If the improvement is determined on, I would recommend the appropriation of the full amount of the estimate at once, $11,500.

Respectfully submitted.

A. N. DAMRELL,
Captain of Engineers.

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

REPORT OF MR. POWHATAN ROBINSON, ASSISTANT ENGINEER.

CAMP NO. 13, AT DURRELL'S,
NEAR MOUTH OF PASCAGOULA RIVER,
October 29, 1878.

MAJOR: In compliance with your instructions, given to me in Mobile on the 16th of August, I have made a rapid yet careful examination of the Chickasaha and Pascagoula Rivers, with a view to their improvement as navigable streams.

CHICKASAHA.

I commenced operations at Shubuta, on the Mobile and Ohio Railroad, in Clark County, whence I proceeded down stream, towards its mouth.

The distance from Shubuta to the Buckatunna River is variously estimated by the citizens at from 70 to 100 miles.

According to my computation, observing the rate of progress and noting the actual running time, it is only 46 miles, but I will call it 50 to Warren's Mill, 1½ miles above the mouth of Buckatunna. From Shubuta, for a distance of 30 miles or more, the river is in a very bad condition, much obstructed by logs, snags, stumps, and leaning trees. A great deal of work will be required here. The low-water surface is, in general, about 60 feet in width. The banks rise immediately from the water-line, so that the leaning trees present a serious obstacle to steamboat navigation, even at high-water. In the channel proper I think there is nowhere less than 2 feet depth at low-water, but it is too narrow to be available at low-water. I would, therefore, advise that the obstructions be removed only down to low-water mark, or even a little above. This will give the best navigation attainable on this part of the river, and will require a rise of about 4 feet for light-draught boats. I estimate the cost of the work from Shubuta to Winchester, 38 miles below, at $4,500. The Mobile and Ohio Railroad crosses the river a little below Shubuta, without a drawbridge, and is therefore impassable to steamboats as it stands. A little above Winchester the river expands to a width of about 100 feet, plenty of room overhead, and the bed less obstructed than above. It may perhaps be well here to remove obstructions to a depth of 2 feet below low-water. From Winchester to Warren's Mill, 12 miles below, I estimate the cost at $1,000. But I deem it unnecessary for our present purpose to consider that portion of the river which I have described, and would recommend that the mouth of the Buckatunna, or some convenient point near by, be assumed as the head of navigation. 1

I have therefore concluded to adopt Camp No. 1, at Warren's Mill, as the initia point of the work, and assuming it accordingly as zero, have computed all my distances therefrom. About 1½ miles below Camp No. 1, the Buckatunna River, a fine stream, affording at low-water from about ⅔ to ¾ the quantity of water discharged by the Chickasaha, makes its debouchure into the latter stream. From this point down to the mouth of the Leaf River, about 80 miles below Warren's Mill, the obstruction should be removed probably to a depth of not less than 3 feet below low-water level, at an average cost of $75 per mile from Warren's Mill; total, $6,000.

ESTIMATE.

For removal of trees, snags, logs, &c., down to low-water mark:	
From Shubuta to Winchester, 38 miles	$4,500 00
From Winchester to Warren's Mill, 12 miles	1,000 00
For removal of same 3 feet below low-water:	
From Warren's Mill to mouth of Chickasaha, 80 miles, at $75	6,000 00
Total	11,500 00

I deemed it proper to include the entire cost of the plant necessary for this work in my estimate for the improvement of the Pascagoula, which will come first in order. This done, the same plant may be applied to the work on the Chickasaha.

It was impossible to obtain any reliable commercial statistics on the line of my route, which passed through a very sparsely populated district after leaving Camp No. 2, 8 miles below Warren's Mill. This much, however, I can state, that the soil is in general a sandy loam, which I am informed is quite productive. But the chief source of wealth is to be found in the vast pine forests extending east and west, far beyond the limits of the river basin, which might afford an almost illimitable supply of the finest ship-timber and building lumber, and of turpentine and rosin; also oak, cypress, ash, and hickory. There are several turpentine-distilleries in this region, but they are mostly dependent upon railway transportation, and cannot be very profitable at present. National wealth I presume means the ability to raise large sums of money on a low rate of taxation, and this depends on the accumulation of wealth in the hands of individuals. But this accumulation is not progressing so rapidly as might be desired, and one very potent cause (among others) for this failure is that our people have sacrificed cheapness of transportation to speed, thereby sacrificing also their profits, and have thus become impoverished when they should have grown rich. The only remedy for this is the development of internal navigation to the utmost possible extent.

The Chickasaha is navigable, I believe, at low-water, for light-draught boats up to the mouth of the Buckatunna at least.

In former days a boat ascended the river to within a few miles of Enterprise; but the river has been abandoned for railroads, and has become choked up as herein stated.

Before Mr. Meyer left me (on sick-leave) we took two cross-sections of the river at Pittman's Ferry, eight miles below Warren's Mill, of which the second was perfectly satisfactory, after its kind, giving 25,730 cubic feet per minute as the water-discharge. The velocity of the current was tried four times with the invariable result of 30 feet in 43 seconds. This shows accuracy of execution.

I would recommend the appropriation of $6,000 for the improvement of this river from its mouth up to Warren's Mill.

I am, major, with great respect, your obedient servant,

POWHATAN ROBINSON.

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

J 13.

EXAMINATION OF CONECUH RIVER, ALABAMA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., July 29, 1879.

SIR: By act of Congress approved June 18, 1878, an examination of the Conecuh River, Alabama, was authorized, and by letter dated July 8, 1878, was assigned to me. This work in connection with the examination of the Patsaliga River, Alabama, and the examination and survey of the Escambia River, Florida, was put under the immediate charge of Mr. Hiram Haines, assistant engineer, upon whose report I have the honor to submit the following. The examination was made from the mouth of Indian Creek to a point where the river crosses the Alabama State line into Florida, and receives the name of Escambia River, a distance estimated at 193 miles.

This river in its present condition is impassable for boats, and even the transportation of timber and saw-logs during high-water is difficult.

The obstructions in the lower portion of the river consist in an immense number of snags and drift-logs, with some sand-bars, which could be removed at a reasonable cost, while the upper part is a succession of rapids and falls over rock shoals, which would require the construction of a system of locks and dams to make it navigable for small-size steamboats.

The principal commerce on this river to be benefited by any improvement is that of timber; 3,000,000 cubic feet is reported as the average

yearly trade, which it is estimated might possibly be increased 75 per cent., should greater facilities be offered by the removal of some of the obstructions.

Two estimates are submitted, one for the opening of the river to facilitate timber transporation by the removal of snags, closing of 3 cut-offs, and construction of some wing-dams, at a cost of $62,430; the other for the opening of low-water navigation for small steamers by the additional construction of locks and dams, and the removal of rock obstructions, at a cost of $241,685.

As all the commerce of this river has to pass over the Escambia, I would recommend that its improvement be delayed until that of the latter river is well advanced.

A copy of the report of Mr. Hiram Haines, with maps, is herewith inclosed, to which I would respectfully refer for further detailed statements.

Very respectfully,

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. HIRAM HAINES, ASSISTANT ENGINEER.

MOBILE, ALA., *February* 24, 1879.

SIR: I have the honor to submit the following report upon the survey of the Conecuh River, made in pursuance of your instructions of the 5th of September, 1878.

Having selected a point near Pollard, Ala., at which to begin the examination of the river, I employed at that place the men required for the work. Mr. R. E. Hardaway, who had been assigned to duty with me as a subassistant, and who had previously reported to me at Columbus, Ga., rejoined me at Pollard on the 16th, and preparations for departure having been completed, the ascent of the river was commenced on the 20th of September. The water was at a stage which exposed every obstruction, being less than a foot above the lowest to which it had ever been known to fall, and was fortunately not augmented during the entire examination of the Conecuh and Patsaliga rivers. The gaugings which were made from time to time of the river and its principal tributaries may, therefore, be regarded as exhibits of their minimum volumes.

The point at which the examination was commenced is situated about a ½ mile north of the line between Alabama and Florida. Here the river has a width of 200 feet, a depth of from 3 to 12 feet, and a maximum surface velocity of 85 feet per minute. The altitude of low-water surface above mean low-water in Pensacola Bay is 40.61. High-water mark of freshet of 1864 is 68.91. Freshet of 1874, 63.91. Railroad grade at Pollard, 65.11 The banks are 15 to 20 feet above the low-water surface of the stream, and covered with all that variety of vegetation common to the river lands of this region. As we proceed same features which everywhere characterize the beds of the stream, cutting through tertiary strata, present themselves. Tortuous beyond description, it winds along its course with shifting sand-bars jutting out from almost every point. Occasionally it dashes along in a rapid current over a bar formed by the accumulation of sand and gravel around a myriad of snags projecting from the embedded trunks of trees that have been undermined along the banks and gathered one upon the other. In many places it has sought a new channel by taking a short cut across narrow strips that separate one bend from another but a few feet, when it may be ½ mile or more around. The fall through these "cut-offs" is such frequently as to accelerate very considerably the velocity of the water passing through them, and tends to draw everything into them that passes near. Where such cut-offs cannot be utilized as new channels, a floating boom attached to piles across the opening, as a fender for rafts, or damming completely, is suggested, according to the nature of the case.

The country contiguous to the river is low, and forms an almost continuous swamp; banks elevated sufficiently to be free from overflow are an extremely exceptional feature, and whenever they occur are commonly adopted as approaches to the river for

roads and for the delivery of timber. Eight miles above Pollard, Murder Creek empties into the Conecuh. This stream with its branches, Burnt Corn and Cedar Creeks, flow through an extensive and valuable timber region, which supplies about one-sixth of the aggregate amount of timber that finds its way to the mouth of the Escambia. Minor streams flow into the river along its course, and form in like manner, during high-water, channels for the transportation of timber from the pine forests beyond the swamps.

The obstructions south of section 15, township 2, range 12, consist exclusively of snags, fallen trees, and sand-bars, but at this part of the river the rocks belonging to the eocene division of the tertiary formation are exposed and form obstructions in the shape of shoals and heavy bowlders of calcareous sandstone of a soft, friable nature, very similar to indurated cement having a large admixture of sand. The position and extent of these obstructions are fully described in the accompanying sketches, and the lithological character of the rocks composing them may be seen in the specimens previously forwarded for your examination.

With the change in the geological horizon a complete change occurs in the nature of the river bed, its banks, and the vegetation with which they are covered. Snags and fallen trees are now seldom encountered. The white orbitoidal limestone which becomes largely developed as we approach the mouth of the Sepulgah, shaped by erosion into a smoothly molded base along the one side and shelving cavernous border along the other, forms massive supports to elevated plateaus with vine and fern covered slopes descending abruptly to the rock. Frequently the rock projects from the banks, both above and below the surface of the water, and where such projections occur at short bends they are difficult to avoid in descending the river. A succession of falls and rapids, occasioned by this limestone and other rocks associated with it, occur at intervals to a point 10 miles above the confluence of the Patsaligo River.

In order to render the river navigable for boats, the more prominent of these falls and shoals will have to be overcome with a system of locks and dams. Estimates for such structures upon the least expensive plans that I could devise accompany this report, and their positions are approximately located upon the maps. The arrangement of the dams is such as to provide a chute for the passage of rafts over them at the ordinary winter stage of the water. A height of 5 feet is proposed for the dams; a greater height and fewer number would be preferable under ordinary circumstances, but if they were built much in excess of that proposed, they would not admit of the passage of rafts over them with safety. Both dam and lock are designed to be constructed mainly of crib-work filled with rock, the whole to be so arranged as to admit of its submersion during freshets. The lock proper to be composite in its construction with chamber 80 feet between gates, and 25 feet wide at the bottom. The head to be of rubble masonry, laid in hydraulic cement, paved apron at entrance, puddled in such a manner as to render the work impervious to water. The foundation to be of yellow pine 12 inches by 12 inches, covered with 2½-inch flooring. The side walls to be crib-work, the groin-posts being bolted to the timbers of which the walls are composed, and sides lined with a double sheeting of 2-inch plank laid first vertically and then longitudinally. The shore-wall to be properly connected with the shore and the dam-wall with the end of the dam and frame-work of the timber chute, projecting below the chute about 35 feet. The top of the lock-walls to be covered with a coping of white oak.

The estimated average length of the dams is 75 feet; breadth of lock over all, 55 feet; total length of work, 130 feet. Pine timber can be obtained at a cost not exceeding $10 per 1,000 feet, board measurement, and white oak at $15. The stone used in the work may be selected from that which forms the shoals upon which the dams are to be built.

Upon some of the minor shoals wing-dams only will be required, and where the bottom consists chiefly of sand, spurs may be attached to the wings with good effect in forming eddies, which cause the deposition behind them of the material washed out of the channel-way. These wing-dams may be constructed of loose rock or fascines, according to the nature of the river-bed and material at hand, the latter being preferred for sand and mud bottoms, and would therefore be found chiefly applicable to the river above and below the zone of rocks.

The principal fall is situated near Bullock's Ferry, 3¼ miles northwest of Andalusia. This is a perpendicular cascade of 4½ feet in height, formed by a stratum of sandstone about 2 feet thick, of uneven structure, underlaid with a soft sandstone, easily disintegrated by the action of water, which permeates it and causes the subsidence and fracture of the stratum above. Within a few years it has receded several hundred feet from this cause, and evidences exist in the character of the shoals, which extend below the foot of the fall, that at no very remote period it occupied a position nearly a mile further down the river. Examination shows that it is now maintained by a narrow strip or wall 15 or 20 feet in thickness, the rock above in the bed of the river having been entirely washed out for several miles. The removal of the top crust or

stratum of harder sandstone which caps this wall and forms the crest of the fall, and from the adjacent ledges which project into the channel below, leaving the softer material with which it is underlaid to the erosive action of the water, would accomplish the almost immediate demolition of the fall. The present surface of the water in the pool above it may be restored, if found necessary, in the arrangement of the dams that would be required to overcome the shoals below it.

The examination was continued up the river a short distance above the confluence of the Patsaliga. Here a series of shoals and rapids were encountered, which I found to be impassable in this direction, and from information received respecting the condition of the river above, I had my boats hauled from the vicinity of Andalusia to Smiley's Bridge, situated about 11 miles south of Troy.

The altitude of the bed of the river 3 miles northwest of Troy, deduced from barometrical observations and levelings combined, I found to be about 415 feet above the Gulf, and the fall to the Florida line 375 feet. The stream in this locality at the time of my examination, October 18 and 19, was nothing more than a sluggish little creek, quite insignificant in its proportions, being from 5 to 10 yards wide, and often separating in its meanderings through the swamp that bounds it a mile or more on either side, until its scanty summer waters are divided into numerous muddy sloughs. Where the river is joined by Indian Creek it becomes much larger and forms a stream deserving some consideration. The section taken at Smiley's Bridge well indicates its capacity at that point, and from which it will be seen that its volume there exceeds that of the New York and Erie Canal before its enlargement. This is the highest point from which timber has ever been sent down the river, but owing to the obstructions with which it has become almost completely filled for 20 or 30 miles below, little or no timber has been launched in this vicinity for many years.

We started down the river from Smiley's Bridge, on the 22d of October, reaching the head of the rapids on the 5th of November. The itinerary kept during that time was a monotonous repetition from day to day of observations concerning the labyrinth of fallen trees and logs with which the river bed was blocked. Such was the difficulty in effecting a passage down the river, that scarcely more than a mile was accomplished during the first day, and but little more during each of several succeeding days. Cutting away fallen trees, lifting the boats over such as were partly submerged, and transporting them around masses of such obstacles, required the most vigorous and untiring efforts, and the successful accomplishment of this part of the work was due to the alacrity and cheerfulness with which the men performed their duty. Nearly the whole distance the river ran through a swamp subject to overflow, rank with growth and noisome with decay, and more tortuous in its course than ever before. From Smiley's Bridge to Sims's Bridge, the distance by river I estimated to be 2.66 to 1 on a straight line, its width ranging from 40 to 100 feet. This proportion diminishes from Sims's Bridge to the Patsaliga to 1.70 to 1. Several reaches exceeding a thousand feet in length occur above Gantt's mill.

At about 4 miles above Gantt's upper mill, the first rock shoal occurs. This is succeeded by another, after an interval of slack water of 500 feet, and again at 1,500 feet, with a shoal and abrupt fall of about 1 foot through a sluice constructed for a fish-trap. A mile further down another sluice was passed, having a fall of $\frac{8}{10}$, built of fragments of sandstone, the stratum from which they were derived appearing in the bed of the river, and forming a shoal below it. The river then becomes less crooked. Fifteen hundred feet further another fall of about $\frac{6}{10}$ occurs, followed by shoaly water and reach of 1,200 feet. A bend of 250 feet to the right gave another reach of 1,000 feet, the lower $\frac{2}{3}$ of which was shoaly, followed by one of 2,000 feet in length, which brought us several hundred feet below Gantt's steam-mill. The back water from Gantt's dam, situated about 2 miles below, extends to this point, and except for the first 200 yards the river is placid and generally deep until the dam is reached. The dam is a wooden structure with a fall of 3.85 feet, and situated at the head of the rapids previously referred to, extending to the mouth of the Patsaliga, a distance of about 5 miles. The rapids are formed by rock shoals, more or less inclined, with short intervening pools of slack water. Within about a mile of the dam their occurrence and fall are respectively as follows: 1.15, 0.55, 0.63, 1.22, 0.88, 0.90, 0.93, 1.02, 0.42, 0.90. For the next half a mile below there was less abruptness of fall, the inclination of the shoals becoming more gradual and of greater length. The remainder of the distance there was a succession of shoals and rapids, varying from 100 to 1,000 feet in length, the maximum fall being about 4.50 feet. The total fall, as determined by Mr. Hardaway, from the foot of the dam to the mouth of the Patsaliga, was 33.28 feet. The fall from the head of the shoals above the steam-mill would therefore be about 40 feet, and require the construction of 8 dams, such as those proposed, to overcome it.

No special estimates were made for overcoming any of the numerous sand-shoals encountered, as the removal of the snags from the bed of the river would, in most instances, cause them to be washed out entirely, or altered materially in their positions and aspect. The removal of the snags and prominent rock obstructions should therefore, in my opinion, precede the consideration of any further improvement of the river.

A proper system of canalization and rectification might, I think, then be adopted, and locks, dams, and other improvements applied to the shoals, to render it navigable for small steamboats and barges to Indian Creek.

The commerce of the river consists at the present time exclusively of timber, and its extent is shown by the tabular statement embodied in my report upon the Escambia River, and of which a copy is herewith appended. This statement having been compiled from abstracts supplied me by the inspectors at Ferry Pass from their official records, is reliable and complete. Of the total amount of timber of all kinds inspected at Ferry Pass, I am also reliably informed that about two-thirds of it is derived from the Conecuh and its tributaries.

It will be perceived that there has been a considerable decrease in the annual production latterly, due chiefly to the depressed state of the market abroad, and largely to the difficulties and consequent cost of procuring it and getting it to market. The forests contiguous to the lower part of the river have generally been exhausted of the larger trees. It is, however, a misapprehension very generally entertained, that this exhaustion is a permanent one, or even of any great duration or injury to the lands. Only the largest trees are cut, such as will produce from 75 to 100 cubic feet of timber, or saw-logs measuring 14 to 15 inches diameter. An acre of the finest timber land will not produce over 5 or 6 trees sufficiently large for the former, or more than 8 or 10 suitable for the latter. Where an original growth is thus culled of its largest trees, but 5 years are required, according to the estimate of experienced timbermen, to restore it to its original capacity of production where the timber trees only are cut, and 10 years to reproduce the original number of saw-logs; with this difference, that each subsequent crop matures with less defects than are found in the original.

The larger tributaries of the river flowing through an extensve and valuable domain of timber land have now become the principal for supplying the commerce of the river. Much of the business that was formerly done by hauling from the adjacent forests to "slides" on the river banks has been removed to the interior, where the timber is more easily obtained. Here it is cut close to the brink on these smaller streams, and at high stages of the water launched and "driven" down to the river, loosely or in "clamps" of a few pieces, and there formed into rafts. The hewed timber is carried to Ferry Pass, where it is inspected piece by piece, classified, and sold. The saw-logs are mostly consumed by mills on the river, where they are converted into lumber or squared, and again rafted to the mouth of the Escambia for inspection and sale as sawed timber.

From information derived from various sources and at different localities where I have made inquiry in regard to the probable increase that would result from the removal of such obstructions as interfered materially with this particular commerce, I have been led to the conclusion that it might be increased thereby 75 per cent. This would, however, involve the necessity of embracing Murder Creek and its branches and the Sepulgah River within the provisions of any appropriation that might be made for this purpose, and I have, therefore, appended approximate estimates of work required on these streams based upon personal observation and reliable information.

The capacity of the country drained by the waters of the Conecuh River for the production of agricultural values is but little known or understood. Pike County, which embraces the upper waters of the Conecuh, with an aggregate population of 24,435, produced annually a total value of agricultural products, according to the United States census report for the decade ending 1860, amounting to $1,534,965. This represents probably the actual capacity of this county to produce agricultural values under favorable conditions and with an adequate and properly organized system of labor, such as is applied to the cultivation of northern and western farms.

The census report for the decade ending 1870 shows the total value of agricultural products of the same county annually, with a population reduced to 17,423, to be $465,249, or a loss in the power of production of this county alone of over $1,000,000 annually. In like manner statistical information, derived from the same source, indicates a far greater capacity for the production of agricultural values in other portions of this region than is realized by the farming operations of the present, and it is upon this actual capacity of production that any measure for its recuperation or development should, I think, be based. The staple product of this region is cotton, and of the aggregate value of farm products before and, perhaps, subsequently to 1860, at least two-thirds were derived from it. I am credibly informed, however, that the lands adapted to the culture of cotton will produce double the amount in value by the production of sugar-cane with much less labor and uncertainty, and that a very large proportion of the lands too poor for cotton would yield profitable crops of cane.

The weight of sugar or sirup does not admit of its transportation to market in wagons, and the farmers are compelled to adhere to the production of cotton. Were means of cheap transportation available, such as might be afforded by the improvement of this river, there is no doubt that the cultivation of sugar-cane and rice along its course

would be greatly stimulated, and their production go largely to restore, if not exceed, the former aggregate of values produced in this section of the country.

Subjoined are estimates of the cost of a full and partial improvement of the river:

REMOVAL OF SNAGS.

	Miles.	
From Florida line to Healy's Ferry	19½	$5,800
Healy's Ferry to Coal Bluff	7	2,900
Coal Bluff to Parker's Ferry	10	3,195
Parker's Ferry to section 15, township 2, range 12	11½	2,670
Section 15, township 2, range 12, to Sepulgah River	9	1,550
Sepulgah River to Patsaliga River	38	1,250
Patsaliga River to Sims's Bridge	16	2,465
Sims's Bridge to Dozier's Bridge	8	3,000
Dozier's Bridge to Williams's Bridge	23	9,200
Williams's Bridge to Peacock's Bridge	8	800
Peacock's Bridge to south line Township 8	8	2,400
South line Township 8 to Smiley's Bridge	20	10,000
Smiley's Bridge to Indian Creek	15	7,500
	193	52,780
1 snagboat and appliances		7,000
Damming 2 cut-offs between Florida line and Healy's Ferry		2,800
Damming 1 cut-off 5 miles above Parker's Ferry		1,800
800 feet fascine dams and shore protections, at $3		2,400
		66,780

ROCK EXCAVATION, DREDGING, AND WING-DAMS TO THE SEPULGAH RIVER.

From section 15, township 2, range 12, to Blackshear's Shoals.

11,300 cubic yards loose rock, at 50 cents	$5,650	
1,000 cubic yards solid rock, at $2	2,000	
		$7,650

On Blackshear's Shoals.

9,500 cubic yards loose rock, at 50 cents	4,750	
1,250 cubic yards solid rock, at $2	2,500	
		7,250

From Blackshear's Shoals to Sepulgah River.

1,200 cubic yards loose rock, at 50 cents	600	
1,250 cubic yards solid rock, at $2	2,500	
		3,100
400 feet wing-dams, at $1.75		700
Total rock work to Sepulgah River		18,700

ROCK EXCAVATION, DREDGING, AND WING-DAMS FROM THE SEPULGAH RIVER TO THE PATSALIGA RIVER.

7,000 cubic yards solid rock, at $1	$7,000	
3,590 cubic yards solid rock, at $2	7,180	
2,900 cubic yards loose rock and bowlders, at 75 cents	2,175	
5,100 cubic yards loose rock and bowlders, at 50 cents	2,550	
3,000 cubic yards sand and gravel, at 30 cents	900	
		$19,805
300 feet wing-dams, at $1.75		525
		20,330

On Gantt's Shoals, above the mouth of the Patsaliga River.

2,500 cubic yards loose rocks and bowlders, at 75 cents	1,875	
1,000 oubic yards solid rock, at $2	2,000	
		3,875

Locks and dams.

1 crib-dam and lock above Riley's Ferry	$12,000	
2 crib-dams and locks below Bullock's Ferry	24,000	
1 crib-dam and lock below Patsaliga	12,000	
7 crib-dams and locks on Gantt's Shoals	84,000	
		$132,000

RECAPITULATION.

Removing snags	52,780	
1 snagboat and appliances	7,000	
Damming 3 cut-offs	4,600	
800 feet fascine work	2,400	
		66,780
Rock excavation:		
To Sepulgah River	18,700	
From Sepulgah River to Patsaliga	20,330	
From Patsaliga River to head of shoal	3,875	
		42,905
Locks and dams		132,000
Total		241,685

No addition has been made for engineering and contingencies, as I am of the opinion that the foregoing estimate will cover the entire cost of rendering the river navigable for steamboats drawing 30 inches loaded, 15 feet beam, and 60 feet length, with a capacity of 35 tons, to a point situated about 5 miles above Gantt's Shoals, and the remainder of the river to Indian Creek navigable for flat-boats at all seasons of the year.

The following is an estimate of work required to facilitate the transportation of timber and extend its production, which probably comprehends all that is required for the commerce of the river at the present time.

The entire removal of the snags is preferred on account of the effect, as before stated, it would be likely to have in the removal of many of the bars also, preparatory to further improvements, partial or desultory work of this kind; affording generally but little permanent benefit.

REMOVAL OF SNAGS.

From Florida line to Indian Creek	$52,780
1 snagboat and appliances	7,000
Booming 3 cut-offs	750
	60,530

ROCK WORK.

From section 15, township 2, range 12, to Blackshear's Shoals.

100 cubic yards solid rock, at $2	$200	
750 cubic yards loose rock, at 50 cents	375	
		575

On Blackshear's Shoals.

125 cubic yards solid rock, at $2	250	
300 cubic yards loose rock, at 50 cents	150	
		400

From Blackshear's Shoals to Sepulgah River.

50 cubic yards solid rock, at $2	100

From Sepulgah River to the mouth of Patsaliga River.

200 cubic yards solid rock, at $2	400	
300 cubic yards loose rock and bowlders, at 75 cents	225	
		625

On Gantt's Shoals.

400 cubic yards loose rock, at 50 cents	200
Total	62,430

In addition to the expenditure of $3,000 in the removal of obstructions in Murder Creek and its branches, $5,000 for similar work on the Sepulgah River and its branches above Brooklyn is advisable.

Conecuh River is situated in the collection-district of Pensacola, Fla. Pensacola is the port of entry.

STATEMENT OF AMOUNT OF REVENUE COLLECTED, AMOUNT OF COMMERCE, NUMBER OF VESSELS ENTERED AND CLEARED, DURING THE FISCAL YEAR ENDING JUNE 30, 1879, IN THE DISTRICT OF PENSACOLA, FLORIDA.

Amount collected for duties on imports	$13,222
Amount collected for tonnage dues	34,820
Amount collected for hospital tax	1,773
Amount collected for official fees	2,843
Amount collected for steamboat inspector	400
Amount collected for fines, penalties, &c	530
Total	53,588
Amount of exports to foreign countries	2,102,477
Amount of shipments coastwise	594,349
Total	2,696,826

	Vessels.	Tons.	Men.
Foreign vessels entered	228	160,907	3,419
American vessels entered from foreign ports	86	24,913	645
American vessels in coastwise trade	167	42,004	1,431
Total	481	227,824	5,495
Foreign vessels cleared	214	159,224	3,332
American vessels cleared for foreign ports	62	17,744	467
American vessels cleared in coastwise trade	172	41,987	1,364
Total	448	218,955	5,163

Very respectfully, your obedient servant,

HIRAM HAINES,
Assistant Engineer.

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

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EXAMINATION OF PATSALIGA RIVER, ALABAMA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., July 29, 1879.

SIR: I have the honor of reporting as follows on the examination of the Patsaliga River, Alabama, provided for by the act of Congress approved June 18, 1878, and assigned to me by letter dated July 8, 1878.

The examination was carried from the mouth to the point where Blue Creek joins it, a distance by water estimated at 70 miles. It was found impassable even for small boats during the low stage of water existing, therefore the examination was necessarily made from the banks.

The obstructions were found to be accumulations of drift at various points throughout the whole distance, and rock shoals at intervals between its mouth and Rattlesnake Branch, a distance estimated at 18 miles.

No improvement of the river was found to be practicable within a reasonable expenditure, considering the extent of commerce present or possible in the near future for navigation during the low stage of water.

The commerce to be principally benefited by any improvement is that of lumber, 500,000 feet of which is reported as annually passing down, with a prospectively large increase with the enlarged facilities offered by a partial removal of these obstructions.

Two estimates are submitted, one for removal of snags throughout, and the improvement of such shoals, by the excavation of rock and the construction of wing-dams, as may be necessary to open the navigation for lumber rafts during a slight rise in the river, $23,500, and the other for confining the work to such points as will accomplish the same result during moderately high water, $8,700, to both of which should be added about $1,500 for working boats and outfits. As the commerce of this river will pass over the Conecuh and Escambia, I would recommend its improvement be subordinated to that of the last-named rivers.

The report of Mr. Hiram Haines, by whom the examination was conducted, is inclosed herewith, to which reference is respectfully made for a more detailed statement.

Respectfully submitted.

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. HIRAM HAINES, ASSISTANT ENGINEER.

MOBILE, ALA., *February* 24, 1879.

MAJOR: I have the honor to submit the following report upon the examination of the Patsaliga River, which formed a part of the work assigned me in your instructions of the 5th of September, 1878.

This river takes its rise in the southeast corner of Montgomery County, Alabama, and, after flowing through the upper strata of the Cretaceous formation for about 15 miles, cuts through the beds of bluish clay and limestone, filled with shells of the ostrea that form the lower series of the Tertiary system of the State. The dividing line between these two formations runs in an easterly direction from this locality, and the beds, above referred to, make their appearance again upon the hills a short distance south of the town of Troy.

As a tributary of the Conecuh River, it is scarcely inferior in commercial importance to that part of the latter river above Gantt's Shoals, and though not equal to it in length, its sources are so numerous and copious, that its volume at their confluence approximates very nearly to that of the Conecuh. West of Troy the two rivers are separated by a distance of about 8 miles only, and the geological and topographical character and vegetation of the country through which they flow being the same, the industrial interests are identical, and the streams themselves assimilate both in their natural conformation and in the condition of their beds. As in the case of the Upper Conecuh, no effort has ever been made to clear away the obstructions of fallen timber with which the channel is filled beyond what has been necessary to afford relief in cases of emergency. Its navigation with rafts is therefore restricted to periods of high-water, when these obstructions are mostly covered, the accumulation of drift being such as to render it impassable even for small boats during the low stages.

My examination of this stream was, for the most part, thus necessarily confined to observations along the banks, and the information respecting it obtained in a large measure from residents who were familiar with it. In descending the Conecuh River from Troy, its proximity enabled me to make frequent comparisons in this manner with the stream then under examination, and the conclusions arrived at were such as to enable me to base, with confidence, the estimates which accompany this report of the cost of improving it.

This stream flows through an exceptionally fine timber region, and constricted as it is in its capacity, it supplies over 500,000 cubic feet of the timber which forms the commerce of the Escambia.