained, have been constructed at about a mean distance of 355 feet, the piers not being parallel by the difference between 340 and 370 feet. Neither is it explained for what reason the inner portion of the southern pier received a flare from the breakwater, which extends to the main shore.

It was soon seen during the course of construction that the reduced width given to the channel-way caused a velocity to the current, on the influx and efflux of the waters to and from the bay, on the recurrence of any considerable variation in the level of the lake from winds, that swept out the channel to a depth far beyond that required by the lake navigation, at the same time that it undermined the pier-work, and caused it to topple over and settle. The injurious effect was thus twofold, in supplying by undue erosion the material which, on the subsidence of the current, forms for the most part the shoals on the lake and bay sides of the entrance, and in requiring the frequent building up of the works, as they sank into the bottom. To correct these evils, which otherwise will be perpetuated, the board considers it advisable to return to the original design, so far as the width of the channel-way is concerned, by substituting an entire new south pier for the present one. This change, with a further extension now become necessary to reach

the deep water of the lake, involves a length of 1,070 feet of pier-work, and the removal of 580 feet of the present pier. The same consideration calls for the extension of the north pier for 430 feet, which the board also recommends. The estimate provides in both cases for piers 20 feet in width.

The survey made by Major Anderson, in 1819, exhibits the sand-bank which connects Presque Isle with the main land as varying in width from 50 to 300 feet, and "three feet above the surface of the lake during a calm, but washed by the surf during a west or north-westerly storm." In November, 1829, large trees were floated across this sand-bank, during a violent storm, doing great injury to the works at the east entrance; and in the annual report, dated in October, 1831, the first mention is made of the breach through the peninsula, coupled with the suggestion that it either be closed entirely or in part, in connexion with the channel-piers between the bay and the lake, to form a second navigable entrance. From this period the breach continued to increase in width, with a corresponding decrease in depth, until 1835, in which year a plan and estimate were submitted to close it, and form a navigable entrance, by means of channel-piers of 400 feet between the bay and lake. The breakwater or dikes called for by this plan were commenced in August, 1836, and 600 feet along the shore, in small depths of water, were constructed. The estimate for the entire work of breakwaters and channel-piers amounted to \$98,152 97. The year following, the north breakwater was extended, exclusive of counterforts of 180 feet in length, for 1,740 feet, or about one-third of the whole distance to the projected channel-piers. In 1838 this harbor, with the other works on Lake Erie, was assigned to the Bureau of Topographical Engineers, and the breakwater towards the proposed channel-piers further extended 570 feet, and stone laid on the outside, with the ostensible object of securing its additional stability; likewise 465 feet towards the north, secured with stone, and 220 feet of that constructed the previous year raised one log and filled with stone.

"The works," Captain Williams, the general superintendent at this time, remarks, "have thus far answered the objects intended, and an accumulation of sand has taken place at the western breakwater tending to restore the firm condition of the peninsula, with the exception of the channel projected to remain open as a western entrance to the harbor." An estimate then made to complete the works is as follows:

Extension of breakwater northerly to head of peninsula.	\$13,219 49
Extension of breakwater southerly to channel pier.....	39,658 47
Channel piers	56,228 25
Amount.....	<u>109,106 21</u>

In 1839 the breakwater, for the most part in three-feet water, was extended for 840 feet, and for 300 feet from the northeast termination of the work, where the low ground was threatened. The length of breakwater constructed up to this time, south from the salient point of Presque Isle towards the breach, was 3,489 feet; and north, from the

same point, 990 feet. The cribs were twelve feet wide, and generally four to seven and eight feet high, and founded in some instances on the shore near the surf-line, but for the most part in depth varying from one to three and four feet. To reach the site of the proposed channel piers, 1,620 feet in addition were required.

In the absence of appropriations, no advance was made in 1840 in the measures to protect the west entrance; neither was there anything done during the following year, when, from the want of finish and the necessary means, the works were becoming dilapidated. The same remarks apply to the years 1842 and 1843.

The works in 1844, from the great exposure and their unfinished state in the absence of appropriations since 1838, were found so completely destroyed that the repair would be equivalent to a reconstruction. They had answered a good purpose as long as they lasted. These repairs were so far made during the season as to relieve the works from any apprehension for their immediate safety. Notwithstanding this expectation, however, 90 feet of the 560 feet of new work just constructed, together with all the old work in detached parts to the north excepting one spur, was entirely washed away in a severe gale which occurred on the 18th of October.

In 1845 nothing appears to have been done at the west end of the bay. In 1846, the operations have consisted chiefly in extending the breakwater at the head of the island 609 feet northwardly for seven logs high, and in extending also the new twelve feet wide work of the same breakwater eighty-seven feet northwardly, four logs high.

The condition of the harbor is reported in 1847 as in an unfinished state, having undergone during the year the usual dilapidation owing to its exposed condition. The annual reports of the bureau of 1848, 1849, 1850, and 1851, contain nothing to show that anything was done at Erie during these years. The late period at which the appropriation was made in 1852 for this harbor, precluded doing anything further than to advertise for materials. In 1853 an experiment was tried on a small scale to intercept the moving sand by making brush-works normal to the shore, and extending a short distance into the lake; but little effect was produced by these, owing, it was thought, to calm weather. This year the brush-works have been continued; but instead of placing them at intervals along and perpendicular to the shore, they were made to cover the whole abraded face, and thus far give indications of good results.

It has been already stated that the breach at the west end of the bay had no existence until 1830. By the surveys in 1835 it was, including two sand islets, 4,800 feet wide; in 1839, 2,800 feet; in 1845, 1,450 feet; in 1853, 480 feet; and by those of this year, but 400 feet. The report of 1835, on the other hand, gives it as nearly a mile in width; and that of 1837 speaks of it as a shallow opening, interrupted by a few small islets, of a mile and a quarter. Without attempting to reconcile these discrepancies, the general facts show that the breach increased from the first opening until 1837, when it reached the maximum width, and that since that year it has decreased until it is now

barely 400 feet wide. How much of this change is due to the measures taken to close the breach, and how much to natural causes, cannot be satisfactorily determined; but it is fair to conclude that, as the closing has been brought about entirely by the moving south of the north point of the entrance on which only works were erected with that object, they have had much to do with it. This movement from 1835 to 1839 was 2,400 feet. The north chop then remained stationary until 1845, between which year and 1853 there was a further accretion of 350 feet, and in this position it still remains.

One of the evils consequent upon the breach at the west end, was the transmission through it into the bay of the sand, which, by the course at this locality of the lake drift, had previously been carried past to the northern portion of Presque Isle, where it in a measure supplied the waste from erosions. The extent of this evil will be seen from the following summary:

The distance from twelve feet in the lake to ten feet in the bay was, in 1835, 1,800 feet; in 1839, 2,000 feet; in 1845, 3,200 feet; in 1853, 4,300 feet; in 1854, 4,300 feet.

The design of forming a navigable entrance at the west end was early agitated after the breach occurred, and recommended principally on the grounds: 1st. That the current in passing through the bay, by impinging along the shore in front of the town, would increase the depth of the water—an effect already produced by the natural opening, as shown by the late surveys. 2d. That it would relieve the breakwaters at the east end from the liability of disruption, to which, with only a single entrance, they are now exposed from the difference of level of the lake and the bay on the recurrence of storms. 3d. That the channel piers would retain the sand now thrown into the bay, and which, if not checked, must eventually fill up the harbor and destroy its usefulness; and 4th. That it would afford to vessels, when southwest of the harbor, a refuge in stress of weather with the winds from those points, without the necessity of doubling the north end of the peninsula.

In the great value of these considerations the board fully concurs; at the same time it is of the opinion, no countervailing effect, to judge from the length of time the breach has been open without injury to the present entrance, is likely to arise from the measure. It is in accordance with these views, the correctness of which might be further enforced were it necessary, that the estimate for the harbor is made to embrace the cost of creating a navigable channel at the west end. The positions of the breakwater and channel piers are shown on the accompanying tracing from the survey of 1853; the latter being designed, on the one hand, to take advantage of the deep water which here approaches close to the shore inside, and, on the other, to give, under the rule heretofore governing, the proper direction to the outer ends of the piers, in reference to the prevailing winds and course of the drift. The greater length set down for the breakwater north of the channel piers, there was estimated for in 1839, (the difference between 1,620 feet and 2,280 feet) is due to the moving of the breach towards the south, already mentioned. It should be remarked, further, that no

provision is made for a breakwater south of the channel piers, for the reason that, as the drift is here from the south, the latter, on being thrown out into the lake, will collect the sand along that shore.

Besides the waste of the peninsula as evinced by the breach, the entire west face of it from the main land to the point at which the shore trends towards the east has been subjected to erosion from a period as far back, at least, as 1819, when the first survey was made. This fact is clearly established by an examination of this survey, and those of a later date; at the same time that a comparison cannot be made of them, to determine satisfactorily the progress or extent of the erosion. The length of shore-line, however, exposed to this action, the only point of real value in the consideration of this branch of the subject, is well settled by a general agreement among the surveys, as being limited towards the north by the salient angle above mentioned. Thus limited, it measures from Barrack Point about 4,620 feet, which, with so much of the shore-line south of the same point (1,000 feet) as exposes the face of the present breakwater, the board recommends may be secured by a covering of brush-work like that applied the present season by Colonel Turnbull, as an experiment, should it prove successful. The materials used in the brush-work consist of hemlock brush, stakes, and stone, and were applied as follows: a layer of brush with the tops towards the shore, ballasted with stone and secured by stakes; and so, in succession, layers of brush and stone until the mass averages three feet in thickness. Provision is also made in the estimate for the cost of this brush-work covering, which, calculated for a width of fifty feet, will admit of a gradual extension lakeward as the work becomes sanded.

The balance in the treasury on account of this harbor is \$9,387 79, which, after retaining \$1,500 to meet any casualties that may happen to the work at the east end, the board is of opinion should be applied to the construction of the brush-work recommended to protect the peninsula from further erosion—a measure of pressing necessity, in view of the safety of this valuable harbor.

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

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau of Topographical Engineers, Washington, D. C.

Estimate for the completion of Presque Isle, or Erie harbor, Pennsylvania.

EASTERN ENTRANCE.

North channel pier (extension to 12 feet water) 14½ cribs,	
30 × 20 × 17 feet, at \$800.....	\$11,466 67
South channel pier (new line for a channel way of 500	
feet) 35½ cribs, 30 × 20 × 17 feet, at \$800.....	28,533 33

Removing 580 feet of present south pier, 12 feet wide, to a depth of 12 feet, at \$20	\$11,600 00
	51,600 00
Contingencies 10 per centum.....	5,160 00
	56,760 00

WESTERN ENTRANCE.

North channel pier, 55 cribs, 30 × 20 × 17 feet, at \$800.	\$44,000 00
South channel pier, 73 cribs, 30 × 20 × 17 feet, at \$800.	58,400 00
North breakwater, 76 cribs, 30 × 20 × 12 feet, at \$670.	50,920 00
Brush-work facing, 4,620 feet, shore north of Barrack Point, 50 feet wide, 26,222 square yards, at \$1 25...	32,777 50
Brush-work facing, 1,000 feet, shore south of Barrack Point, 50 feet wide, 5,555 square yards, at \$1 25....	6,943 75
	193,041 25
Contingencies 10 per centum.....	19,304 12
	212,345 37

RECAPITULATION.

Eastern entrance	\$56,760 00
Western entrance	212,345 37
Total amount.....	269,105 37

JAMES KEARNEY,
Lieut. Col. Top. Engineers, President of Board.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, December 30, 1854.*

SIR: The letter of the Hon. G. A. Simmons, of the House of Representatives, to the Secretary of the Treasury, dated the 23d instant, asking for certain information in reference to the breakwater at Plattsburg, having been referred to the board with directions to furnish the information called for, that the bureau may reply thereto, I am instructed to make following report:

The information sought for by Mr. Simmons is, first, the estimated expense of completing the breakwater; and, second, the actual amount thus far expended on it.

In the original report for a harbor at Plattsburg, dated the 7th of February, 1834, the position and extent of the proposed work is thus described: "Assuming the wharves at the town as the point of reference in the following remarks, the harbor is open to all winds from about south to S. 73° E. From south, however, round to S. 23° E., Valcour island, distant about four miles, and Crab island, at the mouth of the harbor, interpose and afford a tolerable shelter. The exposed segment is, therefore, reduced to 50°, being measured by the distance between Crab island and Cumberland Head." * * * * "The plan consists of a pier or breakwater of 1,000 feet in length, occupying nearly the entire exposed segment, and broken into two unequal wings of 625 and 475 feet. It lies in water varying from 15 to 20 feet in depth, and about 700 feet in advance of the wharves of the town." The width proposed for the work was 42 feet, the height from 23 to 28 feet, according to the depth of water.

The designed plan of the harbor thus described was modified in the construction, as will appear by the following extracts from the annual reports of the agent in charge: In that dated September 1, 1837, he says: "Captain Canfield, the superintending engineer, upon examination, located the site of the breakwater 1,000 feet in front of the present wharves, which is 400 [300] feet further than the plan proposed by Major Bache in his survey. Thus the exposed segment being increased, instead of 1,000 feet as suggested by Major Bache, the length of 1,500 feet is adopted by Captain Canfield." And in that dated September 1, 1838: "Colonel Kearney, on examination and survey of the work, determined not to carry the south wing beyond the crib now building, from the circumstance that the 1,000 feet directed by Captain Canfield would interfere with the entrance into the harbor from the south. Under his direction the south wing will consist of the 620 feet, with pier No. 1, built last year, of 108 feet, making the entire length of this wing 728 feet. Colonel Kearney further directed that the remainder of the breakwater, instead of forming an angle as first contemplated, shall be carried on in a direct line with the present pier."

It will be remarked, that the length of the south wing was extended 103 feet beyond the length proposed in the first instance for that division of the work. The report first named also states, that the pier itself was not only modified by adapting it to the greater depth of water and increasing the height above the lake two feet, but also by making it "48 feet wide at the base and 38 feet at the summit," and in so much giving it a slope (whether on one face only or on both faces does not appear,) instead of making it vertical as originally designed.

The last appropriation for this work was made in 1844, during which year two cribs, each of 75 feet, or 150 in all, were added to the length of the work, still leaving 535 feet to be formed to cover the arc of exposure of 50°, under the changes made in the first design. In 1845, the entire work then in position was planked. The cost of the structure thus far has been \$65 49 per linear foot in the length, which, considering the large cross-section of the pier and the untimely appropriations which spread over a period of eight years, thereby forbidding a thorough economical prosecution of the operations, may be considered

reasonable; and as there is no ground to suppose the course of legislation in regard to appropriations will change, the board is of opinion that the rate the work heretofore cost should be adopted as the probable rate for the completion of the remaining 535 feet. The estimate thus made will amount to \$35,037 15.

The actual amount thus far expended on the breakwater at Plattsburg is \$57,500, and was appropriated at the dates and in the sums as follows:

July 4, 1836.....	\$10,000
March 3, 1837.....	10,000
July 7, 1838.....	27,500
June 11, 1844.....	10,000

The letter of Mr. Simmons is herewith returned.

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

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau of Topographical Engineers, Washington, D. C.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, December 30, 1854.*

SIR: I am instructed by the board to submit the following report in reference to a boom, cut-off, &c., at Boom bend of Red river, as suggested by C. A. Fuller, United States agent, and recommended by Lieutenant Colonel Johnston, in a letter dated December 25, 1854.

The character and position of Boom bend, and its relation to outlets from the river in its vicinity, and especially between it and the present head of the raft, are not sufficiently defined to enable the board to decide upon the propriety of opening a navigable cut-off channel, applying a boom, &c., at the bend, as proposed by the agent. No reports or drawings, explanatory of the river and its valley above the raft, and within the State of Louisiana, can be found in the bureau, from which an adequate knowledge of the state of things on this portion of the river can be obtained. The board, however, is in favor of the plan of operations proposed, provided its adoption does not interfere with or militate against the selection of the most favorable route for a navigable channel through the entire raft region, as contemplated in their report [of the 22d of August last.

The board, moreover, entertain the impression that no such interference is likely to result from the adoption of the plan in question. The letters referred are herewith returned.

Very respectfully, I have the honor to be, sir, your obedient servant,
JAMES KEARNEY,

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau of Topographical Engineers, Washington, D. C.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, January 23, 1855.*

SIR: I am instructed to make the following report in relation to the letter of the honorable the chairman of the Committee on Commerce of the House of Representatives of the 17th instant, referred to the board yesterday, asking for "estimates from the War Department for working the dredge and snag boats for the current year, now owned by the government, specifying each boat, and the amount required for said boat; also, estimates for the mouth of the Mississippi, *Mobile, Charleston, and Baltimore*, and the Mississippi generally; also, if any boats have been sold within the past year; and if so, for what reason?"

There are upon the lakes, belonging to the government, five dredge-boats, with the requisite number of scows—one of them provided for St. Clair flats, that may be used also for the entrance of Clinton river, Michigan; one for Lake Champlain; one for Lake Ontario; one for Lake Erie, and one for Lake Michigan. By the report of the board, (October 25, 1853,) it appears that the cost of working each steam-dredge upon the lakes is estimated at \$7,500 per annum; so that the annual expense of all the government dredge-boats on those waters would be $\$7,500 \times 5 = \$37,500$, including the cost of safe-keeping them during the winter season.

There are upon the principal western rivers two dredge-boats and their scows. They are usually designated as dredge-boats No. 1 and No. 2; and the annual cost of working each of them is also estimated at \$7,500, or for both boats \$15,000. No. 1 has been used at Dubuque; No. 2 has been used both on the Illinois and Ohio rivers.

There are upon the western rivers five snag-boats, viz: four large twin snag-boats and one light-draught twin snag-boat, with their yawls, &c., belonging to the government. According to the reports of Lieut. Colonel Long, these boats are designated and referred to as snag-boats No. 1, No. 2, &c.; and he has estimated the annual expense of working them at \$24,500 each, or in the aggregate \$122,500. Hence—

1st. The cost per annum of working five steam-dredges on the lakes will be	\$37,500 00
2d. The cost of working two steam-dredges on the western rivers will be	15,000 00
3d. The cost of working five twin snag-boats on the western rivers will be	122,500 00
Total	<u>175,000 00</u>

In appears from the second item of the preceding statement that the annual cost of working the snag-boats owned by the government on the western rivers would amount to \$122,500—a sum that may be roughly apportioned among the several objects of expenditure as follows, (taking for a guide the items of appropriation of the act of August 30, 1852,) viz:

For the Ohio river	\$38,017 24
For the Mississippi river	38,017 27

For the Missouri river	\$16,896 55
For the Arkansas river	16,896 55
For the Illinois river	12,672 42
Total.....	<u>122,500 00</u>

But the board is of opinion, that if it is intended to make appropriations for working the snag-boats, this sum of \$122,500 should be appropriated in gross, because of the difficulty of assessing in advance the several objects of appropriation with a view to specific appropriations, especially in the case of the snag-boats, each of which has to be used upon all the principal western rivers at seasons and for periods depending upon the state of the navigation.

As the inquiry concerning the mouth of the Mississippi, *Mobile, Charleston, and Baltimore*, lies within the province of the corps of engineers, according to the regulation of the War Department of September 10, 1852, it will not be expected of this board to reply to it. Concerning the sale of snag-boats, the board has respectfully to refer to the papers and documents in the bureau, the board itself having no information relating to the subject in its possession.

Very respectfully, I have the honor to be, sir, your obedient servant,
JAMES KEARNEY,

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau of Topographical Engineers.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, January 26, 1855.*

SIR: The report of the board of the 23d instant, upon the letter of the honorable the chairman of the Committee on Commerce, House of Representatives, of the 17th, having been returned with an endorsement, signifying that the government owns only three snag-boats instead of five upon the western rivers, and enclosing a copy of a letter from Brevet Lieutenant Colonel Johnston, showing that two of those boats (not designated) have been sold, I am instructed to state, that at the time of the first report of the board upon this subject, it had no official notice of the sale in question, and that it is so stated in its report.

Moreover, during the preparation of the present report, the board has also learned, informally, that the construction of another dredge-boat has been authorized, for the use of the Illinois river, and authority given for the sale of the two dredge-boats heretofore in use on that river and at Dubuque. Being thus advised as to the number and description of boats, the board has now to modify its former estimate (23d instant,) as follows, viz:

The boats to be provided for are, five dredge-boats for the lakes, and one dredge-boat and three snag-boats for the western rivers, and the annual cost of working them will stand as follows:

1st. Cost per annum of working five steam dredge-boats on the lakes.....	\$37,500 00
2d. Cost per annum of working one steam dredge on the western rivers.....	7,500 00
3d. Cost per annum of working three twin snag-boats on the western rivers.....	73,500 00
Total.....	<u>118,500 00</u>

Respectfully submitted :

JAMES KEARNEY,

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau Topographical Engineers.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, January 30, 1855.*

SIR: From a careful examination of the report and drawings of C. A. Fuller, agent for the improvement of Red river, referred to the board yesterday, a variety of explanations relating to the aspect and condition of the very complicated district of country treated of in those documents is deemed essential to a judicious decision in reference to the plan of improvement proper to be adopted, and the order in which it should be prosecuted. The explanations desired can be furnished by the agent who has very recently been employed in the reconnaissance and survey of the district. Accordingly, the board takes leave to request that the agent be instructed to report personally at this office, and give the desired explanations as early as practicable, a course contemplated by the letter of the honorable Secretary of War to Mr. J. B. Gilmer, of the 5th instant, and now deemed advisable by the board.

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

JAMES KEARNEY,

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau Topographical Engineers.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, February 24, 1855.*

SIR: I am instructed by the board to submit the following views in reference to the report of C. A. Fuller, esq., agent for the improvement of Red river, which was rendered under date of January 18th, 1855, and referred to the board on the 29th ultimo.

The report exhibits many important results obtained from the surveys recently made by the agent; one of the most considerable of which

establishes the fact, not previously known, that the surface of the valley proper presents a general declivity from its easterly to its westerly margin, in those portions thereof situated in the vicinity of the existing raft, and extending upward 80 to 100 miles by the course of the river above Shreveport; also, that the main channel of the river through the present raft district passes along the easterly margin of the river valley through its more elevated portions.

The facts just stated and the existence of numerous subordinate water-courses westward of the main channel, obviously justify the purpose of opening, if practicable, a new channel for navigation between the main river and the westerly margin of the valley.

The surveys of the agent were not sufficiently extended to enable the board to decide upon any particular routes by which the new channel could be opened to the best advantage, and with the strongest assurance of success. The personal attendance of the agent was therefore solicited by the board, for the purpose of obtaining from him additional views and explanations in reference to a variety of circumstances affecting the case, but not treated of in his report. The agent was accordingly directed to report to the board in person, and complied with the direction on the 14th instant.

Having investigated, as far as practicable, the whole subject, in the presence and with the concurrence of the agent, and decided upon certain changes in the plan of improvement previously recommended by him, the board requested a supplementary report from that officer, setting forth the manner in which the amended plan could be carried into effect to the best advantage, and a revised estimate of the cost thereof. The report furnished on this occasion is as follows:

"WASHINGTON, *February* 17, 1855.

"SIR: At the request of your board I take leave to submit the following supplementary report in reference to the improvement of Red river in the vicinity of the raft.

"As the season for the annual freshet in Red river is now close at hand, and as the new raft may be expected to commence forming before steps can be taken for its prevention, I am induced to modify the plan of improvement suggested in my report of the 18th ultimo, and to submit the following project of operations, together with a new estimate applicable to the proposed change.

"The plan of improvement recommended in the report above referred to, was to remove the two miles of raft between its head and the head of Dooley's bayou, to improve the channel of that bayou to Shift-tail lake, and thence through Stumpy bayou, Soda lake, and Twelve-mile bayou, to Shreveport. The change of plan now proposed is, to suffer the existing raft to remain untouched, to allow the expected new raft to fill up that portion of the river remaining open between Elmer's bayou and the head of the raft, (the raft running but from three to four days at each annual spring freshet,) and to open a communication by means of a cut between Red river at or near the head of Elmer's bayou, with the inlet of Dooley's bayou, into its first small lake; (see

map.) From the junction of the proposed cut with Dooley's bayou, thence to Shreveport, no change from the original plan is contemplated.

"My plan of operations will then be as follows :

"The head of Elmer's bayou to be at once prepared, by cutting the standing timber, &c., to receive any portion of the coming raft that cannot be stowed in Red river below our proposed outlet. On the subsidence of the spring freshet the cut to be made connecting the river with the inlet of Dooley's bayou, into the first small lake, and any new raft that may have formed in Red river, in the vicinity of Elmer's bayou, to be cut and prepared for stowing.

"Dutch John's lake, or other receptacle, to be prepared for the new raft of 1856.

"During the high water of that year, the surplus raft, prepared as above, to be stowed in the head of Elmer's bayou; and the raft of 1856 placed in its receptacle by means of a boom, &c. During the ensuing low-water season, the small lakes and Dooley's bayou to be improved to Shift-tail lake, and Shift-tail lake and Stumpy bayou cleared to the pass.

"During the progress of the work, such additional surveys as may be deemed necessary should be made above and below the raft.

"A steam machine-boat, similar to the Gopher and Dragon, formerly used for snagging on the western rivers, to be constructed at once, together with two hand machine-boats, with yawls, skiffs, &c. The boats to be employed in removing obstructions in the shape of snags, stumps, floating raft, &c., between Shreveport and the head of Elmer's bayou.

"Estimate.

"Preparing Elmer's bayou for raft, and purchase of tools, &c.....	\$4,000 00
Cost of steam machine-boat complete	20,000 00
Cost of two hand machine-boats complete.....	6,000 00
Making cut, preparing raft receptacle, including boom, &c., and cutting and preparing raft in vicinity of Elmer's bayou.....	25,000 00
Stowing raft in Elmer's bayou, and new raft in receptacle	5,000 00
Improving small lake, Dooley's bayou, Shift-tail lake, and Stumpy bayou.....	20,000 00
Removing dangerous obstructions between Stumpy bayou and Shreveport.....	5,000 00
Contingencies, including surveys, &c.....	9,000 00
Amounting to.....	<u>94,000 00</u>

"Respectfully submitted :

"CHARLES A. FULLER,
"U. S. Agent and Engineer.

"Lieut. Col. JAMES KEARNEY,
"Corps Topographical Engineers, President Board
"Lake Harbors and Western Rivers."

The board is of opinion that the modified plan, as set forth in the foregoing report of the agent, is preferable to that recommended in his former report, for the following among other reasons :

1st. That although the upper portion of Dooley's bayou serves at present as a copious outlet from the main river, yet the quantity of water discharged through it is likely soon to be materially reduced by the raft already formed at its head, and extending about two miles above it, by means of which this outlet is in danger of being closed at no distant period.

2d. That the necessity of constructing a boom across the main river at the head of Elmer's bayou, and of removing the raft already formed between that point and the head of Dooley's bayou, (embracing an extent of about two miles,) will be avoided.

3d. That the tendency of the river to increase the elevation of its surface at all points for several miles above the forming raft, will serve to augment the efflux of the water towards the westerly margin of the river valley continually.

4th. That the efflux thus augmented will contribute to the formation of the contemplated new channel between the present main channel and the westerly margin of the valley.

5th. That the preference of the channel proposed in the supplementary report, to that suggested in the original report, is greatly enhanced by the consideration that the new route lies much nearer the westerly margin of the valley, and passes grounds less elevated than those traversed by Dooley's bayou, for a distance of some four or five miles from the head of the latter.

6th. That the route preferred as above involves another consideration also worthy of special notice, viz: that in the event of any unforeseen difficulties in the way of opening a navigable channel by this route, the channel through the Red and Black bayous above, by which the trade now passes, may be resorted to, and subsequent efforts be directed to the improvement of the channel by that route.

From the junction of the preferred channel with Dooley's bayou, some five or six miles below the head of the latter, the two channels pursue the same route downward to Shreveport, as represented on the map of the agent. The character and position of this route, so far as they may be derived from the reports and surveys made by the agent, are obviously more favorable to the opening of a navigable channel through this part of the river valley than those of any other route presented to the consideration of the board.

For the purpose of exhibiting more satisfactorily the aspect and features of the valley above Shreveport, additional surveys from that point upward through the valley quite to the southern limit of the State of Arkansas, and perhaps above it, are wanted. The surveys desired may be explained as follows, viz :

1st. A series of lines should be run with compass, chain, and level entirely across the river flats and valley, as nearly as practicable, at right angles with the general course of the valley, and at the distance of five to ten miles apart, according to the aspect and facilities of the ground.

2d. The inequalities of the surface, the levels of low water, as indicated by the streams crossed by the surveyed lines, the positions, widths, and depths of the water-courses at the points of crossing the same, and the low water velocities and volumes passing through them respectively, should be carefully observed and reported. Moreover, the drawings, illustrative of the report, should exhibit the natural growth, the positions of the hills by which the main river valley is bounded, and other topographical features.

In view of the anomalous character of the work to be done, and in the absence of the requisite details upon which a more accurate estimate can be predicated, the board is disposed to sanction the estimate of the agent, as given in his last report—the amount of which will nearly cover the unexpended balance of the existing appropriation for the improvement of Red river.

The report and maps referred to the board are herewith returned.

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

JAMES KEARNEY,

Lieut. Col. Top. Engineers, President of Board.

Colonel J. J. ABERT,

Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, February 25, 1855.

SIR: I have the honor to submit the report of the Board of Engineers on lake harbors and western rivers in relation to the improvement of the Red river. From this report it will be perceived what work is recommended by the board, and what additional surveys and investigations. It is respectfully recommended that the views of the board be approved.

Respectfully, sir, your obedient servant,

J. J. ABERT,

Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,

Secretary of War.

The requisite information to determine the eligibility of the proposed improvement does not appear to have been before the board. The character of the soil, the profile of the route, and the level of the adjacent country, all essential to a decision, could only be known from an actual survey, which does not appear to have been made. The success which would attend the proposition to open a communication, by means of a cut between Red river at or near the head of Elmer's bayou, with the inlet of Dooley's bayou, into its first small lake, must be very doubtful. For the above and other reasons it is decided to adopt the project first submitted, viz: to remove the raft above the

head of Dooley's bayou, and to improve the channel of the bayous Dooley, Stumpy, and Twelve-mile, and their connecting lakes, to its return to the main channel of Red river.

JEFF'N DAVIS,
Secretary of War.

WAR DEPARTMENT, *April 28, 1855.*

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, May 1, 1855.

SIR: I send herewith a copy of the report of the Board of Engineers in relation to the Red river improvement, together with a copy of the War Department endorsement thereon.

Should a copy of the map accompanying the report be desired, it will be furnished.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Major S. H. LONG,
Corps Top. Engs., Bvt. Lt. Col. U. S. Army, Louisville, Ky.

OFFICE BOARD OF ENGINEERS LAKE HARBORS AND
WESTERN RIVERS, *Washington, August 7, 1855.*

SIR: Upon the subject of Brevet Lieutenant Colonel Graham's and Mr. Bowes' communications respecting the board's plan of the harbor of Michigan City, I have the honor to make the following report:

Lieutenant Colonel Graham objects to the board's plan of the harbor of Michigan City, described in the report of October 25, 1853, (House Doc. No. 1, pages 214 and 215,) because, in his opinion, it does not provide space between the breakwater and the shore for "*an ample roadstead,*" and the easy access of vessels seeking a safe anchorage behind the breakwater; for he thinks that a crowd of vessels would often seek shelter in it at the same time from a northwardly or northwesterly gale. Mr. Bowes objects to the plan that the cribs of which it is proposed to form the breakwater are to be founded in only 19 feet water, on a sandy bottom, instead of 25 feet on a clay bottom, and that the length of the structure heretofore proposed by him the board has reduced from 2,000 feet to 1,090 feet, and that it reduced the profile of the work from 30 feet base and 37 feet altitude to 20 feet base and 25 feet altitude, and from 12 to 6 feet above the level of the lake.

Among these objections to the plan of the board, the leading one would seem to be want of capacity as a roadstead and anchorage, and with this we will deal at once.

One of the first points of investigation referred to this board was, "that the board investigate the law in reference to the work at Mich-

igan City, Indiana," that alternative being the continuance of the improvement of *that harbor*, or the laying down of a "floating breakwater and safety anchorage," as the Secretary of War may determine, (act August 30, 1852.) On this reference it was decided by the board that a *floating breakwater* ought not to be recommended.

Under this decision, which had the sanction of the War Department, the work retained the character which the law had always given to it, namely, a *harbor at Michigan City*.

Although the naked alternative of a roadstead or a harbor was not at any time formally presented for consideration, the board did not fail to direct its attention to it. But the magnitude and cost of forming a roadstead and anchorage was sufficient to deter the board from presenting a plan for such a work at Michigan City. In an anchorage sufficient space must be left for each vessel to allow of its swinging upon its anchor, according to the changes of the wind, without being exposed to foul any other vessel; and it is usual in reference to such works to calculate upon a radius of two cable-lengths for ships of war, and about half that radius for merchant vessels. This would require an area of 2,880 feet diameter for the accommodation of each ship-of-war, or 1,440 feet for each merchant vessel. In the opinion of the board a work of such magnitude was not only not contemplated by the acts of Congress making appropriations for "the construction of a harbor at Michigan City," but it was not demanded by the wants of navigation. The object of the plan reported by the board was therefore simply to provide a shelter for vessels outside of the coast line, where it had become evidently impracticable to establish a harbor on the land side. For such a work Brevet Colonel (then Major) William Turnbull gave a plan based upon Mr. Bowes' survey of 1845—a plan which the board has aimed at following in all essentials, the area to be enclosed only excepted. This plan it was, and not Mr. Bowes', that the board took as its model, and which it modified in its report of 1852.

In planning the several works committed to it by the department, the board was sometimes influenced by considerations other than those connected with the prospective wants of commerce. Amongst other considerations forced upon the attention of the board by the history of these lake improvements, was the probability, or at least the possibility, that many of the projects, and this among the most probable, might have ultimately to be completed by private enterprise, without the aid and assistance of the general government. The board, therefore, thought it was permitted to keep in mind that an extensive project might defeat itself by reason of its magnitude, if, perchance, the work should be thrown upon the local resources of Michigan City. Under the influence of this apprehension, the board limited the extent of its plan to the probable actual wants of commerce; and this it could do in this, as well as in other cases, without compromising the future by giving such a form and position to the work as to admit hereafter of an unlimited extension lengthwise of the coast, at least should the future wants of commerce require it.

The improvement proposed by the board consists of a line of crib-work or breakwater, ranging nearly parallel with the lake shore, in a depth of

nineteen feet. The agent for the work and the superintending engineer object, as I have already said, that the breakwater in the plan of the board lies too near the shore ; and the agent adds his opinion, that the work should be founded in a depth of twenty-five feet on a clay bottom, instead of nineteen feet on a sand bottom, as proposed by the board ; the agent's objection arising from an apprehension that the work may be undermined by currents which he imagines likely to occur at that depth. The superintending engineer objects likewise to the position of the breakwater, upon the ground that there is not sea-room enough between the breakwater and the twelve-foot curve to enable vessels to round-to safely, and he proposes to locate it upon the outer instead of the inner nineteen-foot curve, whereby he believes he will gain a passage of 800 instead of 400 feet, to the anchorage, which he assumes should exist inside of the works. Moreover, both of these officers object to the dimensions which the board has proposed for the cribs, namely, a breadth of 20 feet, by a height of 25 feet, and they propose to substitute for them a breadth of 25 feet, and a height of 37 feet ; Colonel Graham resting his objection upon the general principles laid down by the board in its instructions relative to the formation of harbor piers ; the agent resting his objections upon the fear that the cribs proposed by the board will not have sufficient stability to resist the force of the waves. In justification of these fears, the agent states that, "in the most tempestuous storms, the waves at Michigan City do not vary much from 14 feet—some navigators say 16 feet ;" and that it is for this reason that he, in *his plan* of the work, assumed 12 feet for the height of the cribs above the level of the lake, in order to assimilate it nearly to the height of the wave.

In noticing this statement respecting the height of the waves of Lake Michigan, the board cannot refrain from expressing its conviction that it must have been breakers or spray, and not waves, that were the subject of observation, and that such a body of water as Lake Michigan is not capable of generating waves equal to those of the Atlantic ocean, or greater than the highest known waves of the Pacific. It has been often remarked, that little or no reliance is to be placed upon the casually estimated height of waves, and the present is an example of the truth of the remark. As to the horizontal force which a wave is capable of exerting in a depth of nineteen feet of water in Lake Michigan, the only force the effects of which need be feared, the board has no apprehension respecting it. In that depth, the board believes that the movement of the waves will be developed essentially in a vertical sense, and will be, therefore, incapable of overturning the structure. It is of opinion, then, that all the reasoning of the agent drawn from the idea of a horizontal force exerted by the waves falls to the ground ; and the same may be said of the attempt to assimilate the case of our harbor piers, founded upon a shallow, shelving bottom, in the midst of the breakers, with the case of a vertical structure, founded in water deep enough to permit the free vertical development of the waves, a depth which the board considered it had attained, when it fixed upon the nineteen-foot curve as the position to be chosen for the proposed work.

As I have already said, the board, while studying this project, had

before it Major Turnbull's plan as drawn upon Mr. Bowes' chart of 1845, and it was well satisfied with that plan. But, influenced by a spirit of economy and the actual wants of that locality, and by the considerations which actuated the board in some other cases—considerations drawn from the history of our lake improvements—the board deemed it expedient to present for the consideration of the department a project less extensive in the first instance, and, therefore, less expensive than Major Turnbull's, but capable of future extension. Regarding the work in the light of a mere harbor for the trade of Michigan City, it deemed it sufficient, with that object in view, to provide shelter only for vessels trading to Michigan City, and for vessels accidentally caught by stress of weather in its vicinity. For this purpose a breakwater nearly parallel with the shore, as suggested by Major Turnbull's plan, was deemed an essential feature. Upon the position of this breakwater, or its distance from the shore, and upon its length, would necessarily depend the amount of shelter to be derived from the work. It is evident, that the farther the breakwater from the land, the greater must be its length in order to yield a given amount of shelter to vessels lying near the shore. On the other hand, the nearer the shore, the less room there would be for vessels to round-to in coming to a berth inside of the work.

The board considered it to be an essential condition of the stability of the work, that the breakwater should be founded at such a depth as to permit the free vertical development of the greatest waves in that vicinity. After much consideration, and no little discussion, it was assumed as very probable that a depth of 19 or 20 feet would suffice for that condition of the problem, and accordingly the 19-foot curve was taken as the proximate position of the breakwater; and as there are two curves of that depth, an inner and an outward curve, the inner curve was taken as more consistent with the principles of economy, by which the board was in some degree influenced with reference to the case; and this curve was the more readily adopted, because, in the opinion of the board, this position still left an opening between it and the 12-foot curve to enable vessels seeking the shelter of the harbor to round-to very safely. This opening, according to the chart before the board, (Mr. Bowes' chart of 1845,) was upwards of 500 feet, an entrance greatly exceeding that of any other artificial harbor on the lakes, and, therefore, in the opinion of board, quite a safe one.

This arrangement enabled the board to reduce the length and consequent cost of the breakwater, yielding an arc of protection equal to that of Major Turnbull's plan, from 2,000 feet to 1,090 feet. Moreover, the board deemed it quite admissible to reduce the profile of the breakwater, for in its opinion it is an error to suppose that a vertical work, founded in water deep enough to permit the free development of the waves, requires as strong a profile as does a work founded in shoal water and upon a shelving bottom, and exposed to the horizontal force of the breakers.

As has been already intimated in this report, the leading reason influencing the board to assume the inner in preference to the outer

19-foot curve for the line of breakwater, was the saving which must necessarily result from the diminished length of the work; a diminution the consequence of the diminution of the length of the sides of the triangle representing the area of protection afforded by the work. Approximately the value of this saving may be deduced from the following statement, viz:

The length of the breakwater proposed by the agent, Mr. Bowes, in his report of September 19, 1852, was 2,000 feet, or $66\frac{2}{3}$ cribs.

The length proposed by the Board of Engineers 1,090 feet, or $36\frac{1}{3}$ cribs.

The length proposed more recently by Lieutenant Colonel Graham and Mr. Bowes 1,560 feet, or 52 cribs.

Which statement may be represented in money value as follows, viz:

66 $\frac{2}{3}$ cribs founded in 25 feet water would cost, according to Mr. Bowes' estimate.....	\$321,000 00
36 cribs in 19 feet water, at \$2,136 30 per crib, according to the board's plan and estimate.....	77,618 00
52 cribs in 19 feet water, and located on the outer 19-foot curve, agreeably to the suggestion of Lieutenant Colonel Graham.....	111,087 60

It should be remarked, however, that, judging from a rough inspection of the diagrams, the protected area secured to shipping by Mr. Bowes' first plan would be more than three times as great as that secured by the board's plan; and also, that the outer 19-foot curve would give about twice the area of protection as the inner 19-foot curve. These facts will enable the bureau to select the position the most suitable to its views of the wants and interests of navigation.

Respecting the profile or cross-section of the breakwater, it may be necessary to add a few words to what has already been advanced. The board, in its report of 1852, proposed 20 feet for the width of the cribs intended for the 19-foot curve; and what has been said upon that point is intended to show that that width should be sufficient to insure the stability of the structure in a depth of 19 feet. But this opinion is founded upon the hypothesis that the only force to which the work can be exposed is the ordinary force of the waves at that depth. The agent for the work, however, makes us acquainted with a fact not known to the board in 1852, namely, that the ice in that vicinity acts occasionally with great force, and that it is necessary to take that fact into view in discussing the question of the cross-section of the cribs. For this reason, therefore, and for others set forth by them in their report touching the harbor of Michigan City, the agent and the superintending engineer propose an increase of width for the piers. This suggestion has engaged the attention of the board, a majority of which are of opinion that, in view of the occasional presence of floating ice and their necessary isolation, it may be prudent to give to the two cribs, for the construction of which there is said to be means in hand, a width of 25 feet.

Respectfully, sir, your obedient servant,

JAMES KEARNEY,

Lieutenant Colonel Topographical Engineers.

Colonel J. J. ABBERT,

Bureau of Topographical Engineers.

APPENDIX N.

HEADQUARTERS DEPARTMENT OF THE PACIFIC,
Benicia, Cal., September 1, 1855.

SIR: According to Topographical Bureau regulations, I herewith (on this 1st September) forward the estimate for funds for topographical military surveys in this department for the fiscal year of 1856. The amounts of the items are as small as they can be made in justice to the subjects; and the objects for which the sums are intended are too obviously necessary to need any explanation beyond the simple approval of the commanding general, which you will perceive is appended to the estimate.

I trust you will take pleasure in co-operating to the end of obtaining the appropriations herein asked for.

I have the honor to be, very respectfully, sir, your obedient servant,
T. J. CRAM,

Captain Top. Engs., Chief of Top. Party, Dept. Pacific.
Col. J. J. ABERT, *Chief Top. Engs., Washington.*

Estimate of funds required for topographical military surveys in the department of the Pacific for the fiscal year of 1856, to be expended under the orders of the general commanding the department.

1. Survey of the Colorado river above Fort Yuma, with a view to ascertain its capacity for steamboat navigation, for the transportation of supplies for the troops from the Great Salt Lake country.....	\$10,000 00
2. Topographical surveys and reconnaissances of routes probably to be passed over by the troops in various expeditions or marches into the Indian country....	5,820 00
3. For the erection of a suitable building on the public reserve necessary for a depot of instruments, having a store-room, a computing room, and an instrument room for rating instruments.....	1,500 00
4. For the purchase of certain instruments in addition to those now in the department, and for the purchase of mathematical tables, books, and maps, necessary for the topographical duties of the department.....	2,000 00
5. For hire and expenses of an office for topographical service, at \$40 per month, for one year, commencing September 1, 1855, that will accrue before the depot can be built.....	480 00
6. For stationery for the office work.....	200 00
Total.....	<u>20,000 00</u>

I have the honor to be, sir, very respectfully, your obedient servant,
T. J. CRAM,

Capt. Top. Engs., Chief Top. Eng., Dept. Pacific.
Col. J. J. ABERT, *Chief Top. Engs., Washington.*

Approved. If it is the wish and desire of the government to obtain with facility accurate topographical surveys of the Pacific department, the amount estimated seems necessary for the coming year. It is near [the time] that the various surveys desired should be projected and outfits made. Hence the necessity of a depot of instruments, and all the means necessary for prosecuting the surveys when the season will permit, and when finished, for doing the office work, such as mapping, &c.

JOHN E. WOOL, *Major General.*

APPENDIX O.

LIEUTENANT RICHARD ARNOLD'S REPORT ON THE MILITARY ROAD FROM
WALLAH-WALLAH TO STEILACOOM.

FORT STEILACOOM, W. T.,
January 26, 1855.

SIR: Having completed the work assigned to me by your instructions of May 26, 1854, and previous instructions of Governor I. I. Stevens, charging me with the construction of the "military road from Wallah-Wallah to Steilacoom," I have the honor to submit the following report and accompanying map.

In order to obtain information of the route by the Nahchess Pass as early in the season as possible, that I might push forward the work rapidly if this line was adopted, and assist the coming emigration, I organized a small party and left Steilacoom on the 23d of May, 1854.

In this examination I travelled the road opened the previous season wherever it was passable, and made a reconnaissance of the entire route to Wallah-Wallah for the purpose of deciding upon the general location, and ascertaining how much of the road cut by the citizens during last season could be adopted. A partial exploration of the approaches to the mountain was made, but the unfavorable state of the weather forced me to postpone completing it until late in the season.

Upon my return I intended to make a reconnaissance of the country from Steilacoom to the main Yakima Pass, to connect the work of Captain G. B. McClellan, performed during the previous season, and to decide upon its practicability for a military road, in connexion with that exploration; but your instructions directing me to adopt the Nahchess Pass and emigrant road, whenever the location of the latter would admit, prevented, and I directed my whole attention to that pass.

Mr. Allen, the contractor, immediately proceeded into the field with a party of thirty men, and, with the exception of some work on the hills bordering Puyallup and White Water rivers, and a general clearing of the old road, commenced work beyond the settlements. My object in so doing was to apply the work where it was most needed, leaving other parts to be made afterwards, provided the means proved sufficient: if not, the settlers could work this portion to better advantage than any other. I will add, that my means did not admit of this improvement, and, in the event of another appropriation, I would recom-

mend an examination of the country to the north of the present road, to avoid the hills bordering Puyallup river, and some marshes, wet and miry throughout the year.

The following is a description of the country traversed by the route adopted:

Leaving Steilacoom, the road crosses a tract of open prairie about ten miles in length and nine in width, a part of what is known as Nisqually plains. These plains are covered with beautiful lakes, filled with a great variety of wild-fowl during the entire year, and are interspersed with timber, mostly oak and fir; the former of which must be of great value for ship-building and other purposes at some future period. The soil throughout is generally gravelly, except along the borders of some of the lakes and in the bottoms of the creeks; there it is black loam, the best proof of the richness of which is, that every acre is settled upon.

From the plains it passes through thick timber for six miles to a high ridge bordering the valley of Puyallup river, and forming the limit of the gravelly district. This valley is from two to four miles wide, lying, like those of the Nisqually and White Water, between high perpendicular bluffs, and covered with a heavy growth of timber, consisting of arbor vitæ and spruce, and with thick underbrush, chiefly willow and vine maple. The soil is rich, but somewhat sandy. Above the crossing the stream forks, and is made up of many tributaries, along the banks of which large prairies are found, capable of a great yield to the agriculturist with little labor. The Puyallup, fordable except at the highest stages of the water, is generally about one hundred feet wide and two and a half feet deep at the ford.

Leaving this bottom the road passes alternately through small prairies and timber to White Water or St. Kamish river. This stream is a perfect torrent, fordable only three months in the year, and even then the force of the current and exceedingly rocky bed, under the transit with pack-animals and wagons, both difficult and dangerous, particularly for emigrant stock that have crossed the plains. One of the most striking peculiarities of this stream is the milky color of the water, due probably to some earthy substance found along the northeastern side of Mount Rainier.

Beyond this crossing lies a succession of fine prairies for seven miles; after which there is no grazing to near the summit of the mountain. At this place I would recommend travellers to "lie by" for a few days to recruit their animals. The land bordering the river, (including the prairies) although elevated, is wet. The soil, a mixture of clay and vegetable mould, retains the moisture of the winter rains until near midsummer. With this exception few sections offer greater inducements to the settler, and none surpass it in fertility. From the last prairie the road passes over a high hill, very appropriately named "Mud Mountain," the soil being similar to that of the prairies. A thorough examination of this mountain was made, but high perpendicular bluffs running to the river and a complete net-work of fallen timber left no choice but to follow the location of last year. Another strong reason for adopting this was, that the travel of the season enabled me to de-

cide upon the character of the soil, and fix upon the best mode of improvement; while an adoption to the right or left would have involved a much greater expenditure, and in the end prove, in my opinion, less satisfactory. The greater part of this tract was made passable by a series of heavy cedar bridges.

Descending again to the river the road continues up the valley, making six crossings, which cannot be avoided except by heavy side-cutting, and in many cases blasting. To the traveller this valley is dreary and monotonous; the view is limited to high ranges, in some places receding, leaving heavy-timbered flats, in others coming to the river in high perpendicular bluffs, generally a conglomerate of earth and stone. The soil is rich, but the extreme dampness pervading the atmosphere, the dense timber shutting out the rays of the sun, and the cold nights, must destroy all vegetation save the rank weeds and mosses, inhabitants of the mountains. The crossings were selected with great care, and are the best on the river; but in the event of another appropriation I strongly recommend that they be avoided.

Leaving White Water the road enters Green River valley, and, with the exception of a short distance where the stream cañons, continues through it to the mountain; this deviation involves two hills, the highest 1,500 feet. Here, as well as along White Water, I should have made more improvements, but for the important obstacles still to be encountered. The appearance of this valley is like the White Water; as we approached the mountain, the ranges rose higher and gradually closed in, forming near its head a continuous cañon, and necessarily involved seventeen crossings. The river has an average width of forty feet, with a gentle current, the bottom generally rocky. It can be forded when the road is passable.

Near the junction of White Water and Green rivers there is a celebrated peak called La Tête, from a large rock on its slope resembling the head and neck of a man. This is an important point, as it forms the gate of the mountains to the west.

Four miles beyond, the only prairie between White Water prairies and the summit is found. This would afford some grass but for the numerous bands of Indians' horses passing to and fro from early spring until late in the fall. The country adjoining the prairie and the slopes of La Tête having been burned many years since, and the position being so favorable, half way between fine camps, I have endeavored to obtain seed to sow from two to three hundred acres, but up to this time have not succeeded. This I strongly recommend, if any further expenditure be made upon the work. With the exception of this prairie and La Tête, the entire valleys of White Water and Green rivers and the surrounding heights are studded with a dense growth of timber, mostly fir and spruce, with some hemlock, and now and then a pine; and the ground is covered with fallen trees from four to six feet in diameter, and from one to three hundred feet in length. In many instances I noticed thrifty trees three and four feet through, one single shaft from two to three hundred feet high growing upon others much larger, and which, upon inspection, proved perfectly sound. This will give some idea of the amount of labor expended throughout this distance.

While the working parties were engaged along White Water river I made a thorough examination of the approaches to the mountain, and finding them impracticable I adopted in part the old line, with changes for grades and straightening. The first hill ascending the mountain was originally an unbroken slope of 33 degrees for a height of 800 feet, and was probably one of the most difficult that any road passed over in this country. This was reduced to a practicable grade. Other steep slopes followed, many of which were graded, but not so much as I wished. On the summit the mountain spreads out to the south, forming an extensive flat filled with ponds, interspersed with prairies, and in other places covered with a dense but small growth of timber. The adopted line skirts four prairies in the distance of two miles, which afford excellent grazing and an abundance of fine spring water.

Under the most favorable circumstances this part of the route will not be passable for wagon trains more than five months in the year. On my first reconnaissance (about the 28th May) I found four feet of snow for five miles, and in many places from six to ten. We were from seven in the morning until dark driving a small band of animals eight miles, and even then two of the packs were carried down the mountain by the men. On my return after the completion of the work, the last of October, I found from one foot to eighteen inches of snow along the summit, thus showing that the observations of one season conclusively prove what is stated above.

While exploring the mountain I visited Mount Ikes, a peak laid down by Captain G. B. McClellan, about 5,100 feet above the level of the sea, and situated near the divide separating the waters of Nahchess and the northern fork of Green river. The view from this peak was grand and extensive. To the west it commanded the valley of Green river and White Water to Mud mountain, and beyond the Olympic range, whose sun-capped peaks were distinctly visible, and the western border of Puget sound, plainly marked by the high clay banks; to the south, Mount Rainier appeared in all its majesty, still towering far above me, and not to exceed fifteen miles distant; to the east was seen the valley of Nahchess and the distant heights; and to the north a high serrated volcanic range, forming probably the southern boundary of the route by the main Yakima Pass, and the beautiful elevated range along the Yakima. Thus every variety of mountain scenery was taken in at one glance for an extent of sixty miles. It was from this point I fixed the position of the principal streams to the southeast and southwest. The valleys of White Water and Bumping river, of Green and Papattsally, and of the northern fork of Green river and Nahchess, were distinctly marked by their respective ranges, the intersection of which determined the divide of the range from this peak to Mount Rainier.

The eastern slope of the mountain was very favorable, and required comparatively little work. As this has proved to be the case in the many examinations that have been made during the past two years, it may be regarded as one of the principal characteristics of the range.

Leaving the mountain the road crosses Nahchess river, a beautiful

stream about twenty-five feet wide at the ford, having a gentle current and rocky bed, and enters one of the most picturesque valleys I have ever seen. High ranges, in some places forming perpendicular cliffs not less than 2,000 feet high, in others graceful slopes covered with a luxuriant growth of bunch-grass and thrifty timber, rapid mountain streams, forming at their mouths islands covered with groves of trees, and numerous rivulets traversing the prairies bordering the river, make the scenery particularly striking when contrasted with the cold, dismal forests of the western valleys. Throughout the valley fine camping grounds are found, affording an abundance of grass, fuel, and the most delicious water; and yellow pine, seldom seen west of the mountain, is the principal tree of the forests. Vegetation matures much earlier on this side of the mountain than on the other, showing that the snows must melt much sooner. The principal tributaries of the Nahchess are Bumping river and Papattsally—the former near twice its size, and the latter not quite equal to it; when viewed from Nahchess these valleys appear very similar. While in this valley (Nahchess) I met with many miners, who had thoroughly explored the above named valleys, and they pronounced them impracticable. As they were prospecting for gold, I learned from them their success; and having examined more country and prospected more streams than any other person, I will state that the gold excitement of the Cascades, so rife during last season, was entirely unfounded. Gold is found, but not in sufficient quantities to pay the miner the ordinary wages of the country, or even provide for his subsistence. The road crosses and re-crosses this stream forty-four times.

My appropriation being nearly expended, and the season far advanced, I adopted the location of the previous season, from this valley to Wallah-Wallah, crossing the divide to Wenass, about 800 feet high, and thence down the valley to within a few miles of its mouth, where the road turns to the south to avoid a deep cañon; and from the best information, I am fully convinced that the course along the Nahchess to its mouth has but few if any advantages. It would involve many crossings and probably quite a heavy expenditure, while the old line will be excellent after the hills sloping towards Nahchess are graded.

An abundance of timber is found near the headwaters of Wenass, and forms the western boundary of a vast tract of country, extending eastward to the Blue mountains, on which, with the exception of a few clusters of cotton-wood found near the streams, scarcely a tree is visible. The soil is fertile, and the banks and slopes are covered with fine bunch-grass. This valley is cultivated by the Indians, and produces fine crops of vegetables.

Four miles further on is the first ford of the Yakima, a few rods below the celebrated fishery of the tribe of the same name, where travellers, during the summer, can purchase the most delicious salmon of the western coast for a mere nominal sum. Notwithstanding the numerous tributaries and the vast extent of country drained by this stream, it is fordable during the emigrant season; it is about one hundred yards wide at the ford, and not over eighteen inches deep in midsummer.

After leaving the Yakima the country becomes rough, and is broken

into ridges having a general east and west direction, the highest being along the route; beyond it spreads out into a vast rolling sage plain, extending far beyond the Columbia to the east, and to Wallah-Wallah to the south. From the last mentioned ford to the great bend of the Yakima there is barely a sufficient supply of water except at stated camps, and at them it is disagreeable and injurious, being strongly impregnated with sulphur, found extensively distributed for miles around, forming a thick crust upon the rocks and soil. Fuel for cooking purposes is also very scarce, and the only redeeming quality is the grazing that abounds. The "Brackish Spring," though fringed with bushes always green and flourishing, is simply a land-mark to point out the proper camping ground about two miles to the south, and distinctly marked by the bushes along the banks of a small stream. The water of this spring is not drinkable.

Near the mouth of the Yakima, where the road crosses, the valley is from one to two miles wide, and I would particularly recommend this place to emigrants, as a fine recruiting place after crossing the Columbia.

From this ford to the terminus of the route opposite Wallah-Wallah, the road passes over a continuous level of a light alluvial character, very disagreeable during the summer months, on account of the violent winds that blow up the valley of the Columbia.

Below will be found a table of distances—being measurements made with an odometer, and generally indicating camps where the best water and the greatest amount of wood and grazing can be obtained.

From Steilacoom—	Distance from point to point.	Distance from Stei- lacoom.
	<i>Miles.</i>	<i>Miles.</i>
To Puyallup river.....	22½	22½
To first crossing of White Water river.	9½	31½
To last prairie on White Water river.....	6½	38
To second crossing of White Water river.....	11½	49½
To sixth crossing of White Water river.....	5½	55½
To La Tête.....	3½	59½
To first crossing of Green river.....	1½	61½
To Bare prairie	2½	63½
To last crossing of Green river, at the western base of the mountain.	10½	73½
To first prairie on summit of mountain.....	3½	77½
To last...do.....do.....do.....	2½	79½
To first crossing of Nahchess river.....	5½	84½
To crossing of Papattsally.....	10½	95½
To mouth of Bumping	4½	99½
To last crossing of Nahchess river.....	11½	111½
To Wenass.....	10	121½
To where the road leaves Wenass valley.....	16	137½
To first crossing of Yakima river.....	4	141½
To first water after leaving Yakima river.....	18½	159½
To second water...do.....do.....	7½	167
To Brackish Spring.....	16½	183½
To Great Bend of the Yakima.....	18½	202
To near the mouth of the Yakima	15½	217½
To terminus of the route, opposite to Wallah-Wallah	17½	234½

I regret that I am not able to present, with the accompanying map, a barometrical profile of the route. A careful set of observations were taken with the best instrument I could obtain, but the results, when worked up, proved incorrect, and consequently have been rejected.

Before closing this report, I would urgently recommend that an additional appropriation of ten thousand dollars be made. This amount properly applied, in connexion with what has already been expended, will give to the work a permanence and stability that it justly demands, even at the present time, as the only military and commercial thoroughfare into this portion of the Territory from the east over which the overland emigration must pass; and more particularly, when the valleys of the numerous tributaries of the Columbia are settled, and when towns on Puget's sound, now in their infancy, shall be classed among the first in importance on the Pacific. On my first reconnaissance, I was fully convinced that the unexpended balance of the appropriation was totally inadequate to construct a military road; and I had, consequently, directed my attention to the most important points, and so distributed the work throughout the route that an additional appropriation could be applied in the best manner possible. The parts requiring particular attention have been previously mentioned.

I would also recommend that the amount expended by the citizens of the Territory in 1853 be refunded. The greater part of the road cut by them from Steilacoom to the mountain has been adopted. But for this, I do not believe the work could have been carried forward as satisfactorily.

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

RICHARD ARNOLD,
1st Lieutenant 3d Artillery.

HON. JEFFERSON DAVIS,
Secretary of War.

REPORT OF THE COLONEL OF ORDNANCE.

ORDNANCE OFFICE,
Washington, October 25, 1855.

SIR: I have the honor to submit the following report of the principal operations of the Ordnance department during the last fiscal year, with such remarks, suggestions, and recommendations as appear to me to be called for by the interests of that branch of the military service.

Funds.

Amount undrawn from the treasury on the 1st July, 1854, as per last year's report.....	\$452,254 87
In hands of disbursing officers same date.....	170,807 90
Amount of appropriations for the fiscal year 1854-'55, including the annual appropriation for arming and equipping the militia.....	1,098,895 00
Received during the year for damages to and losses of arms, &c., in hands of troops, chargeable to them, and from all other sources not before mentioned...	136,843 55
	<u>1,858,801 32</u>
Amount of expenditures during the year.....	\$1,159,601 08
Amount reverted to the surplus fund	26,298 05
In hands of disbursing officers June 30, 1855	259,727 98
Remaining in treasury undrawn June 30, 1855.....	413,174 21
	<u>1,858,801 32</u>

The expenditures from each appropriation during the last year will be found stated hereafter as the subjects appropriated to each occur in this report. The accounts of all the disbursing officers of the Ordnance department have been rendered as required by law and regulations, and have all been examined in this office, and transmitted to the Treasury Department for settlement, excepting those of the military storekeeper at Monterey, California, whose failure in this respect has been duly noticed.

The estimates for the next year have been carefully prepared, and are believed to include nothing more than is necessary to carry on the operations of the department with a due regard to economy, and to a provision for the wants of the public service to be supplied by this department. In consequence of the failure of Congress to appropriate funds for arsenals and ordnance depots in Texas, New Mexico, and on the North Pacific coast, the estimate made last year therefor is renewed; and attention is respectfully called to these items, and to the

remarks thereto appended, explanatory of the necessity of such establishments at these points.

As the adoption of new models embracing the *Minié* principle for all small-arms, and the advantages of uniformity, as well as of superior quality of materials and workmanship to be derived from their fabrication at the national armories, render it highly expedient to enlarge the operations at these establishments, the estimate for this object has been made with a view to a greater amount of work for the next year than has been considered desirable for the last few years. It includes the usual annual amount appropriated for this purpose before the reduction in the scale of operations.

Armament of fortifications.

The expenditures during the fiscal year from the appropriations for this object amount to \$258,552 93.

The principal articles procured by purchase and fabrication during the same period are as follows, viz:

- 54 10-inch columbiads.
- 68 8-inch columbiads.
- 24 10-inch columbiad barbette carriages.
- 37 8-inch columbiad barbette carriages.
- 5 10-inch columbiad barbette upper carriages.
- 6 10-inch columbiad barbette chassis.
- 5 8-inch columbiad barbette chassis.
- 10 42-pounder barbette carriages.
- 10 32-pounder barbette carriages.
- 15 32-pounder casemate carriages.
- 20 24-pounder barbette carriages.
- 6 42-pounder barbette chassis.
- 1,096 10-inch shot.
- 1,229 8-inch shot.
- 8,084 10-inch columbiad shells.
- 12,195 8-inch columbiad shells.
- 45,594 cubic feet of timber for seacoast carriages, platforms, &c.

Besides the repairs of the armaments in position, which have been quite extensive at some of the forts, they have been supplied during the year with 224 heavy seacoast and garrison guns, with their carriages, implements and equipments, and a supply of ammunition. The greater part of this armament has been sent to forts in process of construction in the harbor of San Francisco. The new fort at Key West has also received a considerable armament of heavy cannon, as well as some flank defence and field howitzers. The whole subject of the armament of fortifications has received during the year the special attention of a board of engineer, ordnance, and artillery officers, and has undergone a complete revision, whereby the number, calibre, and positions of the guns at each of the forts have been determined. The total number of pieces of ordnance required for all the fortifications is 6,459; of which 2,319 are 10 and 8-inch columbiads and seacoast howitzers; 2,957 are seacoast and garrison guns; 646 flank defence and block-house howitzers;

269 mortars; and 268 siege and field cannon. Of these there are on hand at the forts and arsenals 3,912, leaving to be procured 2,547 cannon for the permanent fortifications of the United States. The plan has been adopted of procuring this armament gradually by annual appropriations, and is a good one. The guns and projectiles are easily preserved at the arsenals and forts, and suffer no deterioration; while it is necessary to lay up carriage timber, and to keep it in store, for seasoning, several years before it can be properly wrought into carriages. I again recommend the establishment of a national armory for the fabrication of cannon and projectiles, both for the land and sea service; and refer to the many reports on the subject, both by committees of Congress and by the executive departments, for evidence of the propriety and expediency of the measure. In my last annual report I referred to reports in detail of the measures which have been taken to improve the quality of cast-iron cannon, and to apply tests of strength and endurance more reliable than the mere powder-proof, and stated my intention of arranging these reports for publication, with the requisite drawings for illustrating them. They have since been so arranged and the drawings prepared, and they are now in press.

Ordnance, ordnance stores, and supplies.

The expenditures during the fiscal year from the appropriation for this object amount to \$204,591 20. The principal articles under this designation, which have been procured by purchase and by fabrication at the arsenals, are as follows, viz:

- 39 bronze field guns of different calibres.
- 2 bronze field howitzers.
- 35 field carriages.
- 9 caissons.
- 3 travelling forges.
- 200 Sharp's carbines.
- 500 Colt's dragoon pistols.
- 3,884 infantry cartridge boxes.
- 3,030 infantry cartridge-box belts.
- 1,000 infantry bayonet scabbards, with frogs.
- 1,750 infantry gun slings.
- 7,894 waist belts.
- 12,201 cap pouches and cone picks.
- 761 rifle pouches.
- 2,957 rifle cartridge boxes.
- 3,727 rifle waist belts, different kinds.
- 1,226 sword shoulder belts.
- 500 sabre belts for cavalry and horse artillery.
- 2,022 sabre knots.
- 1,000 carbine slings and swivels.
- 147 32-pounder shot.
- 4,907 spherical case shot, different calibres.
- 8,158 stands of fixed ammunition for field artillery.
- 1,318,362 cartridges for small-arms.

1,192,500 Maynard's primers.

134,500 friction primers for cannon.

367,500 percussion caps for small-arms.

1,807 cubic feet of timber for siege and field carriages.

The quantities and kinds of arms, ammunition, and other ordnance supplies which have been issued for the United States service during the year, are specified in statement C hereto annexed.

The duty of furnishing horse equipments having been transferred from the quartermaster's to the ordnance department, these articles now come under the designation of ordnance stores; and the requisite amount for procuring them, which has heretofore been included in the estimates of the quartermaster's department, is embraced in the estimate submitted for the next year, under the head of ordnance, ordnance stores and supplies. For the purpose of testing practically the merits of different patterns of horse equipments, the cavalry regiments have been supplied with those known as Grimsley's, and also with those prepared after the pattern of Campbell—the latter having been examined and recommended for trial by a board of cavalry officers. There has not yet been time to form an opinion as to the relative merits of the different patterns, but this department will not fail to avail itself of the results of these practical trials, in order to introduce into the fabrication of the equipments such modifications as may be found advisable, to make them most durable for service and most easy for both horse and rider.

The purchase of the best breech-loading rifles having been authorized by law, provided it should be deemed advisable and proper after a fair practical test, preliminary trials of all such arms as were presented, after due notice inviting them, have been made by a board of officers, and such of them selected for practical test as gave promise of fitness for use as military weapons. A sufficient number of each kind of these arms has been ordered, to test their relative merits by use in actual service, and will be issued to the troops for that purpose as soon as they are furnished by the inventors. To compare this kind of arms with those loading at the muzzle, in respect to their fitness for the use of troops, some of the latter have been made at the national armories, and sent out for issue and trial at the same time with the patent breech-loading arms. The purchase authorized by the law has been deferred until the results of the practical tests shall determine the question as to the best breech-loading arms, and also the advisability and propriety of any purchase.

Cases not unfrequently occur of inventions and improvements made by officers, workmen, and others employed by, and under pay of the government, which are secured to their exclusive benefit by letters patent. As they very generally, if not always, have the aid of government means while devising these inventions and improvements, it seems but fair that the government should participate in the benefits to be derived from them; and that patentees, under such circumstances, should be required to make provision for allowing the free and unrestricted use, by government, of any machine or improvement produced in the government work-shops by the skill and labor of persons

there employed—relying on the special action of Congress for compensation in such cases as may merit it.

National armories.

The expenditures at the armories during the fiscal year have been as follows, viz :

	Harper's Ferry.	Springfield.	Total.
Manufacture of arms, appendages, tools, &c., and purchase of materials for the same	\$122,925 81	\$110,757 66	\$233,683 47
Repairs and improvements.....	37,292 67	33,251 82	70,544 49
	160,218 48	144,009 48	304,227 96

The manufactures at Springfield comprise 8,624 percussion muskets, 550 musketoons, and 300 rifled carbines, with 47,310 appendages—consisting of extra cones, wipers, screw-drivers, ball-screws, hammers, and spring-vices. At Harper's Ferry, the manufactures comprise 7,700 percussion muskets and 2,339 percussion rifles, with 43,803 appendages—consisting of like parts with those before mentioned; 7,839 assorted components for issue to other posts for repairs of arms, and 8,452 sword bayonets, back-sights, bullet moulds, &c., for long-range rifles. At both armories experimental arms have been made and other work done—the particulars of which will be found stated in the reports of their superintendents hereto annexed. With a view of increasing the efficiency of our small-arms and keeping pace with the great military nations of the world in their improvements, the subject was referred to the ordnance board in June last. A copy of the summary statement of the action of the ordnance board on that and other matters, with your decision and instructions thereon, is herewith furnished, marked D. In order to secure to our new system unity and the greatest possible degree of simplicity and mechanical perfection, I deemed it advisable to cause this work to be undertaken and carried out at one armory—the Springfield. Immediate steps were taken to construct the necessary models. In the execution of this work much, and, considering the great importance of extreme accuracy, satisfactory progress has been made; and it is confidently hoped that before the close of the year both the national armories will be in full operation manufacturing muskets, rifles, pistols, and pistol carbines of the new model.

The fabrication of small-arms of the old model was gradually diminished in the early part of the present year, and finally brought to a close after using such stock of materials as had been provided and prepared for them, and were not applicable to the new model. It is proposed to rifle the barrels of many of the old-model muskets of .69-inch calibre, and provide for them the elongated pointed bullet now generally used.

With a view not only of preserving for the new-model arms the high degree of mechanism which we aim to give to the working models, but to strive for approaching, as near as possible, to perfection, it is proposed to place the final inspection of all the arms made at the two national armories under the charge of an officer of the department, whose duty it will be to see that the models have been exactly copied, that none but materials of the best qualities have been used, that no process in workmanship likely to be injurious to the arms is practised, and that the parts of arms made not only at the same, but at each armory, be capable of interchanging; and further, to insure the last desideratum, as well as other advantages of such a system of exact scrutiny, it is proposed to establish in connexion with this office a depository of small-arms models, under the immediate charge of the inspecting officer, where samples of the products of the armories will be periodically received, examined, and compared.

Arming and equipping the militia.

The expenditures from this appropriation during the last fiscal year amount to \$179,535 27. The principal articles procured by purchase and by fabrication at the arsenals were as follows, viz :

- 64 bronze field guns of different calibres.
- 23 bronze field howitzers of different calibres.
- 12 prairie carriages.
- 6 caissons.
- 4,260 percussion rifles.
- 5,000 percussion pistols.
- 506 Colt's dragoon pistols.
- 1,000 artillery swords.
- 500 sword bayonets for sappers' musketoons.
- 9,892 infantry cartridge boxes.
- 8,405 infantry cartridge-box belts.
- 13,511 infantry waist belts.
- 10,926 infantry bayonet scabbards with frogs.
- 10,683 gun slings.
- 8,365 cap pouches and cone picks.
- 1,824 sword shoulder belts.
- 3,252 rifle pouches.
- 1,534 rifle cartridge boxes.
- 2,580 pouch and flask belts.
- 2,000 copper powder flasks.
- 1,288 sabre belts for cavalry and horse artillery.
- 460 pairs holsters.
- 200 sabre knots.
- 240 carbine swivels.
- 860 carbine slings.
- 160 pistol cartridge boxes.
- 600 carbine cartridge boxes.
- 1,600 artillery sword belts.

The apportionment of arms, and the supplies furnished to the militia during the year, are shown in statements A and B, hereto annexed. In compliance with the provisions of the 7th section of the act of March 3, 1855, the distribution of arms to the several States for the year 1855 has been made according to the number of their representatives and senators respectively. The distribution to the Territories and the District of Columbia has been made under the regulations prescribed by the President, as required, which apportion to each a number of arms equivalent to the quota of a State having the least representation in Congress. Previously, and in addition to the several quotas thus apportioned to the States, Territories, and District of Columbia, there was assigned under the authority granted by the proviso to the section before stated, to each of them which had not received a supply equivalent to 2,000 stands of arms, a sufficient number to make the supply of each not less than that number. The mode of apportionment, as directed by the act of 1855, will effect a much more just distribution than it was found practicable to make under the provisions of the act of 1808.

This department was required to furnish an estimate of the cost of erecting an armory for the reception and preservation of the arms of the volunteers of the District of Columbia, and on the 29th June, 1854, such an estimate, amounting to the sum of \$30,000, was furnished, accompanied by a plan of such a building as was deemed suitable for that purpose; but before final action was taken in Congress on the measure, two other purposes were connected with the plan—one a depository for models, and the other a depository for national trophies—either of which would increase the estimated cost as proposed in this office for the erection of the armory. Plans combining the three purposes have been prepared, and proposals have been invited for the erection of the building; but as the expenditure is limited to the appropriation, it is not expected that any offers of a satisfactory kind will be made.

[NOTE.—Since this was written, a bid has been accepted and a contract made for building the armory on the plan combining the three purposes; but, in order to bring the bid within the available means, it was necessary to omit from the specifications of the work required by the plan, the furniture of the building, such as gun racks and accoutrement presses, and the painting of these and the outside walls. Should it be deemed advisable to provide for the omitted work, and to carry out the proposition immediately following, in relation to the reception and arrangement of models of small-arms, under the direction of the inspector of that branch, an additional appropriation will be required.]

A favorable opportunity is presented of submitting a proposition, which I accordingly do, of enlarging the first plan and estimate submitted by this office, so as to give accommodation for the reception and arrangement of models of small-arms, under the direction of the inspecting offices of that important branch of the service.

Ex. Doc. 1—35*

Arsenals and depots.

The expenditures during the last year, from the appropriation for arsenals, amount to \$42,194 25. This sum has been applied to the repairs and preservation of public buildings, fences, wharves, &c., the erection of new and additions to old buildings, and all improvements of a permanent character. The reports, hereto appended, from the commanding officers of the principal arsenals, furnish detailed statements of the work thus done, and of the other operations at each. The number of arsenals and depots which have been in use during the year is twenty-six, including the depots at San Antonio, Texas, at Fort Union, New Mexico, and at Fort Vancouver in Washington Territory, which are mere temporary arrangements, made from the necessity of some expedient to keep supplies in those quarters, and which it is intended to replace with suitable arsenals, as mentioned in a former part of this report, when the means for so doing shall be appropriated. The ordnance depot at St. Augustine, Florida, which was established during the war with the Seminole Indians, being no longer necessary, has been broken up, such of the stores thereat as were not required for the fort at that place have been removed to the nearest arsenal, and the military storekeeper transferred to Apalachicola arsenal, in the same State. In consequence of the removal westward of our military operations and frontier posts, the ordnance depot at Liberty, Missouri, which was established some eighteen years ago to supply them, has become out of position and almost useless for the purpose. The opinion that has been for some time entertained was confirmed in fitting out the recent Sioux expedition, that the most suitable place for such a depot, west of St. Louis, was at Fort Leavenworth. It is proposed, therefore, to break up the depot at Liberty, and establish one in lieu of it at Fort Leavenworth, and an ordnance officer has been directed to make the requisite preliminary inspections and examinations. An ordnance depot will also be required to supply the troops and posts on the headwaters of the Mississippi, and on our frontier to the north and west of that river and the lakes. The post of Fort Snelling, when abandoned as a station for troops, will furnish a proper site for such a depot, which can readily be furnished, during the season of river navigation, with supplies prepared at St. Louis arsenal. When reports are received of the inspection and examination which has been ordered in relation to the Liberty depot, the establishment of these depots will be made the subject of a special report, with such estimates and suggestions in regard to details as may be necessary. In addition to the service at arsenals and ordnance depots, officers of the Ordnance department have been assigned to duty in the staff of the commanding generals of the military departments of Texas, of New Mexico, of the Pacific, and of the Sioux expedition. These officers have reached their respective stations, and have entered upon the duties assigned to them. Although the smaller arsenals and ordnance depots may seem to be the proper stations for the junior lieutenants of ordnance, it has always been the practice to post these officers at the more important arsenals, where the most active and extensive operations are carried

on. This practice has been adopted for the reason that it affords the junior officers an opportunity of learning the practical duties of their profession, and becoming familiar with the construction of the various arms, implements, equipments and accoutrements of the different kinds of troops, the preparation of ammunition, and all that relates to the fabrication, inspection, packing and preparing for issue of the various ordnance stores and supplies. It moreover avoids the isolation, which is dangerous to the habits of the young officer, of the smaller arsenals and depots, where employment but for one officer can be found, and that almost exclusively the receipt, custody, and issue of stores. Such employment is peculiarly appropriate to the military storekeepers of the department, and they have most generally been so assigned. The act of 23d August, 1842, authorizes the employment of military storekeepers at arsenals; and if they are excluded by the law, as it now stands, from service at ordnance depots, where they can be most appropriately and usefully employed, it is highly desirable for the public interest that the law should be modified. As ordnance depots, however, are, in reality, arsenals of deposite, and the term depot is ordinarily used to distinguish them from arsenals, which, in addition to being depositories, are also places of construction or of repairs, it is thought that the employment of military storekeepers at the depots is not contrary to the letter of the law; there is no doubt in my mind of its being in accordance with its spirit and intent. In this connexion it seems proper to refer to the inadequacy of the compensation of the military storekeepers of ordnance, and of the master-armorers and clerks, at the national armories. At the salaries fixed by the act of August 23, 1842, all these persons are underpaid, considering the advance, since then, in the cost of living, and the extent and character of their responsibilities and duties; and an increase of twenty-five per cent. would not give them now more than a fair compensation. I recommend this increase to their present salaries.

I must again call attention to the exclusion of the enlisted men of ordnance from the benefits conferred on all other enlisted men of the army by the act of August 4, 1854, to increase the pay of the rank and file of the army; which exclusion, although manifestly not the intention of the law, results from its phraseology. As I stated, in my last report, this exclusion of the enlisted ordnance men is manifestly unjust, and there is no conceivable reason for excluding this particular portion of the rank and file of the army from the benefits conferred by the law on all the rest. The attention of Congress was invited to the matter in your report, and it was suggested that an explanatory act should be passed to extend the increase of pay to all enlisted men of the army. Although this suggestion was obviously proper, and its adoption could have no other effect than to secure the execution of the law, according to its real intent, no legislation was had on the subject, and the law still continues to be executed on erroneous construction. I trust that the explanatory act before suggested will be again recommended, and that it will be passed.

Respectfully, your obedient servant,

H. K. CRAIG, *Colonel of Ordnance.*

Hon. JEFF'N DAVIS, *Secretary of War.*

A.

Apportionment of arms for the year 1855, under the law of 1808, for arming and equipping the whole body of the militia, as amended by the seventh section of the act approved March 3, 1855, and the regulations established in conformity thereto.

States and Territories.	Number of representatives and senators in Congress.	Number of muskets.
Maine	8	365
New Hampshire	5	228
Massachusetts	13	594
Vermont	5	228
Rhode Island	4	183
Connecticut	6	274
New York	35	1,599
New Jersey	7	319
Pennsylvania	27	1,233
Delaware	3	137
Maryland	8	365
Virginia	15	686
North Carolina	10	457
South Carolina	8	365
Georgia	10	457
Florida	3	137
Alabama	9	411
Louisiana	6	274
Mississippi	7	319
Tennessee	12	548
Kentucky	12	548
Ohio	23	1,051
Michigan	6	274
Indiana	13	594
Illinois	11	502
Wisconsin	5	228
Missouri	9	411
Iowa	4	183
Arkansas	4	183
Texas	4	183
California	4	183
*Minnesota Territory		137
*Oregon.....do		137
*Washington...do		137
*Nebraska.....do		137
*Kansas.....do		137
*Utah.....do		137
*New Mexico...do		137
*District of Columbia		137
		14,615

* Apportionment according to the regulations established under authority of the seventh section of the act of March 3, 1855.

H. K. CRAIG, Colonel of Ordnance.

ORDNANCE OFFICE, Washington, October 25, 1855.

B.

Statement of the ordnance and ordnance stores distributed to the militia from July 1, 1854, to June 30, 1855, under the law of 1808, as amended by the 7th section of the act approved March 3, 1855.

- 20 6-pounder bronze guns.
- 2 12-pounder bronze howitzers.
- 12 12-pounder bronze mountain howitzers.
- 35 carriages for field artillery, with implements and equipments complete.
- 8 caissons, with tools and spare parts.
- 19 sets of artillery harness for two wheel-horses.
- 20 extra gunners' belts.
- 30 extra linstocks.
- 2 extra cannon locks.
- 28 extra rammers and sponges.
- 5 extra pendulum hausses.
- 12 extra tarpaulins.
- 8 extra bricoles.
- 2 extra vent covers.
- 2 musket bayonet reamers.
- 4,352 muskets and appendages.
- 310 cadets' muskets and appendages.
- 234 sappers' musketoons and appendages.
- 600 artillery musketoons and appendages.
- 2,518 rifles and appendages.
- 30 Hall's carbines and appendages.
- 850 percussion pistols and appendages.
- 106 Colt's dragoon pistols and appendages.
- 680 cavalry sabres.
- 50 horse artillery sabres.
- 386 non-commissioned officers' swords.
- 256 musicians' swords.
- 1,020 artillery swords.
- 11,034 sets of accoutrements for infantry, riflemen, and cavalry.
- 200 infantry cartridge-box belts.
- 1,950 infantry waist belts.
- 774 infantry bayonet scabbards.
- 4,649 cap pouches and cone-picks.
- 1,626 sword belts for non-commissioned officers and artillery.
- 313 rifle cartridge boxes.
- 87 rifle pouches.
- 87 flask and pouch belts.
- 143 copper powder flasks.
- 450 belts for cavalry and artillery.
- 825 pairs of holsters.
- 400 sabre knots.
- 330 carbine cartridge boxes.

1858, for
ded by the
the regula-

Number of mus-
kets.

365
238
594
238
183
274
1,599
319
1,233
137
365
686
457
365
457
137
411
274
319
548
548
1,061
274
594
502
228
411
183
183
183
137
137
137
137
137
137
137
137

14,615

licity of the seventh
of Ordnance.

330 carbine slings and swivels.
 920 extra cones.
 1,000 tumbler screws.
 200 musket mainsprings.
 117 stands of fixed ammunition for field artillery.
 32,500 cartridges for small-arms.
 237,000 percussion caps for small-arms.
 5,000 cannon primers.
 25 pounds olive paint.

H. K. CRAIG,
Colonel of Ordnance.

ORDNANCE OFFICE,
Washington, October 25, 1855.

C.

Ordnance and ordnance stores issued to the army, and to the several military posts, for the year ending June 30, 1855.

5 10-inch columbiads.
 68 8-inch columbiads.
 20 42-pounder guns.
 25 24-pounder howitzers for flank defence.
 6 6-pounder bronze guns.
 4 12-pounder bronze howitzers.
 50 8-inch columbiad casemate carriages.
 17 8-inch columbiad barbette carriages.
 20 42-pounder barbette carriages.
 25 24-pounder howitzer casemate carriages.
 6 6-pounder carriages.
 4 12-pounder howitzer carriages.
 10 prairie carriages.
 10 mountain howitzer carriages.
 13 caissons.
 3 travelling forges.
 1 battery wagon.
 36 sets of artillery harness for two wheel-horses.
 39 sets of artillery harness for two lead-horses.
 220 10-inch shot.
 1,123 8-inch shot.
 4,000 42-pounder shot.
 900 10-inch shells.
 4,545 8-inch shells.
 700 spherical case shot, different calibres.
 3,573 stands of fixed ammunition, for field service.
 2,075 stands of ammunition for siege and garrison service.
 2,348 muskets and appendages.

2,661 rifles and appendages.
585 cavalry musketoon and appendages.
200 artillery musketoon and appendages.
1 sapper's musketoon and appendages.
484 Colt's pistols and appendages.
590 cavalry sabres.
229 horse artillery sabres.
72 non-commissioned officers' swords.
61 musicians' swords.
2,400 sets of infantry accoutrements.
2,694 sets of rifle accoutrements.
676 sets of cavalry accoutrements.
49 sword shoulder belts.
5,472 cartridges for field service.
1,713,070 cartridges for small-arms.
8,795 cannon percussion primers.
799,950 percussion caps for small-arms.
5,660 friction primers.
550 quill primers.
550 percussion copper primers.
66,120 pounds gunpowder.
1,737 pounds paint.
439 gallons of oil.

H. K. CRAIG,
Colonel of Ordnance.

ORDNANCE OFFICE,
Washington, October 25, 1855.

D.

Summary statement of the action of the Ordnance Board in relation to new models for small-arms, &c.

ORDNANCE OFFICE,
Washington, June 26, 1855.

SIR: I have the honor to submit the report of the proceedings and recommendations of the Ordnance Board, in regard to the establishment of new models for the small-arms for our military service. For reasons assigned by the board, which I think conclusive, a smaller calibre than that of our present musket, but greater than that of our rifle, viz: .58 inch, is proposed for all our small-arms; 40 inches is recommended as the length of the musket-barrel; 26 inches as that of the sapper's musketoon, which will be provided with a sword-bayonet; and 10 inches for the barrel of the pistol, which barrel, being also provided with a suitable stock, will answer for a dragoon or artillery carbine, for which a range of 500 yards fits it. One lock, with magazine for 50 Maynard primers, will answer for either musket or muske-

toon; a smaller lock, with magazine for 25 primers, will serve for either the pistol or artillery carbine. All the barrels of .58-inch calibre to be rifled with three grooves, decreasing depth; the musket and musketoon to have a six-feet twist, and the carbine and pistol-barrel a twist of four feet; in other words, the grooves to make a revolution in a length of six feet for the two first, and in a length of four feet for the last. It is recommended by the board that our present rifles be enlarged in calibre to .58 inch, but no proposition has been made for a new model of this particular arm, in the belief it is supposed that the sapper's mausketoon may be substituted for it. Concurring as I do with the board in its other recommendations with regard to a new model, and the details which I submit for your sanction, I cannot agree with it in opinion as to the propriety of ceasing the fabrication of the arm now called the rifle. To arrange a new model of this arm in accordance with the main features of the other arms, it will only be necessary to enlarge the calibre from .54 to .58, and arrange the stock for the Maynard musket-lock, the other points remaining nearly as at present. For such an arm we have a factory and extensive machinery capable of turning out at least 3,000 per annum. I cannot, therefore, recommend the omission of this arm in our future fabrication.

I have the honor to submit, also, for your consideration and approval, the recommendation of the Ordnance Board for certain modifications in the carriage and the caisson of the mountain howitzer, to render them more efficient for service on the prairies.

Those pieces were not originally intended for such service, but carriages for that purpose were subsequently arranged for them on the suggestion of some artillery officers; these were afterwards modified and corrected as the defects were developed, and it was believed that carriages of a serviceable form had been obtained. The late trials made at Fort Leavenworth proved that material changes were called for. The report of these trials has further proved that these carriages were expected to undergo tests to which they should not have been subjected: for instance, their use in the transportation of the gunners. The board, therefore, in taking measures to render these carriages as serviceable as possible, has very properly taken the precaution to arrange them in such manner that they cannot be exposed to unreasonable trials.

Your sanction is asked for the proposed modifications.

Very respectfully, your obedient servant,

H. K. CRAIG,

Colonel of Ordnance.

HON. JEFF'N DAVIS,

Secretary of War.

The calibre of .58 of an inch for all small-arms, the length of 40 inches for the musket-barrel, and of 10 inches for the pistol-barrel, with the details of the lock and other component parts, are approved as recommended, and the proposed change in the gun-carriages is adopted.

The present rifle, modified by the adoption of the new calibre and primer-lock, will be continued, and will be issued to the sappers

instead of the musketoon, the manufacture of which will be discontinued.

The pistol will be provided with a movable stock, by the application of which, it may be used as a carbine by light artillery and mounted troops.

JEFF'N DAVIS,
Secretary of War.

JULY 5, 1855.

Statement of the principal operations at the Armories and Arsenals during the year ended June 30, 1855.

SPRINGFIELD ARMORY, UNDER THE SUPERINTENDENCE OF J. S. WHITNEY.

The principal operations at this armory during the year were as follows:

Fabricated.

- 6 muskets altered to Maynard's patent primer.
- 3 sample rifle-muskets.
- 2 sample rifle cavalry carbines.
- 1 sample rifle sapper's musketoon, with sword-bayonet.
- 27 rifle-muskets, with calibres of various sizes and different number of grooves, for experimental firing.
- 4 rifle carbines, for experimental firing.
- 8,624 percussion muskets, model of 1842.
- 500 percussion musketoons, artillery.
- 80 percussion musketoons, (sappers') with sword-bayonets.
- 300 cavalry rifle carbines.
- 5,946 cones, extra.
- 27,471 wipers.
- 4,156 screw-drivers.
- 7,024 ball-screws.
- 956 hammers for altering flint-muskets to percussion.
- 1,757 spring-vices.
- 227 arm-chests.
- 222 packing-boxes.

In process of rifling.

- 478 muskets, percussion, model of 1842.

Tools.

New tools of the value of \$640 have been made for the fabrication of cavalry rifle carbines and experimental arms.

Two sets of model-gauges have been prepared for adapting the musket—model of 1822—for the Maynard primer.

Machinery.

- 1 machine for sawing wood, completed.
- 6 machines for rifling barrels, hand, completed.
- 6 machines for rifling barrels, power, in progress.
- 1 water-wheel, in progress.
- 9 tilt-hammers, in progress.
- 1 machine for shaving components of arms, in progress.
- 1 machine for planing iron, power, purchased and improved.
- 1 machine for rifling barrels, power, purchased and improved.

Experiments, &c.

A series of scientific experiments has been conducted at this armory, during several months of the year past, with particular reference to the contemplated change in the models of small-arms from smooth-bore to the rifle, for determining the calibre of the barrel, the number, depth, and shape of the grooves, the shape and flight of the ball, the arrangement of sights, &c. These experiments have been conducted by Lieutenant Benton, of the ordnance corps, and have led to many valuable results.

The change in the models having been determined upon by the department early in the year, the manufacture of the percussion musket of the model of 1842 has been gradually diminished and finally abandoned. This will account for the diminished number of these arms made during the year past.

Twenty-seven thousand five hundred muskets, in arsenals, have been cleaned and oiled, up to the 30th of June.

Buildings.

The painting of the public buildings has been continued during the year, comprising the new store-house, offices, and the superintendent's, master-armorers, and clerk's quarters. The latter have also been repaired and furnished with gas fixtures.

Grounds, &c.

The iron fence has been extended along the west side of the armory grounds the distance of — panels, and painted. The foundation for the same has been laid, between 800 and 900 feet, along the east side of Union square. The whole number of panels which it is intended shall be erected before the close of the season will be 235, of 12½ feet each, exclusive of gateways. A large culvert has been constructed within the iron fence at the southwest corner of the government land, which effectually drains all that portion of the grounds.

The fence around the east square, for which funds were assigned, has been commenced, and will be finished this season. The grounds generally have been repaired and sodded, where it was necessary, and improved by setting out shade-trees along the line of State street, and through the squares.

The plans and estimates for concentrating at the upper water privilege all the work heretofore done at the several water-shops, which were submitted, having been approved by the Secretary of War, preparations are now making, under the orders of the department, for the early commencement and vigorous prosecution of that work.

HARPER'S FERRY ARMORY, UNDER THE SUPERINTENDENCE OF HENRY W. CLOWE.

The principal operations at this armory during the year were as follows:

Musket factory.—Arms and appendages fabricated.

- 7,700 percussion muskets, model of 1842, complete.
- 2,148 cones, extra.
- 11,279 wipers.
- 2,672 spring vices.
- 10,322 screw-drivers, P. F. L. musket.
- 5,329 screw-drivers.
- 907 ball screws.
- 5,340 components, assorted, for issue to other posts.
- 2,000 ball cartridges, for issue to other posts.
- 172 bullet moulds, brass, for elongated balls.
- 44 swedges, for elongated balls.
- 1,639 sword bayonets for rifles, stud attachment.
- 1,646 sword bayonets for rifles, ring attachment.
- 40 sword bayonets for rifles, (musicians',) stud attachment.
- 8 reamers for sword bayonets.
- 92 sword bayonet boxes.
- 3,199 long range back-sights for rifles, screw pattern.
- 1,662 long range back-sights for rifles, slide pattern.
- 3 experimental muskets.
- 176 arm chests.

Machinery fabricated and in progress.

- 1 machine for bending wipers, finished—reported half done last year.
- 2 machines for rifling musket barrels, finished.
- 2 machines for slugging musket barrels, finished—(one of these for Frankford arsenal.)
- 1 machine for slugging musket barrels, nearly finished.
- 2 machines for milling side-screws and guard-bows, nearly finished.
- 1 heavy drop-hammer, for use in tilt shop, nearly finished.
- 1 set of tools for fabricating long-range sights, with *screw*, fabricated.
- 1 set of tools for fabricating long-range sights, with *slide*, fabricated.
- 1 set of tools for fabricating swords-bayonets for rifles, fabricated.
- 1 set of tools and fixtures for rolling and scrapping iron, fabricated.
- 1 cast-iron forge for rolling mill, fabricated.
- 1 cast-iron furnace for rolling mill, fabricated.

47 feet, lineal, main-line shafting put up and in operation on first floor of bell shop.

$32\frac{1}{2}$ feet, lineal, counter-line shafting, put up and in operation on first floor of bell shop.

10 feet, lineal, counter-line shafting, put up and in operation on first floor of machine shop.

This shafting is of the latest and most approved style, finished bright, with cast-iron pulleys, gearing, and metallic journals.

1 water-wheel for rolling mill, finished and in operation.

1 forebay for rolling mill, cast-iron frame, columns, gates, gearing, and planking, secured by iron bolts and screws.

Machinery for rolling mill, including the water-wheel and forebay, partially reported last year, has been completed and put into operation, and about ten tons of iron fabricated and rolled into suitable bars and shapes. Extensive improvements have been made on the shingling and drawing hammers, furnaces and fixtures. Fixtures and machinery for drawing head-gates at the rolling mill nearly completed.

Various and extensive improvements have been made to the main and counter-line of driving machinery on the second floor of the bell shop, tilt-hammer shop, second floor of boring mill, stocking shop, grinding mill, and polishing shop; to the water-wheel at bell shop, improving the head-gates of the same, and also to the pit-gearing of that at the machine shop.

Buildings.

New magazine for powder.—This building is of brick, 12 by 16 feet, one story, covered with slate, enclosed by a brick wall coped with cut-stone; upon a portion of this walling iron fencing is placed, and a lightning rod put in position. The building is located on the bluff, immediately above the canal basin opposite the rolling mill. This building was commenced and completed within the year.

New stock house.—Commenced and nearly completed; of brick, 100 by 35 feet, two stories, covered with slate, on stone foundations, cut-stone water-table; the doors and window frames are of cast iron. This building only needs the painting of the walls outside to complete it. The foundation is that which was reported last year as nearly excavated for the new arsenal.

The enclosing wall and fence on the north side of the main entrance gate to armory yard, consisting of stone foundation, brick piers and panels, coped with cut-stone, and wrought-iron fence, resting upon the coping, is completed. This is similarly finished to that on the south side of gateway, completed some years ago.

Enclosing wall and fence has been put up at the west end of the armory yard, near the rolling mill on the west side, consisting of stone foundation, cut-stone coping, brick piers and panels, with wrought-iron fence, filling the space between the piers, and extending from the Baltimore and Ohio railroad track to the basin, leaving the waste-weir and gates within, and thus cutting off all communication with the armory yard from that side.

The superintendent's and other free quarters, as well as the dwelling-houses belonging to the United States, have all received slight necessary repairs during the year; the quarters of the superintendent have been thoroughly painted inside.

A new office has been built in the rolling mill for the foreman.

Grounds.

A road of about two hundred yards in length has been cut and graded, leading from Washington street to the new magazine by an easy ascent, and a number of forest trees planted on the grounds surrounding the magazine and adjacent to the armory. Some considerable amount of fencing has been made and repaired, necessary for the protection of grounds attached to dwelling-houses, armory grounds, and the opening of streets.

New dressed stone curbing and flagging has been placed in front of the public houses on the east end of Washington street, to conform to the grade of this street prescribed by the corporation of Harper's Ferry.

A very considerable amount of filling in with stone and earth has been done in the armory yard to complete coal bins under the railroad; also, the grounds in front of the shops have to some extent been filled up and graded, to bring them to a uniform level with the portions heretofore completed.

The wall along the south side of armory canal has been excavated for, and the foundation of stone completed about 1,365 feet in length. A portion of this wall is sixteen feet high, while the residue is from six to nine feet in height, with an average thickness of three feet. 1,365 feet of cut-stone caps for piers have been made ready to place upon the wall when the brick piers are built.

All the exterior grounds about the rolling mill have been graded, walled, and filled up with stone and earth. The house for the protection of the rolling mill water-wheel has been built, with slate roof and brick walls. The embankment all around the mill on the canal side has been supported with a good dry wall, consisting of some 350 perch, and, where it was necessary, mortar or grouted masonry has been used. This dry walling is extended from the east end of the mill on the south side and gable end, where it terminates in the Potomac river, by a tail race for the outlet of the water from the wheel-pit. These exterior grounds are now fully completed.

The stable grounds have been filled in to a uniform level with about 600 cubic yards of filling, leaving a portion of the yard yet to be filled up.

Rifle factory.—Arms and appendages fabricated.

1,300 percussion rifles, brass mountings.

590 percussion rifles, with long-range sights, *screw* pattern.

449 percussion rifles, with long-range sights, *slide* pattern.

2,339 total.

- 1,041 percussion rifles, brass mountings, received from Washington arsenal, adjusted with long-range sights, screw pattern, and studs for sword bayonets.
- 1,200 percussion rifles, brass mountings, received from Washington arsenal, adjusted with long-range sights, slide pattern, and studs for sword bayonets.
- 3,589 wipers fabricated.
- 3,597 screw-drivers fabricated.
- 578 spring-vices fabricated.
- 477 ball screws fabricated.
- 41 ball moulds, round balls, fabricated.
- 100 ball moulds, conical balls, fabricated.
- 2,439 cones, extra.
- 326 carbine barrels.
- 325 carbine cones, extra.
- 929 rod ferrules.
- 2,499 components, assorted, for issue to other posts.
- 40 swedges for balls.
- 2 bullet moulds, brass, for elongated balls.
- 3 experimental arms.

Machinery fabricated and in progress.

- 1 hand turning-lathe in progress of fabrication.
- 2 stock cutting machines undergoing alterations.
- 5 cutting machines greatly improved.

The annealing furnaces have been enlarged and extensively repaired and improved in construction.

The water wheels at the finishing shop and at the forging shop have been generally repaired.

Special work.

In addition to the experimental arms which have been made and reported among the fabrications, much labor has been expended in experimental firing of rifles to graduate the back-sight of those arms for long ranges.

Much time and labor has been likewise expended in getting up a lock suitable for all arms, and adapted for the Maynard primer as well as for the percussion cap.

WATERVLIET ARSENAL, COMMANDED BY MAJOR JOHN SYMINGTON.

The operations at Watervliet arsenal, for the year ended June 30, 1855, were as follows:

1st. About 140 feet in length of the new smith's shop is erected, with the exception of covering the roof with metallic plates. This building when completed will be 242 feet long by 47 wide, with two pediment fronts, and will accommodate 40 cast-iron forges, with the necessary tilt-hammer, pinching-presses and shears; also brass foundry,

annealing and heating furnaces, &c. The walls are of brick, on stone foundations; the roof framing, door and window frames, of iron; floor covered with stone flagging.

2d. The large water-wheel in carriage-maker's shop thoroughly repaired, with the entire new cast-iron segment and driving pinion.

3d. The steam-engine boiler reset and fitted with new cast-iron front and grate bars.

4th. 758,000 feet of gun-carriage and other timber, &c., received, inspected, and piled in store-house.

5th. Repairs made to the following buildings, &c.:

Brick arsenal. Roof and balustrade painted.

Offices. 36½ squares of slating laid.

Stone arsenal. The whole exterior wood-work painted.

Store-houses. Blinds, doors, and sashes painted, and new stone sills placed in one of them.

Iron store and shops Nos. 3, 4, and 5. Chimney-tops relaid, and other repairs made.

Gates, fences, roads, and machines and tools, &c., repaired.

The stores fabricated are as follows:

6 prairie caissons,	}	with implements, equipments, tools, and spare parts complete.
7 6-pounder gun-carriages,		
12 12-pounder mountain-howitzer carriages,		
23 12-pounder prairie-howitzer carriages,		
4 portable forges,		
20 42-pounder barbette chassis,		
10 42-pounder barbette upper carriages,		
22 8 inch columbiad barbette chassis,		
22 8-inch columbiad upper carriages,		
5 10-inch columbiad upper carriages,		
29 circular platforms for upper carriages,	}	
750 stands 24-pounder canister shot.		
100 stands 42-pounder grape shot.		
159 stands 8-inch grape shot.		
50 rounds 12-pounder fixed shot.		
25 rounds 24-pounder strapped shot.		
275 rounds 24-pounder canister shot, howitzer.		
6 rounds 24-pounder howitzer spherical case shot.		
20 rounds 6-pounder gun spherical case shot.		
507 rounds 12-pounder mountain-howitzer spherical case shot.		
2,296 cap-pouches and cone-picks.		
30,000 musket cartridges.		
3,000 musketoon cartridges.		
99 6 pounder cartridges.		
70 10 inch columbiad cartridges.		
104 8-inch columbiad cartridges.		
3,100 42-pounder flannel cartridge bags.		
50 6-pounder flannel cartridge bags.		
875 12-pounder flannel cartridge bags, mountain howitzer.		
149 10-inch columbiad flannel cartridge bags.		
3,202 8-inch columbiad flannel cartridge bags.		

- 3,300 paper fuzes, garrison and field.
- 40 port-fires.
- 2 pounds quick-match.
- 117 signal rockets.
- 1 set of spare parts for battery wagon.
- 64 sets of harness for two wheel-horses, partly finished.
- 2 complete sets of implements for mechanical manoeuvres.
- 10 garrison, field, and siege guns, with blocks, falls, handspikes, &c., complete.
- 2 sling carts, large, complete with chains, &c.
- 272 pounds mixed paint.
- 46 pickaxes.
- 150 sponge buckets, iron.
- 50 tar buckets, iron.
- 200 gunner's gimlets.
- 26 gunner's levels.
- 80 manoeuvring handspikes.
- 100 truck handspikes.
- 73 roller handspikes for flank defence carriages.
- 11 sets lead harness for two horses, altered to wheel.
- 2 pack-saddles rendered serviceable.
- 6,125 rounds field ammunition, altered.
- 333,000 cartridges for small-arms, altered.

ALLEGHENY ARSENAL, COMMANDED BY LIEUTENANT T. J. BRERETON.

The principal operations at this arsenal during the year were as follows:

Articles fabricated.

- 2 6-pounder field carriages.
- 5 6-pounder caissons.
- 4 12 pounder howitzer caissons.
- 19 sheet-iron tar buckets.
- 22 leather watering buckets.
- 47 trail handspikes.
- 38 gunners' haversacks.
- 52 sets of artillery harness for two wheel-horses.
- 80 sets of artillery harness for two lead-horses.
- 286 nose bags.
- 48 drivers' whips.
- 65 lanyards for friction primers.
- 2 prolonges.
- 54 sponges and rammers.
- 20 tangent scales.
- 54 large tarpaulins.
- 2 small tarpaulins.
- 50 tube or fuze pouches.
- 22 worms and staves.

- 56 oakum wads (for columbiads.)
- 22 tow hooks.
- 10 sponge covers.
- 3,519 infantry cartridge boxes.
- 3,560 infantry cartridge box plates.
- 4,005 infantry cartridge box belts.
- 3,640 infantry cartridge box belt plates.
- 3,327 bayonet scabbards with frogs.
- 4,368 infantry waist belts, (1½ inch.)
- 3,930 infantry waist belt plates.
- 4,126 gun-slings.
- 8,383 cap pouches and cone picks.
- 6,907 rifle and carbine cartridge boxes.
- 3,592 rifle and cavalry cartridge box plates.
- 1,002 rifle ball pouches.
- 991 rifle flask and pouch belts.
- 2,824 rifle sword bayonet scabbards.
- 1,744 rifle sword bayonet waist belts, with clasps, &c.
- 1,400 cavalry sabre belts.
- 2,100 non-commissioned officers' shoulder belts.
- 1,760 non-commissioned officers' shoulder belt plates.
- 580 sergeants' and musicians' waist belts.
- 1,864 sergeants' and musicians' waist belt plates.
- 453 horse artillery sabre belts.
- 4 rifle expanding bullet swedges.
- 1,497 revolver holsters.
- 5,828 rifle waist belts, (1.9 inch.)
- 3,360 rifle waist belt plates.
- 1,000 carbine slings.
- 240 carbine swivels.
- 2,222 sabre knots.
- 1,500 Colt's pistol holsters.
- 128 columbiad proof cartridges.
- 36 12-pounder silk cartridges.
- 450,000 rifle expanding bullet cartridges.
- 135,000 rifle blank cartridges.
- 933,000 rifle expanding bullets.
- 15,000 musket expanding bullets.
- 7 pounds of quick-match.
- 645,000 musket ball and buck-shot *flint lock* cartridges, altered to percussion lock.
- 1 field carriage limber.
- 1 ammunition chest.
- 1 field carriage wheel.
- 30 field carriage poles, ironed, &c.
- 80 field carriage spokes.
- 24 field carriage fellies.
- 1 field carriage pole yoke.
- 38 field carriage pole straps.

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- 19 field carriage pole-pads.
- 7 elevating screws.
- 3 elevating screws nuts.
- 6 artillery bridles.
- 6 artillery collars.
- 20 artillery traces.
- 66 chain halters, and many other spare parts, tools and stores for field battery.
- 1 elongated bullet press; and
- 1 rolling machine, for St. Louis arsenal.
- 1,100 packing boxes assorted fireworks for display on 4th July.

Tools, &c., for current service.

- 1 bookcase.
- 12 dies, assorted.
- 10 dies and punches.
- 253 accoutrement formers (wooden.)
- 4 fire fenders.
- 2 shell gauges.
- 1 set of two-horse harness.
- 1 elongated bullet press.
- 1 rolling machine.
- 44 patterns for castings.
- 6 copper pans.
- 1 fire pot.
- 1 pair shears.
- 1 wrench.
- 1 buffing wheel, and various other tools, fabricated for current service.

Other work done.

464 feet of cast-iron blast-pipe and 8,000 square feet of brick-floor laid in the new smithy. The ceilings, partitions, doors, windows, &c., of the new machine-shop, and the windows and doors of the new smithy painted. 270 square feet of the brick lining of No. 1 reservoir taken out, relaid, and plastered with hydraulic cement.

147 square feet of brick wall built.

376 square feet of sheds erected.

The old frame, anvil block, helve, &c., of the trip-hammer removed, and new ones put in their stead.

4 chimneys of the old smithy torn down and rebuilt.

155 lineal feet of brick barrel sewers constructed.

4 furnaces taken down and rebuilt, in the brass foundry.

The interior of the quarters repaired, painted, and put in good order.

289,000 feet of gun carriage timber taken down and repiled.

346,000 feet of gun carriage timber cut to proper length and repiled in the sheds.

The tires and nave bands of 66 field carriage wheels taken off, cut, and reset, and the wheels repainted.

250 feet of old water and gas pipe taken up and relaid, and 200 feet new pipe laid.

10 racks, for implements, put up in the warehouse.

50 cubic feet of cut stone laid at the centre of fountain.

800 loads of gravel, cinders, &c., hauled and deposited on the public roads, walks, and grounds.

160 lineal feet of 12 feet wide gravelled road constructed.

389 square feet of brick pavement and 400 square feet of pine flooring laid.

216 lineal feet of cast-iron shot frames fixed on permanent foundations.

All the iron cannon, shot, and shells at the post, cleaned, lackered, and repiled.

640 muskets stripped, cleaned, oiled, and replaced in the racks of the arsenal.

Assistance rendered to the inspector in measuring, inspecting, and proving 22 10-inch and 23 8-inch columbiads, received from the Fort Pitt foundry.

Barracks occupied by the enlisted men repaired, painted, &c.

WASHINGTON ARSENAL, COMMANDED BY MAJOR WM. H. BELL.

The operations at this arsenal during the last year have been conducted on a limited scale, as for several previous years.

The following list shows the principal articles fabricated:

20 24-pounder barbette gun carriages.

20 caissons.

70 sets of iron work for pole-pads and straps.

23 sets of iron work for caissons.

16 sets of iron work for travelling forges.

100 worms and staves for siege and garrison guns.

112 6-pounder sponges and rammers.

100 6-pounder sponge covers.

200 lanyards for friction primers.

142 lock lanyards.

10 gunners' callipers.

52 gunners' pouches.

50 thumbstalls.

1,080 6-pounder cartridges.

1,014 6-pounder cartridge bags.

25,000 rifle cartridges, expanding balls.

26,000 rifle balls, expanding.

450 pistol ball cartridges for Colt's pistol.

400 12-pounder howitzer spherical case shot, strapped.

200 6-pounder howitzer spherical case shot, strapped.

25 sets of artillery harness.

FORT MONROE ARSENAL, COMMANDED BY CAPTAIN A. B. DYER.

The following is a summary statement of the principal operations at Fort Monroe arsenal during the year:

The marsh adjoining the ordnance stable has been reclaimed, in about one half the space allotted to the Ordnance department.

1,140 square feet of old wharf taken up, and 190 cubic yards of sand hauled and filled in the same.

The arsenal quadrangle has been raised, and the centre converted into a grass-plat. This space was so flat as to be very uncomfortable during heavy rains.

The road round the quadrangle has been McAdamized, and covered with clay and gravel.

Old brick side-walk in front of finishing shop taken up.

133 square yards of new brick pavement laid in front of workshops.

5,000 32 and 24-pounder balls cleaned and lackered.

100 10-inch shot cleaned and lackered.

147 32-pounder cannon balls, and 4,707 spherical case-shot, various calibres, received, cleaned and lackered.

Experiments with new metal fuzes, for spherical case and field shells, made by Major Mordecai and Major Ramsay.

Report, with details in full, made July 21, 1854.

In pursuance of suggestions, new fuzes were prepared at Washington arsenal, and the experiment continued, which proved highly satisfactory, as to accuracy of fuzes.

Experimental firings with an 8-inch seacoast howitzer, to test a percussion shell, submitted by Mr. W. H. Ward.

Experimental firings of a 10-inch columbiad, on a stone platform, to test carriage and platform.

The following summary from the list of articles fabricated, exhibits the principal ordnance stores which have been prepared for field and garrison service during the year:

10 32-pounder barbette gun upper carriages.

10 32-pounder barbette gun chassis.

15 32-pounder casemate gun upper carriages.

100 manœuvring handspikes.

162 tube pouches.

6 6-pounder sponges and rammers.

32 24-pounder howitzer casemate sponges and rammers.

6 24-pounder field sponges and rammers.

4 32-pounder sponges and staves.

10 6-pounder field worms and staves.

10 12-pounder field worms and staves.

19 24-pounder siege and garrison worms and staves.

20 8-inch siege howitzer sponge covers.

21 32-pounder sponge covers.

10 24-pounder sponge covers.

11 12-pounder sponge covers.

502 32-pounder flannel cartridge-bags.

- 1,166 6-pounder flannel cartridge-bags.
 - 16,920 musket blank cartridges.
 - 8,000 rifle blank cartridges.
 - 8 pounds quick-match.
 - 264 signal-rockets.
 - 450 rocket-sticks.
 - 1 set fireworks.
 - 20 sets iron-work, for 32-pounder barbette carriages.
 - 8 32-pounder pent-houses.
 - 1 fall for garrison gin.
 - 2 cannon scrapers.
 - 20 pounds putty,
 - 400 pounds olive paint,
 - 1,255 pounds black paint,
- } for issue to other posts.

Tools.

- 12 cutters, for machinery.
- 3 chisels, splitting.
- 2 dogs, for lathe.
- 2 gauges, assorted.
- 2 gouges, carpenter's.
- 2 hand-hammers.
- 2 centre-punches.
- 10 reamers, assorted.
- 4 taps, 3 turning-tools, 3 wheel-barrows.

In addition to the foregoing, many small articles, tools and machinery have been made and repaired for the use of the shops.

ST. LOUIS ARSENAL, COMMANDED BY BREVET MAJOR GEORGE D. RAMSAY.

The principal operations at St. Louis arsenal during the year were as follows:

Fabricated.

- 1 travelling forge.
- 10 iron tar-buckets.
- 50 nuts and washers.
- 1,499 packing boxes.
- 24 pack-saddle ammunition chests.
- 3,100 fuze-plugs.
- 9,550 paper fuzes.
- 60,000 percussion musket blank cartridges.
- 40,000 percussion musket buckshot cartridges.
- 127,000 percussion musket buck and ball cartridges.
- 3,640 percussion musket elongated ball cartridges.
- 19,400 percussion musketoon buck and ball cartridges.
- 397,000 percussion rifle elongated ball cartridges.
- 5,000 percussion rifle blank cartridges.

164,170 percussion Colt's pistol ball cartridges.
 13,000 Sharp's carbine blank cartridges.
 75,000 Sharp's carbine ball cartridges.
 120,000 Sharp's carbine balls cast.
 402,500 percussion rifle elongated balls cast.
 7,140 pounds Colt's pistol balls cast.
 2,930 priming tubes.
 850 canisters fixed, field.
 864 canisters fixed, mountain howitzer.
 1,200 spherical case fixed, field.
 463 spherical case fixed, mountain howitzer.
 417 shells fixed, 12-pounder howitzer.
 194 shells fixed, 12 pounder howitzer.

Repaired.

164 small-arms.
 329 swords.
 4 12-pounder howitzer caissons.
 1 6-pounder gun-carriage.
 1 travelling forge.
 1 battery-wagon.

Other work done.

223,000 flint cartridges for small-arms altered to percussion.
 22 sets of artillery harness altered to Grimsley's pattern.
 3,000 rifle ramrod heads altered for elongated balls.
 20,039 small-arms cleaned and oiled.
 1,115 ammunition boxes painted.
 Iron work, complete, made for 50 artillery traces, &c., &c.

Machinery.

1 drill press put up in machine shop.
 1 fan-blower put up in smith's shop.
 73 feet turned iron shafting put up.
 7 hangers and brasses and 15 pulleys put up.

Buildings.

The interior of quarters repaired and painted. Roofs of all the buildings repaired with slate. Old frame building in stable-yard and old stone table torn down, and replaced by a small wagon and straw shed 20 feet square, and small stable 15 by 30 feet.

Most of the buildings have been overhauled, and the interior repaired and painted.

WATERTOWN ARSENAL, COMMANDED BY CAPTAIN R. A. WAINWRIGHT.

The principal operations at this arsenal during the fiscal year ending June 30, 1855, have been as follows :

Articles fabricated.

- 24 10-inch columbiad gun-carriages.
- 24 10-inch columbiad gun-chassis.
- 20 8-inch columbiad gun-carriages.
- 20 8-inch columbiad gun-chassis.
- 24 10-inch elevating jacks.
- 25 8-inch elevating jacks.
- 19 columbiad platforms.
- 176 columbiad truck handspikes.
- 40 columbiad elevating bars.
- 32 columbiad chocks.
- 37 8-inch columbiad sponge-heads and staves.
- 90 tompions for garrison guns.
- 436 cannon cartridges, various calibres.
- 686 cartridge-bags, various calibres.
- 155 sabots, various calibres.
- 176 shell-straps.
- 273 cannon-wads—junk and hay.
- 40 priming-wires.
- 32 shell-hooks.
- 16 gunner's gimlets.
- 6 vent-pouches.
- 1,289 pounds mixed paints.
- 2 bending machines.
- 58 packing-boxes.

Other work.

- 23 barrels cannon-powder proved.
- 140,000 fuzes, rough, moved and piled.
- 58,468 feet of field-carriage timber moved and piled.
- 7,700 rough spokes moved and piled.
- 295 rough handspikes moved and piled.
- 18,900 feet of pine boards moved and piled.
- 18,000 feet of yellow-pine plank piled.
- 125,935 feet of chestnut timber and plank inspected and piled.
- 1 cistern, 1,400 gallons capacity, put up.
- 1,858 shot and shells lackered, in arsenal yard.
- 63 iron cannon lackered, in gun-yard.
- 632 yards iron-fence lackered.
- 15 columbiads lackered and skidded at Fort Winthrop.
- 1,500 8 and 10-inch shells and shot lackered and piled at Fort Winthrop.
- 1,673 8 and 10-inch shells and shot lackered and piled at Fort Independence.
- 1,273 yards painting put on public buildings.
- 12,007 yards of fence whitewashed.
- Quarters, barracks, shops, and stores, repaired and kept in o

a night watch kept up throughout the year for the protection of public buildings and other property.

FRANKFORD ARSENAL, COMMANDED BY BREVET MAJOR P. V. HAGNER.

The principal operations at Frankford arsenal during the year ending June 30, 1855, have been as follows:

Fabricated.

- 104,500 friction tubes for cannon.
- 103 tin packing-boxes for cannon, holding 1,000 each.
- 380 tin packing-boxes for cannon, holding 100 each.
- 1,192,500 Maynard primers.
- 2,897 tin packing-boxes for Maynard primers.
- 36,830 ball percussion cartridges made and packed.
- 28,550 blank percussion cartridges made and packed.
- 20 pounds fulminate of mercury.
- 6 sets of inspecting instruments, for shells, packed in walnut cases, embracing, each, 1 slide callipers, with a full set of points for all calibres for measuring thickness at sides; 1 stem gauge for thickness at bottom; 1 set of fuze-hole gauges for all calibres; 1 inspecting hammer; 1 inspecting punch; 1 screw-driver.
- 3 sets of inspecting instruments, for cannon, packed in walnut cases, embracing, each, 1 star gauge, with points for all calibres; 1 set of ring gauges for all calibres; 1 slide callipers for measuring specimens; 1 standard brass rule; 1 wrench.
- 2 gun-racks, to hold each 900 muskets.
- A large quantity of harness, belts, &c., overhauled, repaired, and blacked.

Machines.

- 1 machine for counter-boring and tapping musket-barrels.
- 1 machine for drawing friction tubes.
- 1 machine for cutting and milling friction tubes, (large tubes.)
- 1 machine for cutting friction tubes, (small tubes.)
- 1 punch press for roughening wire.
- 1 machine for pressing and cutting wires, (addition to old cap machine.)

Experiments were continued during the year to improve the quality of the primers and tubes.

The muskets recently altered have given much more satisfactory results than those heretofore obtained. Trials were made in December last, by a board of officers, with eight different arms, arranged to use the Maynard primers. The report shows that "snaps" (failures to ignite the charge) occur very rarely, except in arms where the mechanism is defective, the force of the blow not being directed in the axis of the cone, or not being sufficient to ignite the primer. Both of these

defects are provided against in the new arms. In 640 fires from *five* different arms only five *snaps* occurred, (some of which were accidental, and might have been avoided) while in other guns snaps were frequent with the same primers, until the cause was detected and corrected.

More recent experiments with one of the new contract locks show that the primers may be relied upon with a fair degree of certainty with these locks. In 140 fires but one snap occurred.

[NOTE.—Since the report was prepared, the firing with this gun has been continued to the 450th fire with primers made in 1854 and 1855. No snap occurred until the gun had been fired over 120 times without cleaning. In the last 150 fires no snap occurred: the last fifty fires were made while the gun was exposed to a hard rain.]

By the present mode of packing the strips, it is believed that there will be no difficulty in keeping them dry in service.

By means of the new machines the cost of the friction tubes has been somewhat reduced, and their fabrication rendered more expeditious. The certainty of fire, as shown by the trials, is as great as that of any plan heretofore used, while the simple means required for their use render them more convenient than other tubes. In addition to a careful inspection in every stage of the manufacture, a final inspection and trial is made by an officer of each month's product. Samples of ten tubes, taken from each 1,000, are fired; and no issues are made from lots if more than one tube in the hundred fires fail from any cause. In many thousands now ready for issue, the failures have not exceeded six-tenths of 1 per cent. of those tried, and in 242 tried of *last* lot made, but one failed.

The machine for counter-boring and tapping musket barrels has been prepared for altering flint-muskets to use the Maynard primer. A machine for rifling the barrels, and one for slugging barrels, are nearly completed for the same object. A new lock and breech-piece (to be furnished by contract) is to be attached to each arm, and the barrel rifled with three grooves of "progressive" depth, to use the expanding cylindro-conical ball. The tapping-machine has been already tried, and effectually secures a perfect uniformity in the starting point of the thread of the screw; and as the same uniformity has been obtained in the breech-pieces, the fitting them together will be easier than heretofore. It is also expected that an increased facility will be secured in rifling the barrels over the present plan, as the new machine is intended to receive three barrels, and cut all the grooves at the same time.

Buildings and grounds.

Besides the ordinary repairs and painting, the following improvements have been made in the buildings and grounds:

- 1,600 square feet of brick pavement laid.
- 500 square feet of pebble pavement laid.
- 3 areas excavated and built.
- 168 feet of culvert rebuilt.

2 section pipes to wells erected, for supplying fire-engine.

1 small boat-house built.

317 bushels of oats and 9 tons of hay were raised upon the cultivated portion of the grounds, and issued to the public horses.

The coping of the magazine wall and enclosing wall has been re-pointed throughout, and the embankment on the lower meadow re-formed, and the meadow filled in and graded.

NEW YORK ARSENAL, COMMANDED BY CAPTAIN R. H. K. WHITELEY.

The principal operations at this post during the year were as follows, viz:

Sea wall completed.

Stone cut and wall built on northwest angle of arsenal grounds, 59 feet long, 11 feet high, and $4\frac{1}{2}$ feet thick.

140 feet picket fence made and put up between quarters and sea wall.

Iron grating door, with hooks and hinges, made for public stable.

The following articles were also fabricated:

50 lock covers.

118 bolts and nuts.

1,266 pounds of paint.

48 pounds wrought nails.

56 pounds wrought rivets.

12 screw-drivers.

39 packing boxes.

131 muskets repaired.

Field battery at Fort Wood put in order.

Float for landing boats, public buildings, carts, trucks, tools, &c., repaired and put in order.

15,169 muskets, rifles, carbines, and pistols, cleaned, oiled, and repacked.

1,713 gun slings cleaned, oiled, and repacked.

32 casemate top carriages lackered.

432 iron guns, howitzers, and mortars, lackered.

83,227 shot and shells lackered.

5,003 canister, grape, and spherical case shot and shells cleaned and painted.

Tools for forge and battery wagon, cleaned, oiled, and repacked.

1,693 packages of ordnance stores received.

1,591 packages of ordnance stores issued.

The armaments of the forts in the harbor have been repaired, &c., as follows:

35 8-inch columbiad carriages repaired and painted.

18 42-pounder carriages repaired and painted.

193 32-pounder carriages repaired and painted.

44 24-pounder carriages repaired and painted.

220 iron cannon, various calibres, cleaned and lackered, and many placed on new skids.

2,469 implements and parts repaired and painted.

The following arms and accoutrements, made by contractors, have been inspected and received:

- 4,260 percussion rifles.
- 5,000 percussion pistols.
- 1,006 Colt's pistols.
- 200 Sharp's carbines.
- 1,000 artillery swords.
- 500 musketoon sword bayonets.
- 77,804 various parts of accoutrements.

BENICIA ARSENAL, COMMANDED BY BREVET CAPTAIN C. P. STONE.

The principal operations at this arsenal have been as follows:

Buildings and improvements.

- 1 stone storehouse, 100 by 40 feet, erected.
- 1 bake-house, 30 by 12 feet, for enlisted men, built.
- 1 reservoir, 59,000 gallons capacity, built, to save the water falling on north storehouse.
- 1 shot bed, 100 by 8 feet 4 inches, of stone and cement, built.
- 2,350 cubic yards of earth and stone excavated on site for magazine.

Fabricated.

- 2,588 cartridge bags for field service.
- 134 spherical case shot for field service.
- 81 canisters fixed for field service.
- 1,875 6-pounder blank cartridges.
- 509 12-pounder mountain howitzer blank cartridges.
- 92,000 cartridges for small-arms.
- 80 pounds bullets for Colt's pistols.
- 195 portfires.
- 79 signal rockets.
- 300 fuzes, paper case.
- 179 sabots for mountain howitzer canisters.
- 24 tompions.
- 308 lights window sash.
- 35 gallons lacker.
- 530 pounds of paint.
- 32 arm chests.
- 58 ammunition packing boxes.
- 32 chests for enlisted men's quarters.
- 15 tin cases; and a large number of tools for the various shops, and for quarrying and cutting stone.

Other work done.

- 56 6-pounder canisters, fixed.
- 264 percussion muskets repaired.

- 315 percussion rifles repaired.
- 56 artillery swords repaired.
- 6 Sharp's carbines repaired.
- 1 Colt's pistol repaired.
- 80 bayonets repaired.
- 10,000 percussion muskets cleaned, oiled, and repacked.
- 800 cavalry musketoon cleaned, oiled, and repacked.
- 250 Colt's pistols cleaned, oiled, and repacked.
- 15,000 cap pouches cleaned, oiled, and repacked.
- 1,500 infantry cartridge boxes cleaned, oiled, and repacked.
- 42 pack-saddles and harness cleaned, oiled, and repacked.
- 1,000 barrels powder rolled and repacked in powder-house.
- 24 field carriages and caissons scraped and painted.
- 6 32-pounder barbette carriages scraped and painted.
- 32 elevating screws cleaned and oiled.
- 1,445 10-inch shells scraped, lackered, and piled.
- 15,100 cubic feet stone quarried, hauled, cut, and laid in reservoir, and landing on Suisun bay.
- 650 tons ordnance stores received from New York and San Francisco, and stored.

The ordnance and ordnance stores required for the troops in the department of the Pacific, and for the militia of California, Oregon, and Washington, have been prepared and sent from this arsenal.

CHARLESTON ARSENAL, COMMANDED BY CAPTAIN C. P. KINGSBURY.

No additions or permanent improvements have been made at this arsenal during the year. The operations have been principally confined to the ordinary repairs of buildings and enclosures, the preservation of arms and ammunition. The usual receipts and issues of stores may be briefly stated, as follows :

640 percussion rifles taken apart, cleaned, and oiled ; inside of barrels, rods, lock plates, and springs polished, defective parts replaced, and the whole reassembled and packed.

46 percussion muskets repaired and polished ; stocks dressed over anew and refinished, and the whole converted from unserviceable to serviceable.

1 32-pounder barbette top carriage prepared for issue, and substituted for one unserviceable at Fort Moultrie.

9 sets artillery harness for four horses thoroughly overhauled, cleaned, oiled, and repacked.

465 stands of 32-pounder grape shot cleaned and lackered at Fort Sumter.

100 casemate traverse wheels cleaned and lackered at Fort Sumter.

100 pintles, 100 tongues, and other parts of the armament, cleaned and lackered at Fort Sumter.

Top of the flag-staff at Castle Pinckney taken down and repaired.

5 pent-houses belonging to Castle Pinckney, shattered by the gale of September 9, 1854, overhauled and repaired, new roofs added, and other parts supplied.

200 32-pounder cartridge bags fabricated for issue.

54 6-pounder cartridge bags fabricated for issue.

3 tons of hay moved from arsenal grounds.

The roofs of quarters, gutters of main arsenal, and the parapet of the old arsenal roof have received various repairs.

Parts of the gateway at the principal entrance, which had decayed, have been replaced and painted; and the water-pipes leading from the arsenal to the outside cistern taken up and relaid, so as to permit the escape of the surface water from the main entrance.

Stores have been received from St. Augustine depot, from Watervliet arsenal, and from troops in Florida; and issues have been made to New York arsenal, Fort Moultrie, Castle Pinckney, Fort Marion, and Fort Dallas.

MOUNT VERNON ARSENAL, COMMANDED BY CAPTAIN JOSIAH GORGAS.

The principal operations at this arsenal during the year were as follows:

Fabricated.

13 32-pounder pent-houses.

300 32-pounder cartridge bags.

96 18-pounder cartridge bags.

4 pairs moccasins.

15 iron bedsteads.

1 set of harness for two horses.

2 formers for cartridge bags.

1 hand hammer.

1 mortise lock.

1 light cart.

2 8-inch chassis.

Altered and repaired.

1,920 flint-lock muskets altered to percussion, cleaned, oiled, and re-packed.

3,000 cartridges altered for percussion arms.

160 powder barrels re-coopered with four copper hoops.

1 fire-engine repaired.

The rear galleries of quarters No. 2 have been enclosed, new floors laid, and stair-way constructed; the new work has been plastered, and the old walls on the north side replastered on furring; all the piazzas have been new floored, and decayed exterior wood work replaced.

Exterior cement washed; and painting of wood work and walls in progress.

The wood work of quarters No. 1, which was only primed last year, has received additional coats, and exterior cement washed. The zinc roof to addition was also taken off and replaced.

300 feet of wooden surface drain made.

200 feet of bridge on road to river landing re-laid with plank.

2,000 feet of new road graded.
1,000 cubic feet of soil hauled on enclosure.
15,000 feet of cypress boards hauled and piled.
348 boxes of muskets hauled to landing.

The armament of the forts in the harbor of Pensacola have also been repaired, &c., to a considerable extent, as follows:

Fort McRee.—Twenty-two gun carriages repaired with new parts, and all the carriages painted; the implements and equipments cleaned and oiled, and all the shot and shells scraped and lackered.

Fort Barrancas.—Nine gun carriages repaired with new parts, and all the carriages and pent-houses painted; the implements scraped, cleaned, painted, and oiled.

Fort Pickens.—Carriages have been scraped and painted, and the implements cleaned and oiled. Nine temporary pent-houses constructed on 8-inch howitzer barbette battery, to serve until good ones can be made. Two of the repaired carriages, one 24-pounder and one 32-pounder, were fired with twenty-two service rounds each, to test the efficiency of the repairs. No want of strength apparent.

VANCOUVER DEPOT—MILITARY STOREKEEPER, THEODORE J. ECKERSON,
IN CHARGE.

The principal operations for the year ending June 30, 1855, were as follows:

The ordnance and ordnance stores at the station have been kept in good condition. The principal issues during the year, for service in the field and at posts in Oregon and Washington Territories, have been the following:

2 6-pounder field guns, with caissons, implements and equipments, complete.
2 12-pounder mountain howitzers, with implements, equipments, and portable forge.
144 rounds of fixed ammunition for mountain howitzer.
71 muskets and sets of infantry accoutrements.
19,000 rounds of ammunition for small-arms.
133 boxes of stores received and issued.

ORDNANCE OFFICE, *October 25, 1855.*