

This canal, when completed, would carry either flatboats or small steamboats around the falls, but it is to be remembered that the river above this point and below to Point Burnside is simply a series of rapids, with intervening quiet pools, and that in many places the channel is obstructed by bowlders and projecting rocks. The clearing out of these obstructions, and the improvement of a few of the worst rapids, would allow flatboats loaded with coal or produce to drop down the river at high stages of water, but nothing short of a complete system of slackwater improvement would make the river above Point Burnside available for steamboat navigation. To give plans and estimates for such improvements above and below the falls is not within the province of this report.

The statistics and description of the country tributary to this part of the river clearly show, I think, that at present such a system of improvement would not be justified by the meager advantages to commerce to be gained thereby. Should the reputed existence of valuable and inexhaustible coal deposits be confirmed in the future, with a great market demand for their products, these improvements may become advisable, but it is safe to say that such a time is far in the future.

Very respectfully, your obedient servant,

S. WHINERY,
Assistant Engineer.

Maj. W. R. KING,
Corps of Engineers.

APPENDIX U.

ANNUAL REPORT OF MAJOR G. WEITZEL, CORPS OF ENGINEERS, FOR THE FISCAL YEAR ENDING JUNE 30, 1879.

UNITED STATES ENGINEER OFFICE,
Detroit, Mich., July 19, 1879.

GENERAL: I have the honor to transmit herewith the annual reports relating to the river and harbor improvements under my charge, for the fiscal year ending June 30, 1879.

Very respectfully, your obedient servant,

G. WEITZEL,
Major of Engineers.

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

U I.

IMPROVEMENT OF THE FALLS OF THE OHIO RIVER.

The appended report of my assistant, Capt. A. N. Lee, Corps of Engineers, gives the progress of the work during the past fiscal year.

A complete history of this work is given in the last annual report. (See Report of Chief of Engineers, Part 1, pages 776, 781.)

The work still to be done on this improvement can only be economically executed at low stages of the river. As the low-water stage was of but short duration last fall, but little was accomplished.

The original estimate for this work was \$1,243,500. There has been allotted and appropriated for it as follows:

1868, allotted	\$85,000
1869, allotted	178,200
1870, appropriated	450,000
1871, appropriated	250,000
1872, appropriated	300,000
1873, appropriated	100,000
1875, appropriated	100,000
Total	1,463,200

Of this amount \$1,419,533.37 has been expended.

No additional appropriation is required for the next fiscal year.

The reasons for the exceeding of the original estimate for this work have been given in previous reports.

The work is located in the third collection-district of Kentucky. The nearest port of entry is Louisville, Ky.

The amount of revenue collected at this port during the fiscal year was \$35,090.21.

The commerce and navigation of the Mississippi River and all its branches will be benefited by the completion of this work.

Money statement.

July 1, 1878, amount available.....	\$47,360 67
July 1, 1879, amount expended during fiscal year.....	3,694 04
July 1, 1879, amount available.....	43,666 63

REPORT OF CAPTAIN A. N. LEE, CORPS OF ENGINEERS.

LOUISVILLE, KY., June 30, 1879.

SIR: I have the honor to submit the following report on the improvement of the falls of the Ohio for the fiscal year ending June 30, 1879.

The work projected at the beginning of the year was the building of a movable dam 300 feet long, parallel with, and about 50 feet below, the permanent dam opposite the middle channel, to benefit ascending commerce.

Owing to the continued high-water, work could not be commenced until October 7, and a rise in the river necessitated its abandonment on November 2. The two abutments have been built, however, and 45 cubic yards of the trench excavated. Timber and iron have been purchased, but owing to the high stage of the river, work has not yet been resumed.

A partial survey of the Indiana Chute has been made, and a detailed map prepared. It is proposed during the coming year to complete the movable dam and also the survey of the Indiana Chute.

* * * * *
Very respectfully, your obedient servant,

A. N. LEE,
Captain of Engineers.

Maj. G. WEITZEL,
Corps of Engineers.

U 2.

SUPERINTENDENCE, MANAGEMENT, AND REPAIR OF THE LOUISVILLE AND PORTLAND CANAL.

The appended report of my assistant, Capt. A. N. Lee, Corps of Engineers, who is in local charge of this work, gives its history and progress during the past fiscal year.

It will be seen from the financial statement at the end of this report that the receipts during the first six months of 1879, under the reduced rates of toll which took effect in January, have been \$22,341.16. In consequence of ice and high-water there were scarcely any receipts in January, and those in February and March were very small. Notwithstanding this the receipts for the six months exceed the running expenses of the canal.

In January last I received permission to purchase a small engine in order to make the experiment of moving the gates by steam. This engine was attached to the winding gear at the north leaf of the middle gates, these being the heaviest and most difficult to move. The engine is supplied with steam from a boiler, which we had on hand, and worked with complete success. I have since received authority to purchase 5 additional engines for the other 5 leaves of the lift-gates. After ascertaining practically the amount of power required I will ask authority to purchase and erect an air-compressor at a point near the workshops and central to the new locks, old locks, dry-dock, and the swing-bridges over the old and new locks. The boiler which furnishes the steam for the compressor can then furnish all the steam required for the workshops, and the compressed air can be carried to whatever point it is needed.

The expenditures during the year were \$73,720.91. Of this amount \$43,661.22 was for superintendence, management, and ordinary repair, and \$30,059.69 for permanent repair and improvements. The receipts were \$42,996.09.

The yellow fever in September and October, 1878, high-water and ice in December, 1878, and January, 1879, and high-water in February and March, 1879, seriously injured the business of the canal, as the financial statement shows.

Financial statement for fiscal year ending June 30, 1879.

Deposits.		Expenditures.	
Months.	Amounts.	Months.	Amounts.
1878.		1878.	
July	\$5,908 53	July	\$7,205 52
August	4,053 00	August	2,276 61
September	2,757 82	September	5,341 14
October	1,991 44	October	10,856 32
November	5,251 23	November	7,033 20
December	892 91	December	12,088 78
1879.		1879.	
January	84 52	January	3,240 00
February	2,329 28	February	4,256 11
March	1,575 09	March	1,260 46
April	6,842 60	April	8,350 44
May	6,393 82	May	5,936 12
June	4,915 85	June	5,876 21
	42,996 09		73,720 91

Cash on hand June 30, 1879, \$51,014.96.

REPORT OF CAPTAIN A. N. LEE, CORPS OF ENGINEERS.

LOUISVILLE, KY., June 30, 1879.

SIR: I have the honor to submit the following report on the superintendence, management, and repair of the Louisville and Portland Canal for the fiscal year ending June 30, 1879.

A detailed history of this work (written by Capt. A. Mackenzie, Corps of Engineers, my predecessor in local charge) having appeared in your report for 1878, it is not thought necessary to repeat the same here in order to comply with the instructions contained in paragraph 2, General Orders No. 4, Headquarters Corps of Engineers, May 21, 1879.

Work accomplished during the year.

NEW CANAL.

The platform near the capstan of the upper gate (north side) has been paved with stone.

The grading and sodding of both banks of the new locks has been continued and is now rapidly nearing completion. The large amount of earth removed (12,773 cubic yards) in this way has been used to fill in the ravine to the side and east of Engineer's Office.

New suspension masts have been placed at all gates, and the old chains at upper and lower gates replaced by new ones.

Shade-trees have been planted on top of the north slope along the locks and fences erected near toll-collector's office and machine-shops, for the better protection of government property.

A small engine has been placed in position on north wall at middle gates, and the gates operated successfully by steam since April 23.

Plan and estimates for new middle gates have been made, submitted, approved, and timber for same ordered.

Wooden shelter-sheds were placed over the capstans for protection of lock-hands while working gates.

Concrete has been laid from the foot of the slope of north and south banks between upper and middle gates and the lock-walls, and a stone retaining-wall built to protect the foot of the slope of the north bank at the lower lock-chamber.

OLD LOCKS.

Owing to continued high-water, the work on the improvement of the old locks could not be resumed till September 1. The work had to be discontinued November 29. The rock excavation in the lower and upper chambers has been finished, with the exception of about 400 cubic yards in the upper chamber. The walls for both recesses of the upper chamber have been carried up as high as the coping of the old walls. The walls of the lower recesses were in a very bad condition, and had to be taken partly down. They have been rebuilt to within three courses of the top. A wooden miter-sill for middle gates was built, but owing to the rock excavation in the upper chamber not being finished, it was not placed in position. Three sets of lift-gates and one of guard-gates were built and are ready to be hung when the masonry is completed. The work was entirely done in the canal shops, and at a cost of \$7,249.08, showing a large saving over contract labor.

The work done by the towboat and dredges and by lock-hands in passing boats is given in tables annexed.

Most all of the work on the new and old locks referred to above, in addition to numerous minor improvements, ordinary repairs and regular duties, have been carried on under the immediate direction of the superintendent, and as far as possible the work has been done by our regularly employed mechanics and laborers.

NUMBER AND SALARIES OF EMPLOYÉS.

The regular canal force has been reduced by one lock-hand since my report for the fiscal year ending June 30, 1878. It has been necessary, however, to employ extra laborers in grading and sodding the banks and other works of permanent improvement. The monthly pay-roll of the regular canal employés now amounts to \$3,160.

RATES OF TOLL.

The reduction in rates of toll recommended in your report for the last calendar year having been approved by the proper authorities, the new rates took effect January 29. They are as follows:

Steamboats and model-barges.....	6½ cents per ton.
Square barges, flats, coalboats, &c.....	5 cents per ton.
All empty square barges and coalboats.....	4 cents per ton.
Small boats.....	\$4 each.
Rafts of logs, &c., measurement and rates the same as for coalboats.	
Boats belonging to or chartered by the United States, free.	
Towing, harbor rates.	
Use of dredge.....	\$2.50 per hour.
Use of steam-pump.....	2.50 per hour.
Use of dry-dock, \$15 for first day and \$10 for each subsequent day.	

RECEIPTS AND EXPENDITURES.

The receipts of the year amount to \$42,996.09. The expenditures for the year have been as follows:

Ordinary superintendence, management, and repairs.....	\$43,661 22
Permanent improvements to both banks of new canal below bridge, such as grading, sodding, concreting.....	11,956 72
Building new gates for old locks.....	3,863 68
Improvement of old locks.....	11,851 47
Minor improvements.....	2,387 82

During the year 4,429,000 bushels of coal, 149,460 barrels of salt, and 18,140 tons of iron ore passed through the canal.

WORK PROJECTED FOR NEXT YEAR.

The following work will be attempted during the coming year, if money and time are available:

- Completing the rebuilding of the old locks, converting three chambers into two.
- Building a new set of lift-gates for new locks.
- Changing the method of suspending the gates of the new locks and substituting iron for wooden masts.
- Placing engines in position for moving gates of new locks by steam.
- Building a sufficient number of cottages on the south bank of the canal to accommodate the engineers of gate-moving engines and necessary lock-hands.

Continuation of grading and sodding the south bank of the canal below the bridge, using the material removed from slope and lock walls for filling in east of engineer's office.

Building engine-houses on lock-walls.

Building new hull for dredge No. 1.

Ordinary superintendence, management, and repairs.

In conclusion I take great pleasure in saying that the duties of the superintendent, his assistants, and the employés of the canal generally, have been performed in a faithful and efficient manner.

Very respectfully, your obedient servant,

A. N. LEE,
Captain of Engineers.

Major G. WEITZEL,
Corps of Engineers, U. S. A.

Financial statement for the fiscal year ending June 30, 1879.

Receipts.		Expenses.	
Tolls.....	\$42,486 72	Lockage department.....	\$30,886 15
Use of dry dock.....	155 00	Dredge department.....	12,775 07
Towage.....	10 00	Improvements.....	30,059 69
Use of steam-pump.....	16 87		
Rents.....	327 50		
	42,996 09		73,720 91

Detailed statement of expenditures for the superintendence, management, and repairs of the Louisville and Portland Canal for the fiscal year ending June 30, 1879.

Date.	Lockage department.			Dredge department.			Improve-ments.	Grand to-tal.
	Labor.	Purchases and repairs.	Total.	Labor.	Purchases and repairs.	Total.		
1878.								
July.....	\$2,375 00	\$234 64	\$2,609 64	\$835 00	\$137 26	\$972 26	\$2,920 07	\$6,501 97
August.....	2,375 00	92 14	2,467 14	835 00	180 29	1,015 29	1,874 55	5,356 98
September.....	2,375 00	128 58	2,503 58	795 00	193 57	988 57	2,434 92	5,927 07
October.....	2,375 00	351 68	2,726 68	795 00	247 82	1,042 82	2,622 44	6,391 94
November.....	2,375 00	191 71	2,566 71	795 00	151 48	946 48	3,112 40	6,625 59
December.....	2,375 00	340 57	2,715 57	802 33	320 58	1,122 91	7,902 09	11,740 57
1879.								
January.....	2,375 00	255 19	2,630 19	795 00	100 86	895 86	787 15	4,313 20
February.....	2,375 00	68 36	2,443 36	835 00	266 66	1,101 66	227 75	3,772 77
March.....	2,375 00	129 25	2,504 25	835 00	225 95	1,060 95	1,665 91	5,231 11
April.....	2,340 00	206 97	2,546 97	835 00	263 11	1,098 11	1,034 68	4,679 76
May.....	2,325 00	392 64	2,717 64	835 00	150 77	985 77	2,611 51	6,314 92
June.....	2,325 00	129 42	2,454 42	835 00	709 39	1,544 39	2,866 22	6,865 02
Total..	28,365 00	2,521 15	30,886 15	9,827 33	2,955 14	12,775 07	30,059 69	73,720 91

Detailed statement of vessels passed through Louisville and Portland Canal during the fiscal year ending June 30, 1879.

Date.	Passenger-boats.		Tow-boats.		Model-barges.		Square barges.		Small boats.
	Num-ber.	Under-tonnage.	Num-ber.	Under-tonnage.	Num-ber.	Under-tonnage.	Num-ber.	Measured capacity.	
1878.									
July	104	40,908	33	3,352	52	13,272	86	18,875	12
August	98	28,926	21	2,319	45	10,782	77	18,151	9
September	64	18,510	30	2,030	12	2,814	44	8,482	12
October	70	18,946	38	2,258	4	644	32	4,160	18
November	93	32,909	41	3,657	52	12,265	100	14,739	46
December	15	5,920	9	655	6	1,100	6	628	11
1879.									
January	3	1,466	2	140					
February	51	24,010	17	2,112	27	7,476	43	11,431	22
March	22	10,012	8	1,525	1	217	22	6,672	13
April	64	29,679	46	7,000	69	18,026	270	82,969	27
May	113	47,223	35	5,364	65	16,483	103	25,030	50
June	107	43,216	13	2,402	44	10,695	67	11,966	38
Total	804	301,725	293	32,814	377	93,774	850	203,103	258

WORK OF DREDGING DEPARTMENT AND EXPENDITURES ON IT FOR THE FISCAL YEAR ENDING JUNE 30, 1879.

Time at work:	Days.
Dredging	170
Time lost:	
By ice	23
By high-water	10
By employment at the improvement of falls and of old locks	90
By Sundays and national holidays	53
By assisting lock-hands and other labor	14
Work done:	Cubic yards.
Excavated during the year	70,034
Excavated per work day	411.96
Cost:	
Salaries:	
For the year	\$9,827 33
Per working day	57 80
Repairs:	
For the year	\$2,955 14
Per working day	17 38
Total:	
For dredging	\$5,977 43
Per working day	35 16
Per cubic yard excavated	8.53

SUPERINTENDENCE, MANAGEMENT, AND REPAIR OF THE LOUISVILLE AND PORTLAND CANAL FOR THE YEAR ENDING DECEMBER 31, 1878.

WAR DEPARTMENT,
Washington City, January 17, 1879.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a report of Major Godfrey Weitzel, of the Corps of Engineers, on the superintend-

ence, management, and repair of the Louisville and Portland Canal for the year ending December 31, 1878, with letter of the Chief of Engineers submitting the same.

The report is approved; and, in accordance with the provisions of section 3 of the act of Congress of May 11, 1874 (18 Stat., p. 44), the rates of toll mentioned in the letter of the Chief of Engineers are declared and fixed as the charges to be collected for the current calendar year.

Respectfully submitted.

GEO. W. MCCRARY,
Secretary of War.

The PRESIDENT
Of the United States Senate.

LETTER OF THE CHIEF OF ENGINEERS.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., January 14, 1879.

SIR: To comply with the requirements of section 3 of the act of May 11, 1874, "providing for the payment of the bonds of the Louisville and Portland Canal Company" (Statutes at Large, vol. 18, page 43), I have the honor to submit herewith copies of the report of Major Godfrey Weitzel, Corps of Engineers, on the superintendence, management, and repair of that canal for the calendar year ending December 31, 1878, and of the receipts and expenditures for the same period.

It will be seen that the receipts during the past year amounted to the sum of \$78,510.60, and the total expenditures for the same period to \$75,467.92, leaving a balance on hand of \$3,042.68; add balance on hand January 1, 1879, \$54,750.46; total amount on hand January 1, 1879, \$57,793.14.

As in previous years permanent improvements and repairs have been continued on different parts of the work in the order of their necessity and as rapidly as the excess of tolls over expenses of management would warrant, and it will be seen that the policy adopted of continuing to place the canal and its appurtenances in better working condition has gradually and steadily given increased facilities to its business.

During the last half of the year 1874, 274,365 tons were passed through the canal at an expense of 9.12 cents per ton for superintendence, management, and ordinary repairs; in the year 1875, 757,695 tons, at 6.14 cents per ton; in 1876, 871,446 tons, at 5.6 cents per ton; in 1877, 999,610 tons, at 4.97 cents per ton; and in 1878 (with rates of toll reduced 20 per cent.), 1,094,942 tons, at 4.05 cents per ton.

The expense during the past year in passing the three chief articles which go through the canal in bulk was: For coal, 0.132 cent per bushel; for salt, 0.81 cent per barrel; for iron ore, 6.85 cents per ton.

The receipts of the last year were diminished in consequence of the reduction of the rate of toll (about 20 per cent.); had the old rate been continued, they would have exceeded those of the preceding year about \$10,000, and this, too, notwithstanding four months of high-water, the prevalence of yellow fever, &c.

The financial condition of the work warrants, in Major Weitzel's judgment, a further reduction of tolls, and he accordingly recommends that they be established for the current year at the following rates:

Steamboats and model-barges, 6½ cents per ton.
Square barges, flats, coal-boats, &c., 5 cents per ton.

All empty square barges and coal-boats, 4 cents per ton.
 Small boats, \$4 each.
 Rafts of logs, &c., measurements and rates the same as for coal-boats.
 Boats belonging to or chartered by the United States, free.
 Towing, harbor rates.
 Use of dredge, \$2.50 per hour.
 Use of steam-pump, \$2.50 per hour.
 Use of dry-dock, \$15 for the first day, and \$10 for each subsequent day.

The rates for the past year were:

Steamboats and model-barges, 8 cents per ton.
 Square barges, flats, and boats, &c., 6 cents per ton.
 All empty square barges and coal-boats, 5 cents per ton.
 No change in the other rates as given above.

A greater reduction is not thought advisable, in view of the fact that a number of permanent repairs and improvements are yet to be made, and also for the reason that it is the part of prudence to keep a sufficient surplus on hand to provide for accidents more or less liable to occur on all canal-locks, and especially upon those of large dimensions.

Section 3 of the act of Congress referred to contains the following provision:

And to ascertain what rates will pay current expenses after the present year [1874], the Secretary of War shall, on the first Monday of January of each year, ascertain from the expenses of the previous year what tolls will probably pay the expenses of the current year; and he shall fix and declare the rate of tolls thus ascertained to be charged for the current year; * * * and he shall, in his next annual report, set forth such receipts and expenditures and the condition of said canal, with a view to such legislation as may be necessary for the superintendence and management thereof.

It is therefore respectfully recommended that the rates of toll above mentioned be adopted as those to be declared and fixed by your authority, in obedience to this law, as the charges to be collected for the current calendar year.

As the report of Major Weitzel contains matter of value relating to commerce and navigation, it is suggested that it be sent to Congress for the information of the Committees on Commerce of the Senate and House of Representatives.

Very respectfully, your obedient servant,

A. A. HUMPHREYS,

Brigadier-General and Chief of Engineers.

Hon. GEORGE W. McCRARY,

Secretary of War.

REPORT OF MAJOR G. WEITZEL, CORPS OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
Detroit, Mich., January 4, 1879.

GENERAL: In accordance with your instructions and to enable the honorable the Secretary of War to comply with the provisions of section 3 of the act of Congress approved May 11, 1874, entitled—

An act providing for the payment of the bonds of the Louisville and Portland Canal Company—

I have the honor to submit the following report on the superintendence, management, and repair of the Louisville and Portland Canal for the calendar year ending December 31, 1878.

During the year, Capt. A. N. Lee, Corps of Engineers, was my assistant on the work. His report is annexed hereto as part of this.

The tables give some of the most important statistics having a practical professional bearing. A great many more are recorded in books kept for the purpose at the canal office.

Continuing our former policy, we have made improvements and repairs on the work in the order of their necessity and as rapidly as circumstances would permit. We have accomplished the following permanent improvements and repairs, viz:

A large shed for storage of tools and machinery and a wagon-shed have been built.

New winding machinery has been placed in position at lower gates.

The anchors of mast-guys at upper and lower gates have been reset, and three new masts have been put in.

The north bank and half of the south bank adjacent to the new locks have been graded and sodded, and a portion of the ravine in the rear of the superintendent's office has been filled up.

Concrete has been laid from the foot of the slopes of north and south banks to the lock-walls, and a stone retaining-wall has been built to protect the foot of the slope of the north bank at the lower lock-chamber.

New one-inch iron chains have been put in at lower gates.

The iron bridge across the new locks has been refloored, repainted, and otherwise repaired.

The suspension masts, buildings, and fences have been painted and whitewashed.

Wooden sheds have been built over capstans, for protection of lock hands.

The enlargement of the old locks has been continued; the rock excavation in upper and lower chambers, the new gate recesses, and new miter-sills have been almost completed.

Two new sets of lift-gates for the old locks have been completed.

It will be seen from the annexed tables that the effect of our policy has continued to steadily improve the business of the canal.

From June 11, 1874, to December 31, 1874, 274,365 tons were passed through, at an expense of 9.12 cents per ton for superintendence, management, and ordinary repairs. In 1875, 757,695½ tons, at 6.14 cents per ton. In 1876, 871,446½ tons, at 5.6 cents per ton. In 1877, 999,610.8 tons, at 4.97 cents per ton; and in 1878 (with rates of toll reduced 20 per cent.), 1,094,942 tons, at 4.05 cents per ton.

The expense last year in passing the three greatest articles which go through in bulk was as follows, viz: coal, 0.132 cent per bushel; salt, 0.81 cent per barrel, and iron ore 6.85 cents per ton.

The receipts during the past year amounted to \$78,510.60, and the total expenditures to \$75,467.92. This leaves a surplus for the year of \$3,042.68. There was on hand, in cash and in bank, at the beginning of the year, the sum of \$54,750.46; consequently the amount on hand at the beginning of the present year is \$57,793.14.

The receipts were less than during last year, on account of the reduction of the rates of toll, which amounted to about 20 per cent. In spite of a loss of about four months by high water, ice, and the prevalence of yellow fever, the receipts at the old rates would have amounted to about \$98,500, or about \$10,000 more than the preceding year.

The amount expended for permanent improvements during the year was \$31,113.60. The running expenses, including ordinary repairs, was, therefore, \$44,354.32.

It will be seen that the present financial condition of the work will warrant a further reduction in the rates of toll.

In my last annual report I expressed my belief that this would be