

REPORT  
OF  
THE SECRETARY OF WAR,

MADE

*In compliance with a resolution of the Senate in relation to the work done under the appropriations of 1852 for the improvement of western rivers and harbors.*

---

MARCH 29, 1854.—Ordered to lie on the table and be printed.

---

WAR DEPARTMENT,  
*Washington, March 28, 1854.*

SIR: I have the honor to submit herewith a report of the colonel of topographical engineers, prepared in reply to a resolution of the Senate of the 10th of January, "That the Secretary of the Department of War furnish the Senate, as soon as practicable, with a report of all the work done under the appropriations of eighteen hundred and fifty-two in reference to western rivers and harbors."

Very respectfully, your obedient servant,

JEFFERSON DAVIS,  
*Secretary of War.*

HON. D. R. ATCHISON,  
*President of the Senate.*

---

BUREAU OF TOPOGRAPHICAL ENGINEERS,  
*Washington, March 24, 1854.*

SIR: I have the honor to acknowledge your direction to report upon a resolution of the Senate of the 10th January, calling for a report of all the work done under the appropriation of 1852 in reference to western rivers and harbors.

This resolution requires information on the following points:

1. Of the improvement of the navigation of the Mississippi below the rapids.
2. The Ohio river, including the repair of the dam at Cumberland island.
3. Missouri river.
4. Arkansas river.
5. Illinois river.
6. Rock river and Des Moines rapids.
7. The construction and repair of snag boats, &c.

8. The removal of obstructions at the harbor of Dubuque, Iowa.

9. Improvement of the Tennessee within a stated length.

The information communicated is derived chiefly from the reports of Lieut. Col. S. H. Long; Lieut. Col. J. E. Johnston; J. Barney, esq., agent at Dubuque; G. A. Dunlap, esq., agent for the Illinois; and Lieut. Col. J. McClellan upon the Tennessee river.

"The portions of these rivers which are considered as having claims upon particular attention, not including the Tennessee, are the Ohio, from Pittsburg to its junction with the Mississippi, 1,000 miles; the Mississippi, from the mouth of the St. Peter's to Natchez, 1,785 miles; the Missouri, from its junction with the Mississippi, to Council Bluffs, 660 miles; the Arkansas, from its junction with the Mississippi, to Fort Gibson, 590 miles; the Illinois, from its junction with the Mississippi, to La Salle, 255 miles; making in the aggregate 4,280 miles of river way which requires improvement.

"The improvements consist in the dredging of sand bars, the removal of snags, rocks, sunken logs, impending trees, wrecks, &c.; the construction of wing dams, jetties, &c., for reducing width and increasing depth, and increasing depth of passes; the opening of channels across sand and gravel bars by dredging; the construction of canals and sluices at rocky shoals and rapids; the formation and protection of commodious harbors at commercial points, &c.

"A brief general view of the present condition of these several rivers will be given."

*"Mississippi river.*

"From Rock island rapids to Dubuque, 83 miles, there are very few obstructions to low water navigation for boats drawing from  $3\frac{1}{2}$  to 4 feet of water. The difficulties in this distance consist chiefly in the crookedness of the low water channel in its meanderings over shoals. From the Des Moines rapids to the mouth of the Missouri, 192 miles, the river abounds with shoals, with a low water channel-way of about 3 feet, and the channel-way across these shoals is exceedingly crooked, and lined with snags and logs—some of them very dangerous, particularly to night navigation.

"But it is considered that a few days of labor, with an efficient snag boat and crew, at a proper stage of water, would do much to suppress the dangers of the navigation.

"From the mouth of the Missouri down to Natchez, about 1,000 miles, snags, logs, wrecks, &c., are of frequent occurrence in the channel-way and on the bars, and especially in bends and along concave shores.

"The low water channel, throughout the entire distance above mentioned, has been successfully operated upon, and effectually cleared of all obstructions that were presented at the time when the work was in progress. The removal of snags, &c., from the Mississippi was commenced in the latter part of September, and has been prosecuted with all practicable diligence to the present date. Much remains to be done, however, on the bars in the island chutes, and even in the main channel itself; for it should be borne in mind that although the channel

depths are remarkably uniform in the lower stages of the river, yet on the subsidence of the latter the bottom of the channels subside at the same time, and new obstructions are continually presenting themselves at the bottom and sides of the channel thus deepened.

“The removal of these and similar obstructions from the sides of the channel, also the cutting of prostrate trees, &c., on the dry bars, the removal of snags, &c., from the chutes, the falling of impending trees, &c.

“In order to exhibit a more intelligible view of the bends, &c., at which the operations of the snag boats have been applied, I hereto subjoin a list of the more formidable and dangerous passes at which they have operated, beginning at the mouth of the Missouri and ending at Natchez, premising that the low water, or rather shoal channels, at all the localities to be noticed in the list, have been effectually cleared of all obstructions visible and discoverable at the time of operation.

“The list is as follows :

*Positions and distances from mouth of the Missouri (downward) to Natchez.*

Designation of passes.	Character of passes.	Intermediate distances.	Total distances.
Sawyer's Bend.....	Snaggy and dangerous ..	10	10
There to Turkey Island.....	Snags and scattering....	60	70
Turkey Island Bend.....	Very dangerous.....		
Grand Tower.....	Very snaggy.....	15	85
Tower Island.....	Occasional snags.....	5	90
Cairo.....	Snaggy and dangerous...	110	200
Bend at Island No. 10.....	Dangerous.....	60	260
Island No. 18.....	Very dangerous.....	55	315
Island No. 21.....	Dangerous.....	5	320
Bend at Island No. 25.....	.do.....	15	335
Islands No. 26 and 27.....	.do.....	10	345
Head of Island No. 30.....	.do.....	10	355
Bends at Plum Point No. 33.....	Very dangerous.....	10	365
Bends at Island No. 34.....	Dangerous.....	10	375
Bends at Island No. 35.....	.do.....	10	385
Bends at Island No. 37.....	Very dangerous.....	10	395
Devil's Elbow.....	Dangerous.....	10	405
Bend at Brandywine Bar.....	.do.....	10	415
Paddy's Hen and Chickens.....	.do.....	10	435
President Island.....	.do.....	10	445
Cow Island.....	.do.....	10	455
Buck Island.....	.do.....	20	475
Commerce Island.....	.do.....	10	485
Council Bend.....	.do.....	10	495
Grand Cut-off.....	.do.....	10	505
Walnut Bend.....	.do.....	10	515
Ship Island.....	.do.....	5	520
St. Francis' Island.....	.do.....	5	525
Helena Island No. 60.....	.do.....	10	535
Montezuma Bar.....	Very dangerous.....	5	540
Horse-shoe Cut-off.....	.do.....	10	550
Old Town Bend.....	Dangerous ..	10	560
Islands No. 62 and 63.....	.do.....	5	565
Island No. 64.....	.do.....	10	575
Island No. 65.....	.do.....	5	580
Indian Charley's Bend.....	.do.....	10	590
Islands No. 67 and 68.....	.do.....	10	600
Island No. 69.....	.do.....	10	610
Island No. 70 and 71.....	.do.....	10	620
Chicot Island Bend.....	Very dangerous.....	65	685
Kentucky Bend.....	.do.....	30	715
Princeton Island No. 89.....	Dangerous.....	10	725
Lara Island.....	.do.....	15	740
Bunches' Cut-off.....	.do.....	10	750
Island No. 93.....	.do.....	5	755
Island No. 95.....	.do.....	25	780
Islands No. 96 and 97.....	.do.....	10	790
Island No. 98.....	Very dangerous.....	5	795
Island No. 100.....	Dangerous.....	10	805
Milliken's Bend.....	.do.....	15	820
Papaw Island No. 103.....	Very dangerous.....	10	830
Natchez.....	Occasional snags.....	170	1,000

"In addition to the localities designated in the foregoing list, there are numerous others, intervening bends and beaches, in which snags and other obstructions to low water navigation are more or less frequently to be met with, besides numerous impediments to high water navigation, which abound in the shoals, and upon dry bars, and more especially in the *island chutes*.

"As before remarked, the low water channels have been effectually cleared of all snags, logs, &c., discoverable during the late low water season; while the shoals, at the sides of the channels, present numerous similar obstructions, not accessible to snag-boats in a low stage of water; and the dry bars are, in many places, overlaid and inlaid with prostrate and embedded trees and logs, not less formidable in higher stages."

*"The Ohio river, and the dam at Cumberland island.*

"From Pittsburgh to Brown's island, about 66 miles, the river presents a series of rocks, reefs, and shoals, at which the low water depth is too inconsiderable, in many places to admit the passage of steamers of the lightest drafts. Sluices have been opened at sundry points, and wing dams, jetties, &c., of stone, resting upon rock foundations, have been formed in numerous instances for the purpose of reducing the width of the channel, and compelling the water to flow in a narrower and deeper volume; much benefit has resulted from the construction of works of this sort, but much remains to be done in this way towards the completion of the improvements of which this portion of the river is susceptible.

"From Brown's island downward to Captina island, about 47 miles, rocks and gravel bars alternate with each other, at intervals of much greater extent than in the river above, the principal obstructions to navigation being occasioned by sand or gravel bars, more or less blended with pebbles, boulders, and rocks.

"Several wing dams have been partially constructed on this portion of the river, all of which ought to be completed, according to their original design, and some of them considerably extended; and, in addition thereto, the construction of others not yet commenced would, no doubt, contribute much to the improvement of low water navigation.

"From Captina island to Letart's falls, 128 miles, rocky reefs and shoals seldom occur, in the main natural channel of the river, but bars of sand and gravel, on which the low water depth is very inconsiderable and of frequent occurrence.

"At Marietta, Blennerhassett's island, and Buffington's island, side walls and wing dams of stone have been projected and partially constructed, for the purpose of diverting the water flow from its natural course, and directing it into the main low water channels.

"The dam at the head of Blennerhassett's island has, in some measure, produced the desired result; but the other works just mentioned have proved of doubtful efficacy. At these several points, and at many others on this part of the river, the process of dredging across sand and gravel bars may, no doubt, be applied to advantage.

"At Letart's falls the obstruction is occasioned by a reef of rocks extending quite across the bed of the river, through which the channel

is narrow and seriously obstructed by protruding rocks and boulders, over and between which the water is hurried with a velocity, and to a fall of about 5 feet, in a distance of less than half a mile.

"From Letart's downward, even to Louisville, 375 miles, the bed of the river is pretty generally destitute of rocky bars; but, in numerous instances, the river spreads to a great width, and the navigation is much obstructed by bars of sand and gravel, in very low stages of the river.

"The upper Ohio, commonly designated 'the Ohio above the falls,' presents, comparatively, but few snags and sunken logs; but its low water navigation is much endangered by wrecks of steamers, flat boats, and other craft.

"The most dangerous obstructions of this character, including snags, logs, &c., have been removed from the low water channel by the successful agency of the snag-boat Terror, (No. 5,) commanded by Captain J. K. Dillingham, who has been employed, during the last season, under the direction of C. A. Fuller, esq., on this portion of the river.

"From the falls downward to the mouth of the Ohio, about 400 miles, the navigation in low water is obstructed, at numerous points, by shoals occasioned by sand and gravel bars; and, in a single instance, by reefs of rocks extending across the bed of the river.

"The most troublesome bars are the following, viz: The Portland bar, a little below Sand island, and half a mile below the foot of the falls.

"No considerable effort has been made for the improvement of this shoal, although, it is believed, that such an improvement might readily be made.

"Formidable shoals again occur at Blue river island, and Flint island, respectively, 60 and 90 miles below Louisville, which are occasioned by indurated bars which present serious impediments in the way of low water navigation, especially the bar near the foot of French island. As yet, however, no attempts of any considerable moment have been made towards the improvement of either of these passes.

"At French island, 78 miles; Scuffletown, 88 miles; and Three Mile island, 96 miles below Flint island, wing dams of stone have been built for the purpose of retaining the low water flow to narrow channels leading across the shoal bars at these several points, but the results obtained in each case are of doubtful efficacy. In these several instances the shoals have been occasioned by extensive bars of loose sand stretching entirely across the bed of the river, which, in every case, is unusually broad.

"The dams having a mere bed of sand to rest upon, have been undermined and become dilapidated, and the water in low stages ceases to flow in the directions intended to be given by the dams.

"Bars of similar consistency, but of less extent, are of frequent occurrence in the lower Ohio, and many of them are nearly or quite as formidable as those above mentioned. In view of the inadequacy of wing-dams as a means of opening low-water channels across such bars, which has proved true in almost every instance of their introduction, I am inclined to repudiate their adoption in cases of the sort referred to, there are, no doubt, peculiar situations where their introduction and use may prove beneficial; but I doubt not that the process

of dredging, with apparatus properly constructed and adapted to the removal of sand, gravel, &c., from the low water channels across the bars, would prove more efficacious and economical in general, and at the same time less objectionable, on very many accounts, than the construction of wing-dams, jetties, &c., on sandy foundations.

"In this connexion I take occasion to observe, that the two dredge boats constructed for use on the western rivers, though very well adapted to the improvement of harbors, and to the deepening and widening of channels across sand and mud bars, upon which the water has a depth of about  $3\frac{1}{2}$  feet, yet, when they are not applicable, and cannot be used to advantage on bars having a less depth of water above them.

"The Cumberland dam affords a remarkable example of the ability of a rip-rap structure composed of stones of irregular forms, sizes, and dimensions, and based on a mere bed of sand of great depth, to withstand a head and fall of more than four feet of water. However questionable the propriety of its ever having been constructed may be, yet the fact above stated has an important bearing upon numerous subjects connected intimately with the improvement of many of the western rivers.

"This dam has been considerably enlarged and extended under the direction of C. A. Fuller, esq., during last summer, but is not yet completed; the operations upon it have, nevertheless, contributed to the formation of a navigable channel, in low water, between Cumberland island and the Kentucky shore, and to open an easy communication in a low stage of the river, between the Ohio, at the head of the island, and Smithland, at the mouth of the Cumberland—a communication that could not previously be had either above or below the island.

"The same operations have no doubt contributed to the formation of shoals at, or a little below, the foot of the island, (between four and five hundred yards below,) across which the low water depth is about three feet only, when a depth of four feet may be found on the bars both above and below the dam.

"The dredge-boat Gopher (No. 2) has been employed some time in efforts to open a channel across the shoal, but has failed of success, partly by reason of frequent interruptions from passing boats through the channel intended to be opened, and partly for the want of a sufficient depth of water at the shoals to admit the working of the dredge-boat. A dredge-boat of the character before suggested, could, no doubt, be used to better advantage in opening the desired channel at this point.

"Numerous bars on this part of the river, both above and below Cumberland island, require the operation of dredging, for the purpose of opening a low water channel across them; and it is confidently believed that the means and manner of operations before proposed, would prove more economical and efficacious than any others heretofore applied for similar purposes.

"The rocky reefs called the Little and Grand chains of the Ohio, respectively 16 and 34 miles above its mouth, are rendered somewhat dangerous by reason of numerous large boulders and other rocks situated in and near the low-water channel. Many of the rocks at the

Grand chain have been blasted and removed, while others remain at both chains, opposing obstructions in the way of free and safe navigation in low stages of the river.

"Snags, logs, and wrecks are accordingly to be met with on the lower Ohio, and have occasioned the destruction of several steamers; it is believed, however, that the most formidable of these obstructions will have been removed within the present month by the snag-boat Terror, (No. 5,) under the command of Captain J. K. Dillingham, who has been employed on this part of the river for several weeks.

"In further reply in reference to the Ohio river and the Cumberland dam, I submit a copy of the annual report of the agent, C. A. Fuller, dated September 1, 1853."

*"Missouri river.*

"The obstructions in this river are quite as numerous and formidable as those in the Arkansas, while the channels of the former are much broader, and the sand bars much less compact, and, of course, the snags much less firmly imbedded than those of the Arkansas.

"Two of the snag boats were employed in removing snags, &c., from an early date in August (about the 10th) till the latter part of September, (about the 20th,) when the river had subsided so much as to render a retreat to the Mississippi quite precarious.

"These boats succeeded in removing upwards of 500 dangerous snags from the low water channel, besides the cutting of trees and logs on the bars, and shoals, felling impending trees, &c. The portion of the river operated upon extends from its mouth to Smith's bar, about 160 miles, beyond which they could not ascend for want of a sufficient depth of water in the deepest channel.

"The shoals at the sides of the channels operated upon were more or less frequently beset with snags, which were not accessible to the snag boats, by reason of the shoalness of the water.

In more elevated stages, these obstructions become serious impediments in the way of navigation, and their removal can only be effected by repeated efforts of the snag boats, applied whenever the river is sufficiently full for the purpose.

"The craft best adapted to the removal of snags, &c., in the Missouri, should consist of one or more twin snag-boats of the largest class; a light draft snag-boat with a single hull, and one or more machine boats, susceptible of being towed from place to place, by either of the other boats; by means of such a flotilla, the more stubborn snags may be removed by the twin boat, while the single hull boat, and the machine boat can be employed to great advantage in removing obstructions from the shoaler parts of the river; moreover the light draft boat in company with the machine boat, can, without much inconvenience, continue their operations on any portion of the river between its mouth and the Council Bluffs, during the entire low water season, or from about the middle of July to the middle of November."

"In reference to the low water channels of the Mississippi, Missouri, and Arkansas, and especially in reference to those of the two former rivers, it should be particularly observed, that they are seldom identical

with, and cannot occupy the position of the deepest channels in more elevated stages; also that the bars formed on the more elevated stages overrun, fill up, and obliterate the low water channels; consequently, on the subsidence of the waters after every freshet, and especially after high floods, shoals begin to be presented when the surface of the rivers have an elevation of some 6, 8, or even 10 feet above their extreme low water marks. Hence the removal of snags, &c. from the shoal channels, first formed after the subsidence of the rivers affords no assurance that these same channels will remain unobstructed during the entire progress of the subsidence to extreme low water mark.

"However protracted this period may be, the depth of the shoal channels remains nearly equable, while the surfaces of the rivers are constantly subsiding; and although these channels may have been effectually cleared of obstructions at the more elevated stages, the progress of removing their obstructions must be repeated again and again some three or four times, in order to keep them unobstructed, till the river falls to its lowest stage.

"Accordingly the phrase '*low water channel*,' as used under the three last heads, is intended to be applied in all stages of the rivers at which shoals and the clause 'effectually cleared' has reference only to that stage, at which all obstructions had been removed from the main channels leading across the shoals existing at that stage.

"Hence it is obvious that the removal of all obstructions from low water or shoal channels, and the opening of free and safe navigation through them at one stage of the river, do not ensure safe navigation through them at a lower stage; also, that in order to accomplish this object, the operations of the snag-boats must be repeated from time to time, not only in the same localities, but at intervening points, at every considerable subsidence of the rivers, from the time when channel obstructions are first presented till the rivers shall have fallen to their lowest stage."

"In conclusion, under these heads, it should be observed that, at the time of my late inspections the depths of the water in the main channel across the shoal bars of the Mississippi did not exceed the ordinary depths of the same channels in extreme low water, although the river surface at the same points was elevated 6 to 10 feet above extreme low water mark."

*"Arkansas river.*

"The region drained by this river is apparently quite as spacious as that drained by the Ohio, while the extent of navigation afforded by the former and its tributaries is less than one-fourth of that afforded by the latter and its tributaries.

"The Arkansas river is navigable only to the junction of three forks distinguished by the names of the Arkansas, Verdigris, and Neosho, viz: a little less than 600 miles from its mouth. Its channel throughout this portion of the river is, for the most part, narrow and very crooked; its current rapid, corresponding to an average declivity of about 8 inches per mile; its bars occur at every bend, and are composed of sand and gravel firmly compacted, rocky reefs extending quite

across the channel, and of frequent occurrence on the upper half of the navigable portion, while snags and logs of large size and deeply imbedded in hard bars are abundant, especially on the lower half.

"The proper season for prosecuting the snag business on this river commences about the first of April, and terminates about the last of July.

"A rise occasionally takes place in October or November, but seldom continues long enough for successful operations with the snag-boats.

"During the last season the snag-boat, No. 4, entered the Arkansas, early in August, and succeeded in removing the snags from the low water channel through a distance of about 60 miles, upward from its mouth. In attempting to retreat from the river, this boat grounded on a bar a little below the White river cut-off, and was detained in consequence during an entire month, or 31 days.

"It is proper to observe in this place that the craft best adapted to the removal of snags, &c., from the Arkansas, is as follows, viz:

"A light draft snag-boat with single hull, accompanied by one or more machine boats of the usual construction, the latter being susceptible of towage from place to place by the former.

"The channel of the rivers, especially in low water, is too narrow and crooked, and the current too rapid to admit of the successful operation of a twin snag-boat of the usual size, although in an elevated stage of the river such a boat may operate to great advantage."

*Synopsis of work done.*

Number and designation of snag-boats.	Names of rivers improved by the removal of snags, &c.	Nature of obstructions removed.					
		Number of snags removed.	Number of stumps blasted.	Number of logs cut on bars and shoals.	Number of impending trees felled.	Number of wrecks removed.	Number of steamers relieved.
1	Missouri (a).....	304	10	.....	30	.....	.....
1	Mississippi.....	589	4	183	684	.....	.....
	Total.....	893	14	183	714	.....	.....
2	Mississippi (b).....	478	.....	17	213	.....	1
3	Missouri (c).....	155	.....	14	274	.....	.....
3	Mississippi.....	395	.....	16	65	.....	3
	Total.....	550	.....	30	339	.....	3
4	Arkansas (d).....	191	.....	271	108	.....	.....
4	Mississippi.....	306	.....	38	31	.....	.....
	Total.....	497	.....	309	139	.....	.....
5	Ohio (e).....	182	36	26	7	27	.....

*Aggregate of the obstructions removed by all of the snag-boats—five in number.*

1	.....	893	14	183	714	.....	.....
2	.....	478	.....	17	213	.....	1
3	.....	550	.....	30	339	.....	3
4	.....	497	.....	309	139	.....	.....
5	.....	182	36	26	7	27	.....
	Total.....	2,600	50	565	1,411	27	4

(e.) "No. 5.—Commenced work in the upper Ohio about the 1st of May; was rendered inoperative at the head of the falls, from July 22 to November 10, by reason of low water. On the date last mentioned, she crossed the falls and resumed operations in the lower Ohio.

"During the detention above mentioned, she received needful alterations and repairs, including two derricks at her bows, a set of cross hog chains, with Sampson posts, an enlargement of her cutting beam, and fastening for cylinder timbers; recaulking of boot tops, &c."

*"Illinois river.*

"In ordinary stages of the water, this river is remarkably favorable for navigation with steamers drawing 4 to 5 feet, and in the more elevated stages for boats of much greater draft. In ordinary low water its navigation is much obstructed by numerous shoals, of which there are no less than thirty-three, respectively varying in their aggregate extent from 50 or 60 yards to a mile, and in one instance, at what is called the Naples flats, about 65 miles from the mouth of that river, to more than twice the distance last mentioned."

The following is taken from the report of G. A. Dunlap, esq., the agent appointed to disburse the funds appropriated for the improvement of that river:

"I have the honor to report upon the arrival of the dredge boat, Gopher, No. 2, in the Illinois river; that we proceeded up to Guilford bar, it being the third bar from the mouth of the river, and the first one that was deemed sufficiently shoal to dredge. The boat arrived at this bar on the third of November; we did not commence operations on the bar until the 8th, (having to spend several days in fitting up boats for service,) at which time we commenced operations. The boat was drawing from 6 to 9 inches more water than was found on the bar, consequently we found it exceedingly difficult to operate to any advantage; the channel through this bar being very narrow, and boats ascending and descending were constantly grounding, and would lay for hours. This bar was composed principally of muscle shells, and hard to cut; we succeeded in cutting a channel through, one hundred and fifty yards in length, and two hundred feet in width, leaving from four to five feet water in the channel on the bar; boats can now pass through this improvement without any difficulty. This statement will account for the few hands on board at the commencement of this service; they could not be employed advantageously to the service; we could only use two scows in conveying the dirt from the boat, and but a short distance to take it; under other and more favorable circumstances this work could have been accomplished in twelve days, whereas it has required double that time. After finishing this bar we proceeded with the boats to the Naples flats, as it was deemed a better and safer place to lay up the boat for the winter. We commenced operations, but in consequence of breaking of the elbow of the force pump were compelled to suspend; at this time I received orders to lay the boat up. I put her into winter quarters at the foot of the flats near Griggsville ferry landing; we found the power of the boat to be inadequate to the service in consequence of the size of the buckets, consequently I retained the engineer on board to assist in cutting the buckets, to give them proportion to the power of the boat, which was accomplished on the 31st December, and he was discharged from service. In consequence of other repairs being required on board before we will be again fitted for service, I have retained Captain Stewart on board of the boat, who (together with one hand) will fit the boats up and have them ready for active operations next season; the boats, including those used by the surveying corps, are now in quarters at Griggsville, under the care of Captain Stewart."

*“Rock river and Des Moines rapids.”*

“The improvement of the Rock island rapids has been committed to the charge of J. Barney, esq.

“Surveys for determining the position of the channel most susceptible of improvement, and of the obstacles therein in the way of navigation, were commenced early in July, under the charge of Lieutenant Warren, with the understanding that they would be executed in conformity to the joint counsel and aid of Major Floyd and Mr. Barney, and with the expectation that they would be completed early in October; but their progress was much retarded by high water, which prevented the accomplishment of the river work till a late date in November.

“The surveys have been made with great care and precision, and the drawings constructed therefrom exhibit the features of the rapids in a clear light, and show, with distinctness, the positions, nature, and magnitude of the obstructions to be removed.

“Captain Barney advertised for proposals preparatory to a commencement of the improvement of Rock island rapids early in October; but, at the end of the usual period for receiving proposals, no acceptable offers had been made by contractors desirous of engaging in the work.

“From Rock island to the Des Moines rapids, 130 miles, a few obstructions, consisting of snags, logs, and occasional boulders and other rocks, are here and there to be met with, but they cause no very serious or formidable impediments in the way of steamboat navigation, the low water depth in the main channel, throughout this portion of the river, being  $3\frac{1}{2}$  to 4 feet.

“The Des Moines rapids have also been surveyed by Lieutenant Warren; but the drawings explanatory of the surveys have not yet been completed. Sketches from the copious field and river notes, taken on the surveys of the lower and English chains, have already been prepared; and from the results obtained, Major Floyd, the agent, has called for proposals in due form for the execution of the work on these two chains; but, by the latest intelligence from the agent, no favorable offers have as yet been made.

“Sketches from the river notes taken on the other chains, and relating to far the greater portion of the Des Moines rapids, remain to be drawn, and cannot properly be applied for this purpose, without the personal attention and direction of the officer by whom they were taken.

“Owing to the prevalence of water stages unusually elevated during the month of July, the hydrographical surveys could not be commenced on either of the rapids till a late date in that month; and, although they have been prosecuted with commendable skill and diligence on the part of Lieutenant Warren, the field and river work, in relation thereto, could not be completed till the latter part of November; consequently the work of improvement could not be undertaken till about the beginning of the winter season, when the weather becomes too inclement to admit of successful operations.”

*"Removal of obstructions in the harbor Dubuque, Iowa.*

"The improvement of Dubuque harbor cannot be regarded as having any immediate connection with the improvement of the navigation of the Mississippi, except in the light of opening an easy communication with a very thrifty and beautiful commercial town.

"The method of improvement was devised by J. Barney, esq., United States agent, and sanctioned, as I believe, by the Topographical Bureau, and partially carried into effect under the direction of the same agent.

"Of its merits, and the propriety of its adoption, I shall merely observe that, from a hasty inspection of the harbor, its islands, &c., without any authenticated plans or drawings showing the former and present condition of the harbor, bars, and islands, by the last of which the harbor is secluded from the river, I am constrained to regard them as questionable and of doubtful efficacy.

"The work of improvement, after having been suspended several years for want of an appropriation by Congress, was resumed on the first of July last, under the direction of the same agent, and has been prosecuted with diligence during the residue of the last season. Much progress has been made towards the opening of a navigable channel from the main landing of Dubuque city across bars, shoals, and low islands of recent formation in the nearest direction to the easterly shore of the river; the new channel, however, is not rendered navigable for steamers, except in very high water.

"During the last season the work was carried on by the use of a dredge-boat (No. 1) constructed under the direction of Captain Barney, at a cost of about \$20,000, the boat and four mud-scoops being included."

In addition, I subjoin the following copy of a report from the agent, (Barney,) dated September 1, 1853.

*Improvement of the navigation of the Tennessee river, (taken from the report of Lieutenant Colonel McClelland.)*

An examination has been made of the various shoals and other obstructions from Knoxville to Kelly's ferry.

At Knoxville shoals two dams are being constructed.

At Lyon's shoals the dam constructed by the State has been repaired.

At Williams' shoals a dam has been built.

At Little river shoals an old dam has been removed, and a new one is being constructed.

At Chota shoals materials for the necessary repairs, &c., have been contracted for, and the work was to be commenced in the early part of September.

At Booth's shoals the necessary work would be commenced in September, and completed this season.

At Cancy creek shoals the materials for constructing the necessary dams were nearly ready, and should the stage of low water continue favorable long enough, they will be completed before the close of the working season. Respectfully submitted.

Your obedient servant,

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

HON. JEFFERSON DAVIS, Secretary of War.

LOUISVILLE, *February 3, 1854.*

COLONEL: I have the honor to acknowledge your letter of the 28th ultimo, and report that four snag boats have been employed since October in the Mississippi, from the mouth of the Missouri to that of Red river, and all the pilots I have been able to question told me that the river has never before been so free from snags.

Outfit and equipment of snag-boats cost .....	\$16,821 81
Working snag-boats till end of January .....	56,000 00
	<hr/>
	72,821 81
Balance .....	<hr/>
	17,178 19

Two snag-boats were ordered to the Arkansas last summer. One of them got aground in the Ohio, and remained so until the Arkansas had fallen too much to be entered by it; the other entered the river and cleared it of snags for about thirty miles from its mouth, but in attempting to return to the Mississippi, on account of low water, got aground, where it lay thirty-one days.

Equipment and outfit of snag boats cost .....	\$7,476 38
Working snag boat, and expense aground .....	8,724 32
	<hr/>
	16,200 70
Balance .....	<hr/>
	23,799 30

Two snag boats also were sent into the Missouri by Colonel Long last summer. They worked in that river from its mouth to Smith's bar, about 160 miles, before being compelled by low water to leave it.

Outfit and equipment of snag-boats cost .....	\$7,476 38
Working the two snag-boats .....	8,793 15
	<hr/>
	16,269 53
Balance .....	<hr/>
	23,730 47

The Illinois has been surveyed from its mouth 150 miles, and the dredge-boat, built with a part of the appropriation for the Ohio, opened a channel 200 feet wide and 4 feet deep to the head of Guilford bar, 18 miles.

Amount expended .....	\$6,255 40
Balance .....	<hr/>
	23,744 60

The work at Dubuque is the cutting two channels from the harbor to the river. The work had been about half finished at the end of the season.

Amount expended .....	\$7,487 70
Balance .....	<hr/>
	7,512 30

Minute surveys were made under Colonel Long's direction of both the Des Moines and Rock island rapids. The two agents advertised for proposals, but received no bids until after the working season.

Amount expended, including agent's pay..... \$4,700 00

Balance ..... 95,300 00

In the Ohio, the repairs of Cumberland dam (see report of C. A. Fuller, in separate enclosure) cost.....\$39,466 00

A dredge boat ..... 19,408 00

Dredging near Cumberland dam ..... 3,567 00

Part of construction of a snag-boat ..... 6,941 00

Repairs ..... 1,244 00

Working snag-boat, and surveys ..... 12,088 00

82,695 00

Balance ..... 7,305 00

The appropriation for construction of snag-boats, &c., amounting to \$150,000, was all expended in the construction of four snag-boats and a dredge-boat, and in assisting the Ohio appropriation in building another. I cannot ascertain the whole cost of this snag boat; the dredge-boat cost \$19,700. In addition to this appropriation, \$31,774 57 was taken from the sums for improvement of the Mississippi, Arkansas, and Missouri, making the whole amount expended for their construction \$181,774 57.

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

J. E. JOHNSTON,

*Superintendent Western River Improvements.*

Col. J. J. ABERT,

*Chief Topographical Engineers.*

DUBUQUE, September 1, 1853.

COLONEL: I have the honor to furnish the following history of my operations for the past year, in relation to my duties as agent for the United States "for the improvement of the harbor of Dubuque, Iowa, for the upper rapids of the Mississippi, and to build a dredge-boat."

I received the appointment as agent, for the above named works, on the 22d September, 1852, and agreeably to orders from the Topographical Bureau repaired to Dubuque, made the necessary examinations, "reported the condition of things and the work to be done," and contracted for the cuts above water "in conformity with the understanding at the office of the colonel of the corps of topographical engineers."

These cuts were necessary for the enlargement and improvement of the cut on which former appropriations has been expended under the sanction of the Topographical Bureau.

I found by reference to the map of the surveys I had made in the year 1844, and a critical examination of the islands and river opposite the city, that some modifications and additions to the plan sanctioned

by the bureau would be necessary, in order to make the improvement of a nature more permanent and suitable to the rapidly increasing importance of the city.

The current of the Mississippi from some cause had, within the preceding few years, taken a more direct course across from the Wisconsin and Illinois shore, so as to impinge against the outer island with much greater velocity about 200 yards above the outlet of the harbor, and had washed away nearly one hundred feet of it both above and below the outlet.

The material from this abrasion had formed a bar about 150 yards from the outer island, visible at low water for an extent of 200 yards, and about parallel to the shore. The head of this bar was just opposite the upper side of the outlet, and made it very difficult for boats descending the river to make an entrance to the harbor, particularly so, as the velocity of the current at this place was nearly 2.5 miles per hour.

In addition to the improvement made under the appropriation of the general government, the citizens of Dubuque had made an excavation of 100 feet in width through Bass island, immediately opposite the outlet, which excavation was then completed to within two feet of low-water mark; and the piles, which had been driven by direction of the Topographical Bureau, in a line across the slough immediately opposite, had all been removed.

From the changes which had taken place I inferred, that as the river continued to encroach upon the islands the bar might extend upwards, and make the entrance by the present outlet still more difficult. I therefore recommended that a cut through the outer island should be made from a point opposite the cut through Bass island, and extending obliquely up the river so as to meet the current of the Mississippi near the point where it impinged against the outer island. I also suggested that the lower cut through Bass island should be perfected, so that the entrance could be made by boats coming up the river through this cut, and their egress could be made by the upper cuts; and by boats going down, the entrance could be made by the upper, and egress by the lower cuts.

On the 14th October, 1852, I concluded a contract for removing the earth above water necessary for the enlargements of the entrances of the outlet and cut through Bass island, and forwarded a copy of the same to the Topographical Bureau.

The contractor was, however, not able to finish his work, owing to an unusual rise of the river and the inclemency of the weather.

After having completed my examination of the harbor, and reported thereon to the Topographical Bureau, I proceeded, according to directions, to St. Louis, and thence to Louisville, to make inquiries as to the facilities for constructing a dredge boat, and on the 3d November reported from St. Louis, that it would be better to have the boat built at Louisville.

I arrived at Louisville on the 8th, when I received instructions from the Topographical Bureau not to enter into any arrangements for a dredge-boat until further orders.

On the 29th November I received orders from the Topographical Bureau to furnish estimates of the probable cost of completing the improvements suggested by me for the harbor of Dubuque, which were forwarded on the 30th.

On the 22d December I received orders to make the necessary arrangements and have a dredge-boat constructed, and on the 25th, after having made the necessary inquiries as to probable cost of materials, labor, &c., I suggested to the Topographical Bureau, that \$20,000 be reserved of the appropriation for snag-boats, dredge-boats, for the construction of the dredge-boat.

Measures were immediately taken, and on the 7th of January, 1853, I reported that arrangements had been made with D. & J. Howard, of Jeffersonville, for the construction of the hull, framing, &c.; with W. H. Grainger, of Louisville, for the engines, castings, &c.; and with A. Van Deventer, for buckets and bucket chains: Estimating the cost at \$16,000.

I remained at Louisville superintending the construction of the dredge-boat until it was nearly completed, when in the latter part of April I repaired to Washington, when I received verbal orders from the Topographical Bureau to proceed to Dubuque with the dredge, and commence operations on the improvement of the harbor, in conformity with the plans I had suggested in my report of the 21st of October, 1852.

Having previously written for information on the subject, I was informed by telegraph on the 1st of March, that two or more screws could be constructed at Dubuque by the 1st of May. I accordingly directed that they should be built, and immediately sent drawings and specifications to govern their construction. Disappointments in obtaining suitable timber was, however, met with, of which I was not apprised in time, and the scows were not commenced when I reached Dubuque with the dredge on the 21st of May.

I immediately took measures to have the timber sawed, and materials procured, and had workmen engaged on their construction by the 24th. Every effort was made to have them completed with as much expedition as possible, but it was the 1st of July before one of them was ready for operations, and the dredging was commenced on that day, on the contemplated cut through the outer island opposite the upper cut through Bass Island.

The water of the river was then nine feet above low water mark, and it was hoped that it might be found practicable to make this cut entire by means of the dredge, as there was there sufficient depth of water on a greater part of the surface of the island to float the boat, and the river still rising. It was found, however, that the firmly rooted stamps which covered the ground in many places, presented great obstacles to the operations, and this, together with the want of scows, and the rapid subsidence of the water, made it impossible to effect the required excavations with the dredge. The work at this cut was consequently suspended when the water became so low that the dredge would not float, then and from that time to the present it has been employed in removing the obstructions which existed in the former improvement and enlarging the channels for approaching the harbor.

The estimated amount of excavation above low water in the cut through the outer island, was 29,710 cubic yards, of which there remains about 20,000 cubic yards, and I have advertised for proposals to remove it by contract during the low stage of water this fall; the proposals to be received until the 15th instant. When this earth is removed there will be no difficulty whatever in removing the remainder with a dredge boat, during the high water of next spring, and thus perfect the contemplated improvement to the harbor, by making it accessible at all stages of water to boats ascending or descending the river.

It is contemplated that the dredge-boat will be used as long as it can be advantageously employed this fall, in removing obstructions and enlarging the channels, and also in enlarging and deepening the harbor, which, in a low stage of water, is very contracted, and by a judicious management with the use of the dredge-boat, the present appropriation will be adequate. Very little can be effected without the use of the dredge, as all the improvements to be made, except the above mentioned excavation through the outer island, consists in the removal of mud from the bottom of the channels and harbor, which is at all times covered with water.

In the construction of the dredge-boat it was thought expedient so to model it as to suit the general purposes for which it was intended; that is, the improvement of the Mississippi, Ohio, Missouri and Arkansas rivers, where it was supposed it would generally be employed in removing the bars, whilst there was water enough on them to float the boat. For such use experience has convinced me it is well adapted. The arrangement of the machinery is good, and it is capable of excavating in such material as is usually found on the bottom of these rivers, 200 cubic yards an hour, when working fairly over the material to be excavated.

But experience has also proved that it is not at all adapted to work in work in narrow channels or confined harbors when it is contemplated to enlarge them, as this can only be done by working one bucket chain at a time, and that under great disadvantages, as neither the dredge, nor the scow which received the load, have room to float so as to work the buckets with full force.

It is impossible to keep the buckets in constant successive action against a bank which the boat has to approach obliquely, and the scows can very rarely receive more than half a load.

A different model should therefore be adopted for dredge-boats intended for the improvement of harbors or channels, and for the removal of bars in the rivers, I would merely suggest that the hull be increased so as to lessen the draft of water.

I find that the steel bushing in the eyes of the links of the bucket chain answer well the purpose for which they were intended, as they preserve the links entire and wear the bolts much less than they were worn before the bushings were introduced.

As the work for the improvement of the upper rapids has not yet been placed under my direction as agent, it would, I presume, be an act of supererogation to make any report on the subject, other than to state, that I have, agreeably to your instructions, aided the officer put in charge of the surveys by your orders, by my council and advice,

whenever I have been called on by him to do so, and have requested him to execute the surveys in such a manner as to enable the agent who may have the work in charge to form a correct idea of the extent and nature of the contemplated improvements.

I am, with much esteem, your obedient servant.

JOSHUA BARNEY, *U. S. Agent.*

Colonel S. H. LONG,

*Sup't W. R. Improvements, Louisville.*

OFFICE OF THE OHIO RIVER IMPROVEMENTS,  
*Louisville, September 1, 1853.*

SIR: In compliance with the regulations of the Topographical Bureau, I have the honor to submit a report of my operations during the past year, in furtherance of the improvement of the Ohio river, including repairs of Cumberland dam, together with an estimate for the further prosecution of the work, during the next fiscal year.

My receipts and expenditures for the year commencing July 1, 1852, and ending June 30, 1853, on account of this service, are as follows, to wit:

*Receipts.*

Treasury draft No. 3,907, received March 22, 1853.....	\$500 00
Do.....No. 3,965, received April 4, 1853.....	3,000 00
Do.....No. 4,118, received April 25, 1853.....	8,000 00
Do.....No. 4,368, received June 2, 1853.....	4,800 00
Do.....No. 4,473, received June 22, 1853.....	11,000 00
Amounting to.....	27,300 00

*Expenditures.*

Amount expended third quarter, 1852.....	.....
Do.....fourth quarter, 1852.....	.....
Do.....first quarter, 1853.....	\$336 00
Do.....second quarter, 1853.....	21,471 90
Amounting to.....	21,807 90
Balance on hand June 30, 1853.....	5,492 10

Which balance has since been applied in the prosecution of the duties of my agency.

From the date of my appointment as local agent and engineer, viz.: on the 3d of February, 1853, to an early date in March, my attention was principally directed to an examination of such drawings and other documents pertaining to former surveys, &c., of the Ohio river and Cumberland dam, as were available, and which might be useful in the prosecution of my duties. On the 12th of March, authority having been

given me to construct a dredge-boat for operation, in the vicinity of Cumberland dam, and such other points on the Ohio as might be deemed expedient, I made the necessary contracts for the hull, engines, and machinery, which were duly forwarded to the Topographical Bureau, under date of 24th of March.

The boat was finished complete in all its parts and appendages, together with four discharging scows, and left Louisville on the 14th of July, for Cumberland dam.

The amount expended on account of the construction, &c., of the dredge-boat, prior to June 30, 1853, was \$11,596 14.

Pursuant to instructions from the Topographical Bureau of the 24th of March, in which I was authorized to receive from Captain J. W. Russell, United States agent, any one of the snag-boats then constructing at New Albany, Indiana, under his directions, should it answer my purpose; I selected the light draft boat No. 5, (Terror,) and that it might be made available for operations on the upper Ohio, I caused it to be brought above the falls to Louisville. The construction, equipment, and outfit, having been completed under my directions, on the 5th of May, it left Louisville for Pittsburg, under the command of Captain J. K. Dillingham, an old and experienced snag-boat captain.

My instructions to Captain Dillingham were mainly that he should proceed as rapidly as possible to the head of the Ohio, and thence work down, removing all obstructions in the shape of logs, snags, &c., in and near the channel, and to return to Louisville in season to pass over the falls, with the usual June freshet, and to operate in the lower Ohio. Unfortunately no "June freshet" of sufficient magnitude occurred, and the boat was compelled to remain above.

The total number of snags and other obstructions removed by the Terror prior to the 30th June, 1853, is as follows, viz:

Date.	Snags removed.	Roots, &c., blasted.	Flat-boats raised.	Snags, &c., removed.	Impending trees felled.
May 5 to June 30.	93	15	9	7	10

The amount expended by me on account of the construction, equipment, outfit, &c., of the boat prior to June 30, 1853, was \$8,797 71.

For reasons submitted to the bureau, and duly approved, I decided to make the repairs and enlargement of Cumberland dam by contract rather than by hired labor. Accordingly, having advertised for proposals for the delivery of the amount of stone required, and having received many propositions from different contractors, that of Mr. Robert Swan was deemed most acceptable. Mr. Swan having made the lowest proposal, and being well known as a former contractor on the river, and as a man of energy, honesty and ability, I felt no hesitation in recommending him for the contract. My course having been approved, a contract was entered into with him for the delivery into line of dam of about thirty thousand tons of stone, which amount it

was then supposed would be sufficient to make the required repairs. A copy of the contract was transmitted, under date of June 7, 1853.

Prior to June 30, but 1,686 tons of stone had been deposited, and no payments had been made by me on account of said contract.

Of the work done at Cumberland dam and on the Ohio river from the 1st day of July to the present date, I will treat briefly, as follows:

At Cumberland dam, to the date of the last report received from the supervisor of that work, (20th instant,) there had been 15,973 tons of stone deposited, which, together with that deposited prior to July 1, (viz., 1,686 tons,) gives a total of 17,659 tons. Having been, by reason of my other duties, unavoidably prevented from visiting this locality since the 26th July last, I cannot report from personal observations the effects, either beneficial or otherwise, of the repairs, so far as they have progressed.

At the date of my last visit I found the depth of water in the Kentucky chute of Cumberland island considerably increased—so much so that no boat attempted to pass through or over the dam, but all availed themselves of the Smithland channel. At that time no stone had been placed in the V, or gap. Since that date, the dredge boat has been operating at and near the head of the Kentucky chute, in straightening the entrance, and widening and deepening the channel over the bar.

The bar at the foot of Cumberland island probably now requires the services of the dredge boat; and I have already sent instructions to the commandant of the Gopher to examine that locality, and to operate there if found necessary and expedient.

The snag boat No. 5, Terror, from the 1st to the 22d of July, worked to great advantage between Cincinnati and Louisville. On her arrival here at the date last mentioned, finding the water too low either to operate above Cincinnati or to pass the falls, and having removed all the obstructions that could be found near the channel between Cincinnati and Louisville, I caused her to be laid up for repairs and some necessary alterations.

The working crew were paid off and the boat put in ordinary, with only the necessary officers and laborers required for the time, and at reduced wages.

The total number of obstructions removed since July 1 are as follows:

Dates.	Snags removed.	Roots, &c., blasted.	Flat-boats raised.	Logs, &c., removed.	Impending trees felled.
July 1 to July 22 .....	47	13	14	.....	.....
Prior to July 1 .....	93	15	9	7	10
Total since May 5, '53.	140	28	23	7	10

On the 2d ultimo, by instructions from headquarters of western river improvements, I was directed to make arrangements for a careful survey of Marietta harbor, to examine the dam at Belleville island, and to inspect all the wing-dams on the upper Ohio, &c.

In compliance with these instructions, I left Louisville on the 10th of August, and have performed the duties required.

The survey at and near Marietta has been made by my assistant, George F. Fuller, civil engineer, under my directions. This survey was required in consequence of a memorial having been received from sundry citizens of Marietta, urgently calling for an improvement at that locality. I am not yet prepared to report fully on this subject, but, from my personal observations on my recent visit, my views in reference thereto, as set forth in my communication of the 17th June, 1853, remain unchanged, and to which I take leave to refer for further information on this subject.

The drawings and report of this survey will be prepared and transmitted to headquarters W. R. improvements, at an early date.

The examination at Belleville Island was made particularly in reference to a request from C. D. Burr, M. D., to the Secretary of the Interior, that permission might be granted to use a portion of the rock for a wharf at Belleville.

The petitioner evidently misapprehends the object for which this dam was built. He says, "that the dam in question is not of the least utility, as it is built at such a place that, when the water is required in the channel, it is perfectly dry around the dam." The dam in question is intended to turn the water at a stage somewhat elevated above extreme low water, and also to back the river over Belleville shoals, a short distance above.

Both of these objects are effected by the dam, and with very beneficial results. Belleville shoals have been a great obstruction to navigation in that part of the river; and, from the peculiar form and position of the bars, can be more easily, economically, and successfully improved, by means of the dam referred to, than by any other plan of improvement. I would therefore recommend that this dam be repaired, and elevated at least one foot above its present level.

Belleville is located nearly equidistant between the dam and the quarries from whence the rock was obtained for the construction of the dam, and doubtless sufficient stone, for the purposes desired by Dr. Bauer, could be obtained at these quarries.

Having inspected the various dams on the Ohio, between Pittsburgh and Cincinnati, I am gratified in being warranted in reporting that, in almost every instance, they have proved decidedly beneficial to the low water navigation.

Many of them, however, were not completed on the suspension of the work of improvement in 1844, and nearly all of them require both repairs and enlargement. Most of the breaches found in them have evidently been made by individuals, either for their own private advantage or with malicious intent. A remarkable resemblance was observed, in several instances, between the rocks at certain landings, in saw mill ways, &c., &c., to those remaining in the neighboring dams.

The location of the dams inspected, their present condition, the repairs required, &c., are briefly enumerated as follows, commencing with the first dam below Pittsburgh, and proceeding in regular order down the Ohio.

Deer Island dam, extending across the left hand chute of Deer Island, is in good condition, but will require about 3,000 tons of stone to complete it.

Dam from foot of Neville's Island to tow-head, a breach has been made in this dam, evidently for the passage of skiffs and other small boats. About 400 tons of stone will fill the gap and repair the dam.

*White's Ripple and Trap.*—The long dam extending downwards from the foot of tow-head should be raised about 18 inches; the cross dam from Middletown requires elevating about one foot; and the opening left for the ferry way should be diminished in length.

*Loogstown Bar.*—The dam at this locality has been but partially constructed. For a distance of 587 feet from shore the dam requires no alteration; thence about 500 feet, a dam six feet in height will be necessary; thence about 600 feet, the present dam should be elevated about one foot.

*Black's Island.*—Dam should be elevated about one foot.

*Black's Island.*—No repairs necessary.

*Brown's Island.*—A portion of the crest of the dam at the head of the island, for about half its length, has been washed off. The wing dam, on the Virginia side, has two small gaps requiring about 50 tons to fill them; and about 500 feet of the dam, from the shore downwards, should be raised two feet; 8,000 to 10,000 tons of stone would make the necessary repairs.

*Mingo Island.*—Dam requires about 3,000 tons of stone to raise it for a distance of 700 feet in length.

*Brack Bottom Dam.*—No repairs required.

*Twin Islands.*—A breach in this dam 400 feet in length; 6,000 to 7,000 tons of stone required.

*Captina Island.*—Middle portion of the dam requires elevating; about 1,000 tons necessary.

*Fish Creek Island.*—The dam, for about 600 feet in length, should be raised; 3,000 tons would be sufficient.

*Fishing Creek.*—About 400 feet of the dam to be elevated one foot, and the dam extended downwards from 300 to 400 feet further, as the water is shoal along the line of dam; but 3,000 tons of stone would be required.

*Williamson's Island.*—Lower end of the dam should be raised, and a small gap near the foot filled; 1,500 tons sufficient.

*Whitton's Towhead.*—The dam at this locality had only been commenced, and but little progress made towards its construction at the date of the suspension in 1844.

To make the improvements here, nearly an entire new dam will be necessary.

*Well's Island.*—The upper portion of the dam, for about 400 feet, is perfect. There are two small breaches to be filled, and two spaces of 400 and 300 feet to be elevated two feet; 4,000 tons sufficient.

*Mill Creek Island Dam.*—No repairs required.

*Grand View Island.*—Lower end of dam should be raised, and the dam extended 200 feet towards head of island.

*Petticoat Bar.*—The right-hand dam is about two feet lower than the left, and might be raised, at least one foot, to advantage. About 100 feet of the left-hand dam requires raising.

*Three Brothers.*—Dam not completed; as far as built is in good order; should be extended downward to head of dry bar, at Second Brother.

*Vienna Island.*—Dam in good order, with the exception of a space about 400 feet long, which requires to be raised about one foot.

*Blennerhasset's Island.*—Dam, at the head, for about 300 feet, commencing at Virginia shore, is in good condition; thence, for 75 feet, it should be raised one foot; the balance, about 700 feet, should be raised two feet. The dam, at the foot of the island, requires about 500 tons of stone to repair it.

*Newberry Bar.*—This dam requires elevating, between two and three feet, nearly its whole length.

*Buffington Island.*—No less than six gaps have been made in this dam, viz: one of 30 feet, one of 40, two of 60, one of 50, and one of 130 feet. Judging from their appearance, they have been intentionally made. These gaps all require filling, and the lower end of the dam, for a distance of 600 feet, should be raised. This dam was never completed. The improvements, at this locality, require the completion of the old dam, and the construction of one across the Ohio chute of the island, as originally designed.

*Letart's Islands.*—The whole dam requires raising, from one to two feet. Many of the stones appear to have been intentionally removed.

*Raccoon Island.*—400 feet of dam, from shore line, in perfect order; thence, for a distance of 150 feet, the dam should be raised from one to two feet; and thence about 600 feet, at least, three feet. Pilfering from the dam appears to have been practised extensively at this locality.

*Brush Creek Island dam.*—The entire length requires elevating about three feet.

There are several localities where no dams have, as yet, been constructed, but which present serious obstructions to the low-water navigation. The most prominent of these are Beaver shoals, Raccoon bar, and Warsaw bar. A dam at the head of Raccoon bar, which is immediately below Beaver shoals, would, doubtless, not only improve the channel at the bar, but would, at the same time, back the water over the foot of the shoals.

Having never examined Warsaw bar at low water, I am not prepared to suggest any plan of improvement at that locality. It is the most serious obstruction between Cincinnati and Louisville, and some improvement should, doubtless, be made thereat. A dredge-boat could be advantageously worked at Beaver shoals and Warsaw bar, as well as at many other places on the Ohio.

The dams on the lower Ohio, with the exception of that at Cumberland island, are in a very dilapidated condition; and the expediency of attempting any repairs of them is, to say the least, very question-

able. The character of these bars is very different from that of those in the upper Ohio, nearly all of them being composed of light shifting sand.

The navigation at these points may be improved, temporarily, by dredging at a stage of water somewhat above the lowest; and the channels thus formed will remain open, at least, until the occurrence of the next freshet. This system will require the constant use of one or more dredge-boats, to operate during the summer months, throughout the lower part of the river.

The unexpended balance of appropriation for the Ohio river, including Cumberland dam, at this date, viz: \$42,436 11, will be insufficient to complete the repairs and enlargement of the dam, and, at the same time, cover the expenses of snagging, dredging, and other contingencies incident to the improvement of the river.

In submitting an estimate for funds for the ensuing fiscal year, therefore, no unexpended balance is supposed to remain on hand at the close of the current fiscal year, viz: on the 30th June, 1854.

The surveys and estimates for the repairs of Cumberland dam were made in 1848. During the period of nearly five years, that has elapsed since that date, many changes have taken place at that locality. A portion of the extreme lower end of the dam, as it then existed, has been washed away; and throughout the length of the dam, generally, the stone has been displaced to some extent. The original estimate, consequently, falls short of the amount required at the time of commencing the present work, rendering a further appropriation necessary to complete the improvement.

It now remains that I submit an estimate for funds required in the prosecution of the duties assigned me, for the ensuing fiscal year, commencing July 1, 1854, and ending June 30, 1855, which is as follows, to wit:

#### ESTIMATE

For continuing the improvement of the Ohio river, including Cumberland dam, \$90,000.

Respectfully submitted.

CHAS. A. FULLER,

*U. S. Agent and Engineer O. R. Improvement, &c., &c.*

Lieut. Col. S. H. LONG,

*Supt. W. R. Improvements, Louisville, Kentucky.*