

For the commercial year ending August 31, 1878.

CLEARANCES.

	Vessels.	Tonnage.	Hewed timber.	Sawed timber.	Lumber.	Cotton.
Foreign.....	351	218,496	<i>Cubic feet.</i> 4,513,985	<i>Cubic feet.</i> 3,996,648	<i>B. m. feet.</i> 42,935,000	<i>Bales.</i> 3,893
Domestic.....	139	42,541	30,431,000	6,342
Total.....	490	261,037	4,513,985	3,996,648	73,366,000	10,235

Estimated value of exports, \$2,150,000.

From September 1, 1878, to May 31, 1879.

CLEARANCES.

	Vessels.	Tonnage.	Hewed timber.	Sawed timber.	Lumber.	Cotton.
Foreign.....	255	160,241	<i>Cubic feet.</i> 2,690,853	<i>Cubic feet.</i> 3,235,461	<i>B. M. feet.</i> 31,132,000	<i>Bales.</i> 16,824
Domestic.....	76	21,989	14,850,000	6,181
Total.....	331	182,230	2,690,853	3,235,461	45,982,000	23,005

Estimated value of exports, \$1,520,000.

In addition to the above staple articles, considerable quantities of oak, cedar, and other woods, and rosin, flour, &c., are shipped from this port.

The increase in the exportation of cotton has been marked within the last few years. Prior to 1877 about 800 bales would cover the annual shipment; in 1877, 1,508 bales were exported; for the year 1877-'78, 10,235 bales, and to the 31st of May, 1879, as shown, 23,005 bales.

Very respectfully, your obedient servant,

H. HAINES,
Assistant Engineer.

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

J 3.

IMPROVEMENT OF HARBOR AT CEDAR KEYS, FLORIDA.

The first appropriation for this improvement, made in 1872, and in amount \$7,500, was applied to surveying the harbor and deepening the channel at the outer bar.

The second appropriation, in amount \$15,000, was also applied to the entrance of the harbor at the outer bar, securing a channel 100 feet wide and 12 feet deep at mean low-water, which remains intact by storms and currents, it being, at this day, in as good condition as when the contractor left it in 1876.

The third appropriation, approved August 14, 1876, in amount \$10,000, was applied to a cut across the middle ground between Way Key and Depot Key, obtaining a channel 80 feet wide and 11½ feet deep at mean low-water, which is in general use.

The fourth appropriation, approved June 18, 1878, in amount \$20,000, has been chiefly applied to completing the cut to a width of 200 feet and depth of 11½ feet, as originally contemplated. The excavation, up

to date, of 38,969 cubic yards of sand and shell, with unstratified limestone (not considerable in quantity, but sufficiently hard to prevent deeper dredging), has accomplished this result. The work under this appropriation was commenced on the 17th February of this year.

The following is a statement of the number of cubic yards excavated each month of the year:

February.....	2,046
March.....	7,714
April.....	5,138
May.....	6,480
June.....	3,370
	24,748

In process of widening the cut, it was observed that the water on the west bank was deeper than when the excavation began; at a later time soundings discovered the lost sand in the original 80 feet cut. Severe spring storms from the southwest had evidently washed the sand already loosened by the dredge into the cut. At the entrance of the cut on the southeast point, a sand shoal of 2½ feet had formed, leaving 8½ feet water where the original excavation was 11 feet. This was probably due to the same cause, and yet being a point where the tides meet it may be due to that fact; this will require time to decide. Now that the quantity of water passing through is more than doubled, it is not unreasonable to assume that the rapid tidal currents will prevent further deposit. There is an unexpended balance of \$6,107.71, which it is proposed to apply to the channel between Sea Horse and Grassy Keys, and the funds available for expenditure during the fiscal year ending on the 30th of June, 1880, should have the same application for the reason that it is most needed in that part of the harbor. The harbor bar will be rendered more convenient and safer by widening, which should be done so soon as the more urgent improvements are made; this part of the work, however, may be delayed without inconvenience, while the shoals in the inner channel referred to now obstruct at half tide some of the heavier draught steamships after they have entered the harbor over the bar in its present condition.

The removal of the wreck of the steamer Gettysburg, the boiler of which is above water near the main wharf, is provided for in the appropriation for 1880.

The appropriation asked for for the fiscal year ending June 30, 1881, would best serve the interest of the government by being applied to the improvement of the inner channel and the outer bar.

Further time will be required to establish the permanency of the improvements, or to ascertain, if they should prove not permanent, the periods when expenditures should be made to maintain the depth of water, and the amounts of money necessary.

This work is situated in the collection-district of Saint Mark's, Cedar Keys being the port of entry.

The amount of revenue collected at this port during the year ending May 31, 1879, as ascertained from the collector, is.....	\$5,144
Value of imports.....	\$3,821
Value of exports.....	\$9,300
Steamers entered from foreign ports.....	29
Tonnage of same.....	14,808
Sail vessels from foreign ports.....	14
Tonnage of same.....	3,595
Steamers cleared to foreign ports.....	2
Tonnage of same.....	638
Sail vessels cleared to foreign ports.....	1
Tonnage of same.....	234

Steamers entered coastwise	77
Tonnage of same	37,494
Sail vessels entered coastwise	24
Tonnage of same	2,987
Steamers cleared coastwise	68
Tonnage of same	33,035
Sail vessels cleared coastwise	38
Tonnage of same	6,682
Total vessels entered	144
Tonnage of same	58,884
Total vessels cleared	109
Tonnage of same	40,589
Vessels which did not enter at custom-house:	
United States mail steamships, arrivals	208
United States mail steamships, departures	208
Other vessels, arrivals	300
Other vessels, departures	300
Estimated value of pine and cedar shipped	\$304,000

The business of the past year was materially reduced by rigid quarantine regulations and stoppage of pine mills.

The plan adopted for this work is that mentioned in annual report for 1877, with modifications specified in annual report for 1878. The original estimated cost of this work, as now being carried on, \$133,500.

The whole amount appropriated since the adoption of the original project. \$67,500 00
 The amount expended thereon..... 46,392 29

Money statement.

July 1, 1878, amount available.....	\$20,000 00	
Amount appropriated by act approved March 3, 1879.....	15,000 00	35,000 00
July 1, 1879, amount expended during fiscal year.....	12,667 39	
July 1, 1879, outstanding liabilities	1,224 90	13,892 29
July 1, 1879, amount available	21,107 71	
Amount (estimated) required for completion of existing project.....	66,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881.	50,000 00	

Abstract of bids received and opened September 10, 1878, relating to dredging at the harbor of Cedar Keys, Fla.

Number.	Names of bidders.	Price per cubic yard.		Time of commencing work.	Time of completing work.
		Middle ground.	Outer bar.		
1	James E. Slaughter	Cents. 49 ³ / ₈	Cents. 49 ³ / ₈	On or before November 30, 1878.	On or before June 30, 1879.
2	Williams & Upham	50	75	On or before January 1, 1879.	On or before July 1, 1879.
3	S. N. Kimball	70	90	On or before December 1, 1878.	On or before July 1, 1879.

J 4.

IMPROVEMENT OF CHATTAHOOCHEE RIVER, ALABAMA AND GEORGIA.

HISTORY.

In the summer of 1874 the steamer Bandy Moore was chartered, and with a proper complement of officers and laborers commenced the improvements by removing snags from the channel. In November of this

year the steamer Clara Dunning was purchased and the working party transferred to her. For a short time she was employed in removing snags and steambot wrecks, when the improvement of Woolfolk's Bar, which had been previously attempted by the State of Georgia, was commenced by a system of jetties, by which the flow of the current was trained in the proper direction, and the cross-section so reduced in width as to produce a sufficient scour to deepen the bar to 4 feet at low-water. A part of each subsequent season has been devoted to the extension of these works, and to the removal of snags, wrecks, and overhanging timber, and in deepening the channel across the gravel-bars by scour, produced by a system of cheap brush wing-dams, built out from either shore and inclining slightly upstream. This plan has worked well.

The river is subject to high freshets during the early spring months, when large quantities of drift timber are brought down, and as the banks are too high for it to escape over them much of it stops in the channel, calling into requisition the services of the snag-boat a part of each season. Besides, land slides are of frequent occurrence, where the soil rests upon a substratum of marl, sometimes precipitating whole acres of heavy timber into the river.

On August 1, 1876, a blasting party, provided with a barge 50 by 20 feet, was added to the force and commenced operations at Little Uchee Shoals, where the channel was widened by removing a part of the reef. This party was employed at Sleek Bluff and other points in Uchee Shoals until the fall of 1877, when the removal of the dangerous obstructions at Hardridge's Shoals was undertaken.

The work was finished on the 26th of October, 1877, and the party transferred to Flint River.

CONDITION OF IMPROVEMENT.

Snags and overhanging timber have been annually removed the entire length of the river. Upatoir and Woolfolk's Bars have been improved by a system of jetties and brush wing-dams, and a shore protection constructed at Shell Creek Bar.

The following rock shoals have been improved by blasting:

- Little Uchee: Reef below Little Uchee.
- Sleek Bluff: Rocks below Sleek Bluff.
- Middle rocks in Uchee Shoals and Hardridge's Shoals.

PROGRESS MADE DURING THE PRESENT FISCAL YEAR.

The river being very low and badly obstructed with snags all along from Columbus, Ga., to Chattahoochee, Fla., their removal was first undertaken during the summer; 798 snags were removed, and a large number of overhanging trees cut down.

At Coachman's Bar no less than 128 logs, which had well-nigh closed navigation, were removed.

In December the jetty at Shell Creek, which had been damaged by high-water, was repaired by replacing 216 linear feet of sheet-piling, and a brush bulkhead 40 feet long was built at its upper end to connect it with the Alabama shore. The working party was then transferred to the Apalachicola River until May, when work was resumed at Woolfolk's Bar. A break of 100 linear feet in the retaining wall on the Georgia shore was repaired and the improvement of Upatoir Bar commenced. This is a coarse gravel bar, or middle ground, which divides the channel. The plan adopted for its improvement consists in running

out brush-wing-dams, from both banks, so as to contract the water-way to 150 feet and deepen the bar, by scour, to 4 feet at low-water. Eleven of these spur dikes, each about 40 feet long, have been constructed on the Georgia shore, and three dams of about 100 feet each thrown out from the Alabama side.

A blasting barge 50 by 20 feet, with derrick for hoisting rocks, and quarters for workmen, has been built, and a dumping scow 30 by 15 feet and a magazine boat 25 by 13 feet, constructed preparatory to resuming blasting operations in Uchee Shoals.

It is proposed to apply the funds available for expenditure during the fiscal year ending June 30, 1880, as far as they will reach, to the improvement of the following gravel bars: Jennie's Island, Abercrombie's Shell Creek, Culpepper Island, and Francis, and to employ the blasting party on the following rock shoals:

Uchee, Betton's Rocks, Cody's Rocks, Snake Shoals, Arerett's, Baltimore, Oak-log, Roanoke Island, and Cowackee, also to remove snags wherever necessary.

The proposed application of the appropriation asked for the fiscal year ending June 30, 1881, will be to keep the channel clear of logs, and to complete the improvements above enumerated, and to continue the work of scouring out the gravel bars and blasting navigable chutes through the rock shoals wherever most needed.

Since the improvements were first commenced, in 1874, the annual expenditures have been about \$5,000 for repairs and to keep the channel clear of snags. This work will have to be done every year.

It is estimated that an annual expenditure of \$5,000 will be necessary for an indefinite period, to maintain the river in good navigable condition.

The works are situated in the collection-districts of Savannah, Brunswick, and Saint Mary's, Georgia.

The nearest port of entry is Savannah, Ga.

The amount of revenue collected for the last fiscal year, \$59,532.65.

The value of produce shipped on the river during the fiscal year, amounts to over \$3,500,000, the freights on which aggregate \$156,558. It is believed that the completion of the improvements would increase these figures 100 per cent. in a short time, and that the commerce would continue to improve from year to year.

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

The original estimated cost of the works as now carried on.....	\$145,247 00
The whole amount appropriated since the adoption of the present project is for the Chattahoochee and Flint (together).....	70,000 00
For the Chattahoochee (by itself).....	33,000 00
The amount expended thereon for the Chattahoochee and Flint (together).....	70,000 00
For the Chattahoochee (by itself).....	5,545 18

The work will not be permanent in its character, but will require an annual expenditure, estimated at \$5,000, to maintain the river in the condition contemplated in the plan of improvement.

Money statement.

July 1, 1878, amount available.....	\$19,958 76
Amount appropriated by act approved March 3, 1879.....	15,000 00
July 1, 1879, amount expended during fiscal year.....	\$34,958 76
.....	7,503 94
July 1, 1879, amount available.....	27,454 82
Amount (estimated) required for completion of existing project.....	105,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.....	50,000 00

J 5.

IMPROVEMENT OF FLINT RIVER, GEORGIA

On November 7, 1877, the blasting party and equipments arrived at Bainbridge, Ga., from the Chattahoochee River, and the work of removing rocks, which constitute the main impediment to navigation, was commenced and carried down to Lambert's Island, and by the end of the fiscal year 1,179 cubic yards of rock and 195 snags had been removed. In September, 1878, the improvements below were completed, and Arnett's bridge at Bainbridge was removed to allow the boats to pass on their way to Fodderstack Shoals. After finishing there, they commenced and are still working on down stream, removing such rocks as obstruct the channel.

A new channel has been opened on the west side of Lambert's Island, and the removal of the following rocks effected:

Rob's, Broad Axe, Bryant's, Versailles, and rocks at Railroad and City Wharves, thus completing the improvements to Bainbridge.

The improvements at Fodderstack Shoals, Cross Chute, and Red Bluff have been completed above Bainbridge. During the fiscal year ending June 30, 1879, the improvements were completed at Lambert's Island, Broad Axe, and Bryant's Rocks. In September, 1878, Arnett's bridge was thrown down, and the party moved to Fodderstack. Work was suspended December 1 in consequence of high-water, and was resumed March 15. A new hull was built for the blasting barge, and the improvements at Cross Chute and Red Bluff completed.

SUMMARY OF WORK.

Number blasts.....	193
Number cubic yards removed.....	1,154
Linear feet drilled.....	759
Number of snags removed.....	80

The average charge was 4 pounds powder, size of hole, 3 inches; cost per cubic yard, \$3.26 for labor and rations.

It is proposed to apply the funds available for expenditure during the fiscal year ending June 30, 1880, in completing the channel from Fodderstack Shoals to Bainbridge.

The boats will then start at Fodderstack, and work as far towards Newton as the funds will allow.

The proposed application of the appropriations asked for the fiscal year ending June 30, 1881, is to complete the work above mentioned, and to continue the improvements above Newton, and on as far towards Albany as the means will permit. (It is impracticable to begin above and work down stream, for the reason that the present outfit could not be carried up at low-water, and, once there, could not be reached by a supply-boat from below.)

The amount, exclusive of former appropriations, estimated for the entire and permanent completion of the improvements to Albany, Ga., is \$105,000.

In prosecuting the work, bowlders are found scattered all along between the different shoals, for the removal of which no estimate was made, and the quantity of work, at places, is greater than originally calculated.

The improvements are of a permanent nature, and will require but

a small annual outlay for their preservation, estimated at \$2,000 per annum for five years.

The work is situated in the collection-district of Brunswick and Saint Mary's, Ga. Apalachicola, Fla., is the nearest port of entry. The amount of revenue collected for the last fiscal year was \$813.

There is at present virtually no commerce above Bainbridge, Ga., only one steamer having made the trip during last fiscal year. The citizens along the river are very enthusiastic, and promise to supply business enough to employ several steamboats.

I should suppose that the value of the merchandise that would naturally seek an outlet by the river would amount to over \$1,000,000 annually.

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	\$184,862 00
The whole amount appropriated since the adoption of the present project is for the Chattahoochee and Flint (together)	70,000 00
For the Flint (by itself)	17,000 00
The whole amount expended thereon is for the Chattahoochee and Flint (together)	70,000 00
For the Flint (by itself)	6,129 51

This work is nearly permanent in its nature, and will require an annual expenditure, estimated at only \$2,000, to maintain the river in the condition contemplated in the plan of improvement.

Money statement.

July 1, 1878, amount available	\$11,958 76
Amount appropriated by act approved March 3, 1879	7,000 00
July 1, 1879, amount expended during fiscal year	\$18,958 76
July 1, 1879, amount available	8,088 27
	<hr/>
	10,870 49
Amount (estimated) required for completion of existing project	105,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881	50,000 00

EXAMINATION OF FLINT RIVER, GEORGIA, FROM ALBANY TO MONTEZUMA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., February 6, 1879.

SIR: I would respectfully report as follows regarding the examination of the Flint River, between Albany and Montezuma, Ga., provided for by act of Congress approved June 18, 1878, and assigned to me by letter dated July 8, 1878.

A mere examination showed such a condition of this portion of the river as to allow of a sufficiently accurate estimate of the cost of such an improvement as seems to be needed for the immediate relief of the people interested, and therefore no survey was made.

The character of the improvement is the removal of logs, snags, and overhanging trees, throughout the entire length, estimated at 77 miles, which would give a navigable channel for light-draft river steamers throughout the greater part of the year.

The worst portion of the river was found to be between Albany and a point 18 miles above (Drayton, still higher up, having been the former head of navigation). Here was found, in addition to the obstructions

already mentioned, a series of shoals at greater or less intervals, which it would probably be found advisable at some future time to improve. A sufficiently careful examination of these, from which to make a close estimate, was prevented by a rise in the river.

This, however, is not considered necessary now, as these shoals will not interfere with such navigation as is demanded at present; and, moreover, the survey of that portion of the river can be carried on to best advantage during the progress of the work of removal of snags by the engineer in immediate charge of the work at small cost, which can be borne by the appropriation for that purpose.

The cost of the improvement as suggested is estimated as follows:

Removing snags, &c., from Montezuma to Drayton, about 26 miles, at \$154 per mile, about	\$4,000 00
Removing snags, &c., from Drayton to Albany, about 51 miles, at \$100 per mile, about	5,100 00
Outfit	6,000 00
Total	15,100 00

There is at present no commerce worth mentioning on this portion of the river, but I think there is every probability that the opening of the river would develop sufficient to warrant the required expenditure.

The commerce would consist in the shipment of cotton, sugar, rice, fruits, cattle, wool, and lumber, to the production of all of which this country is well adapted, and which now has to depend on wagon and railroad transportation, with their usual high rates of freights.

The Southwestern Railroad crosses the river at Albany, and, being without a draw, would prevent the passage of boats during high-water unless changed.

For population, wealth, and other statistics of the country bordering this portion of the river, as well as for other details, I would refer to the report of Mr. Powhatan Robinson, the assistant engineer, who made the reconnaissance accompanying this.

Apalachicola should be considered, I presume, the port of entry connected with this river, the commercial statistics of which, from the custom-house records, for the last fiscal year are as follows:

Amount of customs collected	\$271 05
Number of vessels entered, 24; tonnage	3,135.30
Number of vessels cleared, 23; tonnage	2,727.73
Number of vessels belonging to this district, 26.	

Appropriations for the improvement of the river were formerly made, jointly, for the Chattahoochee and Flint Rivers, and from the amount of \$70,000, so appropriated, \$18,000 were expended on the Flint River below Albany. By act of Congress approved June 18, 1878, the sum of \$10,000 was appropriated specially for Flint River, and of this amount \$3,259.90 have been expended up to date, making the total amount expended on improvement of Flint River below Albany \$21,259.90.

Original estimated cost of improvement from Chattahoochee to Albany ..	\$118,105 00
Estimated cost of proposed improvement from Albany to Montezuma	15,100 00

Total estimated cost	133,205 00
Total amount expended	21,259 90
Amount available for present fiscal year	6,740 10
Amount required for completion of project	105,206 00

If the improvement suggested in this report be ordered, I would recommend that an appropriation of \$15,000 be made for it.

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.

MOBILE, ALA., January 13, 1879.

MAJOR: I beg leave to submit the following report of an examination of Flint River, in Georgia, made in obedience to your orders, between the towns of Montezuma and Albany.

I reached Montezuma on the 10th of December ultimo. On the 13th my camp-equipage arrived, and on the 14th I encamped on the Flint, at the ferry just above the railway bridge.

On the 16th my boat arrived, and on the 17th I launched out and commenced operations.

I was assured by residents that the river was down to ordinary low-water mark, but as rain and high-water were certainly impending at that season I was anxious to make quick work of the job, in order, if possible, to see the whole line at low-water mark.

On the second day (18th) I reached Drayton, 26 miles below Montezuma. Here I was compelled to lie over on the 19th to paint our boat and stop leaks.

On the 20th and 21st it rained all day. On Monday, the 23d, I resumed my course down stream with a rise of about three feet in the river. On the 26th I was detained by heavy rain, and on the 27th I reached Albany, computing the distance from Montezuma, *i. e.*, between the railway bridges at these points, at 77 miles.

The first thing that attracted my attention was the velocity of the current and the fall of the river, both of which were much greater than I had anticipated. I reckoned the former at $1\frac{1}{2}$ feet per second, and the latter at not less on an average than 1 foot per mile.

I assumed the average section of the river to be equivalent to a rectangle of 100 feet width by 4 feet depth. These data would give us a discharge of 36,000 cubic feet per minute. The reckonings of velocity and fall were made independently; that is, without reference to the relations which exist between them.

On reaching Albany, I received a letter from Captain Raoul, superintendent of the Southwestern Railroad Company, informing me that the difference of level (railway grade) between Montezuma and Albany was about 125 feet.

This confirms my judgment as to the fall of the river. I find that the theoretical velocity of a current in a rectangular trough 100 feet horizontal by 4 feet vertical, with a fall of 1 foot per mile, is 2.4.16 feet per second.

The velocity I have assumed is less than $\frac{2}{3}$ of this, to wit, 0.621 of the theoretical velocity. This difference will not appear too great, perhaps, when we compare the smooth flow of water through the hypothetical trough with the obstructed flow through the irregular channel of the river.

I feel assured, however, that any error I may have made in my estimate of the capacity of the river is not on the side of excess.

I will here venture to make a suggestion:

When it is proposed to improve a river, an engineer should descend the stream with level and rod and establish bench-marks on trees, conspicuously blazed and conspicuously marked with the number of the B. M., and its height above low-water at that point. Of these he will of course make a record.

The neighbors, at any locality, may give you the low-water mark accurately; but their opinions as to the vertical height of the water above it, when the river is on a rise, are very unreliable.

The banks of the river are of firm material, the base being generally of what is called rotten limestone, which disintegrates when exposed to the air. About 16 miles below Montezuma we came to a formation which is locally called "shell rock," so called, I presume, for its occurrence in thin layers projecting from the face of the bluffs, while the more friable material between is worn into regular cavettos. I observed this same formation in vertical position on the land at Camp No. 5, 44 miles below Montezuma. It is composed of flint and limestone, as you may see by the specimens I brought you. Immediately below the mouth of Abram's Creek (as spelled on the map), about 18 miles above Albany, there commences a series of shoals, extending at intervals nearly down to Albany, over which the waters dance wildly, rising in waves of from $1\frac{1}{2}$ to 2 feet in height.

In passing over these I directed my assistant, Mr. Meyer, to grasp his rod so as to make soundings of 7 or 8 feet rapidly. He struck one point $2\frac{1}{2}$ feet below the surface. The next shallowest sounding was $4\frac{1}{2}$ feet. I was told that these shoals were formed of "loose rock," but I think the dancing waters are caused by vertical layers of the "shell rock" throwing up the water violently by sudden obstructions. This I infer from the fact that after the shallowest soundings the next sounding would give "no bottom." I think that a cutting 600 yards in total length and $1\frac{1}{2}$ feet deep will open a channel through these shoals of 3 feet depth, which, with 100 feet width, will give 10,000 yards of excavation.

From Montezuma down to Drayton, 26 miles, the channel is very much obstructed

by logs, snags, &c. I estimate the cost of their removal at \$150 per mile, or, in round numbers, at \$4,000.

Drayton was the head of navigation in former days. From Drayton to Albany, I think that the cost of removing snags, logs, &c., will not exceed \$5,000.

I recommend the excavation of the shoals to a depth of 3 feet below low-water mark, and the removal of snags, &c., to a depth of $3\frac{1}{2}$ feet below low-water. I make this distinction, because it is a much more serious matter to strike a snag in deep water than to strike bottom on a shoal. A snag-boat will be required for the work, with a steam-saw and derrick, the latter to be worked by an extra engine of about 3 horse-power. This will cost about \$6,000.

The chimneys will have to be lowered to pass under the bridge at Albany.

ESTIMATE.

Removal of snags, &c., from Montezuma to Drayton, 26 miles.....	\$4,000
Removal of snags, &c., from Drayton to Albany, 51 miles.....	5,000
Snag-boat, steam-saw and derrick.....	6,000
	<hr/>
	15,000
	<hr/>

My estimate of the rock-excavation necessary to open a channel 3 feet deep by 100 feet wide is 10,000 cubic yards, at \$3.50 per yard, amounting to \$35,000. But this is too purely conjectural to be accepted as the basis of an application.

I have estimated that the shoals appear to me to be caused by a succession of reefs crossing the bed of the river, the position of which should be accurately ascertained. A reliable estimate of the amount of work to be done can only be based upon a careful survey made at the low-water stage, and for this purpose the sum of \$1,000 would be required.

I made diligent inquiry into commercial and agricultural statistics. By the census of 1870 the aggregate population of the counties along the line of my reconnaissance was 83,075. There has been a considerable increase since that date.

Their aggregate wealth, according to the comptroller-general's report for 1876, is \$10,177,189.

I omitted to state that the river at Montezuma is 180 feet wide, and varies generally between 120 to 200 feet throughout, though at some points it is contracted to not more than 80 feet.

The yearly receipts of cotton at Albany amount to 35,000 bales.

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

POWHATAN ROBINSON.

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

J 6.

IMPROVEMENT OF APALACHICOLA RIVER, FLORIDA.

HISTORY.

These improvements were commenced in December, 1874, the snag-boat Clara Dunning being employed in removing logs from the river and in opening navigation through Moccasin Slough. A part of each subsequent season has been devoted to the same purpose; the time being divided between this river and the Chattahoochee. Last winter navigation was opened through Chipola Cut-off, from Apalachicola River to White's Bluff, on the Chipola, a distance of 9 miles.

CONDITION OF IMPROVEMENTS JUNE 30, 1879.

Snags and overhanging timber have been removed its entire length, navigation opened through Moccasin Slough by the removal of snags, and the channel straightened and widened by cutting off the sharp