

HISTORIC STRUCTURE REPORT  
THE SENECA AQUEDUCT  
HISTORICAL DATA  
CHESAPEAKE AND OHIO CANAL NATIONAL HISTORICAL PARK  
MD.-D.C.-W.Va.

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## CALENDAR OF EVENTS

OCTOBER 21, 1828: The C & O Canal Company formally accepted the bid of Holdsworth and Isherwood to construct Aqueduct No. 1.

DECEMBER 1831 or JANUARY 1832: The C & O Canal Company formally accepted the bid of Obediah Gordon to construct the wing walls of Aqueduct No. 1.

MARCH 31, 1832: The C & O Canal Company formally accepted the bid of Gideon Davis to construct the railing for Aqueduct No. 1.

APRIL 28, 1832: A final estimate was presented to the C & O Canal Company regarding the contract of Holdsworth and Isherwood. The aqueduct was probably completed in early spring of that year.

WINTER 1873-74: The berm parapet and spandrels of Aqueduct No. 1 were rebuilt.

SEPTEMBER 11, 1971: The west arch of the parapet collapsed during a heavy flood. Following the storm, the National Park Service took steps to stabilize the aqueduct.

I. ADMINISTRATIVE DATA

A. Name of Structure

Aqueduct No. 1 (Seneca Aqueduct), Chesapeake and Ohio Canal National Historical Park, Seneca, Montgomery County, Maryland.

B. Proposed Use of Structure and Justification for Such Use

The List of Classified Structures for this park has not been completed. Therefore, the Order of Significance of Aqueduct No. 1 has not been established, nor has the level of treatment been determined. Because Aqueduct No. 1 is located in an area that the draft master plan recommends be a "national interpretive center," it will undoubtedly figure prominently among the historical resources of the canal. In the event that the Seneca vicinity is developed as a "national interpretive center" to illustrate the construction, maintenance and operation of the canal, Aqueduct No. 1 should be fully restored. Until a final determination is made on the development of the Seneca vicinity, Aqueduct No. 1 should be given appropriate preservation treatment as needed.

C. Provision for Operating Structure

Aqueduct No. 1 should be used as a historic structure exhibit in-place to interpret the construction, maintenance and operation of the canal.

D. Cooperative Agreement, if Any, Executed or Proposed for Operating Structure.

There are no cooperative agreements executed or proposed for operating Aqueduct No. 1. However, National Park Service land at Seneca borders Seneca State Park, and any large-scale planning for the vicinity should be pursued jointly with planners from the Maryland Department of Natural Resources and the Seneca State Park Advisory Commission.

E. Description of Proposed Construction Activity

Pending a final determination of the development at Seneca, appropriate preservation treatment should be given to Aqueduct No. 1 as needed to prevent further deterioration of the structure.

## II. STATEMENT OF HISTORICAL SIGNIFICANCE

This structure is significant because it was important to the operation of the Chesapeake and Ohio Canal and represented a major engineering accomplishment of this period. It was the first of eleven masonry aqueducts constructed to carry the canal across the larger tributaries of the Potomac River between Georgetown and Cumberland, Maryland.

### III. INTRODUCTION

Several months before construction of the canal began, two civil engineers, James Geddes and Nathan S. Roberts, surveyed the proposed line of the waterway. On March 10, 1828, their report, containing estimates of the proposed cost of the canal, was submitted to the House of Representatives by the Secretary of War. The report recommended that the abutments and piers of the Seneca Aqueduct be constructed of stone and the trunk of wood. The structure was to be 20 feet wide and 120 feet in length, and would cost an estimated \$5,128.32.<sup>1</sup>

Before proposals for the construction of the aqueduct (Aqueduct No. 1) across Seneca Creek could be invited, land for the right-of-way would have to be purchased. Property on the east side of Seneca Creek was owned by two descendents of Elizabeth Threlkeld, Mary Grayson and Jane Cox, the wife of the mayor of Georgetown.<sup>2</sup> Land on the west bank belonged to John P. C. Peter, a prosperous landowner in the Seneca vicinity.

After the heirs of Elizabeth Threlkeld had refused for nearly two years to sell their tract of Land to the canal company, an inquisition was taken on their property on November 2, 1830, and damages were assessed at \$688.83. The tract of land thus acquired contained "twenty acres, two rods and one perch."<sup>3</sup>

Like the heirs of Elizabeth Threlkeld, John P. C. Peter refused to surrender his land on the west bank of Seneca Creek voluntarily, in the hope of realizing a greater profit from condemnation proceedings. Accordingly, an Inquisition was taken on "Sixteen acres, three rods and one perch" of his land on April 15, 1829. The jury assessed the damages due him at \$2,199.34, but the decision was quashed on his motion. On December 30, 1829, however, Peter changed his mind and claimed payment of the amount awarded by the jury. The canal board rejected this claim, but on January 29, 1830, the board reversed its decision and offered Peter the amount decided on by the jury. When Peter again refused this offer on February 19, the board offered that a second inquisition be taken. The condemnation proceedings were held on May 1, and the damages assessed were revised downward to \$2,143.50. Finally, after a lengthy legal battle, Peter accepted this latter amount and the deed was executed on June 2.<sup>4</sup>

By the terms of the deed, the company was given the right to quarry 20,000 cubic yards of material from an adjacent piece of ground owned by Peter. This material, which was the well-known Seneca red sandstone, was to be excavated "within the term and space of twenty-seven months from and after the first day of June of the year now last part."<sup>5</sup>

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<sup>1</sup> *Letter from the Secretary of War, Transmitting Estimates of the Cost of Making a Canal from Cumberland to Georgetown*, 12<sup>th</sup> Congress, 1<sup>st</sup> Session, 1828, H. Doc. 192, p. 83.

<sup>2</sup> Rogers W. Young, *The Chesapeake and Ohio Canal and the Antebellum Commerce of Old Georgetown*, 1940, pp. 11-13.

<sup>3</sup> Inquisition, Nov. 2, 1830, Deeds and Other Records Concerning Land Titles, C & O Co. For a boundary description of this tract of land, see Appendix A. All manuscript source materials referred to in this report are deposited in the Department of the Interior files at the National Archives and are designated Record Group 79.

<sup>4</sup> Reference Book Concerning Land Titles, 1829-68, C & O Co. For a boundary description of this tract of land, see Appendix A.

<sup>5</sup> Deed, John P. C. Peter to C & O Canal Co., June 2, 1830, Deeds and Other Records Concerning Land Titles, C & O Co.

#### IV. CHAPTER 1: HOLDSWORTH AND ISHERWOOD BUILD AQUEDUCT NO. 1

Several weeks after President John Quincy Adams presided over the official groundbreaking ceremonies of the canal company on July 4, 1828, canal engineers began laying out thirty-four sections immediately above Little Falls. Accordingly, on July 19 the board passed the following resolution:

The Engineer [in Chief] having reported that another subdivision of the Chesapeake and Ohio Canal, extending from the head of the Great Falls of Potomac to Seneca Creek (about 8-½ miles) is now under survey, and will be prepared for letting on contract for embankment, excavation & walling at the same time with that above named [section between Little Falls and Great Falls], proposals will therefore be received as above on the 14<sup>th</sup>, 15<sup>th</sup> & 16<sup>th</sup> days of August. In this subdivision, there will be five Locks of 8 feet lift each; proposals for building them, as well as for the masonry of such Aqueducts & etc., as may be necessary, will be received as above [section between Little Falls and Great Falls], from the 1<sup>st</sup> to the 20<sup>th</sup> of October next.<sup>1</sup>

During a three-day period toward the end of August, the board let contracts for the sections and locks between Little Falls and Seneca. A hundred contractors were present and submitted 462 bids. Holdsworth and Isherwood were awarded contracts for Locks Nos. 21, 23 and 24.<sup>2</sup>

About October 1, Holdsworth and Isherwood submitted a bid for Aqueduct No. 1. Chief Engineer Benjamin Wright, who had been preparing ground plans and elevations for Aqueducts Nos. 1 and 2, recommended that the board accept their proposal of \$8,000, which included "fixing all the foundations complete." He advised that this bid be accepted because "the foundation of a work of this kind" is "always attended with much trouble" and "the expense of preparing for masonry is very uncertain."

Of the 1,800 or 1,900 perches of masonry required to build Aqueduct No. 1, Wright estimated that between 1,300 and 1,400 perches were needed for the piers, abutments, arches and parapet walls. All of this work was to be of "of the best kind with a good deal of face work and close joints." For this reason he feared that Holdsworth and Isherwood would be unable to "execute the work for the sum they propose."

Wright also urged the board to import 1,000 barrels of Roman Cement as soon as possible to insure that the masonry work on the canal would not be delayed.<sup>3</sup>

In a second letter to the board at this time, Chief Engineer Wright sent the following instructions regarding the construction of Aqueduct No. 1:

The ends of abutments and piers & the Ring Stones are to be rusticated one ½ or 2 inches. The water table to be 8 inches thick & project 8 inches. Coping 9 or 10 inches thick & projecting 9 inches. Coping walls stone to be 8 ft. 9 inches on towpath & 6 ft. on the other side. Spandrel and

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<sup>1</sup> *Proceedings of the President and Board of Directors*, A, pp. 24-25.

<sup>2</sup> *Ibid.*, p. 42. Apparently the board accepted these early proposals contrary to their July 19 resolution stating that bids on the masonry works would not be accepted until October 1-20.

<sup>3</sup> Wright to Board of Directors, October 1828, Ltrs. Recd., C & O Co.

parapet walls to be well hammered smooth work, two faces. Wing walls to be hammered work one face.<sup>4</sup>

On October 21, President Mercer, Directors Lenox and May, and Chief Engineer Wright went up the line of the canal from Georgetown to the Leesburg vicinity, where they were joined the following day by Directors Smith and Janney. Here the board was engaged from October 23 to 25 in deciding on 1,308 proposals that had been offered for the fifty sections between Seneca and Point of Rocks and for the masonry works between Little Falls and Point of Rocks. The board formally accepted the bid of Holdsworth and Isherwood for Aqueduct No. 1.<sup>5</sup>

Resident Engineer Erastus Hurd, on November 27, informed Chief Engineer Wright that "the contractors of the Seneca and Monocacy aqueducts have commenced operations."<sup>6</sup>

The board, on February 21, 1827, received a report from the committee of engineers that had been appointed to obtain information on water cement for the canal's masonry works. Stone of a suitable quality had been discovered near Shepherdstown, on the Virginia side of the river, early in 1828, and a mill and kiln had been erected by Boteler and Reynolds to grind and burn the lime. After reading the report, the board directed Inspector of Masonry Robert Leckie to "proceed to make a contract with Messrs. Boteler and Reynolds for the delivery of fifty thousand bushels of water lime."<sup>7</sup>

As early as March 1829 many contractors along the line of the canal were in financial difficulty. Most of the bids had been below the prevailing level of wages and prices in 1828, and the general inflation of the period exacerbated these problems. Payments for lumber, stone, provisions and labor all exceeded contract figures. The cost of lime alone was 200 to 300 percent higher than the original estimates. Contracts for some sections and masonry works were abandoned and relet.<sup>8</sup>

The financial problems along the canal also affected Holdsworth and Isherwood. In late March, Resident Engineer Wilson M. C. Fairfax wrote to President Mercer requesting information on the procedure to be followed in making out estimates for Aqueduct No. 1. The contractors had complained that Clerk John P. Ingle had told them of "the necessity of getting their estimates by the 1<sup>st</sup> of April to avoid the delay which he said must ensue in the payment of them." Fairfax was confused by this order because the company regulations stated that monthly estimates were "to be made as soon as practicable after the 1<sup>st</sup> of every month."<sup>9</sup>

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<sup>4</sup> Wright to Board of Directors, October 1828, *Drawings and Other Records Concerning Construction*, C & O Co. The exact date of this letter and that cited in fn. 3 could not be determined, but they were received by the board sometime between October 1 and October 20. Aside from these two notes, no other plans or specifications relating to Aqueduct No. 1 could be found in Record group 79.

<sup>5</sup> *Proceedings of the President and Board of Directors*, A, p. 98. On August 9 the board had decided to accept proposals for the sections and masonry works between Seneca and Point of Rocks.

<sup>6</sup> Hurd to Wright, Nov. 27, 1828, Ltrs. Recd., C & O Co. Because the contractors did not receive an assessment of their work until August 1, 1829, this statement is somewhat optimistic.

<sup>7</sup> *Proceedings of the President and Board of Directors*, A, p. 171. See also Boteler to Mercer, Jan. 14 and 22, 1828, *Chesapeake and Ohio Canal Report*, 20<sup>th</sup> Congress, 1<sup>st</sup> Session, 1828, H. doc. 141, App. 4, pp. 38-39.

<sup>8</sup> *First Annual Report* (1829), C & O Co., in *Proceedings of the Stockholders*, A, pp. 38-39, 52. See also *Proceedings of the President and Board of Directors*, A, pp. 178-79.

<sup>9</sup> Fairfax to Mercer, Mar. 20, 1829, Ltrs. Recd., C & O Co.

Inspector of Masonry Leckie, on April 8, informed the board that "a blue hydrate of lime had been discovered about 100 yards from the kilns constructed by Messrs. Boteler and Reynolds for burning the water lime which they had contracted to furnish." This blue stone, in his opinion, was "of superior quality to that which had been contracted for." Accordingly, the board instructed Leckie "to extend the contract with Boteler and Reynolds to 100,000 bushels of water cement, provided they will manufacture it of the blue hydrate at 17 cents per bushel." In the event that Boteler and Reynolds would not agree to these terms, Leckie was "to allow them a reasonable additional price for furnishing the existing contract, manufactured of the blue stone."<sup>10</sup>

Holdsworth and Isherwood, on April 14, sent a letter to the board stating the reasons that made it impossible for them to comply with the terms of their contract for Aqueduct No. 1. The expense of quarrying stone had caused them to open and abandon quarries without meeting the success they had anticipated. The rise in the price of provisions and labor had further hurt their financial positions. Because they were confident that their contract prices were too low, the contractors asked the board for price increases to prevent them from being forced to abandon their contract on the aqueduct.<sup>11</sup>

The following day the board took up the matter of the contractors' financial plight. Because the directors, on April 8, had authorized a general price increase of twenty-five percent to the contractors for the locks, they determined that the same increase should be given to Holdsworth and Isherwood for Aqueduct No. 1.<sup>12</sup>

In a circular letter of instructions to the resident engineer on May 15, President Mercer warned:

As the Locks, Lock houses, culverts and Aqueducts are advancing, too much attention cannot be paid to the manner of constructing them prescribed to the contractors by their contracts with the Company or the instructions of the Engineer in Chief and of the Inspector of Masonry.<sup>13</sup>

Five days later the board took measures to increase the labor supply along the line of the canal. The directors authorized President Mercer

to engage the services of 300 stone cutters and masons from Europe, and further, that he be authorized to make such composition with the contractors for masonry, as will enable them to invite to the Canal, stone cutters and masons, from other parts of the United States, by advancing, on the arrival on the line of the Canal of such workmen, to the contractors, such sums of money as may be necessary to pay the cost of their transportation, to be deducted from the assessments of their respective contractors.<sup>14</sup>

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<sup>10</sup> *Proceedings of the President and Board of Directors*, A, pp. 195-96.

<sup>11</sup> Holdsworth and Isherwood to Board of Directors, Apr. 14, 1829, Ltrs. Recd., C & O Co.

<sup>12</sup> *Proceedings of the President and Board of Directors*, A, p. 202.

<sup>13</sup> Mercer to Resident Engineers, May 15, 1829, Letter Book of the Resident Engineer of the 5<sup>th</sup> Residency of the 1<sup>st</sup> Division.

<sup>14</sup> *Proceedings of the President and Board of Directors*, A, p. 226

At the first annual meeting of the Chesapeake and Ohio Canal Company, on June 1, the stockholders were informed that

The ninety-two sections, thus let [during the first year of construction] of the Canal . . . embrace, in this distance, two considerable aqueducts, about sixty culverts, two dams, twenty-seven locks, seventeen lock keepers' houses and several basins.<sup>15</sup>

On June 17 Leckie reported to President Mercer that he had inspected the cut stone at the Seneca red sandstone quarries. He found that the beds on some of the cut stone had from 1 to 3 inches of the joints left on them. This cut stone would be totally unfit for use in the masonry structure until these joints were cut off. Accordingly, he had taken a pick and broken off the defective parts on forty or forty-five stones. The next night an "evil disposed power" had come and slightly injured about six good stones. The total damage, according to the estimate of Chief Engineer Wright, was ten dollars. The contractors at the quarries, who had resented Leckie's inspection, now were threatening him with lawsuits for being at the quarries on Sunday and for breaking off defective parts of cut stone that did not belong to the canal company.

Leckie also informed Mercer that a number of cut stones at the quarries were very soft and should not be put in the locks. He feared that these would "crush with the superincumbent might of [water] in a lock."<sup>16</sup>

On July 12, Engineer McFarland reported to Clerk Ingle that the low stage of the Potomac had hindered the production of cement at Shepherdstown. As a result, the supply of cement at the kilns had been reduced to 5,000 bushels. To relieve the shortage, McFarland urged the board to develop facilities for the use of the cement that had recently been discovered at Tuscarora Creek.<sup>17</sup>

Ten days later Leckie informed the board that Boteler and Reynolds had been asked to forward as much cement as possible to the lock house on Section No. 8 and the mill building at Seneca for storage. Recent experiments on the new cement at Tuscarora Creek had given indifferent results. When the small kiln there had been fired, it had collapsed, leaving twenty-five bushels of partially burned cement that appeared to be "genuine." In order that a thorough test of the new cement could be made, he had begun building a kiln that would hold a wagonload of raw material.<sup>18</sup>

McFarland, on July 28, notified Leckie that Joseph Hollman had been hired to transport two boatloads of cement from Shepherdstown to Seneca. The boats could carry 500 bushels of

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<sup>15</sup> *First Annual Report* (1829), C & O Co., in *Proceedings of the Stockholders*, A, p. 33.

<sup>16</sup> Leckie to Mercer, June 17, 1829, Ltrs. Recd., C & O Co. The Seneca quarries, which yielded red sandstone, were located on the hill on the berm side of the canal basin just above Aqueduct No. 1. There are interesting ruins of the stone-cutting mill building at the northeast corner of the basin about 200 yards above the aqueduct. See Edward McMillan Larrabee, *A Survey of Historic and Prehistoric Archeological Sites Along the Chesapeake & Ohio Canal national Monument, 1961-1962*, NPS MS, 1961, p. 18.

<sup>17</sup> McFarland to Ingle, July 12, 1829, Ltrs. Recd., C & O Co.

<sup>18</sup> Leckie to Board of Directors, July 22, 1829, Ltrs. Recd., C & O Co.

cement in hemp bags containing two bushels each at a rate of 12-1/2 cents per bag. He also intended to send samples of his experiments with gray hydrate along with the cement.<sup>19</sup>

The first assessment of work done on Aqueduct No. 1 by Holdsworth and Isherwood was taken on August 1. The work accomplished was as follows:

346 perches of masonry @ \$4.50	\$1,557.00
300 perches of stone delivered @ \$0.60	180.00
	<u>20</u> \$1,737.00

Six days later Holdsworth and Isherwood were paid \$1,471.33 based on this estimate of work accomplished.<sup>21</sup>

On September 5 Clerk Ingle informed the board that Holdsworth and Isherwood desired to bargain for the transportation of their own water lime, because they were confident that they could get it for less than the company could.<sup>22</sup>

On September 25, President Mercer reported to the board on the progress of construction on Aqueducts Nos. 1 and 2. Disturbed by the delays in construction, Mercer stated that

Mr. Hovey proposes to substitute Tuscarora cement for that of Shepherdstown, in the construction of the [Monocacy] Aqueduct. The expediency of this should be adjudged after careful inquiry and sound reflection. Judge Wright and Mr. Leckie should decide this question; but if the Shepherdstown lime be used, immediate provision should be made, by land or water carriage, or both, for an adequate supply, that the abutment and piers of the aqueduct may be carried, as Mr. Hovey assures me shall be done, up to the skew backs, before the winter.

The abutment over the Seneca should in like manner be provided for.<sup>23</sup>

After an inspection of the line of the canal, Chief Engineer Wright, on October 21, reported to the board that he had "found every thing moving tolerably well." With few exceptions the contractors below Seneca appeared to be commencing their work with some vigor.<sup>24</sup>

Apparently work on Aqueduct No. 1 virtually came to a halt after the Aqueduct 1 assessment, because the contractors did not receive another payment until January 18, 1830. On November 4, Chief Engineer Wright complained to the board that Holdsworth and Isherwood were neither "disposed to be faithful in their work" nor pressing their projects "in a manner to justify any reasonable belief that their contracts will be executed."<sup>25</sup>

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<sup>19</sup> McFarland to Leckie, July 28, 1829, Ltrs. Recd., C & O Co.

<sup>20</sup> Assessment Book for Sections 19-38, C & O Co.

<sup>21</sup> *Proceedings of the President and Board of Directors*, A, p. 324. See Appendix B for a list of the payments made to Holdsworth and Isherwood for the construction of Aqueduct No. 1.

<sup>22</sup> Ingle to Board of Directors, Sept. 5, 1829, Ltrs. Recd., C & O Co.

<sup>23</sup> *Proceedings of the President and Board of Directors*, A, pp. 358-59.

<sup>24</sup> Wright to Board of Directors, Oct. 21, 1829, Ltrs. Recd., C & O Co.

<sup>25</sup> Wright to Board of Directors, Nov. 4, 1829, Ltrs. Recd., C & O Co.

Ten days later Wright repeated this complaint to President Mercer when he wrote that "we have a great force on the line and our other work with the exception of Isherwood and Holdsworth is going well."<sup>26</sup>

Holdsworth and Isherwood, on December 21, sent a letter to the board describing their financial plight. Because their contract provided for the retention of ten percent of their payments by the canal company, the contractors requested that this money be returned to them so that they could pay their creditors. Their financial problems were particularly troublesome because Isherwood, who was in poor health, was planning to leave the line entirely. Before he left, however, he was anxious to have the money refunded that he had invested out of his own funds in their projects.<sup>27</sup>

On January 18, 1830, Holdsworth and Isherwood were paid \$1,490.65 based on their estimates of work done on Aqueduct No. 1.<sup>28</sup>

On March 9 an assessment of work done on Aqueduct No. 1 was made by the company engineers. The estimate was as follows:

1,621	supl. ft of coping, cut and delivered @ \$.40	\$ 648.40
821	supl. ft. of cut stone, delivered @ \$.40	328.40
827	supl. ft. of ringstone and sheeting, cut and delivered @ \$.70	578.90
236	supl. ft. of sheeting, delivered @ \$.32	75.52
92	feet, lineal measure skew backs @ \$.60	55.20
4,577	supl. feet, ashlar, cut and delivered @ \$.25	1,144.25
2,571	supl. ft., ashlar, quarried @ \$.15	385.65
311	perches of backing delivered @ \$.60	186.60
	Mortared masonry, price not definitely settled	3,038.00
		<u>\$6,440.92</u>
	deduct previous estimate	3,911.00
		<u><sup>29</sup>\$2,529.92</u>

Holdsworth, on March 24, notified the board that Isherwood had left the canal. Due to their straitened financial condition, they were unable to comply with their contracts and were ready to relinquish their projects.<sup>30</sup>

The following day, after reviewing Holdsworth's letter, Chief Engineer Wright wrote to Mercer that

Painful and unpleasant as this statement of Mr. Holdsworth's is, I believe there is too much truth in it, and as I have had particular examinations and have reason to think I know the

<sup>26</sup> Wright to Mercer, Nov. 14, 1829, Ltrs. Recd., C & O Co.

<sup>27</sup> Holdsworth and Isherwood to Board of Directors, Dec. 21, 1829, Ltrs. Recd., C & O Co.

<sup>28</sup> Ledger Book A, C & O Co.

<sup>29</sup> Assessment Book for Sections 19-38, C & O Co. Based on this estimate, the contractors received \$2,276.93 on March 10.

<sup>30</sup> *Proceedings of the President and Board of Directors*, B, p. 49.

situation of nearly all the lock contractors, I do not believe the others are in better situation than Holdsworth.

To protect the masonry contractors from financial ruin and to speed up the construction work, Wright proposed the following remedy:

The contractors shall be charged only 20 cents per bushel for cement, and if he will finish all his locks by the first of July and does the work well and faithfully, the cement shall not cost him anything.<sup>31</sup>

In an attempt to give Holdsworth and Isherwood short-term relief, the board, on April 7, ordered that \$500 be paid to them.<sup>32</sup>

On April 21 Chief Engineer Wright reported to the board on the progress of work on Aqueducts Nos. 1 and 2. Holdsworth and Isherwood had decided to transfer their contracts and accounts with the company to Holdsworth. The board referred this question back to Wright and Director Lenox for their evaluation. When these men commented favorably on the offer, the board, on May 5, granted leave to the contractors to transfer their contracts to Holdsworth. On May 19 Lenox informed the board that an agreement had been made with Holdsworth for the completion of Aqueduct No. 1 with "the condition that his locks should be completed at the existing contract prices."<sup>33</sup>

One week earlier (on May 12) an assessment of the work done on Aqueduct No. 1 had been made by company engineers:

1,621	supl. ft. of coping, cut and delivered @ \$.40	\$ 648.40
1,033	supl. ft. of cut stone, delivered @ \$.40	413.20
2,483	supl. ft. of sheeting, cut and delivered @ \$.70	1,738.10
92	feet, lineal, of skewbacks @ \$.60	55.20
4,365	supl. ft. of ashlar, quarried and delivered @ \$.25	1,091.25
2,571	supl. ft. of ashlar, quarried @ \$.15	385.65
311	perches of backing delivered @ \$.60	186.60
46	ringstones, cut and delivered @ \$4.50	207.00
	Coffer dams prepared	150.00
	Mortared masonry price not settled	3,038.00
		<u>\$7,913.40</u>
	deduct previous estimates	6,440.92
		<u><sup>34</sup>\$1,472.48</u>

<sup>31</sup> Wright to Mercer, Mar. 25, 1830, Ltrs. Recd., C & O Co. The contractors were being charged forty cents per bushel for cement at the time. Holdsworth and Isherwood had contracted for the construction of Locks Nos. 21, 23 and 24 in August 1828.

<sup>32</sup> *Proceedings of the President and Board of Directors*, B, p. 54.

<sup>33</sup> *Ibid.*, pp. 61, 68, 76. The new contract provided for the following price increases: Coping, cut and delivered, \$.05 per superficial foot; cut stone, delivered, \$.10 per superficial foot; sheeting, cut and delivered, \$.15 per superficial foot; ashlar, quarried and delivered, \$.05 per superficial foot; backing stone, delivered, \$.40 per perch.

<sup>34</sup> Assessment Book for Sections 19-38, C & O Co.

Clerk Ingle, on June 30, informed Holdsworth that the board had just decided that each contractor should boat his own water lime. Although the cement at Tuscarora was not to be used, there was a good supply at Shepherdstown. To protect the cement during transport, McFarland, the newly-appointed inspector of masonry, would sell him "at reasonable prices any number of bags and boat covers."<sup>35</sup>

On July 1 company engineers made another estimate of work done by Holdsworth on Aqueduct No. 1 since May 12:

1,621	supl. Ft. of coping cut and delivered @ \$.45	\$ 729.45
1,264	supl. Ft. of cut ashlar, delivered @ \$.50	632.00
2,974	supl. Ft. of sheeting, cut and delivered @ \$.85	2,527.90
92	feet, lineal of skewbacks @ \$.60	55.20
6,956	supl. Ft. of ashlar, quarried and delivered @ \$.30	2,080.88
100	supl. Ft. of sheeting, quarried and delivered @ \$.35	210.00
176	supl. Ft. of pilaster, cut and delivered @ \$.70	123.20
3,000	bushels of sand @ \$.15	450.00
680	perches of backing delivered @ \$1.00	680.00
	For coffer dams	350.00
868	perches of masonry as per previous estimates	<u>3,038.00</u>
		\$10,876.55
	deduct previous estimates	<u>7,913.40</u>
		<sup>36</sup> \$2,963.15

Resident Engineer Thomas F. Purcell, on October 29, warned Mercer "against the use of domestic hydraulic cement for the face work of any lock or aqueduct." From his observations on the Erie, Pennsylvania, and Chesapeake & Delaware canals, he had found that hydraulic cement "was incapable of resisting the effect of the friction of running water." Regarding this problem, he stated:

I feel assured from my observation that this property of yielding to the friction of running water is a defect in the nature of the material of which the cement is made. Its strength, the compactness it assumes when set deceives most persons & very naturally induces a great reliance on its use as a cement; nor do I want to advance a single objection to it as a cement purely. Simply as a bond between a mass [of] stone I know [of] nothing that is preferable; it becomes very hard, even under water, and its tenacity is very considerable; but if you expose it to the action of running water, depend upon it that it will yield and gradually decay.

Accordingly Purcell recommended that "the face of all the locks and that part of the Seneca Aqueduct which will be in contact with the water" be laid in Roman Cement.<sup>37</sup>

<sup>35</sup> Ingle to Holdsworth, June 30, 1830, Ltrs. Sent, C & O Co.

<sup>36</sup> Assessment Book for Sections 19-38, C & O Co.

<sup>37</sup> Purcell to Mercer, Oct. 29, 1830, Ltrs. Recd., C & O Co.

Work on Aqueduct No. 1 progressed at a steady pace during the fall. By December 1 masonry was being laid on the piers and wing walls and the centers for the arches were nearly done. The estimate made on December 1 for work done on the structure was as follows:

1,621	supl. Ft. of coping, cut and delivered @ \$.45	\$ 729.45
2,197	supl. Ft. of ashlar, cut and delivered @ \$.52	1,142.44
2,974	supl. Ft. of sheeting @ \$.85	2,527.90
174	supl. Ft. of skewbacks @ \$.60	104.40
6,003	supl. Ft. of ashlar, quarried and delivered @ \$.30	1,800.90
600	supl. Ft. of sheeting, quarried and delivered @ \$.35	210.00
176	supl. Ft. of pilaster, cut, quarried and delivered @ \$.70	123.20
680	perches of backing stone, delivered @ \$1.00	680.00
	For coffer dam 2 piers	906.00
868	perches of masonry as per previous estimates	3,038.00
240	perches of masonry in piers and wings @ \$1.75	420.00
	Centers $\frac{3}{4}$ done	900.00
		<hr/>
		\$12,582.29
	deduct previous estimates	10,876.55
		<hr/>
		<sup>38</sup> \$1,705.74

Resident Engineer Purcell, on March 10, 1831, informed the board that Holdsworth's contract for Aqueduct No. 1 did not include provisions for the construction of "the wings or necessary retaining walls." Purcell also complained that Holdsworth had been told by a previous project engineer that the wing walls should be "made of common dry work of rubble stone." If the aqueduct was to be finished in that manner, Purcell felt that it would resemble a man half dressed in finery and the other half [in] miserable rags." Regardless of the manner in which the board would have the wing walls built, he recommended that the contract be given to Holdsworth as "it would be very vexatious to him to have another contractor on the same work in so confined a place."<sup>39</sup>

Holdsworth, on March 21, wrote to the board explaining his need for money. Because he had some accounts in the hands of the engineers that were not ready for settlement, he asked the board for \$500 of the money retained from his contracts.<sup>40</sup>

The board, on April 1, authorized Purcell to contract for the construction of the wing walls of Aqueduct No. 1. The contract price was not to exceed two dollars per perch.<sup>41</sup>

Inspector of Masonry McFarland, on May 25, reported to the board concerning a stormy visit that he had recently made to the site of Aqueduct No. 1. Holdsworth had forbidden him to inspect the work and had insulted him with abusive language. Nevertheless, he had detected the following defects in the work:

<sup>38</sup> Assessment Book for Sections 19-38, C & O Co.

<sup>39</sup> Purcell to Board of Directors, Mar. 10, 1831, Ltrs. Recd., C & O Co.

<sup>40</sup> Holdsworth to Board of Directors, Mar. 21, 1831, Ltrs. Recd., C & O Co.

<sup>41</sup> *Proceedings of the President and Board of Directors*, B, p. 293.

The sheeting of the arches [is] laid nearly altogether without mortar, much of which is very deficient in beds, and as a substitute for mortar, the extrados of the sheeting are white washed with grout, with [the] pretension that the joints are perfectly fitted. On a strict examination, however, this proves to be false. After removing this polish of grout, I discovered many vacuums below, which did not contain a particle of either grout or mortar, and in the spandrel and wing walls, depths of from 3 to 4 feet of the walls are laid up perfectly dry and grouted on top, trusting to mere chance for it ever to reach the bottom.

In addition, all of the cement at the aqueduct, amounting to more than 1,000 bushels, was damaged and unfit for use. The sand Holdsworth was using contained "at least one part of loam to 2 of sand," a fraud that could not "fail of causing some accident to this work when the water is let into the canal."

The only part of Holdsworth's work that had been tested with water was the Seneca Guard Lock. This structure was already plagued by leaks, which the contractor attributed to the work "being laid in mortar instead of grout," as ordered by former Inspector Leckie. In commenting on these leaks and the lame excuses of the contractor, McFarland feared "that perfection will not be attained where whitewash offers such a faint apology for grout."<sup>42</sup>

In June Lieutenant Colonels John J. Abert and James Kearney of the U. S. Topographical Corps made a survey of the canal from Georgetown to Seneca "by order of the President of the United States, at the request of the president and directors" of the canal company. These engineers reported favorably in detail on the type of construction actually done on the waterway and upon its existing condition. Regarding Aqueduct No. 1, they observed:

Over this river [Seneca] an aqueduct is constructing. The abutments and piers, which rest upon a rock foundation, are completed, the centering is up, and the arches are partly turned. The masonry is to be entirely of red sandstone of Seneca.

The length of the aqueduct, from the face of one abutment to the face of the other, is one hundred and fourteen feet. It will consist of two piers and three arches. The span of each arch is thirty-three feet, and the thickness of each pier seven feet. The sheeting as well as the ringstone, are to be cut to the proper angle, and the whole of the arch work is to be laid in cement, and grouted carefully over the extrados. The front or facing ranges of the piers and abutments are laid in cement or hydraulic mortar, and the interior of the masonry carefully grouted with cement at every range. No stretcher is admitted with a bed less than its face, and no face is less than a foot wide, and the length of each stretcher must not be less than four feet. No header is admitted that does not extend into the masonry at least four feet, and with a face one foot high and two feet long. The spandrels are to be built up with rubble stone, and grouted with cement at every range.

The stone, before being used, are subjected to a rigid inspection, and if an improper piece finds its way into the work, it is ordered out as soon as discovered.

The masonry of the lower abutment of the aqueduct is connected with a lift-lock, and the width of the canal over the aqueduct is the same as that of the lock chamber. This lock, No. 25 [24], was also in progress.

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<sup>42</sup> McFarland to Ingle, May 25, 1831, Ltrs. Recd., C & O Co.

We believe that this structure will be both beautiful and enduring, and that it presents the best method of passing the stream, even if its water should hereafter be wanted to feed the level between the aqueduct and lock 26 [25].<sup>43</sup>

On September 23 the board directed Resident Engineers Purcell and Cruger to "report drawings and specifications for the iron railing necessary for Aqueducts No. 1 and 2."<sup>44</sup>

On October 21 the board ordered that \$1,000 be paid to Holdsworth's account for Aqueduct No. 1 and his locks.<sup>45</sup>

McFarland, on November 17, reported to the board that the masonry on Aqueduct No. 1 would soon be completed. Although the necessary cramping and railing would require some time, this work could be done during the winter.<sup>46</sup>

The board, on December 2, ordered that \$1,000 be paid to Holdsworth "provided that the engineers shall certify, that the sum may safely be paid, including any balance, now to the Credit of Holdsworth." After Purcell approved this order, the payment was made.<sup>47</sup>

On December 24, Resident Engineers Purcell and Cruger reported drawings and cost estimates for the railings on Aqueduct Nos. 1 and 2. A plan calling for stone posts and chains was approved for Aqueduct No. 2, while the plan adopted for the railing of Aqueduct No. 1 called for wrought iron. The board ordered Clerk Ingle to advertise for contract proposals with the stipulation that the railing and chains be placed only on the towpath side of the aqueducts.<sup>48</sup>

Contractor Holdsworth, on December 27, requested clarification from Clerk Ingle about the contract for the wing walls of Aqueduct No. 1. According to rumors he had heard, President Mercer had let the contract for the wing walls to a Mr. Williams, but Williams had told a number of men along the line of the canal that he did not intend to build them.<sup>49</sup>

Based on his observations of the construction of Aqueducts Nos. 1 and 2, McFarland recommended on January 21, 1832, the following modifications to the general specifications for aqueducts:

Backing stones for piers of cut-masonry, when paid for as such, should be squared or well-scabbled to form close joints, and of equal thickness with the front courses, so as to admit of

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<sup>43</sup> *Report of Col. John J. Abert and Col. James Kearney of the United States Topographical Engineers, upon an Examination of the Chesapeake and Ohio Canal from Washington City to "Point of Rocks"* (Washington, 1831), reprinted in U. S. Congress, House, Committee on Roads and Canals, *Chesapeake and Ohio Canal: Report to Accompany H. R. 94*, 23<sup>rd</sup> Congress, 1<sup>st</sup> Session, 17 April 1834, H. Report. 414, pp. 98-99.

<sup>44</sup> *Proceedings of the President and Board of Directors*, C, p. 7.

<sup>45</sup> *Ibid.*, p. 19.

<sup>46</sup> McFarland to Board of Directors, Nov. 17, 1831, Ltrs. Recd., C & O Co. A cramp is a metal bar whose ends are bent in a right angle for holding together blocks of stone.

<sup>47</sup> *Proceedings of the President and Board of Directors*, C, p. 36.

<sup>48</sup> *Ibid.*, pp. 43-44. A thorough search of the C & O Canal Company records failed to turn up any details of this plan.

<sup>49</sup> Holdsworth to Ingle, Dec. 27, 1831, Ltrs. Recd., C & O Co. The contract for the wing walls was finally let to Obediah Gordon. Available evidence does not indicate the date or terms of the contract.

no small rubbish for filling in, and the headers or bond stones in work of this character should be perfectly parallel in their beds so as to hold the same thickness in rear as in front.

The sheeting of arches where cut and paid for as such, should be well scabbled at the ends so as to fill the square the whole width of the stone from the soffit to the extrados.<sup>50</sup>

Holdsworth, on January 31, informed Clerk Ingle that he had recently "laid a considerable quantity of coping." Although he was interested in bidding for the contract for Aqueduct No. 3 over Catoctin Creek the following day, he had been unable to prepare a proposal due to his work on Aqueduct No. 1 and his declining health. If the board mentioned his name, he wanted Ingle to inform them why he was not able to come to Washington.<sup>51</sup>

On March 31 a contract was let to Gideon Davis for the railing on Aqueduct No. 1 and for the chain "to be used as a railing on Aqueduct No. 2 substituting 2 chains of ½ inch iron for 3 chains of smaller iron, as [was] heretofore adopted."<sup>52</sup>

Two days earlier Holdsworth had sent a letter to the board requesting a final estimate on Aqueduct No. 1, which would be finished within a week. Because McFarland had been ordered by Purcell some days before to make the final measurement, Holdsworth was disturbed because the assessment had been delayed.<sup>53</sup>

McFarland, on March 31, complained to the board that he was unable to go to Seneca to make a final estimate on Aqueduct No. 1 because of his other duties. Thirteen culverts, two locks, and the Monocacy Aqueduct were under construction along the line of canal between Seneca and Point of Rocks and required his supervision. Because it would take at least three days to fully measure Aqueduct No. 1, he felt that it would be unwise to be absent from the line under his charge for that length of time, especially because he had not had an assistant for five weeks.<sup>54</sup>

At the board meeting on April 28 a final estimate was presented for Aqueduct No. 1, amounting to \$22,784.09. Along with the estimate, the engineers recommended a deduction of \$2,170 for masonry that had been laid before the contract had been transferred from Holdsworth and Isherwood to Holdsworth alone. Despite the objections of Holdsworth that the deduction was not within the terms of the contract, the board approved the engineers' recommendation and passed the estimate at \$20,614.09. Because Director Lenox had made the second contract with Holdsworth, the board referred the question of the deduction to him.<sup>55</sup>

Lenox, on May 15, reported to the board that he had agreed to allow Holdsworth the entire amount of \$2,170. In turn, the contractor had agreed to abandon further claims for bailing

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<sup>50</sup> McFarland to Ingle, Jan. 21, 1832, Ltrs. Recd., C & O Co.

<sup>51</sup> Holdsworth to Ingle, Jan. 31, 1832, Ltrs. Recd., C & O Co.

<sup>52</sup> *Proceedings of the President and Board of Directors*, B, p. 118.

<sup>53</sup> Holdsworth to Board of Directors, Mar. 29, 1832, Ltrs. Recd., C & O Co.

<sup>54</sup> McFarland to Board of Directors, Mar. 31, 1832, Ltrs. Recd., C & O Co. On April 2 McFarland recommended to Clerk Ingle that the job of measuring Aqueduct No. 1 be given to the engineers who had taken the levels for its foundations. McFarland to Ingle, Apr. 2, 1832, Ltrs. Recd., C & O Co.

<sup>55</sup> *Proceedings of the President and Board of Directors*, C, pp. 129-30.

the pit of Lock No. 23. Accordingly, the board approved this final payment and ordered that Holdsworth's account for Aqueduct No. 1 be closed.<sup>56</sup>

One week later (on May 22), Obediah Gordon, the contractor for the wing walls of Aqueduct No. 1, complained to the board that he had received an incorrect final estimate for his work. The board referred the matter to Engineer James Mears for a report.<sup>57</sup>

On June 1 Mears notified the board that Gordon had lost the specifications for the wing walls before he commenced the work. Because Resident Engineer Purcell had been engaged on the line above Point of Rocks at that time, Mears had been unable to consult with him about the problem. However, Gordon had told him "of the manner [in] which they were to be constructed" according to what he remembered of the specifications. The plan that Gordon had sketched for him was as follows:

4 walls each 30 feet in length & the same thickness with those previously laid by the original contractor. 2 offsets 18 inches each were to be made in the back of each wall. They were to be carried up perpendicular at the outer extremities 5 feet high and sloped from thence to the top of the coping on the aqueduct.

Mears informed the directors that Gordon had commenced the wing walls at the west end of the aqueduct according to the specifications. However, when he realized that the walls would be too high for the embankment, he had directed Gordon "to commence the steps at or near the surface of the ground and continue them regularly to the coping on the aqueduct." Gordon had not begun these steps where he should have nor had he laid them as directed. Although he had ordered the contractor "to make but one offset in each of the western walls of 2 feet," Gordon had ignored these instructions. Because a 19-1/2-foot foundation for the southeastern wing had been laid previously, Mears had allowed Gordon to build upon it and directed him to construct the opposite wing in a similar manner. Again Gordon had disregarded his instructions by building both wings to a length of 25 feet. Despite warnings, Gordon had not used as much cement in the face of his work as was required.

Summing up his report, Mears stated that construction of the wing walls had "progressed as seemed best to promote the interest of the contractor without any regard to the durability or appearance of the work." After a time he had "desisted from giving any further orders concerning the work" and had referred the problem to Purcell.<sup>58</sup>

President Mercer, on June 11, wrote to Resident Engineer Purcell calling his attention to the poor condition of the "towpath and berm bank of the section comprehending the aqueduct reported to be finished." Accordingly, he instructed Purcell to have the banks trimmed and to have a level "run along the bottom of the section to see that it is true according to the contract." Although no lock drains had been opened on this section, he was certain they were "essential to the security both of the berm and towpath banks in several places."<sup>59</sup>

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<sup>56</sup> *Ibid.*, p. 138.

<sup>57</sup> *Ibid.*, p. 154.

<sup>58</sup> Mears to Ingle, June 1, 1832, Ltrs. Recd., C & O Co.

<sup>59</sup> Mercer to Purcell, June 11, 1832, Ltrs. Sent, C & O Co.

Purcell, on June 15, reported to the board on the subject of Contractor Gordon's complaint. His recommendation in favor of the contractor was accepted by the board, and the balance due Gordon for the wing walls was ordered to be paid.<sup>60</sup>

At the request of Contractor Gideon Davis for a monetary advance to purchase the lead necessary for putting up the iron railing on Aqueduct No. 1, the board, on November 3, advanced him \$130. On December 11 the board ordered that Davis be paid his final estimate for the railing. All told, Davis was paid \$482.91 for construction the railing on the aqueduct.<sup>61</sup>

The second official inspection of the canal was made by Captain William Gibbs McNeill, a U.S. Topographical Corps engineer, in June 1833. After surveying the route of the canal between Georgetown and Harpers Ferry during that month, he reported:

Of this portion every part of the work may be said to have been entirely completed to the "Point of Rocks," 48 miles from the basin at Georgetown, and, with very unimportant exceptions, (where the discovery of slight imperfections has already led to their repair,) exhibited all that faithfulness of execution which insures stability.

Concerning the Seneca Aqueduct, McNeill observed:

*Aqueduct No. 1*, across the Seneca river, built of the red sand stone of Seneca, (procured within half a mile of its site,) is 114 feet in length between its abutments, which, with its two piers, rest on a solid rock foundation. It consists of 3 arches of 55 feet span each, and cost \$22,784.<sup>62</sup>

On November 1 Resident Engineer Cruger reported to the board that the line of canal between Harpers Ferry and Seneca had been watered. There was "no leak or appearance of break" on this entire section, and the manner in which the canal held water was "a subject of admiration to all those who are witnessing it."<sup>63</sup>

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<sup>60</sup> *Proceedings of the President and Board of Directors, C, pp. 166, 169.*

<sup>61</sup> *Ibid.*, pp. 233, 254, 258. See also Ledger Book A, C & O Co.

<sup>62</sup> *Report of Captain Wm. G. McNeill on the Condition of the Chesapeake and Ohio Canal* (Boston, 1833), reprinted in *House Report 414*, p. 144.

<sup>63</sup> Cruger to Board of Directors, Nov. 1, 1833, Ltrs. Recd., C & O Co.

## V. CHAPTER 2: THE AQUEDUCT FROM 1835 TO 1971

Aqueduct No. 1 was giving good service in June 1835 when the board reported that the "masonry is admitted by all who have had the opportunity of judging, to be equal to any on similar works, either in this country or Europe."<sup>1</sup>

Engineer J. Y. Young, on January 4, 1837, notified the board of a breach in the embankment of Aqueduct No. 1.<sup>2</sup>

The Seneca Aqueduct was still providing good service in June 1853 when Thomas L. Patterson, engineer and general superintendent, reported that the "aqueducts are in good condition and require no repairs."<sup>3</sup>

General Superintendent A. K. Stake, on June 25, reported to the board "that directions had been given to the Supts. Of Divisions to have a cheap railing placed upon the inner edge of the coping of the several aqueducts." This work had been an improvement "both in appearance and security to the passing teams."<sup>4</sup>

Unlike several of the company's "works of art," the Seneca Aqueduct suffered no damage during the Civil War. According to the board of directors in June 1866, the "masonry of the aqueducts, culverts and locks is both substantial and in good repair, the only exception requiring special remark being the aqueduct that spans the Conococheague River." During the late conflict that structure had been "wantonly and most seriously injured by rebel soldiers."<sup>5</sup>

In November 1869 the board traveled the entire line of the canal from Georgetown to Cumberland, and the following June they reported to the stockholders:

The masonry, we regret to say was mostly in very bad condition, caused principally by keeping the water in the canal, late in the season, after the freezing weather had commenced. The ice thus forming in the cracks of the works, expands and breaks the bonds of the cement, leaving the structure more like a pile of loose stone than a duct for conveying water; besides, when the ice is permitted to form on the surface of the water in the aqueducts, the expansion pushes out the wall on the berm side, which is only five feet in thickness, and therefore more liable to yield than the towing path side, which is from seven to eight feet thick.<sup>6</sup>

On August 14, 1872, Chief Engineer William R. Hutton issued a report on the condition of the canal. Regarding Aqueduct No. 1, he observed:

The masonry of the spandrills on the berm side is very loose and pushed out, and there are several cracks in the arches, the largest being as usual under the berm parapet. The same remarks apply to [the] Monocacy Aqueduct, which is, however, built of better material. In both the greatest

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<sup>1</sup> *Seventh Annual Report* (1835), C & O Co., p. 4.

<sup>2</sup> *Proceedings of the President and Board of Directors*, F, p. 188. A thorough search of the C & O Canal Company records in Record Group 79 failed to turn up this letter.

<sup>3</sup> *Twenty-Fifth Annual Report* (1853), C & O Co., p. 9.

<sup>4</sup> *Proceedings of the President and Board of Directors*, I, p. 274.

<sup>5</sup> *Thirty-Eighth Annual Report* (1866), C & O Co., pp. 7-8.

<sup>6</sup> *Forty-Second Annual Report* (1870), C & O Co., pp. 5-6.

displacement of masonry is at the pilaster, where the spandril masonry is highest -- both of them leak very much, and both will last some years without great repair. It would, perhaps, be some economy to allow them to remain until the danger of their condition becomes more imminent.

I do not recommend that any expensive temporary work be resorted to. When anything is done the whole berm parapet and spandril ought to be taken down, and at least a foot in depth of the bottom of the water-way removed. It should then be rebuilt in the most solid manner, using rammed concrete wherever practicable, and filling up the bottom with concrete. The tow-path walls are in better condition - the masonry is at least, in place, and a good pointing or at most the resetting of the inner face, will be sufficient. The work should not be hurried. Seneca Aqueduct could be completed in one season. . . .<sup>7</sup>

Superintendent D. S. Lakin reported to President Gorman on January 24, 1873, that Aqueduct No. 1 had "bulged more than before the water was taken out." Because the structure looked unsafe he would soon submit a plan to the board for making the necessary repairs.<sup>8</sup>

In March Superintendent J. R. Maus and Engineer Brannon inspected Aqueduct No. 1 at the request of the board. They informed President Gorman on March 26 that the aqueduct was "in a fearful state and such a terrible condition that it is liable to go out at any time." The structure was "nine inches out of plumb," and the arch was "supported only by the inside lining which is calculated to give way at any moment." Water was running through the aqueduct "in streams at divers places," a problem that "should be attended to at once."

From their examination of Aqueduct No. 1, Maus and Brannon concluded that they could make the structure stand up for the boating season "by building cribs and shoring it up." However, extensive repairs would be needed the following winter.<sup>9</sup>

One of the measures considered by the board to help shore up Aqueduct No. 1 for the summer boating season was a new temporary wooden trunk. On April 5, Engineer Patterson notified Gorman that he had "given the bill of timber for the trunk at Seneca Aq. to Messrs. Weld and Sheridan who will deliver it on cars at Fairhope on the Connelsville road for \$20 per thousand." If the timber would not be required for the aqueduct, it would be useful for other purposes.<sup>10</sup>

On May 31, 1873, Engineer Patterson reported to the stockholders that:

Most of the aqueducts have been leaking more or less for years past; the consequence of which, owing to the freezing of water in the interior of the walls, and spandrils. This injury is so great, in the cases of the Seneca and Tonoloway Aqueducts, that it will be necessary to take down and rebuild a portion of the berm side of these structures. But for the extreme cold weather, this work would have been prosecuted during last winter by pitting in a trunk at Tonoloway, which would render it feasible to take down and rebuild so much of its berm parapet spandrils and arch, as might be necessary, without interfering with the navigation. This can be done in the case of

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<sup>7</sup> *Report of W. R. Hutton, Chief Engineer, As to Condition of Chesapeake and Ohio Canal, With Estimate of Cost of Extraordinary Repairs Required During the Current Year, August 14<sup>th</sup>, 1872* (Annapolis, 1872), p. 16

<sup>8</sup> Lakin to Gorman, Jan. 21 and 24, 1873, Ltrs. Recd., C & O Co.

<sup>9</sup> Maus to Gorman, Mar. 26, 1873, Ltrs. Recd., C & O Co.

<sup>10</sup> Patterson to Gorman, Apr. 5, 1873, Ltrs. Recd., C & O Co.

Tonoloway Aqueduct on account of the width of its water-way; but that of Seneca Aqueduct is so narrow, that the work will have to be done during the suspension of navigation in winter. Means have been used to strengthen these aqueducts, and I am confident that no apprehension need be felt of a failure of either of them; but timber and other materials for the construction of trunks, in case of emergency, have been delivered at points convenient to each work.<sup>11</sup>

During the winter of 1873-74 the necessary repairs were made to Aqueduct No. 1. In late November 450 barrels of cement at \$1.85 per barrel were delivered to Seneca for this purpose by Bridges and Henderson, the owners of the Round Top Hydraulic Cement Company at Hancock.<sup>12</sup>

Superintendent Lakin, on January 10, 1874, reported to Gorman that the workers at Seneca "will have the berm side of [the] aqueduct down to [the] water table this evening." Although the work was progressing as well as could be expected, the late rains had interrupted the work. Unless the water fell quickly, they would be delayed in putting in the centers. At the lowest stages of the river that winter there had been "two feet of water on the first offset on the abutments upon which we must rest centers." The previous day water had entered the canal at the Seneca Outlet Lock and had come within one foot of overflowing the entire waterway. To solve the recurring problem of high water, he urged the board to have a waste weir built on the canal between Locks Nos. 23 and 24 and one at the head of the "nine-mile-level."<sup>13</sup>

On February 16 Lakin informed Gorman that "the Seneca Aqueduct will be completed in five or six days." The line of canal under his charge would be ready for watering by February 25. Although the winter repairs had cost the canal heavily, Lakin stated that his Division was in better condition than it had been for many years.<sup>14</sup>

In the great flood that swept through the Potomac Valley in 1889, Aqueduct No. 1 was left relatively secure. However, a break "68 x 14 x 35 ft." occurred above the aqueduct washing out some 1,250 cubic yards of material. Figuring \$.40 per cubic yard, the total cost for repairing this washout was estimated at \$500 by company engineers. Just above this breach, 800 cubic yards of material were washed from the towpath and berm banks.<sup>15</sup>

The flood in 1889 left the canal a wreck and forced the canal company to go into receivership, with the Baltimore and Ohio Railroad emerging as the majority owner of the canal company bonds. Under the railroad's management, trustees were appointed and the canal entered its last period of operation. In 1924, after the railroad had captured almost all of its carrying trade, the Chesapeake and Ohio Canal ceased to operate. While documentary data dealing with maintenance and reconstruction problems in the C & O Company records for the period 1850 - 89 is sketchy, there is virtually *no* information dealing with these subjects for the years 1889 - 1924.

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<sup>11</sup> *Forty-Fifth Annual Report* (1873), C & O Co., pp. 28-29.

<sup>12</sup> Bridges and Henderson to Lakin, Nov. 26 and Dec. 1, 1873, and Bridges and Henderson to Gorman, Nov. 29, 1873, Ltrs. Recd., C & O Co.

<sup>13</sup> Lakin to Gorman, Jan. 10, 1874, Ltrs. Recd., C & O Co.

<sup>14</sup> Lakin to Gorman, Feb. 16, 1874, Ltrs. Recd., C & O Co.

<sup>15</sup> Gambrill to Board of Public Works, May 13, 1890, Ltrs. Sent, C & O Co.

In 1950 an engineer who visited the site of Aqueduct No. 1 observed:

*Seneca Creek Aqueduct.* -- This is a three-span stone-arch aqueduct with total length of about 130 feet. The structure is in generally good condition except for longitudinal cracks in the arch barrel. These cracks could probably be grouted. . . .Some resetting of the facial stones in the spandrels is also necessary, particularly in the upstream spandrel which looks as if it had been rebuilt since the original construction.<sup>16</sup>

Heavy rain on September 11, 1971, raised the level of Seneca Creek about eight feet above the backwater of the Potomac River. The creek became a raging torrent, and houses, boats, trees, and debris were torn loose upstream and thrown against the east and middle arches of the aqueduct. As a result, the west arch took the brunt of heavy objects battering the bridge structure and collapsed. The entire arch was destroyed, leaving only five upper courses of stone in the upstream flume wall. Following the storm, the National Park Service took steps to stabilize the aqueduct and thereby prevent further deterioration of its structure.<sup>17</sup>

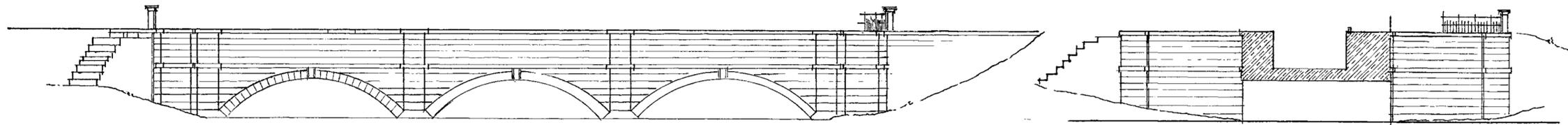
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<sup>16</sup> U. S., Congress, House, Committee on Public Lands, *Chesapeake and Ohio Canal Report*, 81<sup>st</sup> Congress, 2<sup>nd</sup> Session, 1950, H. Doc. 687, p. 70.

<sup>17</sup> Thomas F. Hahn, *Towpath Guide to the C & O Canal (Section One)* (Washington, 1974).

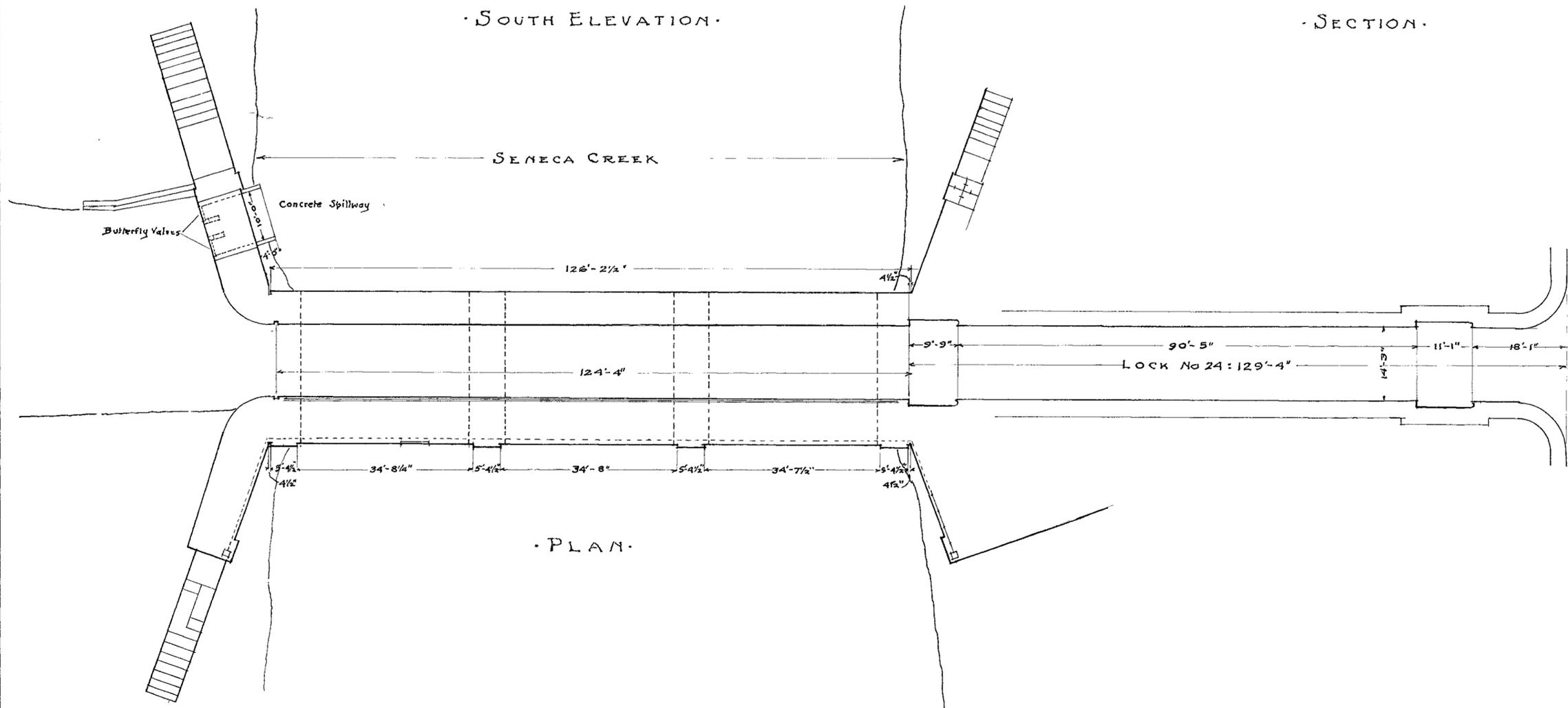
Attached are the files for subject report and one file for our FY 2007 transcription hours. In the file for the subject report, the Illustrations are provided as files labeled Plate I through V, i.e. they are **not** also included in the report. As I recall that is the way you wanted the file. Also I am forwarding Drawing No. 1 and 2, which are from HABS, but not mentioned in the HSR, so they are gratis. If you do not want them just use the delete key. I note the Table of Contents could be revised with the pagination. Oh yes, Plates VI and VII are in Park archives I expect and so are not included herein. I hope Sam will let you scan them to complete this HSR.

William Bauman, Transcriber  
November 2006



· SOUTH ELEVATION ·

· SECTION ·



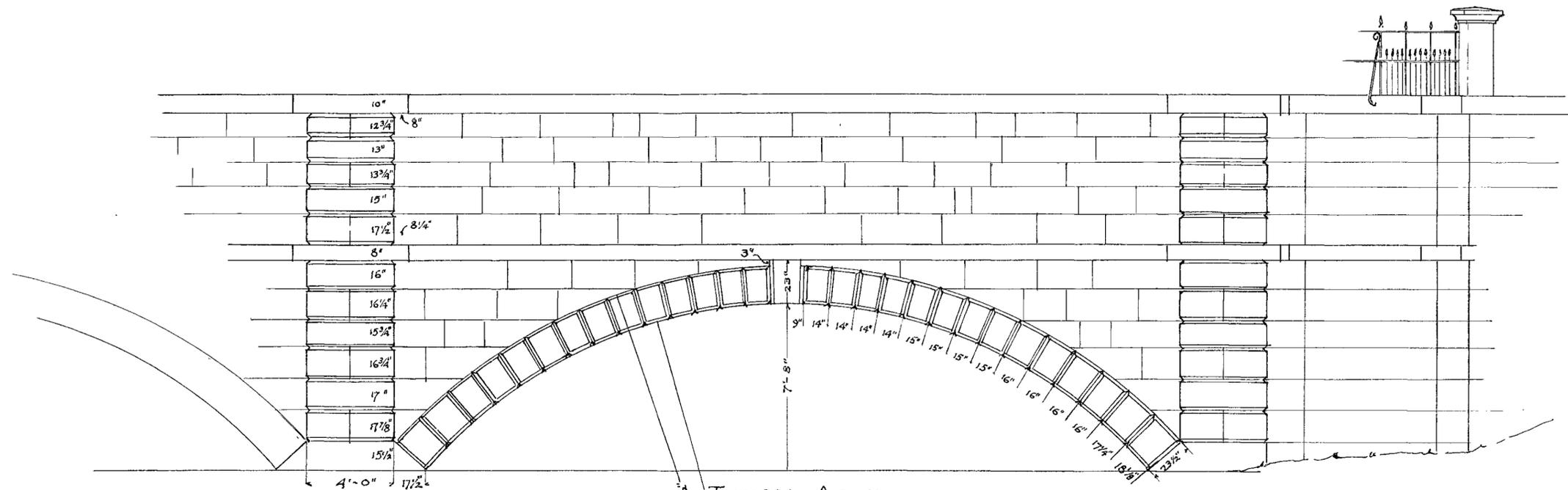
· PLAN ·

Guttensen & McGrew, Measured, 6<sup>th</sup> July, 1939.  
 McGrew, Del., 12<sup>th</sup> July, 1939.

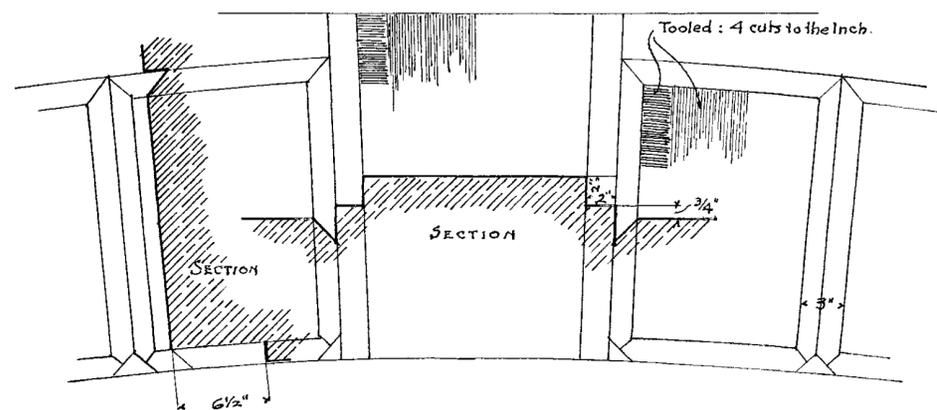
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UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE, BRANCH OF PLANS AND DESIGN	NAME OF STRUCTURE <b>· SENECA AQUEDUCT ·</b> · CHEESAPEAKE AND OHIO CANAL · · MONTGOMERY COUNTY · MARYLAND ·	SURVEY NO. <b>MD-57</b>	HISTORIC AMERICAN BUILDINGS SURVEY SHEET 6 OF 10 SHEETS	LIBRARY OF CONGRESS INDEX NUMBER MD-57 16-30
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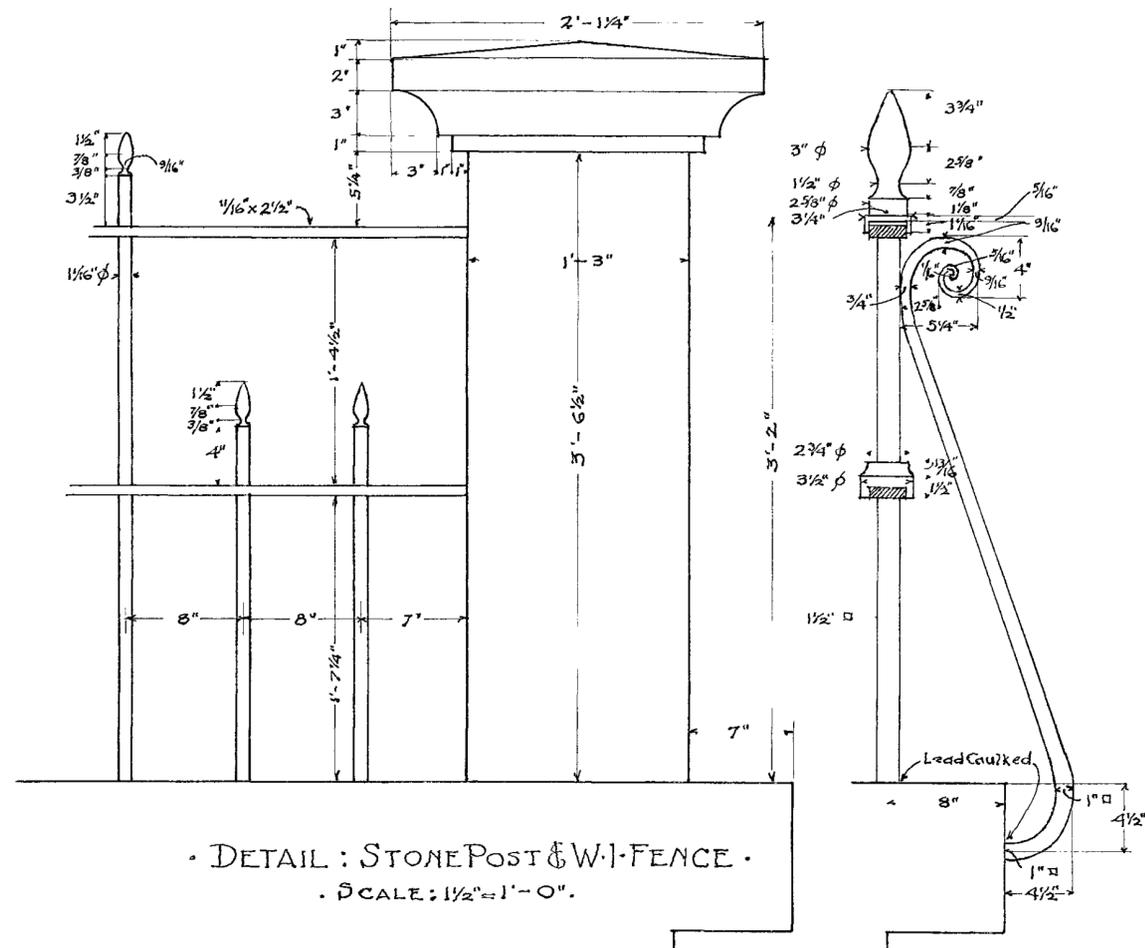
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TYPICAL ARCH  
SCALE: 1/4" = 1'-0"



DETAIL: KEYSTONE & VOUSSOIR.  
SCALE: 1/2" = 1'-0"



DETAIL: STONE POST & W.I. FENCE.  
SCALE: 1/2" = 1'-0"

SCALE: 1/2" = 1'-0" 2 Feet. 0 1 2 3 4 5 6 7 8 9 10 11 12 Inches.

SCALE: METRIC 10 9 8 7 6 5 4 3 2 1 0 6 1/2 Inches.

Gullersen & McGrew: Measured, 6th July, 1939.  
McGrew, Del., 12th July, 1939.

MD. 16 - — , 30-1

HABS



MD. 16 - — , 30-2

HABS

