

TABLE D.—Exhibiting all information thus far obtained relative to the establishment of slackwater on the South Fork of the Kentucky River, from its mouth at Beattyville to the Goose Creek salt-works, at the confluence of Collins Fork and Goose Creek, being a distance of 68.5 miles.

Division.	Length.	Distance from—		Rise.		Height above—			Average height of bottoms.	Average width of channel.	Average length of dams.	Total lockage.	No. of locks.	Lock-chambers (size of).		Lockage (estimated cost per foot).		Contingent expenses.	Lockage (estimated cost per foot lift).	Grand total.
		Beattyville.	Ohio River.	Month.	Ohio River.	Sea level.	Report of 1837.	Present.						Report of 1837.	Pres-ent.	Per lock and dam.	Total.			
Beattyville..	0.0	0.0	233.9	0.0	0.0	225.6	635.6	.....	.....	.....	212.7	.....	.....	120 × 19	170 × 38	4,800	.....	.....	.....	.....
Booneville..	12.2	12.2	206.1	25.0	25.0	250.6	600.6	30	180	200	.....	.....	.....	120 × 19	170 × 38	4,800	.....	.....	.....	.....
Red Bird....	23.8	42.0	233.9	106.7	131.7	357.3	707.3	30	150	200	.....	.....	.....	120 × 19	170 × 38	4,800	.....	.....	.....	.....
Collins Fork.	26.5	68.5	322.4	75.0	206.7	432.3	842.3	20	85	150	.....	.....	.....	120 × 19	170 × 38	4,800	.....	.....	.....	.....

NOTE.—The data from which this estimate is made above the town of Booneville is derived entirely from reports of State Engineer Sylvester Welch, esq., and his assistants, made in the year 1837, and partially confirmed by reconnaissances made by the writer in 1872.

TABLE E.—Exhibiting all information thus far obtained relative to the project of connecting the headwaters of the South Fork with the waters of the Cumberland River, at the Cumberland Ford, in Josh Bell County, by means of a canal.

Division.	Length.	Ascent.	Descent.	Height above—			Total length.	Lockage.	Canal.			Cumberland dam, height.	Lockage, estimated cost per foot.	Summit cut, estimated cost.	Cost.			
				Mouth of Collins Ford.	Beattyville.	Ohio River.			Sea-level.	Summit cut.	Depth.				Assumed average cut.	Length.	Total cost.	Grand total.
Mouth of Collins Fork.....	0.0	.....	.....	0.0	206.7	432.3	842.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Junction of Collins Fork and Barbourville road.....	13.5	97.4	.....	97.4	304.1	529.7	939.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Summit.....	0.85	105.3	.....	202.7	409.4	635.0	1,045.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Branch of Richland Creek.....	1.0	.....	.....	166.2	372.9	598.5	1,005.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Cumberland River, Barbourville.....	6.0	.....	.....	124.5	331.2	536.8	966.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Cumberland Ford.....	15.0	20.0	.....	41.7	351.2	576.8	986.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	

The above table is prepared entirely from the report made in 1837 by Sylvester Welch, esq., engineer of the State of Kentucky, except in respect of estimates of cost, which are based upon that data and the results of reconnaissances made by the writer in 1872.



TABLE I.—Estimate of the repairs needed on the five locks and dams on the Kentucky River.

	Number 1.			Number 2.			Number 3.			Number 4.			Number 5.			
	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	
Leveling foundation, rock, cubic yards	3,700	\$0 40	\$1,480	3,000	\$0 40	\$1,200	2,000	\$0 25	\$500	2,000	\$0 25	\$500	3,000	\$0 25	\$750	
Dam filling, rock, cubic yards	4,000	25	1,000	4,000	25	1,000	1,000	40	400	1,000	40	400	1,000	40	400	
Gravel, cubic yards	2,000	40	800	2,000	40	800	13,000	15	1,950	12,000	15	1,800	14,000	15	2,100	
Crib-timber, linear feet	30,000	15	4,500	25,000	15	3,750	6,000	20	120	6,000	20	120	8,000	20	160	
Heavy piling, linear feet	4,000	20	800	3,000	20	600	6,000	02½	150	6,000	02½	150	8,000	02½	200	
Sheet piling, board-measure	12,000	02½	300	12,000	02½	300	92,000	02	1,840	104,900	02	2,098	89,000	02	1,780	
Sheeting, heavy, board-measure	120,000	02	2,400	103,200	02	2,064	1,720	02	34	1,532	87,400	02	1,748	74,000	02	1,480
Sheeting, light, board-measure	100,000	02	2,000	86,000	02	1,720	76,600	06	459	360	06	216	6,000	06	360	
Iron, pounds	3,000	06	180	9,000	06	540	6,800	3 00	204	2,400	3 00	7200	1,800	3 00	5,400	
Abutment masonry, cubic yards			1,000			1,000			1,000		1,000		1,000		1,000	
Crib abutment, repairs			1,000			1,000			1,000		1,000		1,000		1,000	
Guide and slope walls, repairs	4	500 00	2,000	2	400 00	800	2	400 00	800	1	600 00	600	1	600 00	600	
Lock-gates			2,800			500			500			400			700	
Incidentals																
Total			18,620			17,424			11,432			9,056			14,870	
Grand total															71,402	

TABLE K.—Showing the cost of rebuilding the five crib-dams on the Kentucky River upon the old foundations.

	Number 1.			Number 2.			Number 3.			Number 4.			Number 5.		
	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.
Filling for washes in foundation, rock, cubic yards	3,700	\$0 40	\$1,480	3,000	\$0 40	\$1,200	14,800	\$0 40	\$5,920	17,000	\$0 40	\$6,800	14,000	\$0 40	\$5,600
Stone filling in dams, cubic yards	13,900	40	5,560	12,000	40	4,800	4,000	40	1,600	5,000	40	2,000	4,000	40	1,600
Gravel behind dams, cubic yards	5,000	40	2,000	4,000	40	1,600	32,000	15	4,800	5,000	15	750	54,000	15	8,100
Square timber, linear feet	65,000	15	9,750	60,000	15	9,000	7,000	20	140	7,800	20	156	3,000	20	600
Heavy piling, linear feet	8,000	20	1,600	7,000	20	1,400	18,500	02½	463	21,200	02½	530	36,000	02½	720
Sheet piling, board-measure	23,000	02½	575	30,000	02½	750	32,000	02	640	103,200	02	2,064	89,000	02	1,780
Heavy sheeting, board-measure	120,000	02	2,400	103,200	02	2,064	76,600	02	1,532	87,400	02	1,748	74,000	02	1,480
Light sheeting, board-measure	100,000	02	2,000	86,000	02	1,720	18,500	06	463	110	06	660	18,000	06	1,080
Iron, pounds	18,000	06	1,080	18,800	06	1,128	18,800	3 50	668	2,800	3 50	9,800	1,800	3 50	6,300
Abutment masonry, cubic yards			1,500			1,500			1,000		1,000		1,000		1,000
Repair of crib, abutment			1,000			1,000			1,000		1,000		1,000		1,000
Repair of guide and slope walls			2,000			2,000			1,500		1,500		1,300		1,300
Lock-gates	4	500 00	2,000	2	400 00	800	2	400 00	800	1	600 00	600	1	600 00	600
Incidentals			1,700			1,700			1,300		1,300		1,300		1,300
Total			32,820			30,114			26,165			26,220			29,160
Grand total															144,479

This estimate is intended to cover the cost of workmanship and of removing the debris of the old dams, and contemplates the use of such old materials as may be available. In other respects the construction will be the same as that of the new crib-dams described in Table L.

TABLE L.—Showing estimates of the cost of rebuilding the five crib-dams on the Kentucky River upon new foundations, including cost of repairing locks, pier-heads, &c.

	Number 1.			Number 2.			Number 3.			Number 4.			Number 5.		
	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.
Abutment masonry, cubic yards.....	1,200	\$4 00	\$4,800	1,000	\$4 00	\$4,000	1,000	\$4 00	\$4,000	18,000	\$0 40	\$7,200	26,000	\$0 40	\$10,400
Stone filling in dams, cubic yards.....	19,000	7 00	133,000	17,000	4 00	68,000	18,000	4 00	72,000	4,500	7 00	31,500	7,000	7 00	49,000
Gravel behind dams, cubic yards.....	5,000	4 00	20,000	4,300	4 00	17,200	4,600	4 00	18,400	90,000	15	1,350,000	97,000	15	1,455,000
Square timber, linear feet.....	100,000	15	1,500,000	90,000	15	1,350,000	97,000	15	1,455,000	90,000	15	1,350,000	109,000	15	1,635,000
Heavy sheeting, board-measure.....	120,000	02	2,400,000	103,200	02	2,064,000	92,000	02	1,840,000	89,000	02	1,780,000	109,000	02	2,180,000
Light sheeting, board-measure.....	100,000	02	2,000,000	86,000	02	1,720,000	76,000	02	1,520,000	74,000	02	1,480,000	91,000	02	1,820,000
Heavy piling, linear feet.....	15,000	20	300,000	9,000	20	180,000	9,000	20	180,000	21,000	02½	427,500	44,000	02½	887,500
Sheet piling, board-measure.....	40,000	02½	1,000,000	34,000	02½	850,000	22,000	02½	550,000	21,000	02½	525,000	44,000	02½	1,100,000
Iron, pounds.....	18,000	06	1,080,000	18,000	06	1,080,000	18,500	06	1,110,000	19,000	06	1,140,000	25,000	06	1,500,000
Repairs, guide and slope walls.....	4	500 00	2,000 00	2	400 00	800 00	2	400 00	800 00	1	600 00	600 00	1	600 00	600 00
Lock-gates.....															
Incidentals.....															
Total.....			43,880			37,034			37,110			30,625			40,850
Grand total.....															188,499

This estimate provides for dams, composed of square timbers, with a double row of sheet piling along the face of the upper breast, and on no other than solid rock foundations, extending ten feet into the bottom of the river. It provides also for new abutments and for a double covering of sheeting on the upper slope.

TABLE M.—Showing estimates of the cost of replacing the five old dams on the Kentucky River by five others, constructed of stone, on new foundations.

	No. 1.			No. 2.			No. 3.			No. 4.			No. 5.		
	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.	No.	Price.	Amount.
Dam-masonry, cubic yards.....	4,700	\$7 00	\$32,900	4,200	\$7 00	\$29,400	4,500	\$7 00	\$31,500	4,500	\$7 00	\$31,500	10,800	\$7 00	\$75,600
Abutments, masonry, cubic yards.....	1,200	5 00	6,000	1,000	4 00	4,000	1,000	4 00	4,000	1,150	10 00	11,500	140	10 00	1,400
Coping, cubic yards.....	1,125	10 00	11,250	1,110	10 00	11,100	1,115	10 00	11,150	1,000	10 00	10,000	140	10 00	1,400
Coner-dams.....			10,000			5,000			1,500			1,500			7,000
Griddle work, linear feet.....	9,000	20	180,000	4,500	20	90,000	4,500	20	90,000						
Foundation piling, linear feet.....	60,000	20	1,200,000	30,000	20	600,000	30,000	20	600,000						
Foundation platform, linear feet.....	25,000	15	375,000	13,000	15	195,000	13,000	15	195,000						
Iron, pounds.....	2,000	06	120,000	1,800	06	108,000	4,600	06	276,000	4,500	06	270,000	5,500	06	330,000
Excavation { Rock, cubic yards.....	1,000	15	150,000	800	15	120,000	500	15	75,000	200	1 00	200,000	300	2 00	600,000
Earth, cubic yards.....			1,000			1,000	250	2 00	500,000	200	2 00	400,000	300	2 00	600,000
Repairs on guide and slope walls.....			2,000			2,000			1,800			1,800			1,800
Lock-gates.....	4	500 00	2,000 00	2	400 00	800 00	2	400 00	800 00	1	600 00	600 00	1	600 00	600 00
Incidentals.....			3,500			2,300			2,000			1,800			4,300
Total.....			74,470			52,660			42,801			38,020			90,730
Grand total.....															298,681

This estimate provides for dams of solid masonry, founded either upon solid rock or upon foundations of heavy piles and platforms. The masonry is bound together, bottom and top, with iron fastenings, and on rock bottoms; the foundation course is countersunk.

## V II.

## SURVEY OF LICKING RIVER, KENTUCKY.

UNITED STATES ENGINEER OFFICE,

*Cincinnati, Ohio, February 14, 1879.*

GENERAL: I have the honor herewith to submit the report on the Licking River, Kentucky, called for in the river and harbor act approved June 18, 1878.

The survey was assigned to Mr. C. Schenk, assistant engineer, who was very familiar with the region in question by reason of long service with the Kentucky Geological Survey.

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Field work was begun at McClure's Mill, about five miles below West Liberty, being the point at which was found the last bench-mark of Buford's survey of 1837. It was continued up stream 70 miles to Trace Fork, in Magoffin County.

It was supposed when this programme was adopted that Buford's map of the river from Slate Creek to West Liberty was in existence. A careful search failed to discover it, and it is inferred that it perished in the fire that destroyed the State archives in 1869.

From the mouth of the Licking River to Slate Creek, a distance of 149 miles, the survey was made in 1829 under the direction of the War Department, and the maps are on file in Washington. We therefore have a complete map of the Licking River from the mouth of Trace Fork, in Magoffin County, a distance of 300 miles, except for the 81 miles between Slate Creek and McClure's Mill, in which, however, we have a few distances and elevations.

The total length of the Licking River is 320 miles.

Owing to the natural scarcity of navigable water, the only practical method of improvement is by the construction of locks and dams. In the lower part of the river there would probably be a sufficiency of water for lockage and to meet losses by evaporation and leakage, but in the upper portion the supply would be inadequate during the dry months of the year. This is chiefly due to the very restricted drainage area at the headwaters of the Licking, it being merely a narrow valley, wedged in between the water-sheds of the Kentucky and the Big Sandy. The rapid removal of the forests at headwaters, which is now in progress, will probably still further reduce the supply of water.

As the present survey was made near the headwaters, the mouth of Trace Creek being reported to be only about 20 miles below the head springs of the Licking, no estimates for works of improvements were made for this part of the river, as a system of slackwater navigation ought naturally to be carried upwards from the mouth.

The existing navigation is very small, and the chief complaint of navigators is that the State of Kentucky has practically turned over the river to the Licking River Lumber and Mining Company. A copy of the charter of this company is appended. It is probable that the grounds of complaint would disappear if the river were improved by locks and dams. There would then be no need for an indiscriminate rush of boats, rafts, and loose logs, all eager to get to market before the flood abated.

The chief products to be transported on the Licking, in case it were improved, would be iron, coal, agricultural products, and timber. The lowest deposits of iron ore are found at the Preston ore-banks, on the

waters of Slate Creek, in Bath County, about 8 miles from the Licking. The nearest point on the latter river is about 158 miles from the Ohio, and in this distance the fall is about 215 feet.

On the basis of the estimates of the Kentucky Board of Internal Improvement the cost of slack water up to this point would be \$1,424,184. This is for locks, 175 feet long and 38 feet wide, up to the Lower Blue Licks, and locks 120 feet long and 38 feet wide above that point. Their estimate was a total of \$1,018,509 to the Lower Blue Licks, and \$5,409 per foot of lockage above that point.

The lowest workable deposits of coal, as far as now known, are found in Elk Fork Valley, in Morgan County. The Elk Fork joins the Licking one mile above McClure's Mill, and 231 miles above the Ohio. In this distance the fall is about 322 feet, and, on the basis given above, the cost of locks and dams up to this point would be about \$2,002,947.

It should be stated that there are some discrepancies in the distances and elevations just used from those given in Appendixes A and B, which are Welch's and Buford's reports on the Licking. The reason is that I have taken from Slate Creek the distance and elevation given on the profile of 1829, which are 149½ miles and 200.8 feet, respectively. I consequently obtain for West Liberty a distance of 235 miles and an elevation of 333½ feet. There are evident errors and inconsistencies in the reports of Welch and Buford that can only be righted by a new survey or additional information.

It has been suggested that a lock and dam at the mouth of the Licking would create a valuable manufacturing interest on both banks for a distance of 3 miles. This is probably correct, but as this is a work that only indirectly concerns navigation, no estimate is made for it. If built, the dam ought to be a movable one.

In 1837 the State of Kentucky began the improvement of the Licking River by locks and dams, and contracts were let for 5 locks. In 1839 contracts were let for 2 more locks. In 1840 work was suspended for lack of funds, and in 1842 a final settlement was made with the contractors. The total cost to the State was \$372,520, all of which was total loss.

Should the government be unwilling to enter upon so large an expenditure as the radical improvement of the Licking would entail, it is suggested that a small appropriation for the removal of the rocks and bowlders that make the passage of "The Narrows" so dangerous would afford great relief to existing navigation. It is believed that \$5,000 could be profitably expended on this work.

Respectfully submitted.

WM. E. MERRILL,  
*Major Engineers.*

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

REPORT OF MR. C. SCHENK, ASSISTANT ENGINEER.

CINCINNATI, OHIO, *December 28, 1878.*

SIR: I have the honor to submit the following report on the reconnaissance of the upper part of the Licking River, assigned to me by your letter of August 28, 1878. The Licking River was surveyed in 1829 from its mouth to Slate Creek, a distance of 149 miles, by Lieutenants Turnbull and Grayson, and the maps of this survey are on file in the Engineer Department at Washington. In 1835-'37 the survey was continued by N. B. Buford to West Liberty, but his maps cannot now be found; his last-

known bench-mark was at the old site of McClure's mill, 4.7 miles below West Liberty. In the hope (which was not realized) that Buford's map might be found, the work of the present survey was begun at McClure's mill and was continued to Trace Fork, in Magoffin County, a distance of 69.7 miles.

The Licking River rises in the acute angle formed at the junction of the water-sheds of the Big Sandy and the Kentucky Rivers, and flows in a northwesterly direction, through Magoffin, Morgan, Menifee, Rowan, Bath, Fleming, Robertson, Nicholas, Pendleton, Kenton, and Campbell Counties for a total distance of about 320 miles, emptying at last into the Ohio River, opposite the city of Cincinnati.

In Magoffin and Morgan Counties the folds in the stratified rocks which form the watersheds of the Kentucky and Big Sandy Rivers are so near each other that the intervening basin drained by the Licking has little width; a fact that has a marked influence on the regimen of the river.

The basin of the Upper Licking is eroded into a complicated system of main and minor ridges and spurs, among which the tributaries take their rise. The latter are fed by numerous springs, which, however, have scarcely any flow in dry seasons. The lateral valleys, with bottoms from 50 to 1,500 feet wide, are bordered by richly-timbered hills, rising from 50 to 400 feet above the valleys.

The bottom lands, composed of sand, clay, rocks, and vegetable mold, are mostly sufficiently elevated to be free from overflow during summer.

Although the average width of the Licking Basin in Magoffin and Morgan Counties is only from 18 to 20 miles, the length of some of the tributaries exceeds these figures, owing to the fact that they frequently follow courses more or less parallel to the main stream.

The area drained by the Licking from its source down to the mouth of Elk Fork, in Morgan County, is estimated at 600 square miles. The immediate valley is from 300 feet to one mile wide, and it is bordered by hills from 100 to 400 feet high, chiefly composed of alternating beds of sandstones, shales, clay, coal, and iron ore. The river descends in an extremely crooked course, alternately approaching the hills on each side, washing and excavating their bases, and forming deposits on the opposite side. This is specially the case in the sharp bends, where one side of the river is often lined by vertical banks of sandstone and shale, which present insuperable obstacles to roads, while the other side is flat bottom land, which can be traversed in any direction with the utmost ease.

The bottom lands, as a rule, are formed by the washings from the neighboring hills, and terraces, at various elevations, are of common occurrence. Between McClure's mill and West Liberty these bottoms vary in height from 8 to 20 feet above low-water, but those that have the smaller height are usually backed by a terrace or else a hill is found within a distance of from 300 to 600 feet.

The width of the river varies from 80 to 100 feet; its course is very tortuous, many of the bends covering three-quarters of a circle, and having a mean radius of from 150 to 200 feet.

It is very common to find drifting sands on the rocky bottom of the river. Wherever a lateral depression brings in the drainage of the steep hills we find a ripple formed by the debris brought down by the rains, which makes a short pool above it.

The same character pertains to the country and river above West Liberty, except that the sandy banks, which vary in height from 14 to 20 feet above low-water, are more ragged on account of the effect produced by log jams.

Above the Gordon Ford, which is 6 miles above West Liberty, ripples are less numerous. It is here that the sinuous character of the Licking is most marked; places 3 miles apart in an air line are 12 miles distant as measured by the course of the river.

The general elevation of the bottom lands between West Liberty and Salyersville is from 14 to 20 feet, diminishing towards the latter place; being only 12 to 16 feet near Licking Station. Salyersville is flooded by a rise in the river of 8 to 11 feet, and 3 miles above that town a 7-foot rise overflows the sandy and irregular river banks. The river here is from 80 to 160 feet wide.

The quantity of water flowing in the Licking is extremely variable. The tributaries, sparingly fed by weak springs, become almost dry in summer, while in wet seasons their volume is enormous. As there are no table-lands and the hills are steep and covered by a soil that has little capacity to retain water, the greater portion of the rain runs at once into the river, charged with sediment to its utmost capacity.

A gauging of the river at West Liberty, made on the 23d of September, when the water was near its lowest stage, showed a discharge of 13 cubic feet per second. Another gauging, made about half a mile above Salyersville, on the 8th of November, when the river was at the average low stage of winter, gave a discharge of 15 cubic feet per second. If to this be added 2 cubic feet per second for State Road Fork, and the same for Burning Fork, both of which join the Licking at Salyersville, we would obtain for the discharge of the Licking below the junction 19 cubic feet per second.

The rise in the river between McClure's mill and Prater's Branch, a distance of 49.954 miles, averages 2.286 feet per mile. This rise, however, is not uniform, as can be seen by the following table:

Section of river.	Length of miles.	Total rise.	Rise per mile in feet.
McClure's mill to Dan Branch.....	5.719	13.076	2.287
Dan Branch to Gordon Ford.....	4.815	7.800	1.621
Gordon Ford to War Creek.....	4.917	8.632	1.756
War Creek to Patrick's Ford.....	14.050	28.322	2.016
Patrick's Ford to Bloomington Ford.....	1.499	5.621	3.750
Bloomington Ford to Millard's mill.....	1.067	5.521	5.174
Millard's mill to Calvin Coal Bank Ford.....	5.379	9.917	1.843
Calvin Coal Bank Ford to Middle Fork Ford.....	4.854	10.285	2.117
Middle Fork Ford to Licking Station.....	4.037	12.171	3.015
Licking Station to Salyersville.....	2.381	8.533	3.583
Salyersville to Prater's Branch.....	1.236	4.313	3.489
Total.....	49.954	114.191	
Average rise per mile.....			2.286

The heavy rise at Millard's mill is caused by a rude dam of loose rocks and drift-wood. The mill-race, about 20 feet long, is cut into the rock bottom of the river, and the mill itself is merely an uncovered frame-work supporting the necessary wheel and mill-stones.

The elevation above low-water of floods in the Licking varies as follows:  
At Salyersville it is from 10 to 13 feet.

At Cottle's Bend in 1874 it rose to 22 feet, flooding the bottoms from 2 to 7 feet.

At Day's mill-site it is 25 feet, flooding the bottoms from 3 to 10 feet.

At West Liberty it is 29 feet.

The following table gives elevations and distances along the Licking, the connection with the Ohio River being made through the bench-marks at West Liberty, as given by N. B. Buford, civil engineer, in his report to Sylvester Welch, chief engineer, of Kentucky, dated November 1, 1847.

Licking River.

Miles from mouth.	Name.	Elevation in feet above low-water in Ohio River at Cincinnati.	Elevation in feet above mean ocean levels.	Length of ripple.	Rise of ripple.	Remarks.
226.27	McClure's mill-site.....	289.79	738.52	.....	.....	
228.85	Neele's Branch Ripple, head.....	300.506	744.15	19.7	0.65	
231.00	West Liberty mill-site.....	310	749.74	.....	.....	
231.62	Horse Branch Ripple, head.....	310.55	750.28	49	0.32	
231.99	Dan Branch Ripple, head.....	311.86	751.59	52	1.08	
233.86	Elam Bend.....	314.68	754.41	.....	.....	Near Mr. Thos. Elam's house.
236.26	Gordon's Bend Ripple, head.....	318.61	758.34	337.3	0.96	
236.81	Ford in Gordon's Bend.....	319.66	759.41	49.3	0.34	
238.51	Day's mill-site.....	322.44	762.17	.....	.....	
241.73	War Creek Ripple, head.....	328.30	768.03	705	1.27	
243.29	Cut-off.....	330.77	770.50	.....	.....	In Mr. Dave Cottle's field.
245.05	Bend below White Oak Creek.....	334.32	773.95	.....	.....	
249.90	Mouth of Rock House Creek.....	345.01	784.77	.....	.....	
250.58	Shoal Branch Ripple.....	346.13	785.86	115	0.76	
251.87	Mill-site.....	348.36	788.09	19	0.27	Below Pricy Creek.
252.09	Mouth of Pricy Creek.....	348.86	788.59	.....	.....	
255.78	Ford.....	356.62	796.35	.....	.....	Near Mr. H. Patrick's house.
257.29	Bloomington Ford.....	362.24	801.97	.....	.....	
258.37	Millard's mill.....	367.76	807.49	118	2.06	
261.47	Mouth of Grape Creek.....	373.20	812.93	.....	.....	
262.26	Johnson's Fork.....	374.71	814.44	.....	.....	
263.72	Ford.....	377.68	817.14	.....	.....	Below Calvin Coal Branch.
264.26	Calvin Coal Bank Branch.....	379.34	819.07	.....	.....	
265.77	Pricy's Bend.....	383.17	822.90	.....	.....	Lower end of Bend.
268.59	Ford.....	387.98	827.69	.....	.....	Ford of Middle Fork Road.
270.35	May's Bend.....	292.89	832.62	.....	.....	Where road leaves river.
271.89	Ford.....	398.52	838.25	.....	.....	West Liberty and Salyersville Road.
272.61	Ford at Licking Station.....	400.13	839.86	.....	.....	
274.94	Salyersville.....	408.47	848.40	.....	.....	Mouth of State Road Fork.
275.02	Burning Fork.....	409.07	848.80	.....	.....	
275.83	Bend.....	411.69	851.42	.....	.....	At end of Mr. Jos. Gardner's field.
276.18	Prater's Branch.....	412.98	852.71	.....	.....	Below Mr. E. Prater's house.