

points. A jetty has been constructed, at the upper end, to protect the bank and train the flow of water into the proper channel. Chipola Cut-off has been opened to navigation, by the removal of sunken logs and overhanging timber, and the channel straightened by removing some of the sharp points.

The following work has been accomplished during the fiscal year ending June 30, 1879:

During the month of July, 1878, 43 snags were removed at different points; and in November 11 logs were removed at Moccasin Slough, and a large raft of drift timber removed from the jetty and another at Styx Island. In January, 1879, a survey was made of the mouth of the river and the harbor of Apalachicola. February, March, and April were consumed in opening Chipola Cut-off.

It is proposed to apply the funds available for expenditure June 30, 1880, in opening a canal, or cut-off, across the peninsula, at the head of Moccasin Slough, and in removing the point of land on the right bank, at Styx Island.

It is proposed to apply the appropriations asked for the fiscal year ending on the 30th June, 1881, for the completion of these works and to remove snags wherever necessary.

It may be found necessary to improve Bluntstown Bar by a system of wing-dams. If it should be decided to deepen the river bar at Apalachicola, funds could be beneficially expended there.

The amount (estimated) for the entire completion of the improvements, exclusive of the river bar, is \$47,000.

An annual expenditure of \$2,000 is deemed sufficient to keep the improvements in repair and the channel free from snags.

The works are situated in the collection-district of Apalachicola, Fla.

Apalachicola, Fla., is the nearest port of entry.

The amount of revenue collected for the last fiscal year is \$813.

The present commerce on this river is insignificant when compared to its former proportions. This diminution is due partly to railroad competition, but the shallow outlet at Apalachicola is the prime cause. With the river bar deepened to 11 feet, a fresh impetus would spring up, and the present river commerce would probably be increased \$1,000,000.

The plan adopted for this work is detailed in annual report for 1873.

The original estimated cost of the work as now being carried on.....	\$80,333 33
The whole amount appropriated since the adoption of the present project.	33,000 00
The amount expended thereon.....	23,410 64

The project does not contemplate permanent completion. It is estimated that an annual expenditure of \$2,000 will be required to maintain the river in the condition contemplated in the plan of improvement.

#### Money statement.

July 1, 1878, amount available.....	\$8,702 58
Amount appropriated by act approved March 3, 1879.....	5,000 00
July 1, 1879, amount expended during fiscal year .....	\$13,702 58
.....	4,113 22
July 1, 1879, amount available.....	9,589 36
Amount (estimated) required for completion of existing project.....	47,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	25,000 00

#### EXAMINATION OF MOUTH OF APALACHICOLA RIVER AND BAY, FLORIDA.

UNITED STATES ENGINEER OFFICE,  
Mobile, Ala., February 5, 1879.

GENERAL: In compliance with instructions contained in your letter of the 30th of October, 1878, I have the honor of reporting that an examination was made of the bay of Apalachicola during the month of January.

The following changes are found to have taken place since the survey made in 1871:

New Inlet has filled up considerably, there being now only 10 feet on the crest of the inner and 5 feet on the outer bar.

The bar at the mouth of the Apalachicola River has extended a little farther out, and possibly does not afford quite as great a depth, the minimum being given at 3½ feet.

The report made with regard to the improvement of the bay contained in the Annual Report of the Chief of Engineers for 1872 is not materially affected by these slight changes, and is referred to as containing all the information required. The conclusions arrived at then are considered good now, viz: While other improvements might be made, the only feasible one within a reasonable limit of expenditure is the dredging of the channel to a depth of 11 feet through the bar at the mouth of the river, with a width of 100 feet, to be afterwards increased to 200 if the first cut should produce results that would warrant it.

The total estimated cost of this work is the same as then. The possible increase in amount to be excavated would be just about compensated for by the decrease in the cost of dredging since that time, so that the estimate now is:

Dredging 250,000 cubic yards of sand and mud, at 40 cents..... \$100,000

The commerce and trade of the port have not much changed since the time of the old survey, so far as I have been able to learn.

The custom-house statistics for the last fiscal year are as follows:

Amount of revenue collected at the port of Apalachicola, Fla., during the fiscal year ending June 30, 1878, \$271.05.

Number of vessels entered during above period, 24; tonnage, 3,135.30.

Number of vessels cleared during the above period, 23; tonnage, 2,727.73.

Number of vessels belonging to the district, 26; tonnage, 1,204.60.

If the work is determined upon, I would recommend an appropriation of \$50,000 to commence operations.

The tracing showing the line of soundings run by Mr. Quattlebaum is transmitted herewith, which by comparison with map forwarded in 1871 will show the changes referred to.

Mr. Quattlebaum's report is also inclosed.

Very respectfully, your obedient servant,

A. N. DAMRELL,  
Captain of Engineers.

Brig. Gen. A. A. HUMPHREYS,  
Chief of Engineers, U. S. A.



REPORT OF MR. P. J. QUATTLEBAUM, ASSISTANT ENGINEER.

JANUARY 15, 1879.

MAJOR: The instructions conveyed in your letter of November 21, 1878, directing me to "make an examination of the mouth of the river and bay of Apalachicola, Florida, to determine what changes, if any, have occurred since the survey made in 1871," have been complied with, and I respectfully submit the following

## REPORT:

We arrived at Apalachicola on 31st December, 1878, with steamer Clara Dunning. The weather proving unusually rough, and at times foggy, a considerable portion of time was necessarily lost.

The following lines of soundings were run:

1. From City Wharf to Upper Anchorage.
2. Upper Anchorage to East Pass.
3. Upper Anchorage to New Inlet.
4. From New Inlet to Indian Pass.
5. From Upper Anchorage to West Pass.

*First line.*—As will be seen from the inclosed maps, there is a depth of  $3\frac{1}{2}$  feet on the river bar and 11 feet at anchorage.

*Second line.*—Norman Bar gives  $7\frac{1}{2}$  feet, between it and Bulkhead  $8\frac{1}{2}$  feet, and in Bulkhead  $4\frac{1}{2}$  to  $6\frac{1}{2}$  feet. From here to the Lumps we find not less than  $9\frac{1}{2}$  feet, to the East Pass Anchorage not less than  $10\frac{1}{2}$  feet, and on the anchorage 15 feet. From here, 18 feet has recently been carried across the bar.

*Third line.*—Starting at Upper Anchorage and running to New Inlet we find nothing less than  $11\frac{1}{2}$  feet until we get one-half of a mile from the gap, when the water shoals rapidly to 2 feet. In the pass, which is 300 feet wide and 600 feet long, from 15 to 20 feet depth is found. Outside there is a bar with only 5 feet, which gradually deepens to 16 feet half a mile from the gap.

*Fourth line.*—From New Inlet to Indian Pass we find from 6 to 12 feet.

*Fifth line.*—On the line from Upper Anchorage to West Pass we find 11 feet to the outer bar, and on the bar not less than 12 feet. All of these soundings are reduced to mean low-water. At mean high tide there would be  $1\frac{1}{2}$  feet more. Comparing these soundings with the survey of 1871, it seems that New Inlet has filled up considerably, and that the bar at the mouth of the river has extended a little farther out and does not afford quite as much depth, but the latter may be due to a discrepancy in the tides at time of sounding.

The condition of affairs seems to call for dredging the bar at the mouth of the river to a depth of 11 feet at mean low tide and 100 feet wide along the line of the present natural channel to the Upper Anchorage, and also cutting through Bulkhead Bar  $7\frac{1}{2}$  feet deep and 100 feet wide, to facilitate lightering to the East Pass Anchorage.

## ESTIMATES.

River bar, 250,000 cubic yards, at 30 cents.....	\$75,000 00
Bulkhead, 15,000 cubic yards, 30 cents.....	4,500 00
Contingencies.....	5,500 00
Total.....	85,000 00

Very respectfully, your obedient servant,

P. J. QUATTLEBAUM,  
Assistant Engineer.

Maj. A. N. DAMRELL,  
Captain Corps of Engineers, U. S. A.

J 7.

## IMPROVEMENT OF CHOCTAWHATCHEE RIVER, ALABAMA AND FLORIDA.

Under an estimated cost of \$34,332 for the improvement of this river, from its mouth to Geneva, the present head of navigation, three different appropriations of \$5,000 each were made in 1874, 1875, and 1876, and the work of improvement commenced on the 12th of November,

1874, and continued until the 12th of February, 1875, when, the appropriation being exhausted, work was suspended.

Under the second appropriation work was resumed in May, 1875, and, owing to the exhaustion of the money, was again suspended in September, 1875.

Under the third appropriation of 1876, work was resumed in May, 1877, and continued until the money became exhausted, August 31, 1877.

The work was carried on first with light-draught schooners, until in December, 1874, a flat 20 by 60 feet was built; the work was prosecuted on her and continued, with the help of a light-draught steamer, in September, 1875, and during the working season of 1877.

Work was commenced at the mouth and continued up the river during the three working seasons for a distance of about 100 miles.

During this period over 1,400 large snags and stumps, about 3,200 overhanging trees, several sand-bars, drifts, and gravel-bars were removed. A channel 3 feet deep, 30 feet wide, and about 150 feet long was cut through a rock shoal about 1 mile above Cerro Gordo or Hewett's Bluff.

## PRESENT CONDITION OF THE WORK.

The condition of the river, as far as the work has progressed, is such as to allow light-draught vessels to navigate at all seasons of the year.

Above that point, however, the river is in a very bad and dangerous condition. Two sunken steamboat wrecks, situated, one about 30, the other about 50 miles below Geneva, obstruct navigation considerably during low-water; a cut-off about 15 miles below Geneva presents a very difficult and dangerous point to pass for vessels descending, and a rock shoal about 4 miles below Geneva is almost impassable in low-water.

There are also a great number of points and bends in the river full of snags and stumps and overhanging trees, which make navigation extremely dangerous.

Owing to the smallness of the yearly appropriations so far made, the work of clearing the river of snags and stumps, &c., had necessarily to be made hurriedly, and certainly not very thoroughly. Only the most dangerous and necessary points were improved, leaving still a great many points and bends in the part of the river so far gone over in a bad condition.

However, by using proper care and precautions navigation on that part of this river is comparatively safe at all seasons of the year.

No appropriations having been made for the continuance of the work during the fiscal year ending June 30, 1879, nothing was done during that period.

## FUTURE OPERATIONS.

An appropriation of \$5,000 having been made for the fiscal year ending June 30, 1880, it is proposed to expend that amount in the removal of two sunken steamboat wrecks, situated, one about 30, the other about 50 miles below Geneva; in the improvement of a dangerous cut-off, called Buzzard Bar Cut-off; in cutting and blasting a channel 3 feet deep and 35 feet wide through a rock shoal about 4 miles below Geneva, and to devote about six weeks' time to removing the most troublesome snags and stumps and overhanging trees that may be encountered on the way up the river to Geneva.

It is proposed to apply any appropriation that may be made for the



fiscal year ending June 30, 1881, to the thorough removal of snags, stumps, and overhanging trees, commencing about 20 miles from the mouth, up to within about 10 miles below Geneva; the river above and below these points mentioned, being almost entirely free from obstructions, requires but very little work.

The amount required for the completion of the work of removing obstructions in this river, exclusive of the \$20,000 already appropriated—\$14,851.13 of which has so far been expended, and \$5,148.87 being available after the 1st of July, 1879—may safely be estimated at \$25,000. This exceeds the original estimated cost of the improvement by about \$10,000. The cause of the excess is principally the smallness of the appropriation, which has lengthened the time required for the work, and added materially to the amount on account of the obstructions referred to below. Owing to the fact that a great number of rafts of timber and logs are annually going down the river, and that a large quantity of square timber and saw-logs are driven down-stream, that is, allowed singly to float down and find their own way to the mouth, the banks in the bends become undermined by the timber striking, and numbers of trees standing on the banks are washed into the river, forming obstructions to boats, so that this river will not admit of a permanent completion of improvement, and it would require an annual expenditure of about \$2,000 to keep the river clear of obstructions from Geneva to its mouth.

During the fiscal year ending June 30, 1881, the sum of \$15,000 could very profitably be expended in removing snags, stumps, and overhanging trees.

Choctawhatchee River empties into Choctawhatchee Bay, which, flowing through Santa Rosa Sound, enters Pensacola Bay, and thus finds an outlet into the Gulf of Mexico.

Choctawhatchee River and Bay is situated in the collection-district of Pensacola, Pensacola being the port of entry.

Pensacola light-house, Forts Pickens, Barrancas, and McRee, and the United States navy-yard are located at the entrance of Pensacola Harbor.

The number of vessels entered and cleared during the fiscal year at the port of Pensacola were: entered 481, tonnage 227,824; cleared 448, tonnage 218,955. The amount of revenue collected during the same period is \$53,588.

By the improvement of and maintenance of an unobstructed river, the counties of Walton, Washington, Jackson, and Holmes, in Florida, and the counties of Geneva, Coffee, Dale, Pike, Barbour, and Henry, in Alabama, would be greatly benefited, opening a highway and water navigation for an extensive commerce.

It is estimated that from 4,000 to 5,000 bales of cotton, from 2,000 to 3,000 barrels of sirup, a large amount of country produce, and probably \$1,000,000 worth of timber would be shipped down the river annually if it was in condition for steamboats to navigate with safety; and, of course, the number of vessels doing business on the river would in a very short time be trebled.

The plan adopted for this work is detailed in the annual report for 1872.

The original cost of the work as now being carried on is .....	\$34,332
The whole amount appropriated since the adoption of the project is .....	20,000
The amount expended thereon is .....	14,851

The reason for this excess of cost over first estimate is the smallness of appropriations made and a larger amount of work than was included previously.

An annual expenditure of \$2,000 will be required to maintain the river in the condition contemplated in the plan of improvement.

*Money statement.*

July 1, 1878, amount available.....	\$208 87	
Amount appropriated by act approved March 3, 1879.....	5,000 00	\$5,208 87
July 1, 1879, amount expended during fiscal year.....		60 00
July 1, 1879, amount available.....	5,148 87	
Amount (estimated) required for completion of existing project.....		25,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.....		15,000 00

## I 8.

## IMPROVEMENT OF ALABAMA RIVER, ALABAMA.

This work was commenced during the fiscal year ending June 30, 1879. The equipment consists of the steam snag-boat Seawell, a quarter-boat for 30 men, a barge for transporting material, and a small office-boat.

The Seawell is a single-engine boat, 95 feet long, 22 feet beam, and 5 feet hold. She was bought in Mobile, fitted up with a derrick, capstan, and other appliances needed for snagging, and went into service August 19. The quarter-boat was put to work one week later. The barge and office-boat were built in the spring and placed upon the river May 12. The Seawell returned to Mobile in September to have a steam-capstan placed in her, and went down again in April to have her machinery repaired and to be strengthened with hog-chains. One month's time was consumed in making these improvements. The total time spent upon the river during the fiscal year was 4½ months.

Work was commenced at the place known as the "Cut-off." This is an outlet from the Alabama into the Tombigbee, about 25 miles, by the former river, from their junction. The distance via the Cut-off is 7 to 8 miles less, and the main current took the shorter route, thereby causing a bar to form across the river below the Cut-off. Hence, during low-water, steamboats were obliged to pass through the Cut-off, and the people living along the river below were deprived of their river facilities. As the volume of water diverted from the river was yearly increasing, and the latter threatened soon to become a closed lake, it was thought important that the first improvement attempted should be closing the Cut-off. A dam was accordingly commenced across the head of the Cut-off, at a point where the latter was 800 feet wide and 7 to 9 feet deep for half this distance. The case presented some difficulty, as the foundation from shore to shore was of loose drift-sand, and it was necessary to leave an opening in the dam of 140 feet, in order to continue the use of the Cut-off to the boats until a channel could be forced through the bar in the river. The plan adopted was to sink cane mats, 2½ feet thick, from end to end of dam and secure them to the bottom, in order to prevent scouring as the water-way contracted in building the dam. Small piles, driven by hand-mauls, served to guide the mats and retain them in place until sufficiently weighted. No rock or gravel being accessible for this purpose, the sand from the banks was wheeled in and deposited in the current above the mats, in order that, by washing down against and becoming lodged among them, a bar might form that would serve as a secure base for the dam. In the gap



left for the steamboat channel the mats were pinned down by piles with T heads, which were driven by followers until the mats were pressed closely to the bottom. It happened (as was afterwards ascertained) that in removing a guide-pile used in sinking a mat, it was canted over so as to raise the corner of an adjacent mat. When the current was increased by building up the dam on each side of the gap, this mat was torn out and carried off. Heavy scouring took place at once, which was checked as soon as possible by sand-bags, 500 of which were deposited. By this time the river was rising rapidly, from the winter rains, and on December 5 work was suspended.

Work was resumed on April 21, with the river about 16 feet above its low stage. Piles and fascines were prepared for the dam, and when the water fell to 8 feet a dike was built across the island chute opposite the Cut-off and a wing-dam thrown out above. The object was to scour out a channel as the water fell, in order that the gap in the Cut-off might be dispensed with. The result desired was obtained, and a minimum low-water depth of 4 feet was secured through the bar. The dam was found to be in the same condition as when the winter rise took place, and heavy piles were driven with an 800-pound hammer across the gap preparatory to closing it. But, as the water fell, the sand cut out from under the deposit of sand-bags so that they settled below the adjacent mats. This caused side currents along the upper base of the dam, which removed the sand banked against the mats, allowing the water to pass under them in many places and cutting out the sand to a depth of 3 to 5 feet. In order to weight the mats down again, the Seawell and barge were sent 60 miles up the river for rock, which, with 500 sand-bags that were at hand, was deposited at the base of the piles, forming a bank with its top about 6 feet under water. Willow mats 25 feet wide and 2½ feet thick were then floated against the piles and let go, the current immediately drawing the upper edge to the bottom, while the lower edge rested on the rock and against the piles. Loading the mats with clay from the other side of the river, and repeating this process with another row of piles and mats, gave a broad and tight base upon which it was easy to raise the dam to the surface. This had been nearly accomplished when a sudden rise in the river on the night of June 15 forced an opening around the south end of the dam and speedily cut away the bank for 100 feet. It was a work of some difficulty to connect the dam with the shore again, as the loose sand bottom offered but slight resistance to the concentrated current that poured through the break. It required a week's labor to extend the dam to the bank and make a secure connection there.

The dam in its present condition allows the water at high tide to flow over it for 400 feet with an average depth of 2 feet. It gives a head of 1 foot at low tide, and as that is sufficient to keep the channel open in the river below it is thought, in view of the very unreliable nature of the foundation and abutments of the dam, it would be imprudent to finish the dam at much above its present height, at least until it has settled and silted up from sediment.

It will take about one month's work yet to finish the dam for the present, and its effects upon the river below will be (as has already been proved) all that was designed. The bar is steadily cutting away, and there is now 4 feet water on the crest at extreme low tide where last season there was less than 2 feet.

The tides at the Cut-off depend greatly upon the winds. As far as observed, the difference between low tide with northerly winds and high

tide with southeasterly winds is 1.83 feet. The daily oscillations vary from 0.24 foot to 1.46 feet.

The Seawell, besides the work done by her at the Cut-off, has removed 320 logs from the channel for 50 miles above the mouth of the river. Steamboat-men express much satisfaction at the improvement to navigation thereby effected.

It is proposed to apply the funds available for expenditure during fiscal year ending June 30, 1880, to completing the dam at the Cut-off, to the improvement of the river at Hayne's Island, and to remove the troublesome logs from the channel as high up, probably, as Cahawba.

It is proposed to apply the appropriations asked for for fiscal year ending June 30, 1881, to the thorough improvement of the bars below "Mary Taylor's Bar," and to remove the logs from the channel throughout the river.

As every winter's floods bring down large amounts of drift, portions of which lodge in the bottom of the river and become snags, it will be necessary to pass over the river every summer with a snag-boat in order to maintain the improvements effected. A yearly appropriation of \$10,000 will, I think, be ample for this purpose.

This work is situated in the collection-district of Mobile, and commences 50 miles above that port of entry.

The amount of revenue collected at Mobile during the past fiscal year was \$40,816.10.

The present business done upon the Alabama River consists mainly in transporting to Mobile the cotton crop grown near the river and taking back plantation supplies. The number of bales shipped down the river during the past year was 42,000, valued (at an average of \$50 per bale) at \$2,100,000. No record is kept of the up freights, but as it is well known that of late years almost the entire proceeds of a cotton crop are expended in purchasing the next year's supplies, the up freights may reasonably be estimated at 80 per cent. of the down trade, say, \$1,600,000. To these sums should be added a considerable but unknown amount of business done on the upper portion of the river. Above Claiborne many bales of cotton are carried to Selma and Montgomery, and corresponding amount of supplies brought back.

Arrangements are being made to carry coal by barges from Montgomery to Mobile. It is brought by rail 96 miles from Birmingham, where it is furnished very cheaply, and the managers of this enterprise expect to deliver it in Mobile at \$3 or less per ton. Their success will very much depend upon the uninterrupted and unobstructed navigation of the river, which it is the object of this improvement to accomplish.

The plan adopted for this work is that recommended in my annual report for 1876.

The original estimated cost of the work, as now being carried, on is .....	\$229,741 00
The whole amount appropriated since the adoption of the present project is .....	55,000 00
The amount expended thereon is .....	21,687 68

*Money statement.*

July 1, 1878, amount available .....	\$25,000 00
Amount appropriated by act approved March 3, 1879 .....	30,000 00
	<hr/>
July 1, 1879, amount expended during fiscal year .....	\$55,000 00
	21,687 68
	<hr/>
July 1, 1879, amount available .....	33,312 32
	<hr/>
Amount (estimated) required for completion of existing project .....	174,741 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	60,000 00



J 9.

IMPROVEMENT OF BLACK WARRIOR AND TOMBIGBEE RIVERS, ALABAMA AND MISSISSIPPI.

HISTORY.

This work was commenced in July, 1875, with an appropriation of \$25,000. This sum being insufficient to provide suitable steam-power, except by using too large a proportion of the funds available, a logboat and three quarter-boats were built at Tuscaloosa without motive power, and the work was carried on downstream, the boats floating with the current from point to point. November 28 high-water compelled a cessation of the work, which was resumed June 5, 1876.

A new and stronger logboat was added to the equipment in July, and work was continued until August 10, when, funds being exhausted, work was again suspended. It was resumed November 1, an appropriation of \$15,000 having been made available, and continued until January 2, 1877. Up to this time work had been carried on from Tuscaloosa down for a distance of 70 miles, improving 30 bars and removing 1,100 logs, but the improvements effected were of moderate immediate advantage to navigation, from the fact that the river below could not be used during extreme low-water. Accordingly, as the funds available for the season of 1877 were sufficient to operate one boat only, it was thought best to commence with a logboat at the mouth of the Warrior and work upstream, the boat's capstan furnishing power for warping. The boat worked from April 5 to November 10, removing 800 logs and cutting 1,100 overhanging trees between the mouth of the river and Log Shoals, 80 miles above. This work was of much service, but was not thoroughly done, owing to the fact that the season proved a wet one and very little low-water stage was encountered. Work was resumed July 5, 1878, and continued until December 10. The Warrior River was left September 10, and the forces worked upon the Tombigbee, improving the shallowest bars from Demopolis down, and removing logs from the channel at the points most obstructed by them.

The boats were put to work on the Tombigbee again in June, and are engaged on the lower portion of the river at this time.

The work accomplished up to date is as follows:

Number of bars worked upon .....	38
Number of logs removed .....	3,911
Number of trees cut .....	2,925
Linear feet of dikes and jetties built .....	16,077
Linear feet of bank protection .....	1,281

Of the 38 bars improved, 8 will need additional work, mainly to remove shoals formed below. From the fact that the jetty was not carried downstream far enough to deposit in deep water the sand scoured out from the bars. Some little additions and repairs will be needed in other cases to properly finish and secure the work already done.

In the Warrior several slides have occurred, throwing into the river probably 100 trees that should be removed. The experiments made in protecting caving banks by small piles driven near the shore and filled in with brush and gravel have proved successful, and the system should be adopted at many points on that river.

The navigation of the Warrior has been greatly improved by the work done, bars formerly impassable at low-water now affording 4 feet water,

and the fact established that this depth can be secured throughout the river. As the bars upon the lower half of the Warrior have not yet, however, been improved, 2½ feet at low-water is all the depth that the river gives for navigation at present.

The work done upon the Tombigbee up to this time has proved quite satisfactory, 4 feet depth having been secured upon the bars improved. The removal of the most troublesome logs from the channel has also much benefited navigation.

The present equipment for this improvement consists of 1 logboat, worked by hand-power, 1 quarter-boat for 35 men, 1 office-boat, and 4 small flats for transporting material. The quarter-boat and small flats are much decayed and cannot outlast the present season.

The work for the fiscal year ending June 30, 1879, was commenced at Log Shoals on the Warrior River. A new logboat 66 by 24 by 3 feet was built, and two old quarter-boats were utilized in making one from the sound material they both contained. Two other old quarter-boats were stripped to use as transports, but it was found difficult to keep them afloat, and, after sinking several times, they were finally used in jetties.

The forces worked upon the Warrior until September 12, when they were moved into the Tombigbee. In the former stream 2,190 feet of jetties were built at 7 bars, and 713 logs were removed by the logboats. Work on the Tombigbee was commenced at Turkey Shoals. This was a hard bar with only 18 inches water, and its surface was formed by a crust 2 inches thick, incapable of erosion. This was broken up by a rake with heavy iron teeth, attached to one of the small flats, and dragged back and forth by the logboats with their capstans. This was a slow but effectual process, and after contracting the river with jetties a 4-foot channel was obtained. Work at this place was much delayed by sickness, the jetty force at a time being reduced to 10. The force was recruited with some difficulty, owing to the yellow-fever panic prevailing throughout the country, but after the middle of October there was no further inconvenience on this account. Turkey Shoals was left on October 26, and Barney's, Sellar's, and Osage were then improved, they being the most troublesome points for boats to pass; from 2 feet to 2½ feet was found on these bars, which was increased to 4 feet. On November 24 work was commenced at Hatchetigbee Bar, and continued till the end of the month, when a rise in the river compelled a cessation for the winter.

Work was resumed in the latter part of May. Some time was consumed in putting the boats in working condition; one logboat was found to be altogether unserviceable from decay. The quarter-boat and small flats were beached and calked so as to be serviceable for the present season. The boats were then towed up to Hatchetigbee Bar, and at this date have just completed the improvement there.

The work of the past fiscal year that was done upon the Tombigbee, amounts to:

- 3,305 linear feet of jetties built.
- 911 logs removed.

It is proposed to apply "the funds available for expenditure during fiscal year ending June 3, 1880—"

1. To building a light-draught steam snag-boat, that can also be used for towing the other boats from point to point.
2. To commence the improvement of the Tombigbee, between Demopolis and Columbus, both by removing logs and deepening shoals.