

Hoover told me that it was very seldom low enough to ford, and some years did not become fordable at all.

From Hoover's Bluff to the 34th mile the river is wide and deep. It is here joined by the "Coffee Bowl" Creek, and just below is Coal Mine Bluff, on the south bank. There is said to have been a mine of brown coal, which was formerly used by country blacksmiths, but a land-slide took place and carried the outcrop of coal below the surface, and there is a very large mass of clay and rock, which does not now appear to be washing very much. The water along the face of the land-slide is 25 to 30 feet deep and the bluff 90 feet high.

On the 40th mile a bayou leaves on the left bank, which takes more than half the water of the river across a cypress brake 1,800 feet to the river, 5,000 feet below. The trees are very thick, and it would cost far more to cut out a channel than to float in drift enough to close it up. The old river yet retains its depth and width.

On the 44th mile is Ratliff's Ferry, where nearly all the river is confined to one channel, which is 300 feet wide and 35 feet in the middle.

There is a cypress brake crossing the river at the 45th mile, and several trees must be cut. On the 46th mile is a new cut-off, which can yet easily be closed.

Between the 46th and 51st miles are five cut-offs. Their effect is everywhere visible in the caving banks in every bend, and so fast is the bank wearing that it will soon regain its length, but at the cost of wearing away a large amount of land, and a great many large trees will go into the river in the process.

On the 52d mile is Bull Mill Cut-off, which is a very bad place. Six large trees must be cut unless the cut-off itself is closed by drift.

Three cut-offs have been made on the 53d mile, and another is now being washed out, which can yet be closed by the willow for a mile above, which should be cut.

On the 55th mile is a cypress brake, through which the river runs for 250 feet, and 20 trees must be cut and the usual large quantity of drift logs taken out to clear the channel. There is a cut at the next mile, where the river is nearly closed by a number of drift trees, which have collected on some obstruction below water. From here to the 60th mile are six cut-offs, and there is one on the 61st mile, called "Flatboat Cut-off," which is the worst place on the river. Six large trees and some smaller ones must be cut and a large quantity of drift must be taken out.

There are three more cut-offs up to the 65th mile, and many large trees have slid in. There is a cut now forming on the 66th mile, which should be closed. There are three cut-offs on the 69th mile and a double cut-off at Haley's old river on the 72d mile. Four more cut-offs down to the 76th mile; two at the 80th mile, one of which, running through a cypress brake, needs to have 10 trees cut out to make it passable at low-water, and the old river is so filled with sand-bars that it is no longer navigable.

On the 82d mile Pelehatchie River, which is a large stream, enters from the south-east.

On the 83d mile is Mule Jail Cut-off, where a cut of 50 feet, made in 1878, shortened the river 2 miles. Boats can pass through the cut without hinderance, but at the bend below the river is so choked by several large oak and hickory trees that it is difficult for a skiff to pass.

From here down to Jackson there are but few places where there is any present danger of new cut-offs forming, nearly every one possible having already been made. There is about one for every bend, and for the whole distance the bends are caving and the straight reaches are being broken up by the bank caving in alternate places on opposite sides, breaking the current, so that it no longer has the velocity that it must have had a few years ago when most of these cut-offs were first made.

The present tendency of the river is to make new bends and lengthen its course. There are many snags and trees in the river and very much overhanging willow and a few large trees hanging over, but there are no places where there is any other obstruction than trees, logs, snags, &c., until we reach Jackson, where there are two bridges, one a highway bridge, the other where the Vicksburg and Meridian Railroad crosses.

The extreme rise of the river here is 42 feet above low-water. The river runs along the right bank bluffs on the west side of the valley, and with a 12-foot rise it is all confined to one channel. Two hundred feet below the railroad bridge is a fish-trap, made of rock and timber, which will have to be blasted out. As a fish-trap it is a failure, but it forms a complete obstruction to all passage of boats with less than a 3-foot rise of the river. There is no other means of getting cotton to market from the Upper Pearl River than hauling it over the bad roads, which from Carthage to the nearest railroad depot costs \$3 per bale of about 300 pounds, and a team can haul but 2 bales. If snags, trees, and logs in the river are removed and the standing trees cut out so as to let boats pass, there will be good navigation for nearly the whole year with 3½ feet on bars at low-water, and a sufficient width to permit boats to cross. Keeping open one channel will give less current in bayous and all channels, except the one open, and the tendency will be to make a single channel with all the water

of the valley running in it at low river; this is all that is needed to make permanent navigation, and it would probably cause a greatly increased production in the whole valley.

A large quantity of fine oak timber is found and cypress brakes occupying large portions of the bottom land for the first 80 miles of the survey.

We found but one old Indian mound on the bottom land, and it was evidently made facing an old river of long ago, which is now a cypress brake with large timber. The present channel is cutting away another side of it, and in the caving bank we saw pieces of pottery and flint arrow-points like those of Lake Pontchartrain shell banks.

Beds of marl outcrop in many places near Jackson, which are said by Professor Hilgard, a former State geologist of Mississippi, to be very similar to and equally valuable with the green sand marls of New Jersey for agricultural purposes; it is found in large quantities, and, if as valuable as represented, will be of great assistance on the Upper Pearl cotton-fields.

A table is made with the number of standing cypress-trees in the river, snags, trees, and logs visible and number of piles of drift; number of tow-head islands; of large overhanging trees and length of banks covered with overhanging willow; the number of bayous running into and leaving the river and the cut-offs, and the distance where the bank is caving on each mile of the river from Carthage to Jackson, and a chart of the river on a scale of 1:100,000, giving locations of each, with the soundings, character of bottom, bluffs, &c.

All facts noticed having a bearing on the navigation are placed on the chart.

Yours, respectfully,

H. C. COLLINS,
Assistant Engineer.

Capt. C. W. HOWELL,
Corps of Engineers, U. S. A.

Number of mile.	Cypress trees.		Trees in.	Snags.	Drift-piles.	Tow-heads.	Large trees, No. of over-hanging.	Willow, feet of.	Bayous.		Old river.		Caving banks.
	Large.	Small.							In.	Out.	In.	Out.	
1	4	10	2		4		2,200	1	6				
2	3	3	1		1		1,400	4	1				
3	3	3		2	2		2,400	3	5				
4	2	5	3	6	7		800	3	2				
5				10	2		3,000		4	1	2		
6	2		3	3	2		2,200	3	3				
7	1		1	13	3		1,100	2	10		1		
8			1	11	8		1,800	5	4			1,200	
9	7	8	2	9	6		3,000	2	5				
10			1	6	3	1	1,800	4	5				
11	1		4	3	4		3,800	5	6				
12			2	7	5	3	3,200	3	8			1,400	
13	4	3	3	4	5		3,000	2	10			1,200	
14	4	4	2	1	4		800	6	5		1	1,000	
15					8	2	800	4	4				
16	2	3			5		1,200	2	3			1,200	
17				1		3		2	2			200	
18					2		400	1	4			1,800	
19			2	1	1				2			1,800	
20					2			2	3			800	
21	7	15		6	6	1	3	2	5	2	2	2,000	
22			3	2	6		2,000	3	5			500	
23	7			1	4		400		3				
24	2			1	4			3	3			600	
25	3		1	2	1			1	2				
26	2		5	5	9	1		4	4			1,800	
27				1	5		1,400	1	4			2,000	
28	2	2			2			3	4			400	
29				1	4			1	3			800	
30	3		3	1			1,600	1				1,400	
31	3		1	2	1				2	1	1	1,000	
32			5	2				1	1			2,200	
33	2	2		2	4	1			2			1,200	
34			2	4	3		3,600		1			3,000	
35				3	1			2	3		1	1,200	
36				2	6					1	1	3,000	
37	1		5	2	3			1				3,600	
38			3	1			1,400	1	2			2,000	
39			4	4	1			2	1			2,400	
40	2		1	1	5				3			4,400	
41			2	1	6		800	4	1			2,200	
42	1		4	3	5		400			2	2	1,200	
43			8	2	1	2	200		1	1		3,000	

Number of mile.	Cypress trees.		Trees in.	Snags.	Drift-piles.	Tow-heads.	Large trees, No. of over-hanging.	Willow, feet of.	Bayous.		Old river.		Caving banks.
	Large.	Small.							In.	Out.	In.	Out.	
44	1				1		3				1	1	2,200
45	1	1	3	2	2			200	2	2			800
46	8	10	1	1	6								800
47			4	4	2		3		1	2			2,800
48	3		3	4	3						2	1	1,000
49		1	4	1	2		4	200		3	1	2	2,600
50	4		4	4	5				2	2	1	2	2,200
51			4	3	6		3		2		1	1	2,200
52	6	10	4	3	1			600		1	2	1	600
53			5	6	6			1,000	4		2	1	1,800
54			5	6	6				1	3			4,400
55	10	20	7	5	14						1	1	3,200
56			10	2	3			500			1	1	1,400
57	1		4	1	1				2	2	1	2	3,600
58		1	8	8	18					4	3		1,600
59			5	3	3		1		2	1		1	2,000
60			3	3	9				1	1			1,800
61	16	20	2	6	1				1	2	1	1	3,900
62			1	5	12				4	3	1	1	2,200
63			4	2	8					7	1	1	4,800
64			4	4	13				3	2			2,400
65			7	5	10					2	1	1	5,200
66				1	1		5		2	2			5,400
67	1		9	5	16		14					1	5,200
68			2	10	10						1	1	4,800
69			9	5	7					2	1	2	4,800
70			9	3	6		3						5,200
71			7	3	8				2	1			4,200
72	2		11	3	4		1				3	2	2,000
73			10	1	7		1						2,200
74	2			2	4							2	4,000
75	2		3	3	8		1		1	1	2		4,800
76			3	3	10			1,200			1		2,800
77	5	5	2	2	5				1	1			4,600
78			9		12				2		1		2,800
79			3	1	1		4				2	2	2,800
80	20	20	2	2	2			500					6,400
81			4		4			500		1			6,400
82			11		2				4	2		1	5,200
83			8	10	7		1	2,500			1	1	3,500
84			12	10	3		2	500		2	1	1	5,400
85			3		9		1			1	1	2	5,600
86			10	2	11				1	1			5,200
87			1		7						1	1	3,200
88			5		4			400			1	1	3,600
89			6										5,000
90			10		6								3,600
91			9		5			1,600	1		1		4,400
92			8		7		5	2,800					3,200
93			3		3			2,000	1	1			5,600
94			9		9		2						3,200
95			13						2	3			5,400
96			5		4		10	1,400			1	1	4,400
97			2	2	4		5	600			2	1	2,000
98	1		13	3	9			3,200	1				3,800
99			11	4	8			3,600			2	2	4,800
100					6		1	400		1	1	1	5,200
101			2		6		9		1	2			3,200
102			2					1,400		2			
Total	158	143	393	268	487	19	78	69,800	130	207	55	50	

2.—BELOW JACKSON.

NEW ORLEANS, LA., August 1, 1879.

SIR: In accordance with instructions for completion of the survey of Pearl River, I procured the necessary outfit, and on the 28th of March last started from Jackson, Miss., on the survey. No low-water stage of the river could be reasonably expected before July, and the water at the time of the survey was about 10 feet above its extreme low stage, and about its average for eight months of the year.

My party consisted of 2 rodmen, 1 oarsman, and 1 cook, besides myself, and we had 3 small skiffs, and a very small covered flatboat on which to eat and sleep; it was rowed by the cook.

At Jackson there are two bridges, in which the county and railroad company can at any time place draws where they are needed.

Pearl River, from Jackson to its mouth, runs nearly south in its general course through a wide valley. It can be divided into four sections, the first of which reaches 40 miles from Jackson. Its peculiarity is the high bluffs which are cut through by the river. They frequently appear directly opposite but in some places are eroded valleys, 2 or 3 miles in width, through which the channel runs in a very crooked course. On this section, the river, at its great rise in 1874, could not pass fast enough between the bluffs, and attained an extreme height of 57 feet above extreme low-water of summer droughts, sweeping out in the gorges all overhanging trees, and whatever snags and other obstructions were found there, but depositing in the wider intervals a far greater number of trees to become snags. The next section of 210 miles was formerly a region of great cotton plantations, mostly reaching to the river bank. The bluffs are far apart for the greater part of the distance, and the river runs in a very crooked channel from one side to the other of a valley usually several miles in width. Wherever it touches the bluffs they are rapidly washed, even though there are thick strata of hard rock, as there are in most of those bluff outcrops, underlying strata of very easily washed material. There are points where some harder range of hills crosses the valley, and bluffs are found on opposite sides with but a narrow valley between. For a part of the distance the river has cut a channel 20 to 30 feet in depth into the rock bed of the wide valley; this is about 300 feet in width, varying somewhat in the bends, but retaining its position from its rock walls, while at high floods the river sweeps directly down the valley, covering all the land between the bluffs, and even the lower part of the bluffs was under water in 1874.

The third section includes the portion of the river 32 miles long where an entire change is now taking place in the channel. At the beginning of the section the river is altogether in its old valley, while at its lower end it is again united, but in a new channel, which it follows to salt-water in the Rigolets, 33 miles forming the fourth section.

Settlements were made on the lower portion of the river during the latter half of the last century, and it then received its name from the absolute purity of its water, which was so clear that the bottom could be seen at depths of 10 to 15 feet, except during short periods at the head of a rise; but even then it was good drinking-water. This character it retained within the memory of old inhabitants, and even up to 1850 it was a comparatively clear stream during a greater portion of the year. Since then the channel has been shortened by cut-offs in almost every place where it was easy to make them; and as cut-offs were made, the current at once increased and began to wear away its banks in bends and so to increase in length. This made further cut-offs easy, and they still further increased the wearing away of the bank in bends, each in turn reacting until the entire character of the river has been changed from being a slow running clear stream, with few snags or logs in its channel, with permanent banks, very crooked in its course, it is true, but with a good navigable channel, to a rapid torrent during freshets, and about as muddy as the Mississippi River. So many trees have been washed in that it is not now navigable with less than a 6-foot rise on the upper sections. Until it shall have regained its normal length, the wash of the banks must take in trees, which form the obstruction to navigation in great part. The flood of 1874 was an exceptional one, the height having been several feet above any other since the first settlement of the country. Farm buildings were formerly almost universally on the bank of the river, which is, through the cotton region, rather higher than the bottom land at the base of the bluffs in most cases. The buildings, fences, live stock, and in many instances the soil of the farms were washed away, and through cultivated farms frequent wide, deep channels were washed out across bends. As the river rose drift lodged in the woodland river-banks and protected these from washing, and through them new cut-offs were made.

Jackson is on a high bluff of red clay, on the right bank of the river, and on this side, above all overflow; but the central portion of the city was covered in 1874 by backwater from a small creek which enters the river just below the city. Just below the railroad bridge is a fish-trap, which forms a complete blockade of the river with less than a 7-foot rise. It must be removed, and can be easily pulled out at low-water, as it is of timber and rock. Below this the low-water depth is 8 feet or more for several miles, but many trees obstruct the navigation, and there are many overhanging trees. A mile below Jackson the first high bottom is found on the left bank, with immediately above it a swamp, through which the overflow and drainage water of the bottom returns to the river. This high bottom extends for nearly a mile along the left bank, its lower end being a sand-bank, and immediately below it is a swamp reaching back into the bottom land, through which the drainage reaches the river. This is alternately repeated on each bank of the bottom land, the succession being the same, indicating that every portion of the valley proper has in succession been channel, swamp, sand or clay bank, and low or high bottom. Every bank on this distance

is caving on the concave side of the bend, faster or slower, as the bank is at the point sand or clayey loam deposited in the still water of the swamp.

There are many logs and snags at low river visible which do not show at high stage and do not appear on the chart, but which must be removed. The positions of trees in the river and snags will change more or less, by drifting down in some cases, and from their being on the filling side of bends, and as the caving bank recedes they are no longer obstacles. A large proportion of the trees located have gone in within a few years, and many are anchored by earth among their roots. On the 4th mile is found, on the left bank, the first cultivated farm. Near the beginning of the 6th mile is the mouth of Richland Creek, a large stream entering from the left bank.

Near the middle of the 7th mile, the river first touches the edge of the bluff land; but it is not above overflow, as the flood of 1874 here reached to the railroad, a mile distant, covering all the bluffs to that distance, at least on the west side of the river. At the end of the 9th mile is Richland Bluff; on the left bank, for 1,200 feet it is nearly vertical, and on its caving face is 40 feet high, and rises back from the top of this bank several feet more; but its highest point bears marks of having been under water. On the 11th mile, the river again follows the east bluffs for nearly a mile; on this bluff is McMillan's farm. Tucker's Bend Cut-off, which shortened the river 2 miles, is about the middle of the 14th mile. Near the beginning of the 15th mile the river reaches the west bluffs; and a mile below, the bluffs appear on the opposite side, and the entire river runs in a narrow gorge, between bluffs 30 to 45 feet high, but overflowed in 1874 down nearly to Byram, at the end of the 18th mile. Byram is on the right bank, on bluff land which is underlaid with the marl beds, so highly recommended by the State geologist, Professor Hilgard, for purposes of fertilization; the amount of the marl is said to be inexhaustible, which I think probable, as the outcrop follows the river for many miles, and it apparently underlies the whole country, but is most easily obtained at its outcrop on the river at Byram. On the 20th mile the river reaches a high rocky bluff on the left bank, and turns abruptly to westward along its base; following it for a mile, it reaches a high rocky bluff on the right bank. Both these bluffs are caving slowly, in great land slides, caused by some soft strata below being washed out, and the rock breaking down by its own weight when left unsupported. It here turns again to eastward, and, after 1½ miles, reaches a point but 800 feet from its bank, above the 21st mile. Fortunately this 800 feet is a high rocky ridge, so a cut-off is impossible. Some high points of these bluffs were above overflow of 1874, but the water ran over the lower bluff land back of them. This gorge is 1½ miles long, and with a rise of 20 feet, it is about 500 feet wide water surface. Again, on the 22d and 23d miles, the rock bluffs are opposite each other, about 600 feet apart, forming a gorge nearly 2 miles long. The bluffs which have by wearing down formed these gorges, were evidently the rim of some old lake covering the country above, and the river took its present crooked course through the bluffs, as being the lowest line of drainage through them. The water-washed outcropping edges of limestone in opposite bluffs are at the same height and the strata of similar thickness in the same order. Since the gorges were excavated, the bluffs have become rounded by action of rains and frosts, and so slow is the change that trees of the largest size grow on the rounded slopes where in part protected from the force of the current which swept out everything fully exposed to it in 1874. At the end of the 24th mile the bluffs again approach within 800 feet, and that on the east side is so high that it was probably above overflow. On a tree on the west bluff is a water-mark 4½ feet above its highest point, and 53½ feet above extreme low-water. From this west bluff 3 great land slides have found their way into the river; one is 200 feet long, and two are each 300 feet long, 30 to 50 feet wide. At the upper end the river is 19 feet deep at low-water, and at the lower end 25 feet in depth.

Near the end of the 25th mile is Fortner's Ferry, and just below it is a bluff on the west bank with 50 feet nearly vertical face, and it rises to double that height through the cultivated field back of it. From the 26th to the 30th miles, inclusive, is another of the gorges. The air-line distance of these 5 miles being slightly more than a mile. Two high bluff ridges from the east side of the valley, and one from the west side, interlock. The tops of these ridges were 2 to 5 feet below the flood of 1874; drift marks found in several places, and a high-water mark shown by Mr. Deer at his ferry on the 30th mile all agree in making the top of the flood here 52½ feet above low-water.

Steen's Creek enters the river from the east at the head of the 27th mile, and just below it is a land-slide 900 feet long and about 100 feet wide, which had apparently recently slid in; it was fast being washed away, and, as it is covered with large trees, will make many snags as it disappears. About the middle of the 30th mile is a fish-trap, just below a high rocky bluff at Deer's Ferry. A cypress brake through which the river runs narrows the available channel to 75 feet, and just above the cypress trees a rock ledge crosses the river; on top of this rocky bottom large blocks of rock have been laid, which form a complete blockade of all navigation, with less than a 5-foot rise. It will be easily removed at low-water. The depth immediately above is 7 feet; on top of the rock blocks, 2 feet, and below them 16 feet at low-water. At the end of

the 31st mile is a rocky bank on the right bank which is 37 feet high. From the face of this bluff a large island has recently broken off and slid down into the river; the channel has cut out in the bottom land to left side of it, and it does not form any obstruction, and will probably retain its place as an island, as it is chiefly of limestone rock. Opposite the lower end of this is a rock bluff on the left bank, 30 feet above highest flood marks. Above water it is stratified clay, limestone, and clay, but there is evidently some easily washed strata below water, as it caves off in great slides, extending from water edge to top of the nearly vertical face. At the end of the 32d mile rock bluffs are again found on each side of the river, which here runs to westward between them. On the left bank the slides are very uneven, the caves are in great angular notches in the vertical face of the bluff, while the bluff a mile above has a smooth, regular face, that is north and south along the dip of the strata, while this is parallel with the strike. A mile below I measured the outcrop strata of the bluff. The dip was a little east of south, beginning at the water-line, 12 feet above extreme low; 6 feet soft sandstone, 2 feet dark clay, 3 feet hard limestone, 12 feet yellow clay, 4 feet shelly limestone, 20 feet red clay, thin soil; it slopes up from the top of the slide as far back as I could see among the trees. Soundings showed blue-clay bottom; and a distinct water mark on the face of the bluff was 55 feet above extreme low-water.

Near the end of the 34th mile the bluffs recede from the river, which here runs through cultivated fields, nearly level, to the beginning of the 35th mile. The banks of the channel are of limestone 15 to 20 feet above low-water, and above the earth to the depth of 20 feet appears to be alluvial. At the end of the 35th mile is a low, rocky bluff far below high-water line; and just above it is a large eddy, on the left bank. It has vertical sides, and is caving in fast. This is the first of a series of eddies, all nearly alike. At the end of the 36th mile is a rock bluff, on the east side. The outcropping rock is pudding-stone, made of gravel 1 to 2 inches in diameter, cemented by lime and iron; it forms a very hard rock, but must be underlaid by some softer material from its caving with so straight and vertical a face, frequently overhanging.

Slides are frequent along this bluff, and at its upper end is the second of the series of large eddies. The third eddy is below the pudding-stone bluff, on the 37th mile. About the middle of this mile is a cut-off lately made through the sandy woods, shortening the river about a mile. The rock bank, with alluvial soil above, it continues down to the end of the 39th mile, but here the right bank is all of alluvial soil with no rock. Thick woods grow on the low, sandy soil. The river here turns to the northeast. The left bank is rocky, and rises before reaching its extreme northeasterly bend into a high rocky bluff, far above the highest overflow. The river has cut directly into this hard clay shale bluff, about 600 feet, having a vertical face, while on the opposite bank is low woods, overflowed with every freshet, but the banks of which do not cave, nor is the surface washed; it is covered with vines and cane. Below the bend the river returns in a line nearly parallel with its former course, passing within 400 feet of its channel above. Near the end of the 42d mile is a double cut-off, made in 1874. At the end of the 45th mile is Mahassett's Ferry. From the 40th to the 47th mile the river has cut down from 23 feet in the cut-off to 28 to 40 feet in other places into the rock bed of the valley. Above the rock the earth to the depth of 30 feet or more appears to be alluvial; but during the flood of 1874 the surface was cut away in places several feet in depth. Much of the land is yet cultivated, but all inhabitants have left the river bottoms and moved to the bluff lands since 1874. At the beginning of the 47th mile is a large gravel island, in the middle of the river, which is here caving fast on both sides and is very wide. The gravel is identical with that of the pudding-stone bluffs above. The bar formed across the river here is said to have 4 feet covering at lowest water, but one arm might be closed at low-water to advantage. A little fascine work would cheaply accomplish it. The rock bank continues, on one or the other side, to the end of the 50th mile, where is a sharp bend to eastward, and the right bank is rocky. The depth here is 30 feet at low-water. At the bend a creek enters from the west; the creek bottom is of gravel, and a gravel bar fills the bed for 1,500 feet, having above it a 3-foot low-water depth. Five gravel islands rise to a height of 15 feet above low-water. This gravel bar is probably from the creek and from the same gravel strata which crosses the river at the 37th mile. The rock of the river bank below that is all of shale or limestone, with a dip of 3¼° to southward. The pudding-stone bluff is irregular, like a drift gravel or sand bank. The upper and lower ends of this bar are abrupt, 15 feet depth, being but 100 feet above or below the first or last 3-foot sounding. Below this the rock banks are found with a channel cut down into it of 26 to 36 feet in depth. The banks are slowly caving in every bend, as the rock is worn away by the strong current. Mr. John Ketchen's plantation begins with the 56th mile, and reaches on the right bank 2¼ miles; on it are 2 bad gravel bars, where Mr. Ketchen said there was, at lowest stages, 3½ feet water, but that it was seldom so low as that. For 8 or 10 months there would be 5 to 8 feet, or more.

Below the lower end of Mr. Ketchen's place is a fish-trap at a place ¼ of a mile

above Georgetown Ferry. Both banks and bottom are of rock, and points of the blocks forming the trap, I was told, rise within $1\frac{1}{2}$ feet of the surface at low-water. It must be removed. At the end of the 59th mile is Georgetown, on the right bank. Limestone Creek enters the river from the left. The banks at Georgetown are high. Half a mile below the village the rock in the banks disappears, and the river widens to 500 feet, with caving on both sides; 2 gravel islands rise above water with a 16-foot rise, and the bar which is here found has but 4 feet at low river. Just below this bar is a bend in which there is a low-water depth of 8 feet, and it is narrowed to 200 feet by a gravel bar on the left bank, which is advancing as fast as the river wears into the opposite bend. Below this bend is another gravel bar in a straight reach of the river, where it is caving on both sides. There is but 3 feet depth at low river. At the end of the 60th mile is a flood channel, made in 1874, through what were cultivated fields previously. The surface was removed to a depth of 10 to 15 feet and the farm entirely ruined.

The next bend has a narrow, deep channel, with its one caving side, and a gravel bank on the opposite side. In the next straight reach, the middle of the 61st mile, is another gravel bar, with a width of 500 feet and depth of $2\frac{1}{2}$ feet at low-water, caving both sides; a little fascine work would probably give the entire low-water discharge to one side, and by increasing the caving on that side make a bend which would have the same effect afterwards as a natural bend.

Through this kind of bottom-land bends are always good, except for the snags and logs, while straight reaches have universally their caving on both banks and shoal bars of gravel. Inhabitants told me that these gravel bars were all made since 1850.

Near the beginning of the 62d mile Strong River enters from the east, with a channel nearly as wide as Pearl River above, but not so deep. It brings in very much more water than any other stream above, draining most of 3 counties. For nearly 2 miles below the mouth of Strong River the water is deep, but at the beginning of the 64th mile is a bend, and at the lower end of the reach above it, is a fish-trap, which forms the basis of a bad bar, on which is scant 3 feet at low river. The water in the bend is deep, but there is a bar just below it. The banks are caving fast in the bends and on straight reaches. A flood-channel was washed across this point in 1874 800 feet wide and $\frac{1}{2}$ a mile long to a depth of 10 to 12 feet, and most of the soil was washed off from the whole overflowed lands of these farms. Copiah Creek enters from the west at this bend. A large part of the 65th mile is gravel bar, with but 3 feet at low-water on it, and there are many gravel islands. No rock was above water at the time of the survey, and the valley was here probably washed down below the bottom of the channel and the alluvial surface now found afterwards deposited. Dr. Joseph Kessing's cotton-fields begin here on the right bank and Frank Kessing's on the left bank. The land on both sides was much washed, but the right bank much more than the other.

Near the beginning of the 66th mile the banks are again of rock, the surface of the water at the lowest stage being 20 feet below the level of the rock in the banks. This is a hard, sand rock; above it the alluvial land of the valley has a depth of 18 to 20 feet, and it had a nearly level surface previous to 1874. The bluffs are about 3 miles apart; many gullies and deep holes were washed in 1874, and piles and beds of drifting sand were left below any obstruction.

The low-water depth of the channel is 5 to 15 feet, and the width at the usual winter stage of 10 feet above low-water is about 200 feet; 10 feet more rise increases the width but little, seldom more than 30 feet.

At the lower end of the 70th mile is the village of Rockport; it is situated on a high bluff-land bank on west side of the river. This bluff is of clay shale, and the river after reaching it turns abruptly to the eastward across the valley, reaching at 2 miles a high, rocky bluff. Half a mile below Rockport the rock again disappears, and both banks again are caving with a gravel bar in the middle. A flood-channel was washed out across the bend below a mile long and nearly $\frac{1}{2}$ mile wide, to a depth of 5 to 15 feet below the surface of the old cotton-fields. Nothing but sand and gravel remain in the bed found. The land changes entirely at Rockport; below it is more sandy, washing easier. The present tendency of the river is shown on the 74th mile. At the beginning of the mile both banks are caving at a straight place with a gravel bar, and but 3 feet in the channel at low river; just below this is a bend, which, since 1874, has cut away its left or concave bank 550 feet, increasing the length of the channel 1,000 feet on the mile; this is an extreme case, but the whole of this part of the river is wearing its bends and lengthening.

Wherever the bottom lands were in cultivation in 1874 the soil was washed into gullies and piles of sand were left; but where it ran through the thick woods it left great piles of drift, and though many trees were broken off, there was very little washing of the soil. At the beginning of the 79th mile is a cut-off which shortened the river $\frac{1}{2}$ a mile. All the banks near it are caving, and the low woods of the bottom-lands near it are filled with drift, which is the only apparent reason for there not having been more cut-offs made. On the 80th mile is a water-mark made on a gum tree by drift, and a long piece of driftwood hangs in a fork just below it.

The mark was 54 feet above extreme low-water. About the middle of the 82d mile is Slater's Ferry, where the river touches the bluff on the east side of the valley. A mile below this ferry Price Creek enters the river from the west, and the left bank opposite its mouth has an eddy which is in a straight reach of the river, with no apparent cause, but the entrance of the creek has worn away the bank in a great pond-like hole and doubled the width of the river for 500 feet. The bank of the eddy is everywhere caving in great slides. For a mile below this is a high bluff on the left bank; it is very far above all or overflow, and the right bank opposite is of high bottom-land heavily timbered. The high-water mark at Walter Kator's place on the lower side of this bluff is 52 feet above low-water. The water here had a chance to escape to the wide bottoms below, and the water-mark above the same bluff where it was dammed up somewhat was 2 feet higher above the stage of water at the time of survey than that at Kator's place. The soil was almost entirely washed off from this farm below high-water mark. A wide, deep flood channel was washed through its fields for a mile to a cypress swamp below. At the beginning of the 85th mile the rock again appears in the bank, on one side of the river only, and at intervals; it is about 13 feet above low-water line. A sand bank forms the opposite bank. The surface of the high bottom-lands is nearly the same height whether underlaid with rock in the bank or alluvial. Where the rock is found its surface shows marks of having been washed before the deposit of its present covering of 20 to 30 feet of alluvium. At the end of the 87th mile a high pine bluff is found on the left bank and 700 feet from it; across the river and a narrow strip of low bottom-land is high bottom-land, with rock 12 feet above low-water mark, and 18 or 20 feet of alluvial soil on top of it, all the fields badly washed. At the 88th mile, left bank, Mr. Youngblood lives; he has a large cotton plantation in a bend of the river, and it is but $\frac{1}{2}$ a mile across the bend to the river $2\frac{1}{2}$ miles below. The bank is of rock, but the land across this bend is badly washed out; large sand drifts were formed also.

Mr. Youngblood told me that the water of 1874 rose 10 or 12 feet higher than ever before, and that all farms and live-stock of this part of the valley were washed away.

The rock bank is found here wherever there is a bend and prevents its being so rapidly washed as above. At the end of the 90th mile is a wide reach of the river, with no rock in the bank, and caving on both sides; but 3 feet over its bar, and two large islands have been found in the river. At the end of the 91st mile is an abrupt bend with a deep channel for a mile down to Fox Ferry, where is a very bad gravel bar on a straight, wide, caving reach. Wherever farms in this part of the valley were not protected from the current of the flood of 1874 they were almost ruined, those on bends suffering most. A very large proportion of the land was at once abandoned and inhabitants moved on to the bluff lands.

At the beginning of the 95th mile is a bluff 42 feet high, which showed drift-marks over its highest part. Across the channel is a wooded island 100 feet wide; to right of this was a flood channel, washed out in 1874, 500 feet wide and down to the low-water level. This channel is now being filled by sand and mud, with a growth of small willow.

From here to the 98th mile are two bluffs on the east side, both of which were under water, and between them, and all on the right bank are washed-out, abandoned farms. From the 98th to Monticello, at the 104th mile, are long, sweeping bends, where is 10 feet or more at low-water. Many snags and logs will require removal at low-water; but few of them showed at the time of survey, so were not located. Nearly all the land was once in cultivation, but has been abandoned in most instances, and where fields are cultivated, nearly half their area is so washed with gullies as to make it useless.

Monticello is on the right bank at the beginning of the 104th mile. It was once of great importance as a business center of the great cotton belt of Central Mississippi, but since navigation of the river has stopped for the greater part of the year business has mostly gone to the railroad towns, 20 miles to the westward. The town is well situated on a rolling bluff above all overflow. A flood channel was washed out across a bend just below the town. It is 1,000 feet wide where it leaves the river, and it crosses old cotton-fields to the river a mile below, having a channel washed out to the depth of 10 feet or more. From Monticello to the 108th mile there are no bad bars, the river running in great sweeping bends, but it is everywhere washing its banks in the bends, and many trees will obstruct low-water navigation. The banks on the 108th and 109th miles are low woods with large trees, and, as the banks are rapidly caving, many trees are constantly going in at every freshet, from the great increase in current, owing to the fact that from the beginning of the 110th to the middle of the 112th mile is a succession of cut-offs shortening the river several miles. It now runs in a nearly straight course through heavily timbered, low sandy woods, and both banks for much of the distance are caving. The cut-offs have been recently made, and soon bends will start on one or other side of the river, on these wide places, by some drift or obstruction on one side throwing most of the current to the other side;