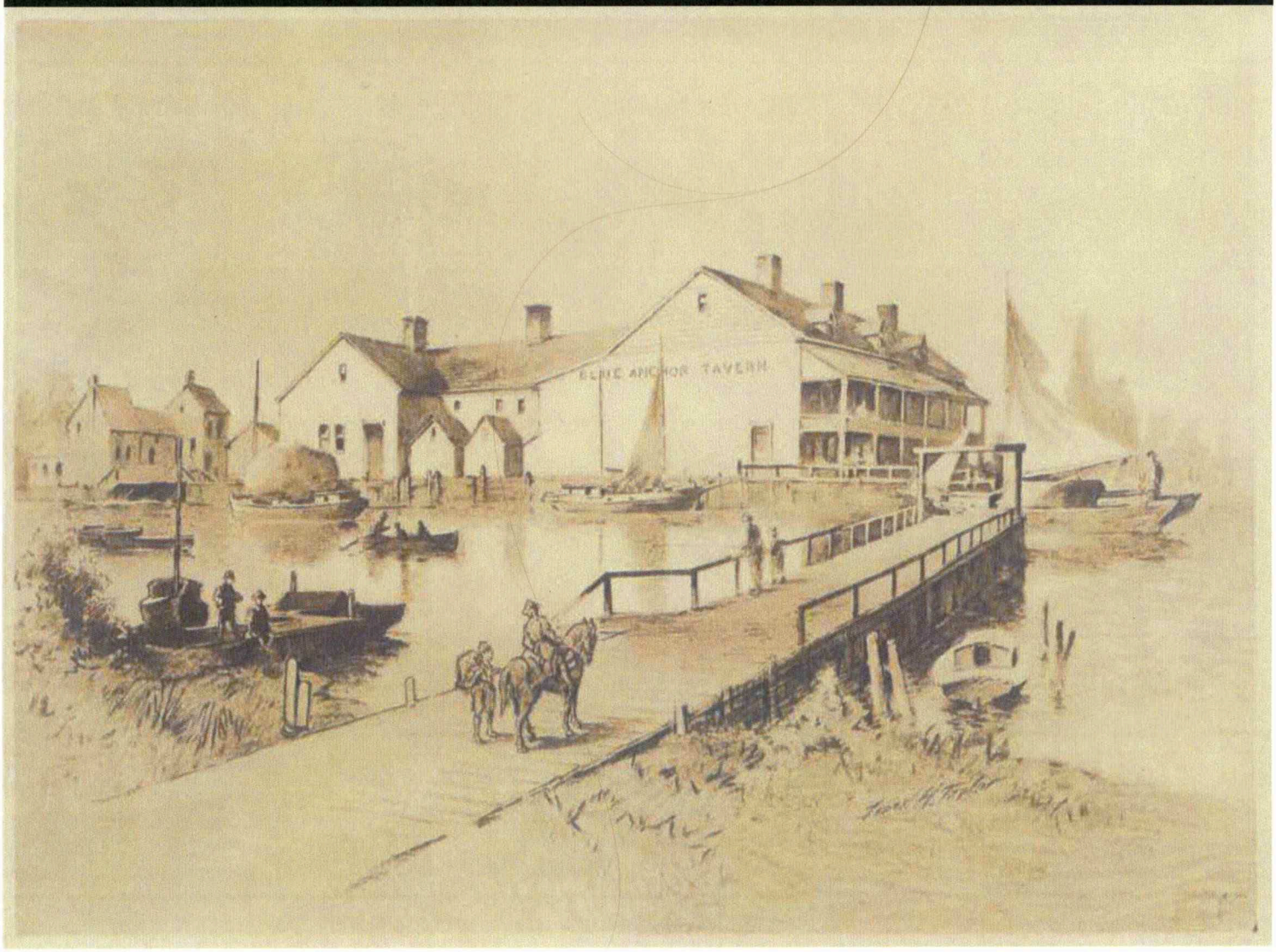
Independence

National Park Service
U.S. Department of the Interior

Independence National Historical Park
Philadelphia, Pennsylvania



SCENIC STREAM TO CITY SEWER: DOCK CREEK FROM 1682 TO 1849

A report compiled by Bill Double for the Division of Cultural Resource Management of Independence National Historical Park

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On the Cover:

The Blue Anchor Tavern and Dock Creek

Drawing by Frank H. Taylor, c.1922

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CONTENTS

DOCK CREEK HISTORY

Page

1. An Inviting Inlet on the Delaware

5. Bridging the Creek

7. Navigating the Scenic Stream

9. Nuisance Industries Proliferate

13. Citizens Petition for Relief

16. Pollution and Disease

19. Other Environmental Ills

21. The Cover-Up Begins

26. Public Sewer

28. Conclusions

CHRONOLOGY

FIGURES

TABLES

BIBLIOGRAPHY

An Inviting Inlet on the Delaware

When Europeans began arriving in the 17th century, the topography of Philadelphia differed notably from the flat, streamless central city of today. Early maps and accounts of the city reveal a more hilly and marshy terrain watered by numerous runs and creeks flowing east and west from a central high ground toward the Delaware and Schuylkill Rivers[1] (Figures 2, 3 and 4). Most of the streams have long since been covered, the marshes filled and the hills leveled to accommodate the city's development.

One creek, in particular, figured significantly in the early history of Philadelphia. It is marked today by a Park Service wayside plaque (Figure 5) and a grassy depression at Hudson's Alley between Third Street and Fourth Streets south of Carpenters' Hall. Here two streams converged to form the main body of Dock Creek (Figure 6). One branch rose near 10th and Spruce Streets and flowed east, forming a pond on the west side of Washington Square before crossing it diagonally. The other tributary ran southeast from a pond near Fourth and Market Streets.[2] From their juncture, the main body of Dock Creek flowed southeast, following the route of the present Dock Street toward the Delaware

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[1] Gary B. Nash, "City Planning and Political Tension in the Seventeenth Century: The Case of Philadelphia," *Proceedings of the American Philosophical Society*, February 1968, 60; "Philadelphia's Historic Streams," Philadelphia Water Department at PhillyH2O.org.

[2] These tributaries were referred to as the northern and southern branches of Dock Creek. See Benjamin Kite's "Recollections of Philadelphia Nearly Seventy Years Ago" *Pennsylvania Magazine of History and Biography*, July 1895. Another tributary, which joined the main flow east of Second Street north of Spruce Street was called "Little Dock Creek."

River. After merging with Little Dock Creek east of Second Street, the widened stream continued eastward to form a cove at the river bank below Front Street, just north of Spruce (Figure 7). The north side of the cove consisted of a low sandy beach, while on its south side the stream fed a tidal marsh, known at the time as the "swamp,"[3] which was contained by the rise of Society Hill south of Spruce Street[4] (Figure 8). The marshy wetland covered a substantial area of the early city. It extended north from the creek to another ridge running east to west north of Chestnut Street and irregularly to the northwest as far as Sixth Street and to the southwest as far west as Eighth Street.[5]

Thomas Holme's "Portraiture of Philadelphia," published in London in 1683, depicts Dock Creek entering the Delaware River south of Spruce Street (Figure 9), whereas later maps show the creek's mouth north of Spruce Street. Holme's widely reprinted work was a commercial document intended to help William Penn sell real estate, rather than an accurately surveyed map. The plan was later revised to reflect land surveys which revealed the city's actual topography and the extent of its wetlands.[6]

Native Americans, who navigated the creek by canoe, called it "Coocanocon" (place of pines). [7] By offering a break in the steep bank of the Delaware River, the inlet formed by the tidal creek provided a convenient

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[3] John F. Watson, *Annals of Philadelphia and Pennsylvania in the Olden Time*, Leary, Stuart & Co., Philadelphia, 1909, Vol.1, 336.

[4] J. Thomas Scharf and Thompson Westcott, *History of Philadelphia, 1609-1884*, L.H. Everts & Co., Philadelphia, 1884, Vol.3,2148.

[5] Barbara Liggett, *Report on the Study of the Dock: Results of Archaeological Excavation*, 1975, draft manuscript on deposit at the Library of the American Philosophical Society, 12. Liggett's estimates of the extent of the swamp are based on a review of land records and city ordinances regulating the depth of privy pits, 12, 21-22. Liggett asserts that an actual Dock Creek never existed as a natural feature except in the eyes of John Fanning Watson, 82. She maintains that "the Dock was a man-made feature" consisting of cuts made through the broad marsh between Front Street and Third Street, 83.

[6] Hannah Benner Roach, "The Planting of Philadelphia, A Seventeenth Century Real Estate Development (part two)," *Pennsylvania Magazine of History and Biography*, April, 1968,151, 156. Also, see Liggett who contends, based on property records, that the city's street grid was shifted to place the High Street (Market Street) on higher and drier ground, 14.

[7] Scharf and Westcott, Vol.1, 8.

anchorage for the shallow-draft sloops of European settlers. William Penn landed at the "low and sandy beach" on the north side of the inlet in 1682, after traveling upstream from Chester in an open boat[8] (Figure 10). The Dutch, Swedes and others who preceded Penn had already begun to establish businesses at the site. The Blue Anchor Tavern stood in the middle of Front Street near the north side of the inlet when Penn arrived[9] (Figure 11). Soon a bake house and others enterprises would cluster near the inlet to form the city's first commercial center.[10] Seafarers mingled with locals at public houses near the creek.[11]

Efforts to improve the Dock Creek inlet as a harbor began in 1688. Thomas Budd proposed to the city to construct a wharf and make a 50-foot-wide channel for vessels. He further proposed to create a 30-foot wide street on each side of the creek extending from the river to Third Street.[12] These twin Dock Streets, were the first diagonals in the city's rectangular street grid (Figure 12). As compensation for his expenses, Budd requested a patent for a lot running 118 feet on the west side of Front Street, just north of the inlet. His request was granted by the Proprietor. Budd erected five two-story houses on the lot that became known as "Budd's Row."[13]

These early developments involving the city and the Proprietor (William Penn) presaged the continuing involvement of the provincial and municipal governments in matters affecting Dock Creek. Penn's 1701 Charter of Privileges

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[8] Watson, Vol.1,130

[9] Thomas Allen Glenn, "The Blue Anchor Tavern," *Pennsylvania Magazine of History and Biography*, vol. xx, no. 4, 1896.

[10] Ellis Paxon Oberholtzer, *Philadelphia; A History of the City and Its People, A Record of 225 Years*, J.S. Clarke, Philadelphia, 1912, 17

[11] William Perrine, "The Return of William Penn," *Lippincott's Monthly Magazine*, December, 1899, 930.

[12] Independence National Historical Park, Note Card File, Dock Street 1688-1850, cites a Nov. 30, 1855 account by J. Godley on the history of Dock Creek. Also Joseph Jackson, *Encyclopedia of Philadelphia, Vol. II*, National Historical Association, Harrisburg PA, 1931, notes that the creek was dug out to form a dock soon after 1691, 600. Early maps of the city such as that of Matthew Clarkson and Mary Biddle, 1762, show a divided Dock Street separated by the creek.

[13] Ibid, Note Card File.

created a unicameral government for Pennsylvania that enabled an elected Provincial Assembly to legislate, levy taxes and exercise broad powers over municipalities. In the same year, Penn's Charter of the City of Philadelphia established a corporation to govern the city. It consisted of the Mayor, Recorder, Aldermen and Common Council. The corporation (titled the "Mayor and Commonality of Philadelphia") was a self-perpetuating body whose members were not popularly elected.[14] Moreover, its ability to govern was constrained by the charter, which provided no power to levy taxes, and by the Provincial Assembly's proximity and authority to regulate cities of the province. [15] This dominance was accentuated by the Assembly's predilection for appointing "commissioners" to implement laws affecting Philadelphia, rather than delegating this responsibility to city government.[16]

A controversy emerged in 1691 concerning public access to the Dock Creek landing.[17] Despite the general expectation that the landing would be preserved as public property, its value for private development was soon recognized. In fact, in 1691 the agents of the Proprietor were prepared to sell the property.[18] Jeremiah Elfreth and others attempted to build on the beach in that year but were dissuaded by local authorities after remonstrances by several citizens, according to Scharf and Westcott.[19] The matter was resolved when

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[14] William Penn, Charter of the City of Philadelphia, 1701. The original members of the corporation are named in the charter and granted the right of "perpetual succession." The members are authorized to meet annually to select one of the aldermen to be mayor for the ensuing year. The charter further empowers the mayor, aldermen and council members to appoint additional freemen of the city as aldermen and council members.

[15] Judith M. Diamondstone, "Philadelphia's Municipal Corporation, 1701-1776," *Pennsylvania Magazine of History and Biography*, April 1966, 183. This article describes the corporation and discusses its difficulties. See also Carl Bridenbaugh, *Cities in the Wilderness*, Ronald Press, 1938, who notes that "lack of adequate powers of taxation" was a defect of William Penn's city charter of 1701,145.

[16] Diamondstone, 183.

[17] Watson presents an abstracted version of a petition signed by 32 inhabitants of the city imploring the Governor and Council to maintain a free public landing along Front Street in front of Budd's Row. The petitioners were responding to information that certain persons, after obtaining a grant from the commissioners, had encroached on "a part of that public flat sandy beach," Watson vol.1, 36.

[18] Scharf and Westcott, vol. 3, 2148

[19] Ibid.

William Penn acceded to a request by the Pennsylvania Assembly and designated the inlet a public landing place in his 1701 Charter of the City of Philadelphia:

> *And I do also ordain that the Landing places now & Heretofore used at the penny pot house & Blew anchor & saving to all persons their just & Legall Rights & property in the Land so to be left open as also the Swamp Between Budds Buildings and the Society Hill shall be Left open & common for the Use & Service of the said City and all others with Liberty to Digg Docks & make Habours for Shipps & Vessels in all or any part of the said Swamp.*[20]

Bridging the Creek

Initially, a small ferry transported passengers across the inlet from a landing near the Blue Anchor Tavern to the swampy area on the other side that would be occupied by the Society of Free Traders.[21] The ferry was supplanted about 1682 by a wooden drawbridge (Figure 13).[22] The precise date of its completion is unclear. Bronner states that a drawbridge was built in 1700 to carry Front Street across Dock Creek.[23] Thomas Holme's "Portraiture of Philadelphia," published in 1683, shows a bridge crossing Dock Creek at Front Street (Figure 9).

The wooden drawbridge was frequently out of repair as was the causeway south of the bridge. For example, a grand jury in 1704 found the bridge "insufficient and dangerous to man and beast." Two years later, another grand jury observed the bridge had been washed away by a storm and recommended that it be rebuilt.[24] The area south of the bridge remained largely inaccessible

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[20] William Penn, *Charter of the City of Philadelphia*, 1701.
[21] Watson, 132; Jackson, 600; Perrine, 931; Liggett disputes accounts of a ferry. She states that no contemporary evidence of a ferry exists and that the earliest reference to crossing the swamp at Front Street is to a foot path, 84.
[22] Scharf and Westcott, vol. 3, 2148
[23] Edwin B. Bronner, "Village into Town, 1701-1746," 59, in Russell F. Weigley, editor, *Philadelphia, A 300 Year History*, W.W. Norton, New York, 1982, Bronner notes that the causeway was frequently washed out and rendered impassible.
[24] Scharf and Westcott, Vol.3, 2148.

until a causeway was constructed across the swamp, extending Front Street to the high ground of Society Hill. In March 1713, the city council appointed three aldermen to proceed "with expedition" to complete work on this causeway.[25] However, council minutes of August 10, 1716 note that the bridge over the Dock at the south end of Front Street had become very dangerous after the unfinished causeway was washed out. The Common Council asked the overseers of the reconstruction to speedily complete the work.[26] In November of 1722, the Council requested that those assigned to repair the bridge and causeway to Society Hill finish the work.[27] In 1737, the grand jury found the bridge over the Dock at Front Street "very much out of repair." A tax on inhabitants of the city was proposed to repair the bridge and streets.[28]

About 1763 the drawbridge was replaced by a stone bridge.[29] However, Common Council and other residents continued to refer to the Front Street "drawbridge" even after it had been replaced by a fixed span.[30]

Excavations during the construction of Interstate I-95 in 1968 revealed remnants of this early construction near where Dock Creek flowed into the Delaware River.[31] A stone pier was uncovered on the south side of Dock Street and the remains of a log road exposed running north about eight feet below the current level of Front Street (Figure 14). Footings of a stone bridge were uncovered 10 feet below current street level along Front Street on either side of

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[25] "Minutes of the Common Council of the City of Philadelphia 1704 – 1776" (hereinafter MCC), March 12, 1713.
[26] Ibid. August 10, 1716.
[27] Ibid. November 26, 1722.
[28] Ibid. August 8, 1737.
[29] MCC of October 18, 1763 indicate that the Commissioners of Philadelphia County had applied to the Council for a loan to finish the bridge over the Dock in Front Street, while those of April 10, 1764 refer to the "new stone bridge" in Front Street.
[30] *Excerpts from the journal of Elizabeth Drinker, from 1759-1807*, Vol. 4, Aug. 25, 1803, edited by Henry D. Biddle, J.B. Lippincott Co., 1889. Drinker speaks of the "draw-bridge" at the mouth of the creek, noting that "name had been continued although there has not been one there within my memory. " Also, see reference to the Draw-bridge in Common Council minutes of August 27, 1774.
[31] Liggett, 3, 4.

Dock Street, apparently the remains of a 1763 stone bridge. Immediately south of the pier, evidence of a causeway was exposed in the form of an intricate wood cribbing extending to just south of Spruce Street. A stratum of thick black muck found under both the causeway cribbing and the log road suggested the geology of a marsh bed or swamp.

Navigating the Scenic Stream

The extent and duration of navigability on Dock creek and its branches is open to question. The river's tidal surge swelled the creek as far as Chestnut Street, by some accounts, allowing sloops to navigate as far as Third Street.[32] Watson states that the creek was navigable as high as Girard's Bank (First Bank on Third near Chestnut Street) and that shallow-draft boats may have traveled beyond this point[33] (Figure 15). His sources suggest that a landing for wood and other products existed on the creek's northern branch at the corner of Fourth and High (Market) Street around 1740 [34] and that Little Dock Creek, which diverged to the southwest, was accessible to canoes and bateaux as far south as St. Peter's Church (Third and Pine Streets). [35] [36] A profile of Philadelphia written in 1824 reports: "...in Chestnut street opposite Carpenter's court was a wharf to which vessels came up on the creek on which Dock street now is In laying down the conduit pipes of iron in the summer 1820 the workmen dug down to this same wharf part of which they had to cut away in order to lay down the pipes The timber was of oak and in a good state of preservation."[37]

The construction of fixed bridges where the creek intersected the city's street grid may have curtailed marine traffic (Table 1). Construction of fixed

[32] Scharf and Westcott, Vol.3, 2147; Watson, Vol.1, 132.
[33] Watson, Vol.1, 132, 340.
[34] Ibid., 340.
[35] Ibid.,133
[36] Perrine, 931
[37] James Mease, *The Picture of Philadelphia for 1824*, Thomas Town, Philadelphia, 1823, 5.

spans began about 1683 when, Watson states, a rude bridge was constructed over the creek on Chestnut Street[38] (Figure16). This bridge has been described as the "Portal to the West" because Market Street had been impassable due to a pond on the branch of Dock Creek that flowed southeast from the vicinity of Fourth and Market Streets.[39]

In 1705, city council appointed a committee to oversee repairs to the drawbridge and another span over the creek at Second Street (south of Walnut).[40] In ensuing years, fixed bridges across the creek and its tributaries also were built on Walnut Street west of Second, Third Street north of Walnut, and Chestnut Street east of Fourth[41] (Figure 17). Common Council on August 9, 1717, appointed overseers for work to "two brick bridges," one in Second Street and the other in Walnut Street.[42] Council minutes of Dec 29, 1718 indicate that Samuel Powell had requested a discount in his stall rents for being "considerable out of pocket" in the building of a bridge over Dock Creek at Walnut Street.[43]

In June 1720, the council agreed to pay Edward Collins, mason, £125 to construct a bridge over Dock Creek at Second Street with the proviso that the work be completed by November. In response to a request from several residents living near the bridge, Common Council also appropriated an additional £35 to widen the proposed span to the width of Second Street.[44]

Lacking evidence that bridges across Dock Creek, other than at Front Street, were equipped with draws, Scharf and Westcott conclude that

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[38] Watson, Vol. 1, 371,372
[39] Grant Miles Simon, "Houses and Early Life in Philadelphia," *Transactions of the American Philosophical Society*, New Series, Vol. 43, No.1 (1953), 285.
[40] MCC, June 1,1705
[41] *Part of Old Philadelphia: A Map*, American Philosophical Society, 1952.
[42] MCC, August 9, 1717.
[43] Ibid. Dec. 29, 1718.
[44] Ibid, June 14, 1920.

construction of the fixed bridges closed the creek to most existing navigation. [45] Oberholtzer contends, however, that the fixed bridges were high enough to allow navigation.[46] Scharf and Westcott deem this unlikely because no record exists of the additional expenses required to build causeways or elevate streets to accommodate the high bridges. They also dismiss Watson's suggestion that ships struck their masts in order to sail under the bridges. [47]

Lured by the clean water, grassy soil and pleasant views, prosperous residents built homes along or near Dock Creek.[48] The lawn of one "great house" located on Second Street north of Spruce sloped toward the creek and provided a grazing place for a herd of "tranquil deer." Owned by Edward Shippen, a wealthy merchant and mayor of the city, the house was used as a residence by William Penn in 1699.[49] Figure 18 depicts Clarke's Hall, a grand residence built in1694 by lawyer William Clarke. It stood at Third and Chestnut Streets on a large tract bordered on one side by Dock Creek. In the lower right corner of the illustration, the Chestnut Street bridge spans the creek.

Nuisance Industries Proliferate

However, as the city continued to grow, this idyllic milieu began to change. Unconstrained by land use regulations, a variety of processing industries increasingly became attracted to the neighborhood. Dock Creek provided them with needed water and a convenient place to dispose of wastes. Archeological excavations near the creek area have uncovered evidence of these

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[45] Scharf and Westcott, Vol.3, 2147.
[46] Oberholtzer, 116. He cites a serialized "History of Chestnut Street" by Casper Souder Jr., which appeared in Thomas Westcott's *Sunday Dispatch* from August 1858 to October 1859. Souder states the bridge over Dock Creek at Chestnut Street, 15 or 20 feet above the bed of the stream, was high enough to allow navigation.
[47] Scharf and Westcott, Vol.3, 2147
[48] John J. Cotter, Daniel G. Roberts, Michael Parrington, *The Buried Past, An Archaeological History of Philadelphia*, University of Pennsylvania Press, Philadelphia, 1995, 234..
[49] Horace Mather Lippincott, *Early Philadelphia: its people, life and progress*, J.B. Lippincott Co., Philadelphia, 1917, 30.

industries, which included leather tanneries, slaughterhouses, breweries, distilleries.

For example, the basement of the John Wagner Building (c. 1836) on the north side of Dock Street just east of Third was excavated prior to its demolition in 1957. An area of sterile yellow clay underlain by water-rolled pebbles and cobblestones was found, suggesting the old channel of a watercourse. Twenty cattle horn-cores, most with part of the skull attached, also were found, probably remnants from slaughter houses, tanneries or other animal processing businesses located there prior to construction of the Wagner Building. A 1729 deed for the larger lot which included the Wagner property described buildings on the lot as a "bark mill, millhouse, currying shop, lyme house, beam house stable and tan vats."[50]

Further evidence of such 18th century businesses along the creek was found during excavations prior to the construction of the Sheraton Society Hill Hotel at Front and Dock Streets in 1984. The stone foundation and interior mortar floor surface of a relatively large structure were unearthed on the east side of Dock Creek near Front Street. Artifacts recovered suggested the area was probably associated with manufacturing or craft-related activities such as tanning, currying or cordwaining.[51] Excavations for an underground steam line in Dock Street between the Custom House and Merchants Exchange buildings in 1954 revealed bones, suggesting that animal slaughtering occurred in the area.[52] Earlier excavations near the creek also yielded remnants of the industries once situated along its banks. For example, several tanners' vats in good condition

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[50] B. Bruce Powell, *Exploratory Excavation in the Basement of the John Wagner Building,* Independence National Historical Park, 1957, 4.
[51] John Milner Associates, *Archeological Data Recovery Excavations at the Site of the Sheraton Society Hill Hotel, Front and Dock Streets, Philadelphia*, 1996, 72.
[52] *Philadelphia Bulletin*, October 3, 1954; "Dock Field Documentation artifact lists," Independence National Historical Park, 1954.

were found in 1834 during excavation for the foundation of the Merchants Exchange adjacent to the creek at Third and Walnut Streets.[53] [54]

Although the processing businesses that set up shop along Dock Creek produced everyday necessities, they were not welcome additions in the nearby residential neighborhood. Leather, for example, was important in the colonial economy. It was essential for footwear, clothing, saddles, harnesses and a myriad of other purposes in this pre-synthetics age.[55] But the tan yards that produced it proved to be especially unwholesome neighbors.

By 1739 at least seven tanneries had located on or near to the creek and its branches[56] (Figure 19). The scale of one tannery, operated by Samuel Morris at Second Street south of Walnut, is indicated by an advertisement in the Pennsylvania Gazette of March 5, 1751 to sell the business. The "commodious tan yard" included: 26 vats and three large lime pits, all under cover, with a loft large enough for 200 or 300 cords of bark. There were also "three Negro men to dispose of, well-acquainted with the tanning business; and one of them an excellent currier. And a quantity of good upper, soal (*sic*), bridle and harness leather." Interestingly, Morris notes that his tannery is located "on a navigable part of the Dock."[57]

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[53] Watson, Vol.1, 348.

[54] A pollen analysis in connection with construction at the Merchants Exchange in 1995 suggests the types of plant life that may have existed near Dock Creek (Table 5). Gerald K. Kelso, "Exploratory Pollen Analysis of Engineering Cores from the Merchants Exchange (Dock Creek)," Cultural Ecology Laboratories, Golden CO, 1995.

[55] The demand for domestically made shoes and boots was so great during this period that improperly tanned leather was being produced in Philadelphia. A penalty was imposed making shoemakers liable for making and selling products of inferior leather and workmanship. Herman Leroy Collins and Wilfred Jordan, *Philadelphia, A Story of Progress*, Lewis Historical Publishing Co., New York, 1941, Vol. 3, 47.

[56] Michal McMahon, "Publick Service versus Mans Properties, Dock Creek and the Origins of Urban Technology in Eighteenth-Century Philadelphia " in *Early American Technology: Making and Doing Things from the Colonial Era to 1850*, ed. by Judith A. McGaw, University of North Carolina Press, 1994, 121.

[57] *Pennsylvania Gazette*, March 5, 1751. Fourteen years later, Morris sought to lease the former tannery building, which had been converted to a store, for use by joyners (sic), chair makers, sail makers and others. He noted that improvements lately made on the Dock rendered it a little less convenient for water carriage than stores on the river. *Pennsylvania Gazette,* July 25, 1765.

Leather making was a lengthy and involved process that produced a plethora toxic waste and noxious odors. Upon receiving a raw animal hide, often from nearby slaughterhouses, the tanner first cut off the horns, ears and tail and washed it in running water for about 30 hours to remove dirt, dried blood and other impurities. After this, the hides were immersed in lime pits for as long as a year to dissolve the hair and epidermis.[58] This soaking also caused the hides to swell and opened pores for penetration of the tanning solution. After the hides were neutralized with vinegar and draped over a beam to be scraped with a curved knife, they were ready to be tanned (Figure 20). This was accomplished by soaking them for up to several months in a series of vats filled with heated water containing pulverized hemlock or other bark, a mixture which supplied the coloring tannins (Figure 21).[59] After tanning, the hides were dressed by soaking in an acidic liquid containing refuse from cider presses and later in an alkaline solution of buttermilk or dung. The process consumed great amounts of water which, when spent, was returned to the creek as a noxious brew. Acrid smoke from recycled tanbark, burned to heat the vats, permeated the neighborhood.[60]

The environmental effects of tanning might have been ameliorated by siting these offensive enterprises in less populated areas. In London and nearby New York industries such as slaughterhouses and tanneries were moved to the outskirts due to the popular view that pollution caused disease.[61] But these industries were not the sole source of Dock Creek's pollution. The city's residents exacerbated the problem. Seepage from open-bottom privy pits found its way into the creek and its branches which comprised the city's central

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[58] Peter C. Welsh, "A Craft that Resisted Change: American Tanning Practices to 1850," Technology *and Culture*, Johns Hopkins University, Summer 1963, 299-317.
[59] Hugh O. Canham, "Hemlock and Hide: The Tanbark Industry in Old New York," *Northern Woodlands*, Summer, 2011, 36; "Tanning in the Seventeenth Century," Historic Jamestown website, www.nps.gov/jame/historyculture/tanning-in-the-seventeenth-century.htm
[60] Michal McMahon , "The Smelly Saga of Dock Creek," *Today, the Philadelphia Inquirer*, Oct. 31, 1982, 11.

drainage system. Moreover, in an age when garbage was routinely thrown into the street to rot in the sun or be devoured by pigs, it is not surprising that household waste of all sorts was deposited in the creek.[62] As a consequence, the creek once navigable as far as Third Street, at least until completion of the Second and Walnut Street bridges, became choked with tanbark, garbage and animal parts. [63]

Citizens Petition for Relief

By 1739, as one historian noted, Dock Creek had grown "exceedingly offensive."[64] Residents of the area, including Benjamin Franklin, had had enough. They petitioned the Pennsylvania Assembly for relief, citing "the great Annoyance arising from slaughter houses, Tan-Yards, Skinner Lime Pits, etc, erected on the publick Dock, and Streets adjacent." The petitioners argued that the tanyards had diminished the value of nearby properties by hindering navigation and choking the creek with their tan, horns and other waste. They said the creek "was formerly navigable as high as Third Street." They further asserted that "the smoak arising from the burning Tan fills all the neighbouring Houses and is exceedingly offensive."[65] The petitioners asked the Assembly to "restrain" the construction of new tanyards and to remove the existing ones within a reasonable period. [66]

The tanners responded forcefully. They conceded that their pits might give rise to unpleasant odors but contended that these might be ameliorated by regulation rather than removal of the tan yards. They proposed a solution that included paving between pits, fencing, daily washing, carting off tan, horn and

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[61] http://Environmental History.org
[62] Simon, 286.
[63] Scharf and Westcott, Vol.3, 2147
[64] Ibid., 2148
[65] *Pennsylvania Gazette*, Sept. 6, 1739.
[66] *Pennsylvania* Archives (hereinafter PA), Eighth Series, Vol. III, 2487, May 15, 1739.

offal every week, and that the waste from their yards be dumped into the tidal creek only during high tide.[67]

The battle between the tanners and their offended neighbors was played out in the press. Franklin's *Pennsylvania Gazette* supported the petitioners. The *American Weekly Mercury*, the journal of Franklin's rival and former employer Andrew Bradford, presented the response of the tan yard owners. The tanners claimed that their trade had been unfairly singled out by the petitioners. They said the creek had become "a receptacle for all kinds of filth," including that flowing from an abundance of necessary houses that lined its banks. Further, the tanners noted, the tidal surge was no longer sufficient to carry off the volume of waste deposited in the creek.[68]

Franklin replied to the tan yard owners with a front-page letter in the *Gazette*. In an early expression of environmental activism, he argued that public good should take precedence over the rights of private land owners. The creek and its adjoining street were given (by William Penn) for "publick service," he said. Rather than an attack on the tanners, Franklin stated, the petition "was only a modest attempt to deliver a great number of tradesmen from being poisoned by a few, and to restore to them the liberty of breathing freely in their own houses."[69]

This dispute--juxtaposing the public good against the rights of private property owners--framed a classic political debate that continues to resonate today.

In the end, the citizen petitioners won but their victory proved illusory. The Assembly directed the weak city government to provide for the relief of the petitioners as it shall find "necessary and consistent with its powers." However,

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[67] Ibid., 2503

[68] *American Weekly Mercury*, August 6-9, 1939, 1

the Assembly tacitly acknowledged that these powers might prove inadequate. It authorized the city to apply for the Assembly's assistance, if necessary, to compel compliance.[70] The Assembly's response avoided the land use issue raised by the petitioners, who had asked that establishment of tan yards along Dock Creek be prohibited. Yet existing legal and legislative precedents would have supported such a response. Regulation of land use to mitigate nuisances was an established principle of common law. And colonial governments regularly used statutes and ordinances to define nuisances and prohibit certain uses of land in certain areas.[71]

McMahon contends the Assembly's response reflected the long-standing political clout of the tanners, several of whom were among the city's elite and well-connected.[72] William Hudson (1664-1742), for example, the son of an English tannery owner, migrated to Philadelphia in 1683. Hudson established tanneries along Dock Creek and became prominent in the city's business and political establishments. After serving in the Common Council and Provincial Assembly, he was chosen as mayor of Philadelphia (1725-26) and subsequently as a justice of the Orphans' Court.[73]

The tanners seemed satisfied that their interests had been protected by the Provincial Assembly. They rejoiced at their success in frustrating "such a daring attempt on the liberties of the tradesmen of Philadelphia."[74]

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[69] *Pennsylvania Gazette*, Sept. 6, 1739
[70] PA, Eighth Series, Vol. III, 2504
[71] John F. Hart, "Colonial Land Use Law and Its Significance for Modern Takings Doctrine," *Harvard Law Review*, April 1996, 1298.
[72] McMahon,"Publick Service," 125-126
[73] Thomas Allen Glenn, "William Hudson, Mayor of Philadelphia, 1725-1726," *Pennsylvania Magazine of History and Biography*, Vol. 15, No.3, 1891, 339.

the Assembly tacitly acknowledged that these powers might prove inadequate. It authorized the city to apply for the Assembly's assistance, if necessary, to compel compliance.[70] The Assembly's response avoided the land use issue raised by the petitioners, who had asked that establishment of tan yards along Dock Creek be prohibited. Yet existing legal and legislative precedents would have supported such a response. Regulation of land use to mitigate nuisances was an established principle of common law. And colonial governments regularly used statutes and ordinances to define nuisances and prohibit certain uses of land in certain areas.[71]

McMahon contends the Assembly's response reflected the long-standing political clout of the tanners, several of whom were among the city's elite and well-connected.[72] William Hudson (1664-1742), for example, the son of an English tannery owner, migrated to Philadelphia in 1683. Hudson established tanneries along Dock Creek and became prominent in the city's business and political establishments. After serving in the Common Council and Provincial Assembly, he was chosen as mayor of Philadelphia (1725-26) and subsequently as a justice of the Orphans' Court.[73]

The tanners seemed satisfied that their interests had been protected by the Provincial Assembly. They rejoiced at their success in frustrating "such a daring attempt on the liberties of the tradesmen of Philadelphia."[74]

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[69] *Pennsylvania Gazette*, Sept. 6, 1739
[70] PA, Eighth Series, Vol. III, 2504
[71] John F. Hart, "Colonial Land Use Law and Its Significance for Modern Takings Doctrine," *Harvard Law Review*, April 1996, 1298.
[72] McMahon,"Publick Service," 125-126
[73] Thomas Allen Glenn, "William Hudson, Mayor of Philadelphia, 1725-1726," *Pennsylvania Magazine of History and Biography*, Vol. 15, No.3, 1891, 339.

account, as well as one of the owners of the two tanyards then located on Dock Street.

A map recently produced by historian Billy Smith, plotting yellow fever deaths by address during the city's great epidemic of 1793, shows a high incidence of victims residing along Dock Street and the waterfront. (Figure 22, Table 3) The main body of the creek had been arched and covered for several years by then.

In 1747, an outbreak of yellow fever stirred resident concerns anew over the filthy condition of Dock Creek and the marshes surrounding the inlet.[81] Common Council appointed a committee to assess the problem of the polluted stream and recommend measures to cleanse and restore it.[82] The panel, which included Benjamin Franklin, proposed a comprehensive public works project, dependent upon private as well as public resources. The committee recommended that the inlet between Water Street and the river be widened, dredged and walled. It also called for widening, dredging and walling the creek as far as the tidal surge, presumably at Third Street, for "the reception of flats, boats and other small craft..." A 60-foot dock was proposed westward along the main body of the creek. Stretches of beach were to be left open on either side of the creek for landing smaller boats. The creek as far upstream as Third Street was to be walled and dug out to a depth that would allow it to remain covered with water at low tide. Land owners along the creek would be responsible for dredging and walling the sides of the creek. In return, they would receive "any profits arising from the landing of wood and other things on the bank...opposite

[81] Scharf and Westcott, Vol.1, 217.
[82] MCC, February 24, 1747, 494.

to their lots."[83] Unlike the earlier petitioners, the committee proposed no restrictions on land use along the creek.

Declaring the polluted creek a nuisance that could impede the development of the city, the committee proposed that a tax be levied to fund the "publick cost" of its ambitious plan.[84] But the corporation, which governed the city, lacked taxing authority. Its revenues were derived largely from fees, rentals—including the leasing of a wharf at the Dock Creek inlet—and occasional lotteries. The Provincial Assembly might have enacted the proposed tax. But neither it nor the Proprietor proved receptive to this idea. A private subscription was begun as an alternative to raise funds for the project. But a lack of support, especially on the part of the proprietor, prevented the project from being carried out.[85] McMahon suggests, however, that the plan might have been implemented using other sources of revenue if the city had been more committed to the project. [86]

It would be 16 years until another concerted effort emerged to deal with the polluted stream. During the ensuing period, wetlands along the creek were filled for development, and buildings and streets continued to expand over the watershed. For example, an examination of city property records indicated that references to the north branch of the creek west of Third Street disappeared in the early 1740s, suggesting that portions of the creek were filled during block-by-block residential development.[87] While the dysfunctional creek's branches were fading from the urban landscape as underground sewers, the inlet east of Front Street continued to serve as a landing for firewood and bulky building

[83] Ibid., 495
[84] Ibid., 496
[85] Scharf and Westcott, Vol.1, 217
[86] McMahon,"Publick Service," 138
[87] Liggett,43.

materials.[88] In 1757, the Common Council approved construction of a 50 foot pier or wharf extending 80 or 100 feet on the north side of the inlet.[89] This pier, if built, would have been rented out by the city.

Other Environmental Ills

The polluted creek was by now just one of several knotty environmental problems confronting the growing city. Provisions for the creek's cleanup and restoration were included in laws designed to address more widespread degradation.[90] A 1762 provincial law provided for the paving and cleansing the city's streets, many of which were unpaved and laden with garbage.[91] This act also called for the repair of common sewers discharging water into the river. The Assembly also provided for funding, including property owner assessments and the use of lottery proceeds, to complete this work. City "nuisances" were the target of an Assembly law enacted the following year.[92] These included discharges of contaminated liquids by distillers, soap boilers and others into public streets or waters; the laying of animal carcasses or discharges from privies or necessary houses in the streets or into Dock Creek, and the obstruction of streets by building extensions or drain spouts. Penalties ranging from 30 shillings to £20 were assessed for violations of the act.

Perhaps encouraged by the passage of the environmental cleanup legislation, residents of the Dock Creek area in 1763 again demanded action to improve and restore the creek. They petitioned the Pennsylvania Assembly which, unlike the city, had the power to legislate and tax, for relief. They asserted the creek was "useless," and noted: "in its present condition (it is) a receptacle

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[88] Ibid, 58.
[89] MCC, July 12, 1757.
[90] Charles S. Olton, "Philadelphia's First Environmental Crisis," *The Pennsylvania Magazine of History and Biography*, Philadelphia, January 1974.
[91] Statutes at Large of Pennsylvania (hereinafter SLP), Chapter CCCCLXXX,
[92] Pennsylvania Gazette, March 10, 1763.

for carcasses of dead dogs and other carrion, and filth of various kinds, which, laying exposed to sun and air become extremely offensive and injurious to the health of inhabitants." They asked that the creek be "rendered navigable for small craft and...commodious for the conveyance of firewood, materials for buildings and other necessaries by being cleaned out, planked on the bottom, and walled on each side, as well as of great use for a supply of water in case of fire..."[93] Many years earlier, petitioners had stressed the creek's utility as a source of water for fire protection.[94]

On February 4, 1763, the Pennsylvania Assembly appointed a six-member committee to examine the matter.[95] Members Benjamin Franklin and Samuel Rhoads had served on a panel with a similar mission appointed by Common Council 16 years earlier. Charged to investigate the state of the Dock and any private claims thereon, the committee reported that it was "very necessary" for Dock Creek to be cleansed and properly walled.[96]

The Assembly responded with a law which empowered the commissioners appointed under an earlier law to open, cleanse, repair, and regulate and make Dock Creek navigable.[97] The Assembly did not assert public ownership of the waterway or impose a tax to fund the project. Instead, it required owners of property adjoining the streets along the creek to wall in their portion of the creek bank in a manner as the city might direct. If an owner failed to comply, the Assembly authorized the city to build that portion of the wall and recover the

[93] PA, Eighth Series VI, 5384.
[94] *Pennsylvania Gazette*, Sept. 6, 1739, 1.
[95] PA, Eighth Series VI, 5393.
[96] Ibid. 5397.
[97] SLP, Chapter CCCCLXXXV, 1762-63. March 3, 1763.

cost from the owner.[98] Public costs incurred for the improvements were to be paid from property assessments authorized under the earlier act.[99]

The Assembly also enacted a penalty, not to exceed 40 shillings, to be assessed against any person who shall "cast, throw or lay any carcase, carrion or filth whatsoever, or any dirt, rubbish or other annoyance or obstruction whatsoever into the public water-course of the said city, commonly called The Dock..." [100] In contemporary prices, this amount might have purchased a cord of wood or a dozen bottles of claret.[101] The manner and extent of efforts to enforce this penalty are unknown.

Although the Assembly again seemed receptive to the pleas of citizens aggrieved over the wretched condition of Dock Creek, its response--premised on fines for polluters, borrowing by a weak city government and landowner assessments--apparently did not prove effective.

The Cover-Up Begins

In 1765, the commissioners appointed to oversee the improvements under the 1763 clean-up act reported to the Assembly that it was infeasible to restore navigability on Dock Creek between Walnut and Third Streets. A survey of lots along the creek had shown that only a 20-foot channel would remain for a restored creek. A creek of this breadth would "neither answer public conveniency or private interest," the commissioners reported. However, they had reached an agreement with property owners to arch that portion of the creek at their own expense, with the understanding that a market would be established atop the creek once it was covered.[102] According to the property owners, a new

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[98] Ibid, 240.
[99] Ibid,Chapter CCCCLXXX, March 26, 1762.
[100] Ibid, Chapter CCCCLXXXIV, March 4, 1763.
[101] *Pennsylvania Gazette*, March 19, 1741; November 8, 1764.
[102] PA, Eighth Series VII, 5715

market was needed because "the present Market in High street is very much crowded and too small to accommodate the inhabitants of both the City and County..." After completing an eight-foot high stone arch at a cost of £400 pounds, they requested the Assembly to rename that section of Dock Street as "Exchange Street" and to appropriate the land for construction of the "Exchange Market."[103]

Consequently, the Assembly supplemented its 1763 act to require that this portion of the creek "be filled up over the arch now erected" and together with the adjoining streets on either side of the creek be leveled, regulated and left open and common for public use as one street to be known as Dock Street.[104] This work was completed in 1767.[105]

Construction of the arch over the creek between Walnut and Third Streets marked the end of the protracted, sporadic and largely ineffectual effort to restore and preserve the creek as a viable waterway. It signified a realization that the political will and necessary resources were not equal to the task, perhaps that the cost would exceed any benefit. Arching and covering the creek permitted its continued flow into the Delaware River, while transforming it into a *de facto* underground sewer.

The arching of Dock Creek, however, may have restricted its flow enough to aggravate flooding along its northwestern tributary. In 1769, residents in the area of Fourth and Market Streets appealed to the Pennsylvania Assembly for relief. This Dock Creek feeder stream had once offered sufficient drainage, but it could no longer handle the runoff from heavy rains. An increase of building and regulation of the streets exacerbated the problem. The petition asserted that the resultant flooding made streets impassible, damaged property and endangered

[103] Ibid., 5714
[104] SLP, Chapter DXXIV, February 15, 1765.

residents. Although local officials had been responsive, the petitioners noted, the city lacked the resources needed to enlarge the common sewer or divert damaging waters.[106] Flooding in this area appears to have become a chronic problem. In a 1784 diary entry, apparently written after that branch had been replaced with a culvert, Jacob Hiltzheimer noted that a common sewer 2 feet 8 inches in diameter was insufficient to accommodate the flow resulting from a "smart shower" there. [107]

In 1784, a group of citizens determined "that no use can possibly be derived to the public" from the remaining segment of Dock Creek, between Walnut and Front Streets. They asked that the creek be covered with a culvert, the street filled in over it, and a market place and shambles be erected in the center of the street.[108]

In considering this request, the Assembly noted the creek and the streets on both sides had been left open for public benefit to extinguish fires and to provide flood runoff and landing places. Despite many public and private efforts to maintain the creek, it had become a "grievous nuisance," nearly filled up with "filth and rubbish... from all quarters of the city." The Assembly observed that the expense of cleaning the creek and keeping it in good order "is vastly greater than all the public and private benefits from the landings thereon." Thus the Assembly ordered that a brick arch at least nine feet wide and high enough to give vent to the waters be built over the creek from Walnut Street to the "main branch of the dock, adjoining the public landing." The arch was to rest on strong stone walls and be floored with planks or logs at least five inches thick.

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[105] Joseph Jackson, *Encyclopedia of Philadelphia,* 591.
[106] PA, Eighth Series VII, 6308-9
[107] *Extracts from the Diary of Jacob Hiltzheimer, 1765-1795*, William Fell & Co., 1893, 68.
[108] *Pennsylvania Gazette*, Feb. 4, 1784.

Once erected, the arch was to be covered with earth and leveled to form a public roadway known as Dock Street.[109]

To provide the fill needed to cover the creek, the city altered the topography of the area by flattening the surrounding hilly ground.[110] The market established atop the creek, along the wide, irregular Dock Street, evolved into the city's central produce market (Figures 23, 24), a purpose that it continued to serve until being relocated to South Philadelphia from 1957 to 1959 as part of an urban renewal project.[111]

Later in 1784, the Assembly directed that this arch be extended to the middle of the main branch of the creek, and that an existing arch over the creek's southwestern tributary (Little Dock Creek) also be extended. These lengthened arches were to be joined in the middle of the creek's main channel and a wall erected that would extend Dock Street nearly to Front Street.[112]

Sections of the creek's branches west of Third Street apparently remained uncovered into the 1790s. In March 1790, the city's Common Council received a citizen petition requesting that part of "common sewer" between Third and Fourth Streets be arched.[113] Later that year, the council resolved to pave Fourth Street between Walnut and Chestnut Streets after "the common sewer between Fifth Street and Walnut Street (is) arched over." [114]

Dock Creek tributaries which crossed Washington Square, merging just west of Sixth Street, were arched and filled during improvement of the square in

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[109]SLP, Chapter MLXXX, Mar. 30, 1784. This act also offered relief to residents near Fourth and Market Streets whose cellars in times of heavy rains "are frequently overflowed" by authorizing the city to enlarge the arch from Market Street to allow a greater flow capacity.

[110] McMahon, "Smelly Saga", 24

[111] *I.M. Pei and Society Hill: A 40th Anniversary Celebration*, Society Hill Towers Owners Association, Diane Publishing Co., Collingdale PA, 2003, 35.

[112] SLP, Chapter MCVI, Sept. 1, 1784.

[113] MCC, March 22, 1790.

[114] Ibid, May 10, 1790. The same act also provided for enlarging the arch over the branch of the creek south of Market Street to relieve chronic flooding.

the early 19th century. In 1805 the city councils directed that a branch crossing the square from Walnut to Sixth Street be arched and covered.[115] A tunnel had been built in 1786 to carry the merged streams under Sixth Street and the adjacent Walnut Street Prison.[116] An archeological project in 2000 discovered two buried segments of a brick culvert constructed over this branch. This culvert was approximately 3.5 feet below the surface of the square.[117]

A table of city accounts published in September 1791 indicates that funding was provided to arch the common sewer (Dock Creek) between Third and Fourth Streets.[118] Much of the earth used in filling the creek was drawn from the Pear Street hill and Society Hill west of Front Street, according to Watson's Annals.[119]

However, a portion of Dock Creek apparently remained open as a landing just west of Front Street where the city maintained a sand wharf as late as 1814.[120] An 1818 city ordinance required that this portion of the creek, then occupied as a deposit place for sand, be arched over in such a manner as to continue the passageway across Front Street.[121] However, a map of Philadelphia produced in 1796 by John Hills indicates that the creek had been covered beyond Dock Street east to Water Street at that time (Figure 25). The Dock Creek inlet lying east of Water Street was not completely filled until the 50-foot-wide Delaware Avenue was built along the river about 1839.[122]

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[115] Denise R. Rabzak, *Washington Square: A Site Plan Chronology, 1683-1984*, Independence National Historical Park, Philadelphia, 1987, 8.
[116] Ibid., p.4.
[117] John Milner Associates, Archeological Supervision and Monitoring of Restoration Activites at Washing ton Square, Philadelphia, Pennsylvania, 2000, 23.
[118] *Dunlap's American Daily Advertiser*, September 6, 1791, p.3, col. 1-2. An amount of 75 pounds was expended to include this project and the paving Chestnut Street between Sixth and Seventh Streets.
[119] Watson, 347
[120] Liggett, 87.
[121] Chapter CCXLVII, Ordinances of the Corporation of the City of Philadelphia, March 4, 1818.
[122] Liggett, 87. Harry Kyriakodis in *Philadelphia's Lost Waterfront, History Press*, 2011, states that Dock Street east of Front Street was completed by 1839 when "the first incarnation of Delaware Avenue was laid." 100.

Public Sewer

During the years after the *de facto* "common sewer" was arched and covered, it was incorporated into the city's sewer system. Philadelphia, as did other cities of that era, followed a path of least resistance by placing its sewers in beds of existing streams.[123] This scheme had several advantages. Gravity could be relied upon to move the sewage, the expense of digging new sewer lines could be avoided, and the filling of streambeds and removal of bridges expanded real estate available for development. However, in addition to removing scenic and functional features of the natural landscape, this process hastened the flow of toxic sewage into major waterways such as the Delaware River. Philadelphia would not have an effective sewage treatment system until the mid-twentieth century.[124] Today the Dock Creek main carries sewage to a city treatment facility.

Figure 26, drawn for the National Park Service, depicts the Dock Street sewer and its various feeders superimposed on an 1860 city map.[125] Also shown are cross-sections of the main arch and feeder sewers installed by the Philadelphia Water Department to channel the flow of sewage. Figure 27 is a profile of the Dock Street sewer drawn by the City Surveyor in 1843.[126] Figures 28 and 29 are photographs of the main arch and the insertion of a new sewer main through the arch.[127]

The covering of Dock Creek removed a long-festering environmental nuisance from public sight and smell. But the subterranean stream continued to

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Philadelphia's councils had adopted an ordinance in 1834 providing for construction of this portion of the street, *Philadelphia Inquirer*, March 8, 1834.

[123] Adam Levine, "Sewers, Pollution and Public Health in Philadelphia," *Pennsylvania Legacies*, May 1910, p.18.

[124] Ibid., 19.

[125] Library of Congress.

[126] http://www.phillyh2o.org

[127] Independence National Historical Park and the Philadelphia Water Department, respectively.

spew sewage into the river and to vex property holders along its course. Complaints about flooded cellars in the Dock Street neighborhood led the city's Select and Common Councils in 1849 to appoint a commission to survey the region of Dock Street "to ascertain the best system of drainage."[128] The commission was charged to determine whether the flooding problem could best be addressed by (1) improving the existing Dock Street culvert, or (2) constructing a new culvert under Walnut Street from Dock Street to the river. Members also sought to determine the impact of the river's tidal flows on the flooding.

An earlier study had found 4.5 miles of sewers, representing one quarter of the city's land area, feeding into the Dock Street sewer. Based on an 1843 report by the City Surveyor, the panel reported that the sewer had been constructed in piecemeal fashion over time.[129] Building materials were varied and had included stone, brick and timber. Its flow capacity also varied considerably, with cross sections that ranged in area from 45 to 140 square feet. "This irregular structure has been located in a soil that is of marshy and unstable character, replete with land springs, which have their outlet through the sewer," according to the report. The commission observed that the system performed effectively on dry days, irrespective of the tidal flow. However, with even moderate amounts of rain, the sewer quickly filled and overflowed.

The commissioners determined that the flooding problem might be relieved by repairing and enlarging the Dock Street sewer. However, because an alternate conduit for the sewer's normal discharge was lacking, this approach was deemed impracticable. The panel recommended instead that a Walnut Street culvert be constructed to relieve the Dock Creek flow.

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[128] Report of the Topographical Commissioners to the Select and Common Councils, July 5, 1849, http://PhillyH2O.org.

Conclusions

In less than 100 years, a once scenic and useful creek had become a nuisance and public health menace, conditions that foreshadowed its removal from the urban landscape. Why did this occur and why did several apparently well-intended efforts to restore and improve the befouled creek fail?

Dock Creek became polluted because the city's residents, as well as the tanneries and other industries that located along its banks, treated the creek as a common sewer. The political will necessary to regulate or relocate the tanners and other overt polluters clearly was lacking. However, even if the dumping of carcasses, tan bark and other debris so offensive to nearby residents had been curtailed, the ultimate degradation of Dock Creek was all but inevitable. Its broad watershed drained much of the early city, concentrating storm run-off, privy pit seepage and other waste in the creek. Technology that might have addressed this problem did not exist at the time. Modern sanitary sewer systems did not begin to develop in American cities until the following century.

Once Dock Creek had become a *de-facto* sewer, transforming it into an actual sewer by arching and filling must have seemed a practical solution. Other factors contributed to this decision. As additional docks were constructed along the Delaware to meet the city's needs, Dock Creek's early importance as a landing place declined. Also, growing demand for residential and commercial land provided an economic incentive to arch and cover the creek and its tributaries. The creek's fate established a precedent the city followed in burying other free-running streams.

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[129] Profile of Dock Street Sewer, Samuel Haines, city surveyor, 1843, PhillyH2O.org.

Efforts by government, both local and provincial, to clean up and restore the creek began in 1739 when Franklin and his neighbors implored the Provincial Assembly to relocate the tanneries, perhaps the most egregious of the polluters. The Assembly understood that a problem existed. But palliative measures such as charging the weak Municipal Corporation and creek-side lot owners to solve the problem clearly did not work. The Assembly's failure to remove or effectively regulate these polluters implicitly elevated the rights of a few private property holders above the welfare of the many. The political clout of the tanners may well have influenced this decision. Later appeals to the Assembly and the city's Common Council proved no more effective.

Ostensibly responsive to citizen concerns, the governing bodies established committees and commissions to study and address the creek's ills. But efforts to implement their recommendations lacked adequate funding, enforcement and follow-through. Precedent existed for the Assembly to restrict nuisance industries along the creek, but it assiduously avoided any assertion of public ownership of the creek as well as the imposition of a tax for its improvement.

Citizen activism in behalf of the creek was evident throughout the period, starting with the 1739 petition to remove the tanneries. But public advocacy seemed to have limited effect until the creek's condition had deteriorated to a point where arching and covering it appeared the only practical alternative. Despite the advocates' efforts, the relentless pollution by the citizenry and industries of an expanding city combined with the lack of technology to effect a full solution and a failure of political will ultimately doomed Dock Creek.

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CHRONOLOGY OF DOCK CREEK

1682 William Penn lands in Philadelphia at Dock Creek Inlet. The Dutch, Swedes and others who preceded Penn had already begun to establish businesses at the site. The Blue Anchor Tavern stood in the middle of Front Street near the north side of the inlet when Penn arrived.

c. 1682 Wooden drawbridge erected across Dock Creek at Front Street.

1683 Holme's "Portraiture of Philadelphia" shows inlet and creek. Also shown is a bridge across the inlet at Front Street east of Second Street between Walnut and Spruce Streets.

1683 Rude bridge erected across branch of creek at Chestnut Street east of Fourth Street, west of Fifth Street and north of Walnut Street.

1688 Thomas Budd proposes to expand the inlet as a harbor by constructing a wharf along the creek and a 50-foot channel from Front Street to Third Street with a 30-foot wide street on either side of creek. As compensation for his expenses, Budd receives a patent for a lot running 118 feet on the west side of Front Street, just north of the inlet, where he erected five two-story houses on the lot that became known as "Budd's Row."

1701 Acceding to pressure from local citizens, William Penn's Charter of City of Philadelphia decrees that Dock Creek inlet be left open for common use and service.

1704-1737 Chronic problems in maintaining integrity of Dock Creek drawbridge and adjoining causeway south of bridge to Society Hill.

1705 Common Council appoints committee to oversee repairs to drawbridge and Second Street bridge.

1716 Common Council minutes note bridge across Dock Creek at Front Street had become dangerous after causeway south of bridge was

washed out.

1717 Common Council appoints overseers to for work to brick bridges in Second Street south of Walnut Street and Walnut Street west of Second Street.

1730 By this date, at least eight leather tanneries had located along or near Dock Creek.

1737 Grand Jury finds bridge over Dock Creek at Front Street very much out of repair

1739 Led by Benjamin Franklin, residents petition Pennsylvania Assembly to restrain construction of tanneries along Dock Creek and remove existing ones.

1739 Pennsylvania Assembly directs city to provide for relief of petitioners as necessary and consistent with its powers.

1744 Dr. Benjamin Rush urges that marshes along Dock Street near Spruce be filled as precaution against malarial fever.

1747 Following outbreak of yellow fever, Common Council committee proposes tax to fund ambitious plan to cleanse and restore Dock Creek. Plan was never implemented.

1748 Common Council committee recommends comprehensive project to dredge, widen and wall creek from Front to Third Streets.

1757 Common Council approves construction of a 50-foot wide pier and north side of Dock Creek inlet.

1762 Pennsylvania Assembly passes legislation to clean city streets and provides for assessment of property owners and lottery proceeds to fund the project.

1763 Stone bridge erected across Dock Creek at Front Street, replacing

drawbridge.

1763 Pennsylvania Assembly directs that Dock Creek be cleansed, opened and made navigable; requires adjacent property owners to wall their portion of the creek; imposes penalty for disposing of waste in creek.

1765 Pennsylvania Assembly directs that section of creek between Walnut and Third Streets to be filled over arch erected by residents to create a Dock Street market place. Work was completed in 1767.

1769 Residents in area of Fourth and Market Streets appeal to Pennsylvania Assembly for relief from flooding of Dock Creek feeder stream after heavy rains.

1784 In response to citizens' request, Pennsylvania Assembly directs that section of the creek between Walnut Street and the arch over Little Dock Creek just west of Front Street be arched and covered to form a public street to be known as Dock Street.

1791 City provides funding to arch branch of creek between Third and Fourth Streets.

1805 City Councils direct that Dock Creek branch crossing today's Washington Square from Walnut to Sixth Streets be arched and covered.

1818 City ordinance directs that remaining portion of creek west of Front Street be arched and covered to Front Street.

c. 1839 Remaining portion of Dock Creek inlet east of Water Street was filled in during the construction of Delaware Avenue.

1849 Commission appointed by City Councils to address chronic flooding of sewage into cellars along lower Dock Street recommends building Walnut Street culvert to relieve flow in Dock Creek sewer.

FIGURES

1. Main Body of Dock Creek Over Time
2. Philadelphia's Historic Streams
3. 1810 Street Elevations of Central Philadelphia
4. Early 19th Century Topography
5. Park Service Marker
6. Dock Creek Installation
7. Philadelphia as William Penn Knew It
8. Philadelphia in 1702
9. Portraiture of Philadelphia
10. Landing of William Penn
11. Blue Anchor Tavern and Dock Creek
12. 1762 Clarkson and Biddle Map
13. Dock Creek Drawbridge
14. Bridge Footings and Causeway
15. Watson's Conception of Dock Creek
16. Chestnut Street Bridge
17. APS Installation Map
18. Clarke's Hall and Dock Creek
19. Leather Tanneries near Dock Creek
20. Working the Beam
21. Stripping and Delivering Tanbark
22. Philadelphia Yellow Fever Deaths, 1793
23. Market atop Covered Creek
24. Aerial View of Dock Street
25. Covered Sections of Dock Creek in 1796
26. Dock Street Sewer
27. Dock Street Sewer Profile
28. New Sewer through Old
29. Dock Creek Sewer Repair, 2003
30. Dock Street Structures, 1801

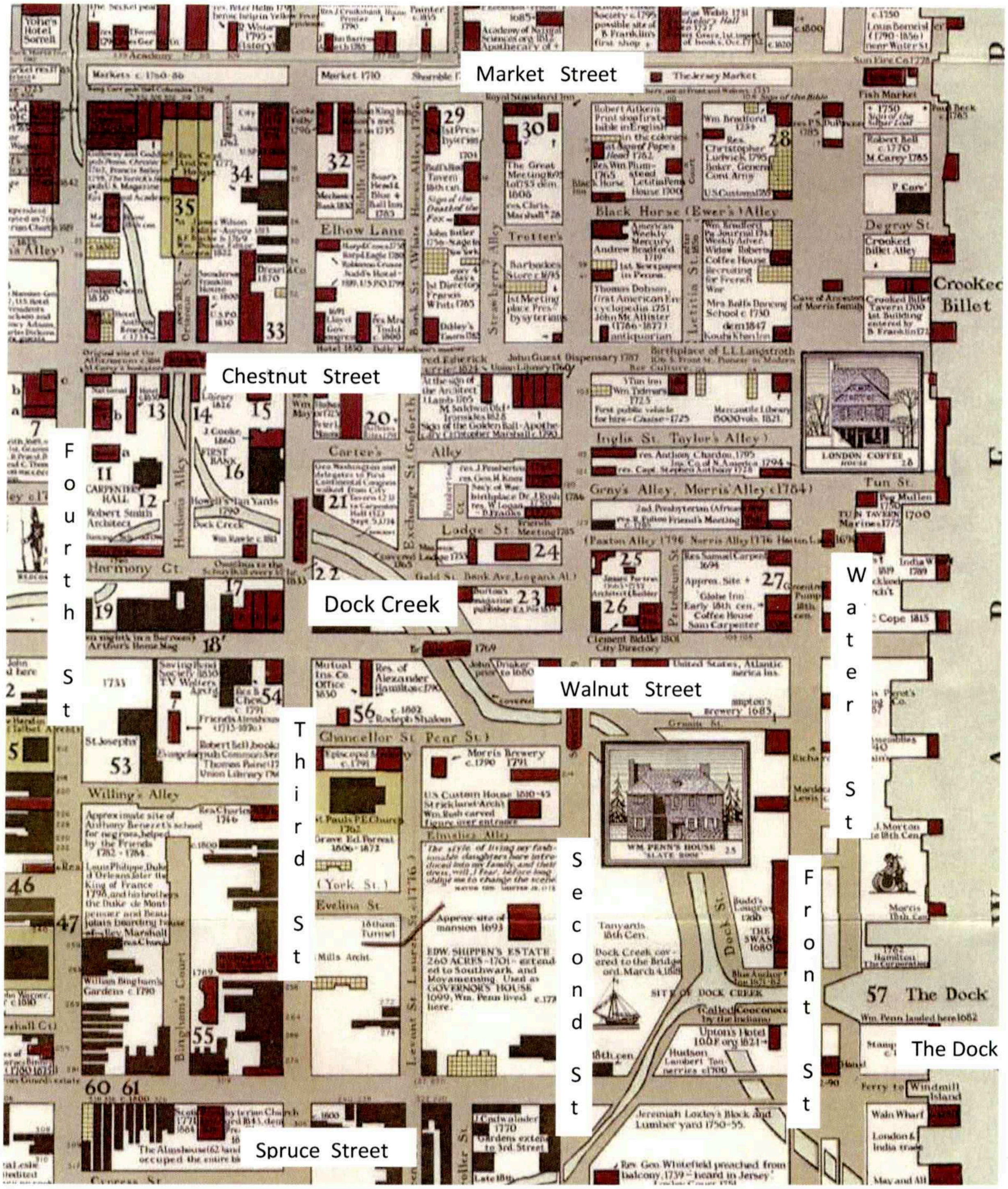


Figure 1. Main Body of Dock Creek Over Time

This composite map documents the historic transformation of Dock Creek and surrounding area from Penn's landing in 1682 forward. (*Part of Old Philadelphia, a Map,* Grant Miles Simon, American Philosophical Society, 1952.)

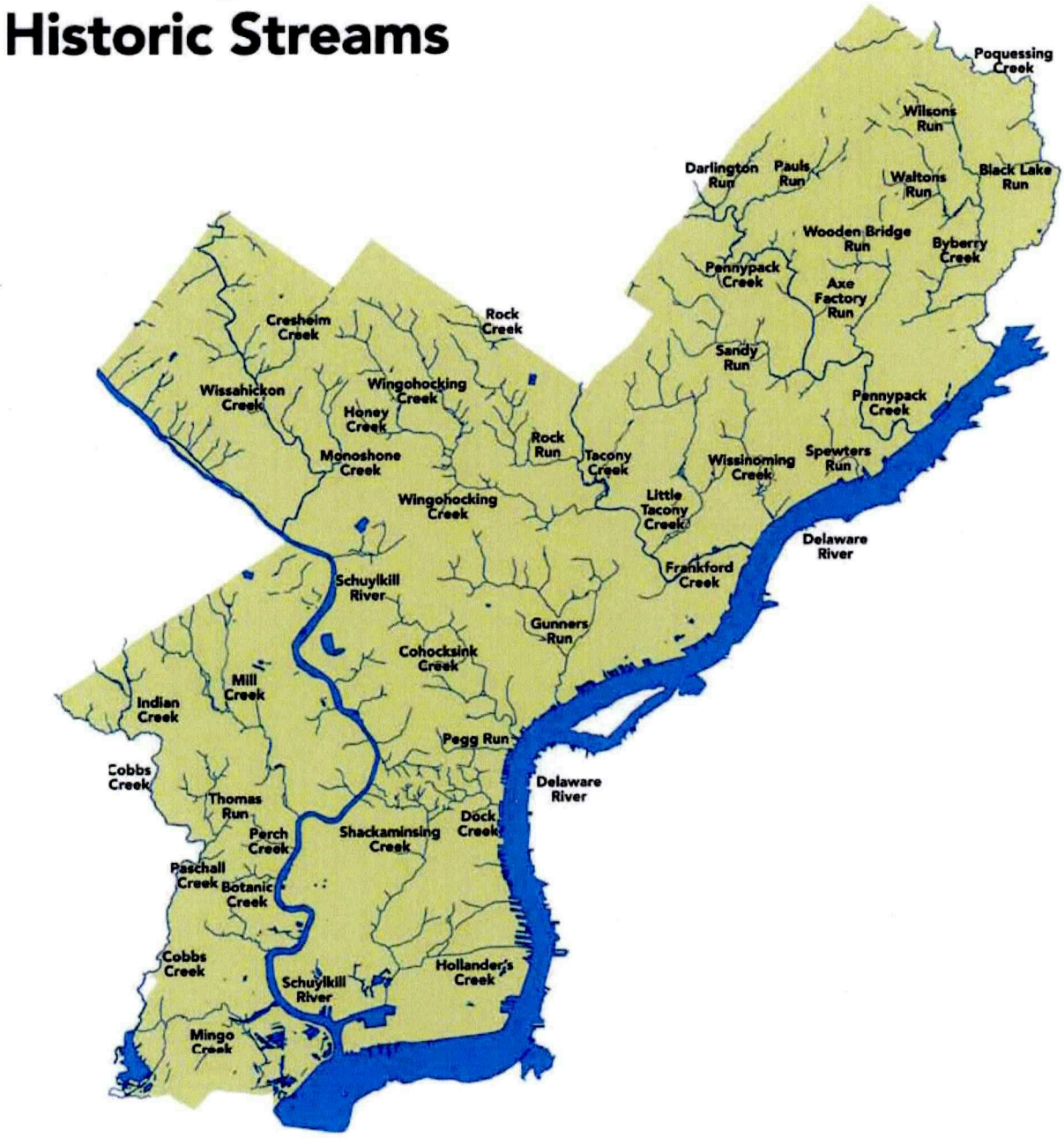


Figure 2. Philadelphia's Historic Streams

This map, compiled by the Philadelphia Water Department, shows Dock Creek and the many other streams which once flowed on the city's surface. Most of these have been covered and some of them, including Dock Creek, have been incorporated into the city sewer system. (*Philadelphia Water Department Historical Collection/ www. PhillyH2O.org*)

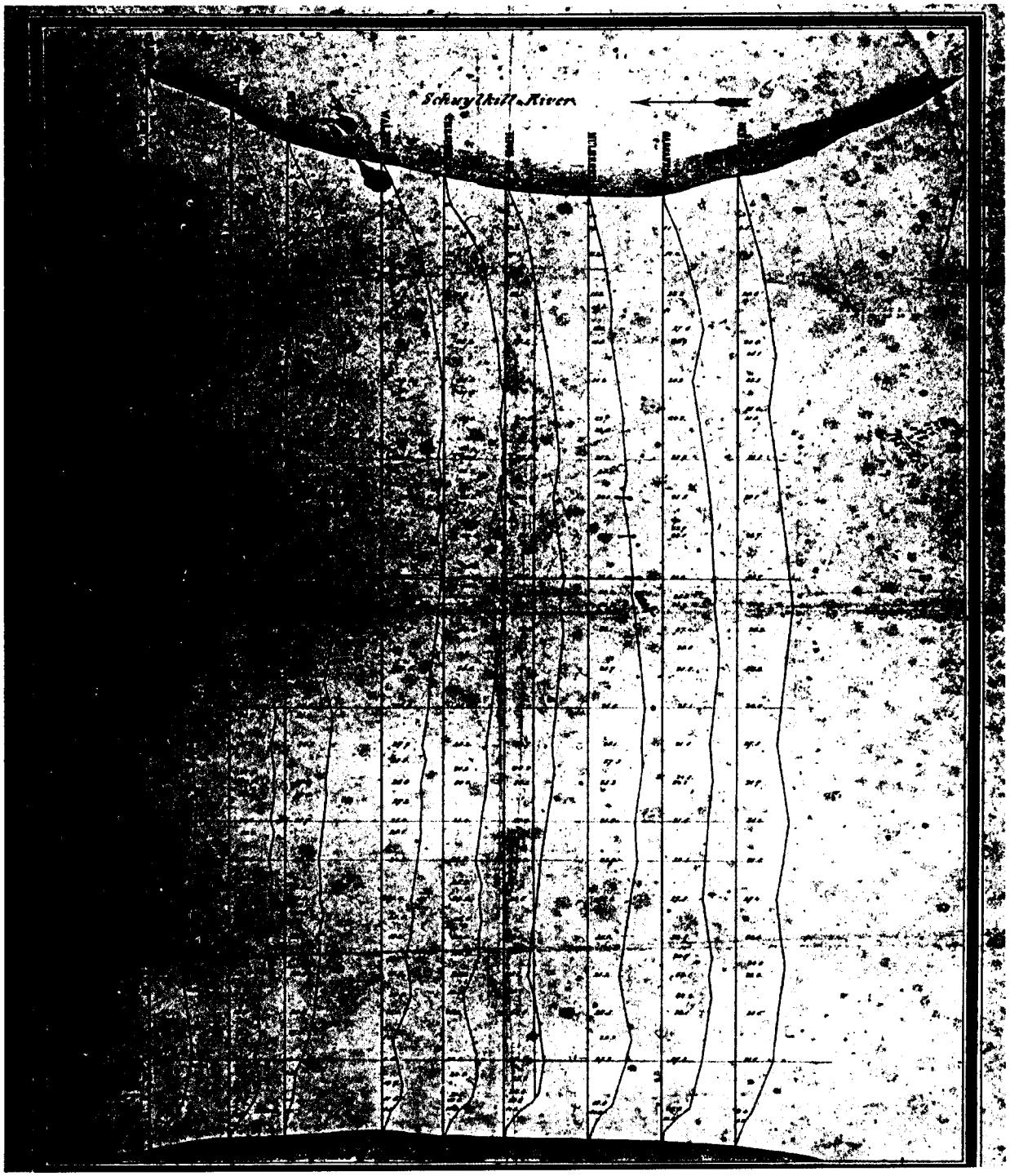


Figure 3. 1810 Street Elevations of Central Philadelphia

Lithograph of major street elevations from Vine to South between Schuylkill and Delaware Rivers. Plan may have been used by Frederic Graff in designing Fairmount Water Works distribution system, c. 1810. Elevations taken at 317 sites, mainly intersections. Land slopes downward from the center toward rivers. (PhillyH2O.org from the Historical and Interpretive Collection of the Franklin Institute, Philadelphia)

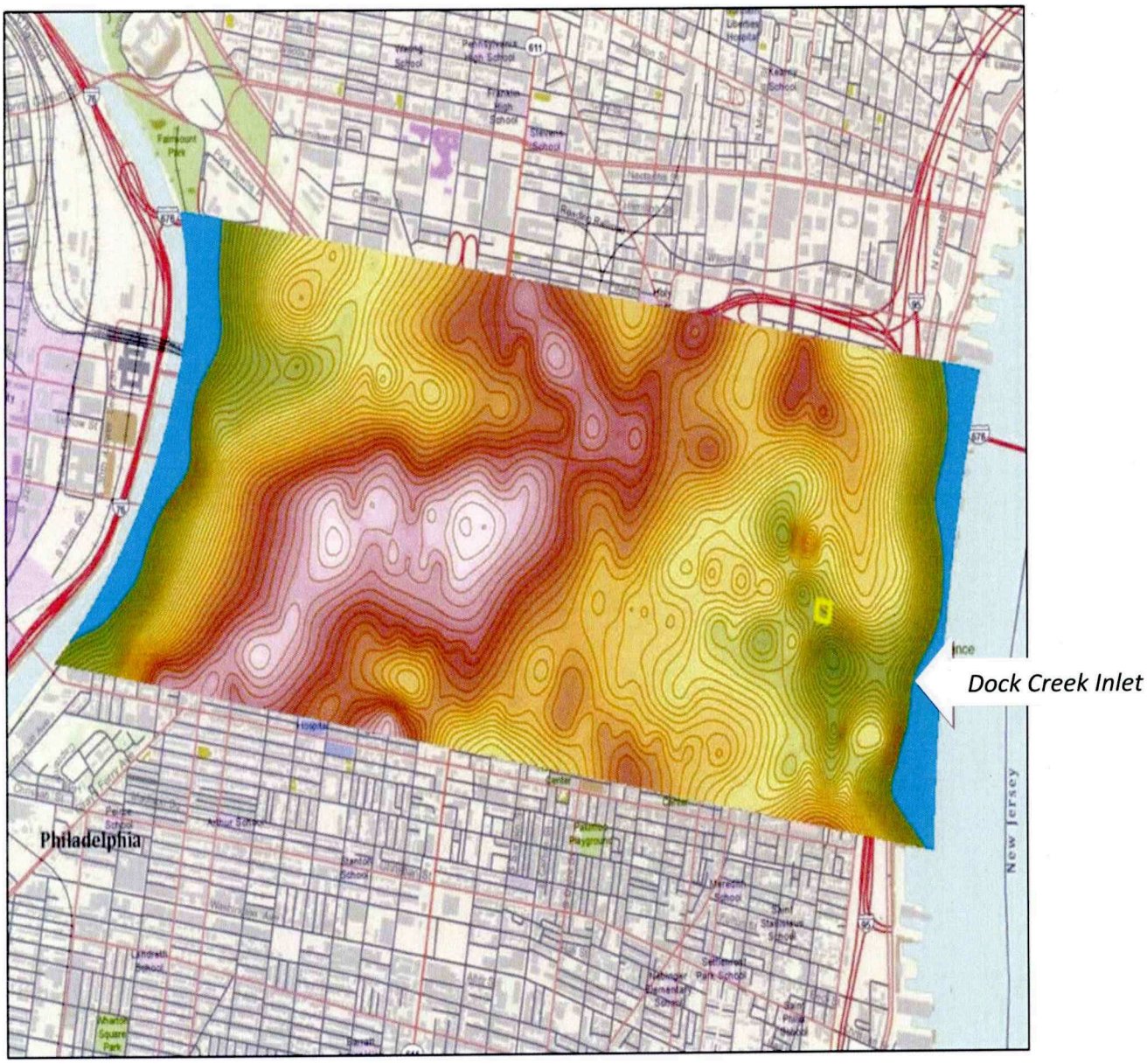


Figure 4. Early 19th Century Topography

Computer image showing central Philadelphia elevations roughly between Vine and South Streets, river to river, based on Spline interpolation of 1810 elevations in Figure 3. White indicates the higher elevations; green to blue the lower.

("Investigating Dock Creek -- A Lost Waterway from Philadelphia's Colonial Past," Matthew D. Harris, John Milner Associates Inc.)

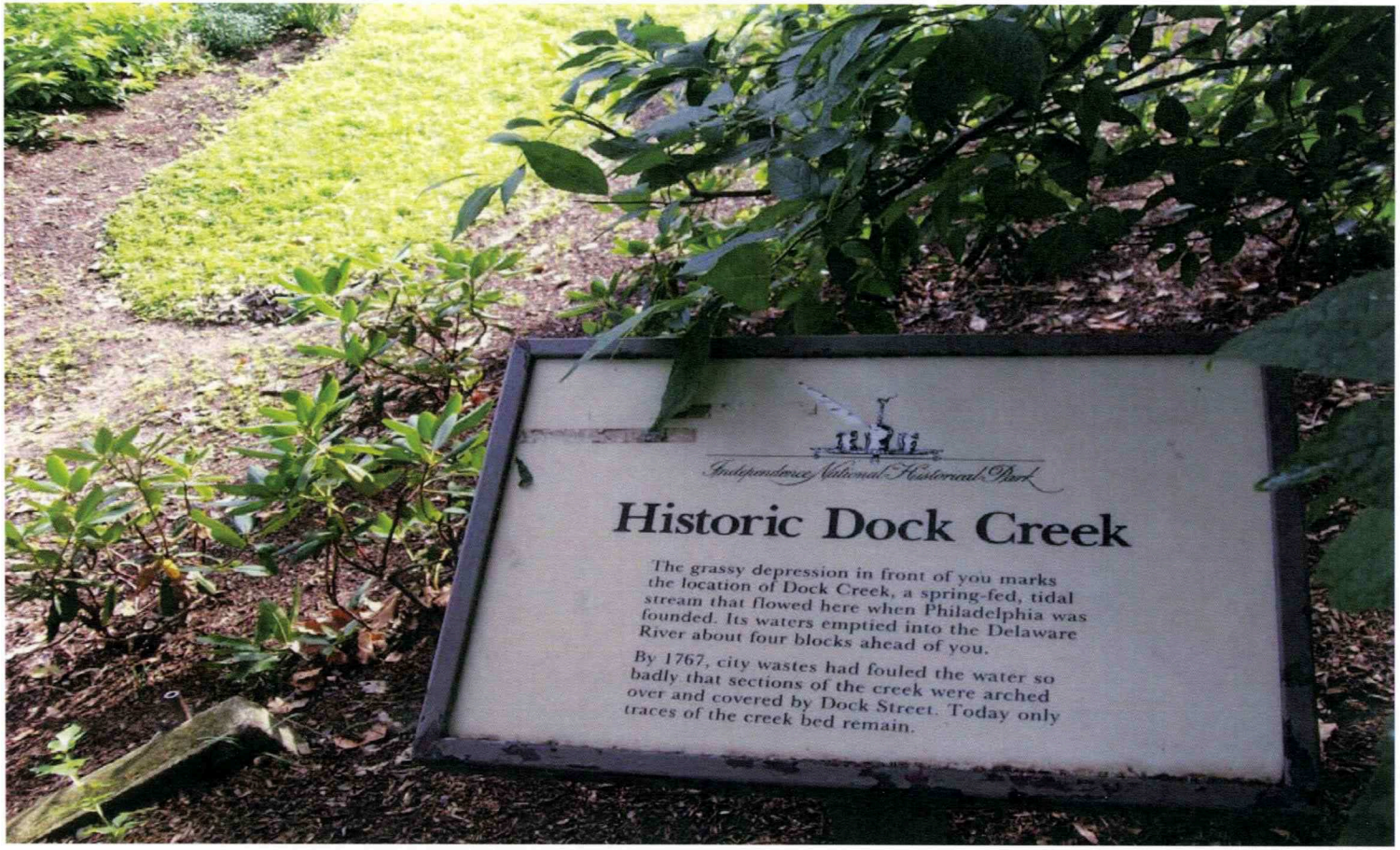


Figure 5. Park Service Marker in Hudson's Alley

Wayside marker placed by the Park Service just east of Hudson's Alley between Chestnut and Walnut Streets where streams from the north and west converged to form the main body of Dock Creek. (*Bill Double*)



Figure 6. Dock Creek Installation

The blue shock cord above represents the convergence of two streams to form the main body of Dock Creek just east of Hudson's Alley between Chestnut and Walnut Streets. It was part of an installation depicting the course of Dock Creek over the terrain where it originally flowed. The 2008 installation by Winfred Lutz titled "Drawing Dock Creek" also employed athletic field paint, white wash and grass to trace the creek's course across the current landscape. The installation was commissioned by the American Philosophical Society in partnership with Independence National Historical Park. (*Bill Double*)

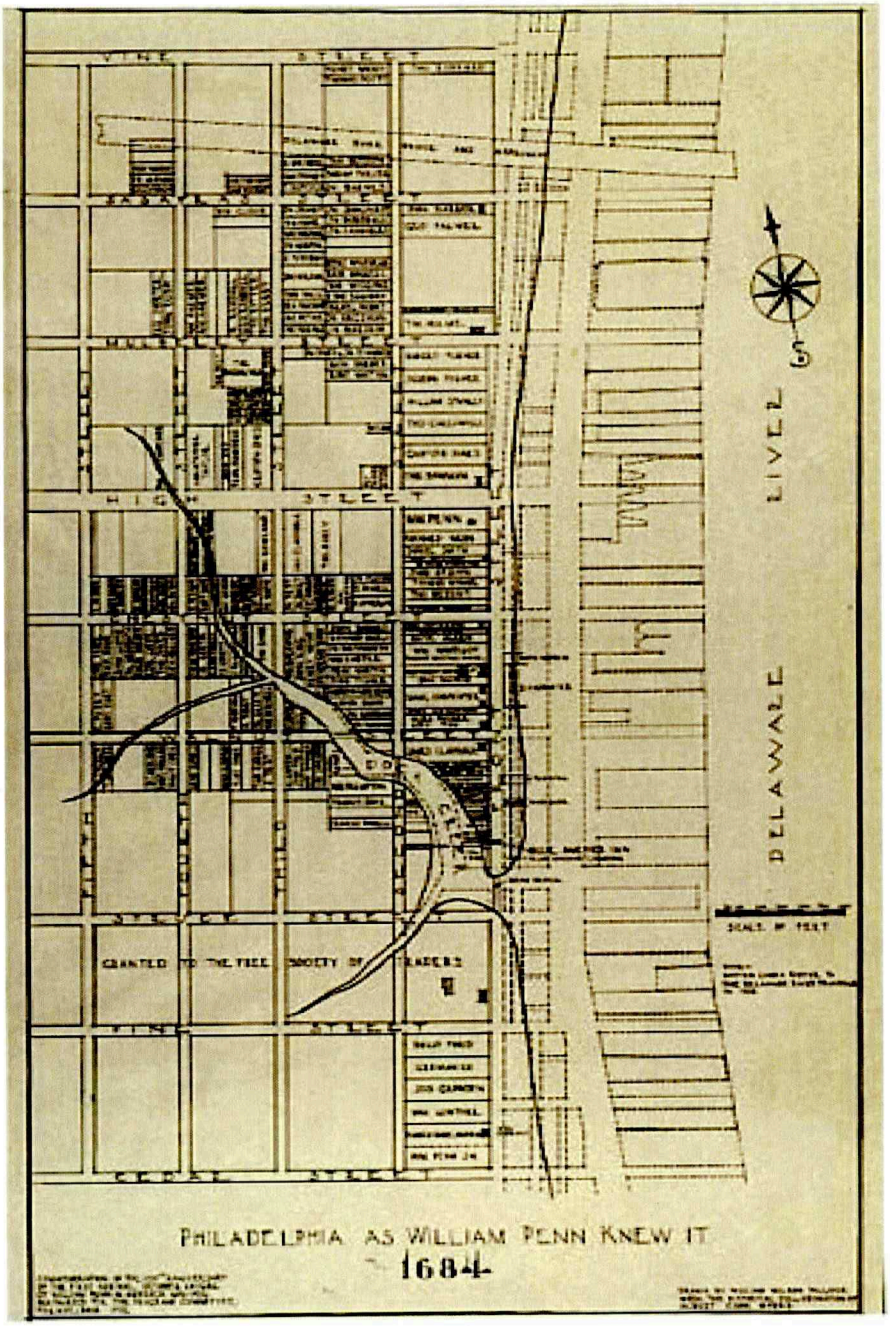


Figure 7. Philadelphia as William Penn Knew It

This map was produced in 1932 to mark the 250th anniversary of Penn's arrival. It portrays Philadelphia in 1684. Prominently depicted are Dock Creek, its tributaries, and property owners of the time. Note the extension of the river bank over the intervening years. (*Philly GeoHistory.org from Frankford Historical Society*)

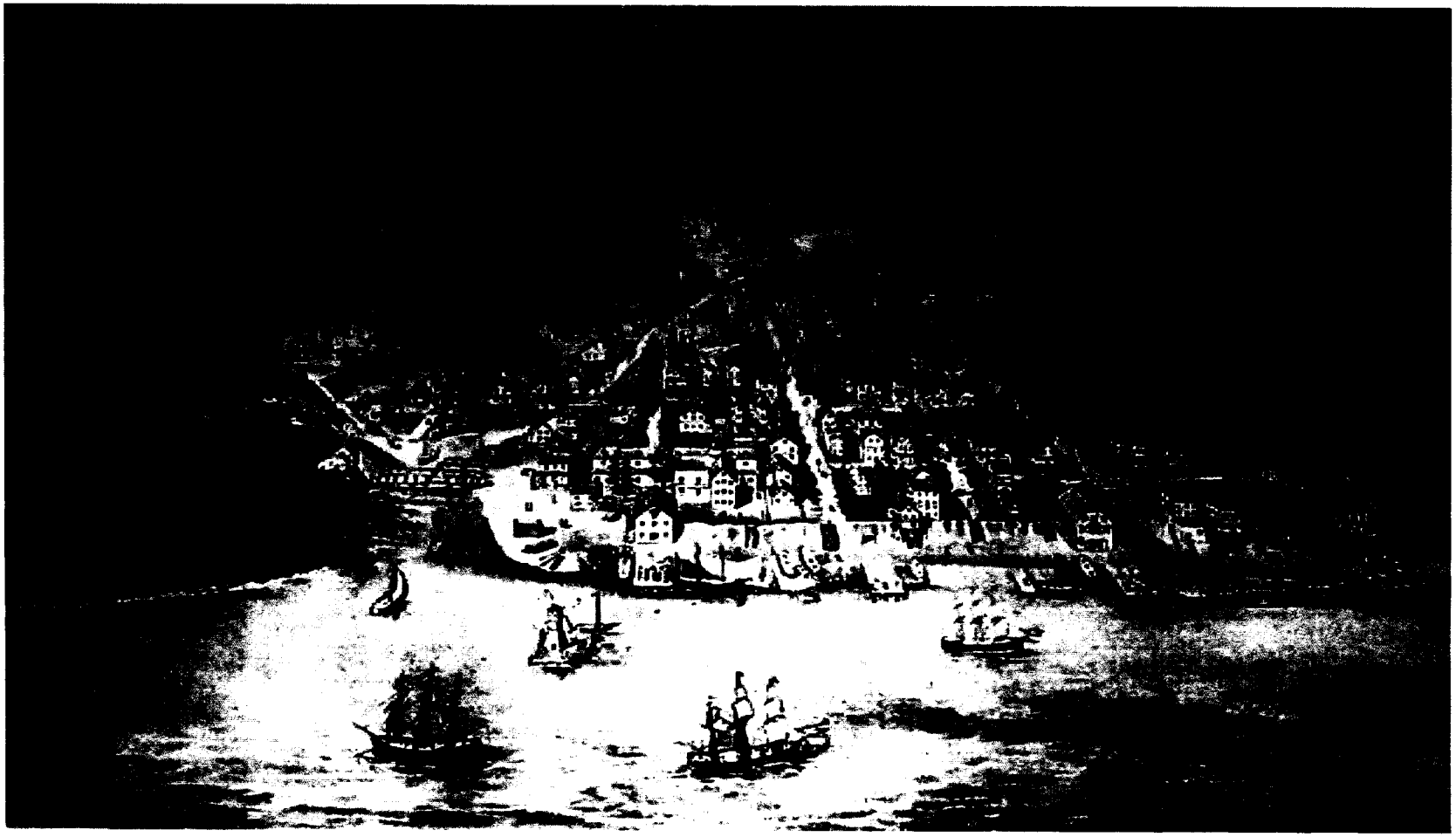


Figure 8. Philadelphia in 1702

This lithograph subtitled "the Centennial city when 20 years old" was published in 1875. It depicts the mouth of Dock Creek, including ship traffic in the Delaware River around the inlet and the drawbridge at Front Street. (*Library of Congress*)

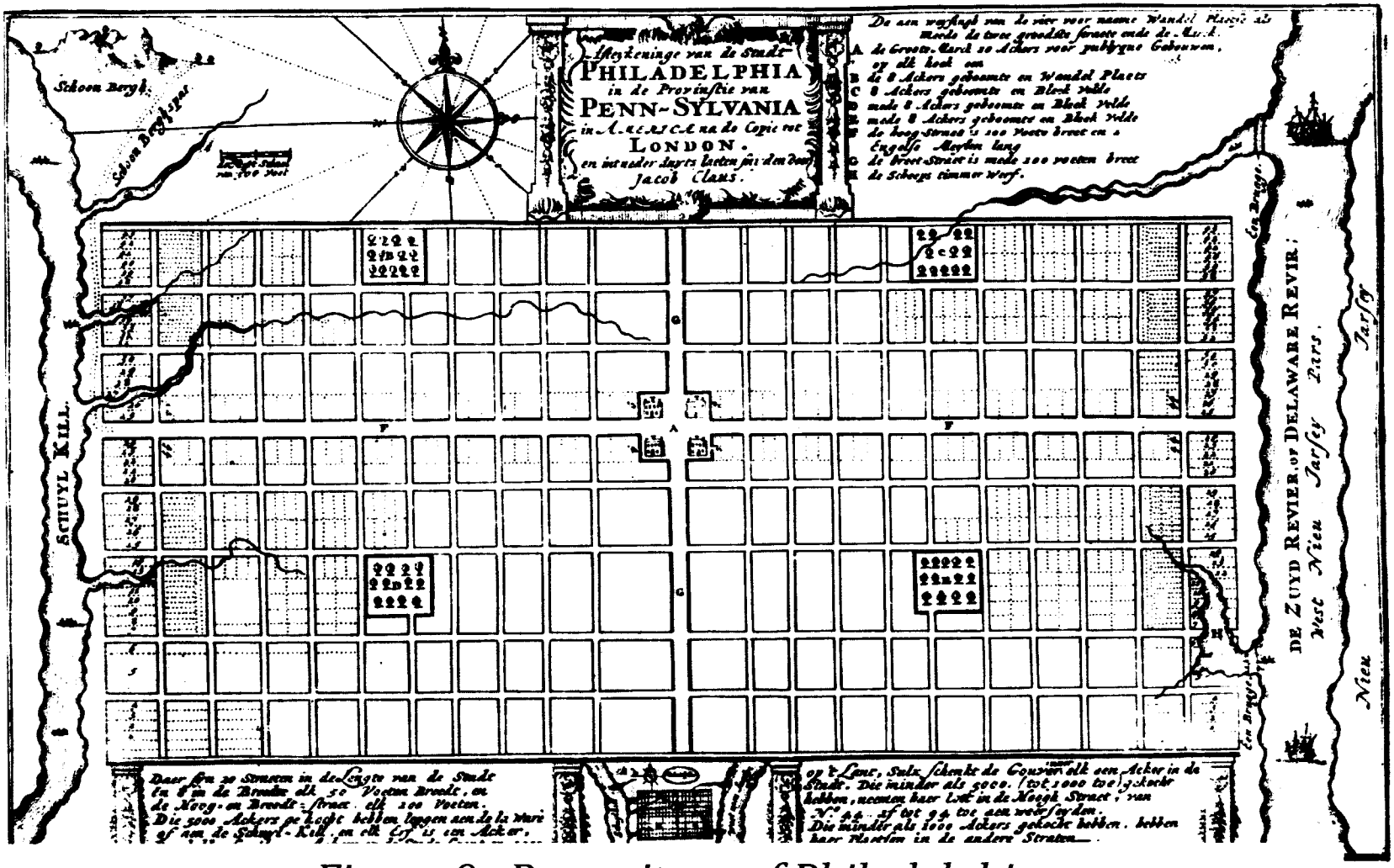


Figure 9. Portraiture of Philadelphia

This plan drawn by Thomas Holme in 1683 was a commercial document intended to help William Penn sell land, not an accurate map of the city. Its orderly street grid was altered after property surveys revealed the city's actual topography. Although the plan shows the Dock Creek inlet south of Spruce Street, later maps placed it north of Spruce. (*1684 Dutch reprint, Free Library of Philadelphia*)

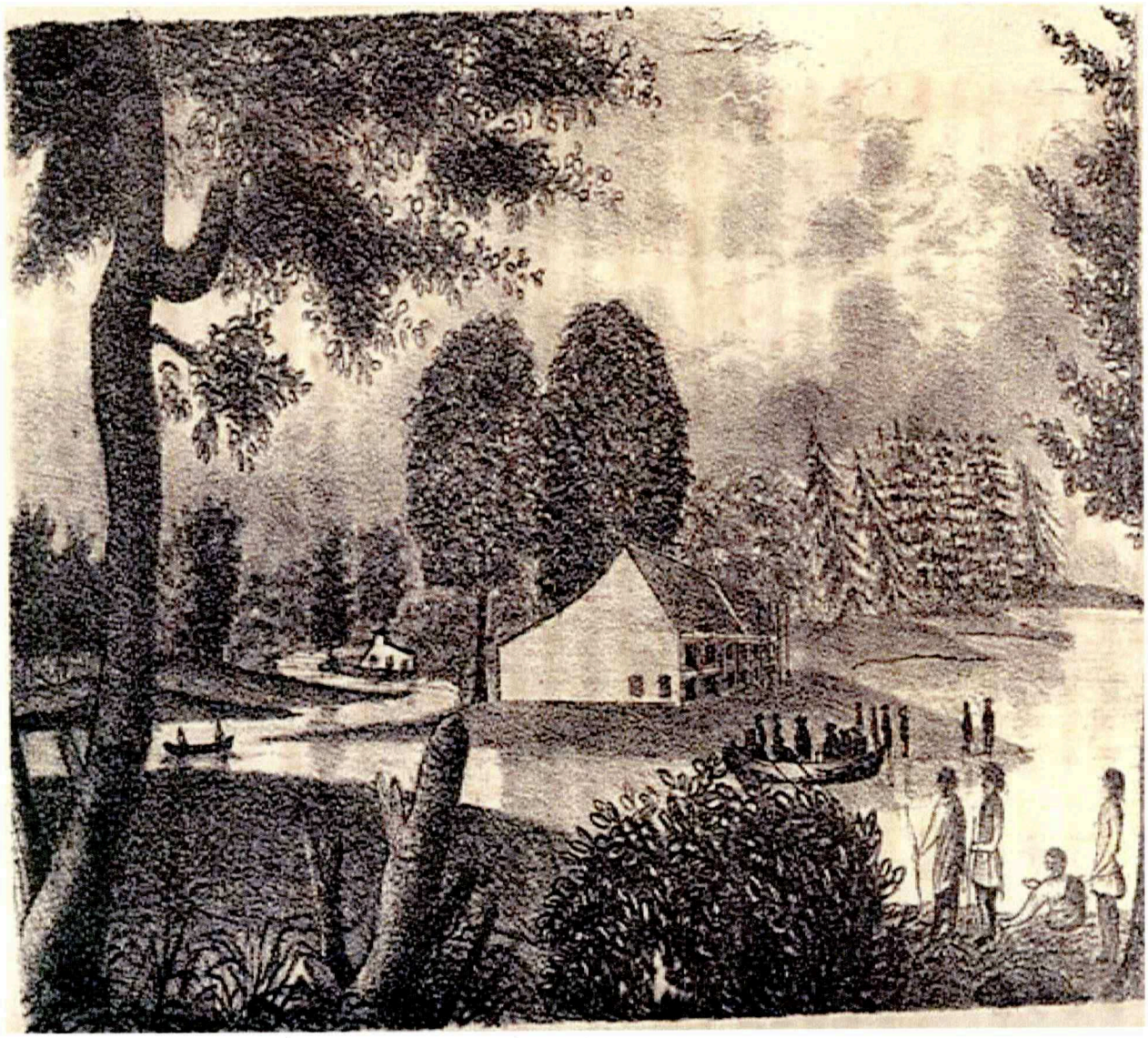


Figure 10. William Penn Landing at Dock Creek Inlet

Lithograph depicting landing of William Penn in Dock Creek inlet in 1682. Penn had come upstream from Chester in an open vessel. The Blue Anchor tavern stands to the right of the inlet. (*Library Company of Philadelphia from John F. Watson's "Historic tales of olden time: concerning the early settlement and progress of Philadelphia and Pennsylvania."*)



Figure 11. Blue Anchor Tavern and Dock Creek

This drawing by Frank H. Taylor, c.1922, is based on a familiar woodcut in Watson's "Annals." It shows the drawbridge at Front Street, marine traffic in the Dock Creek inlet and the Blue Anchor Tavern, an early Philadelphia public house, west of Front Street. (*Library Company of Philadelphia*)

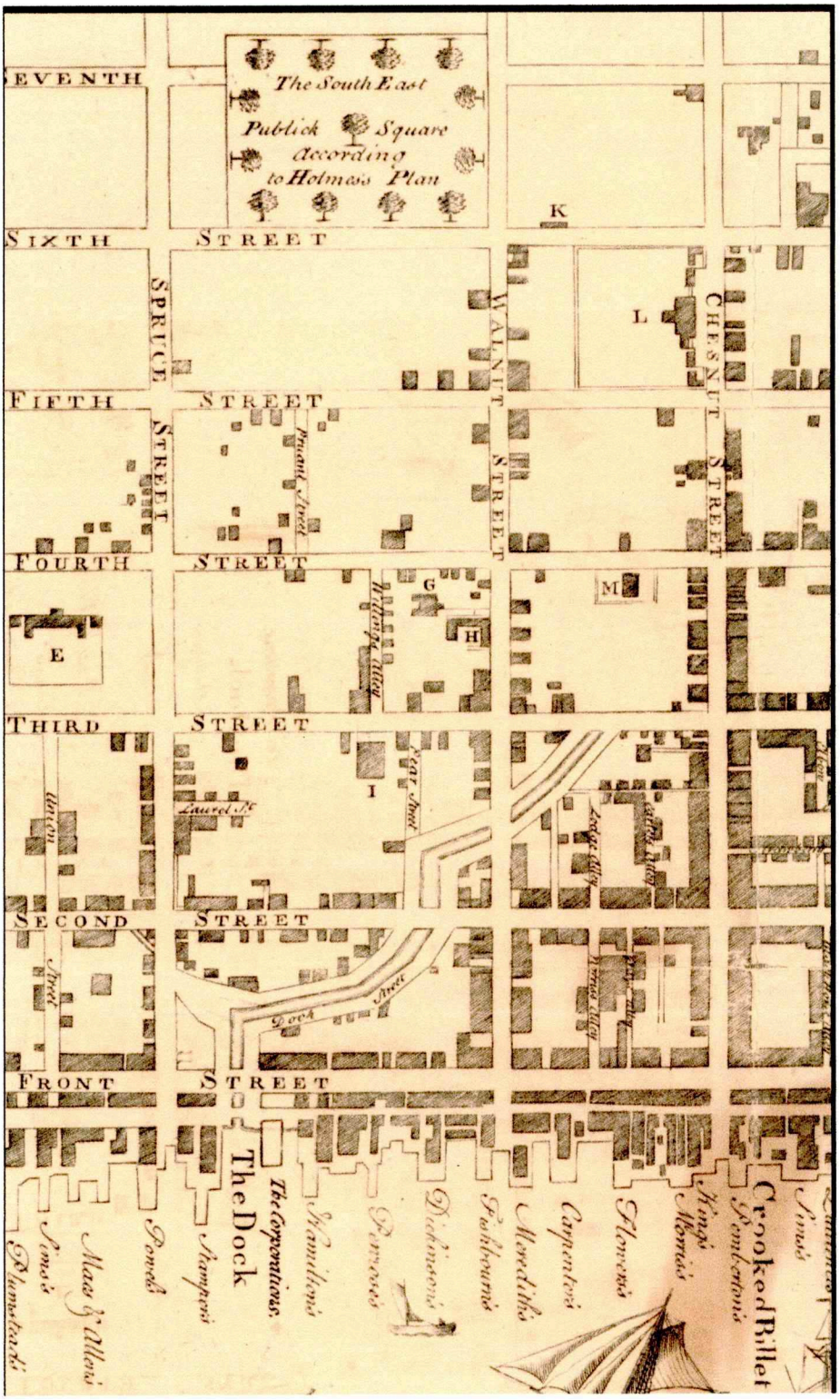


Figure 12. 1762 Clarkson and Biddle Map

Dock Creek was open to Third Street at this time. The roadway on both sides of the creek was known as Dock Street. The map was based on a survey by Nicholas Scull, Esq., surveyor general of Pennsylvania.
(*Free Library of Philadelphia*)

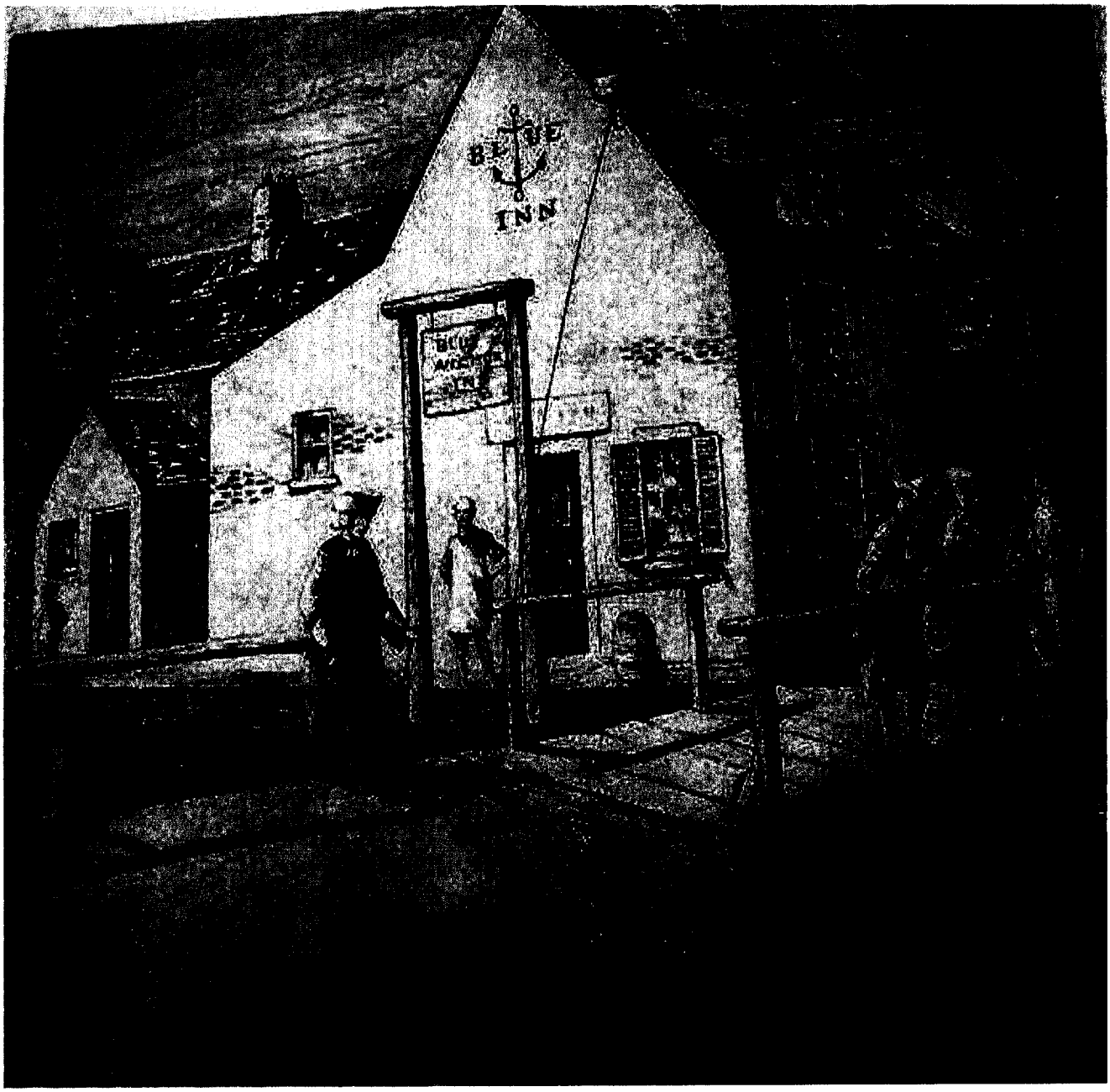


Figure 13. Dock Creek Drawbridge at Blue Anchor Inn

This early 20th century etching by E.T. Scowcroft depicts well-dressed colonials peering into a narrow Dock Creek from a decidedly short drawbridge. The Blue Anchor Inn stands behind them on Front Street. This image appeared in an advertisement of the National Distillers Products Corp. (Free Library of Philadelphia)

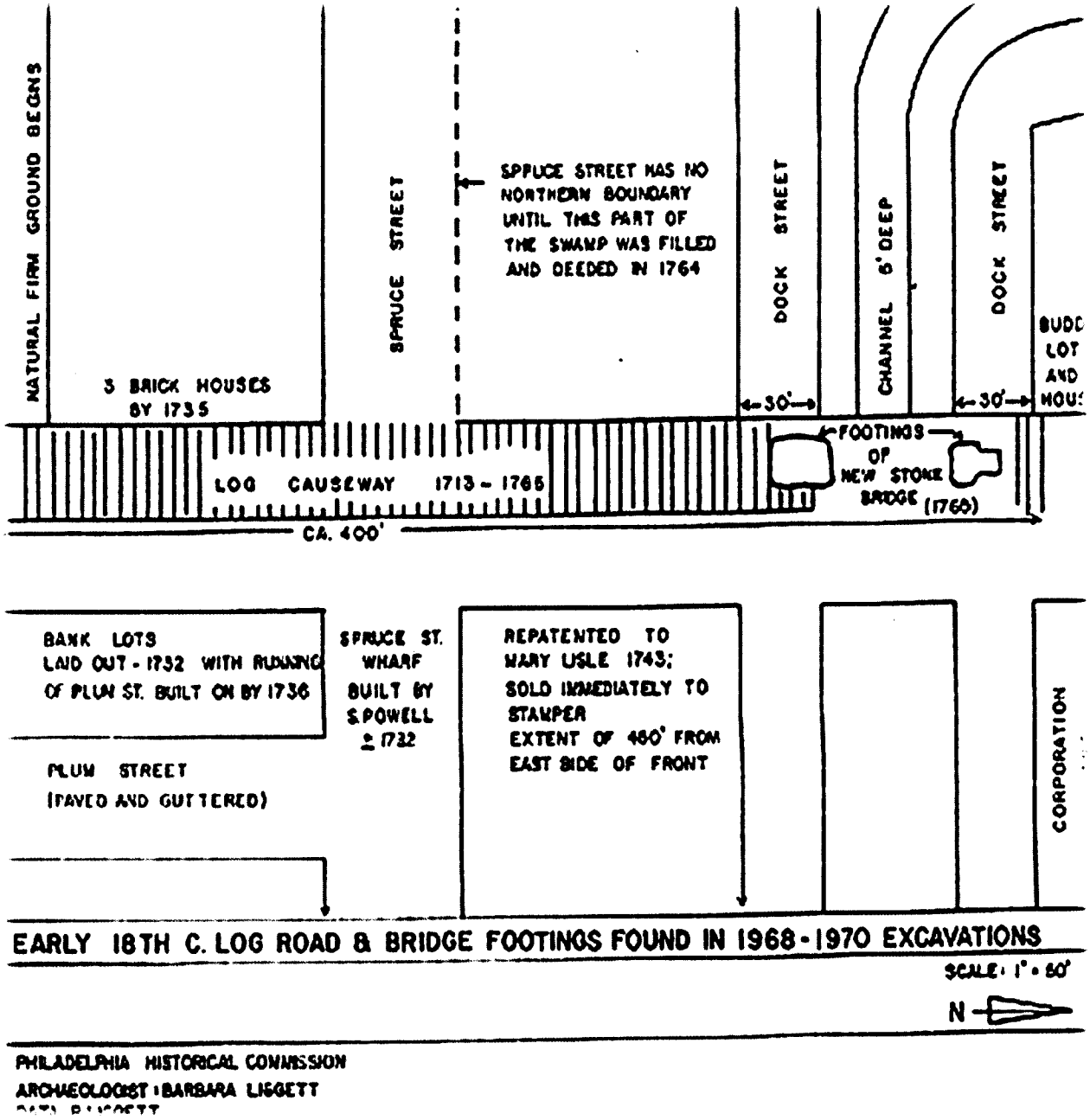


Figure 14. Bridge Footings and Causeway at Front Street

Excavations during the construction of Interstate I-*95* revealed remnants of earlier construction where Dock Creek flowed into the Delaware River. Archaeologist Barbara Liggett observed the excavation. She noted what appeared to be the footings of the 1763 stone bridge which replaced the Front Street drawbridge and a wood cribbing that indicated the remains of a causeway extending southward. *(American Philosophical Society from Philadelphia Historical Commission)*

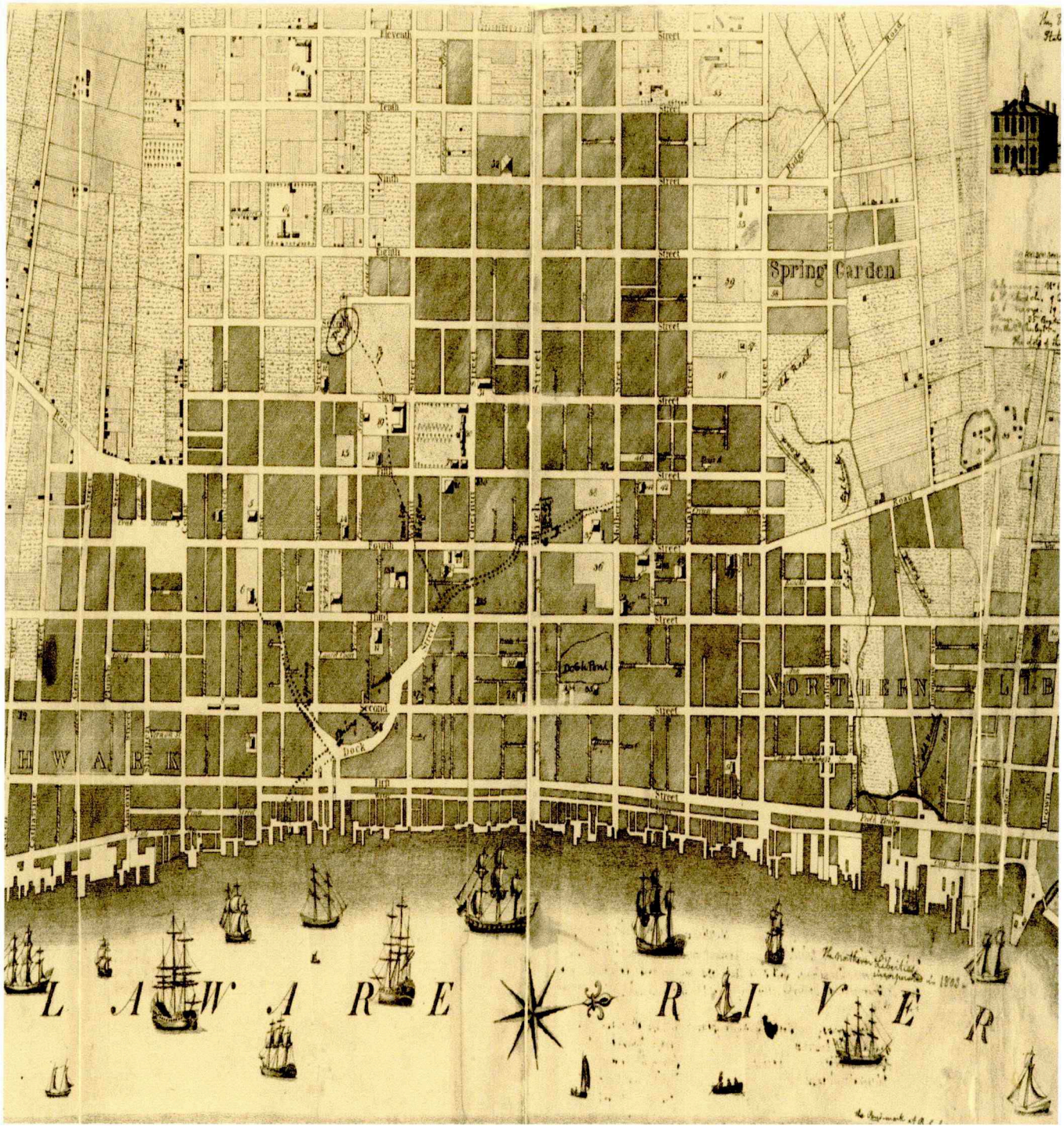


Figure 15. Watson's Conception of Dock Creek

This map, included in a manuscript of John Fanning Watson's "Annals of Philadelphia" is annotated with pen notes showing an extended Dock Creek watershed. (*Library Company of Philadelphia*)



Figure 16. Chestnut Street Bridge

This house at 325 Chestnut Street was built for David Benezet about 1700. The Chestnut Street bridge over Dock Creek is in the foreground. The house is associated with Quaker abolitionist Anthony Benezet, who lived there for many years. Note the rowboat passing under the bridge. (*Library Company of Philadelphia from John F. Watson's Annals of Philadelphia*)

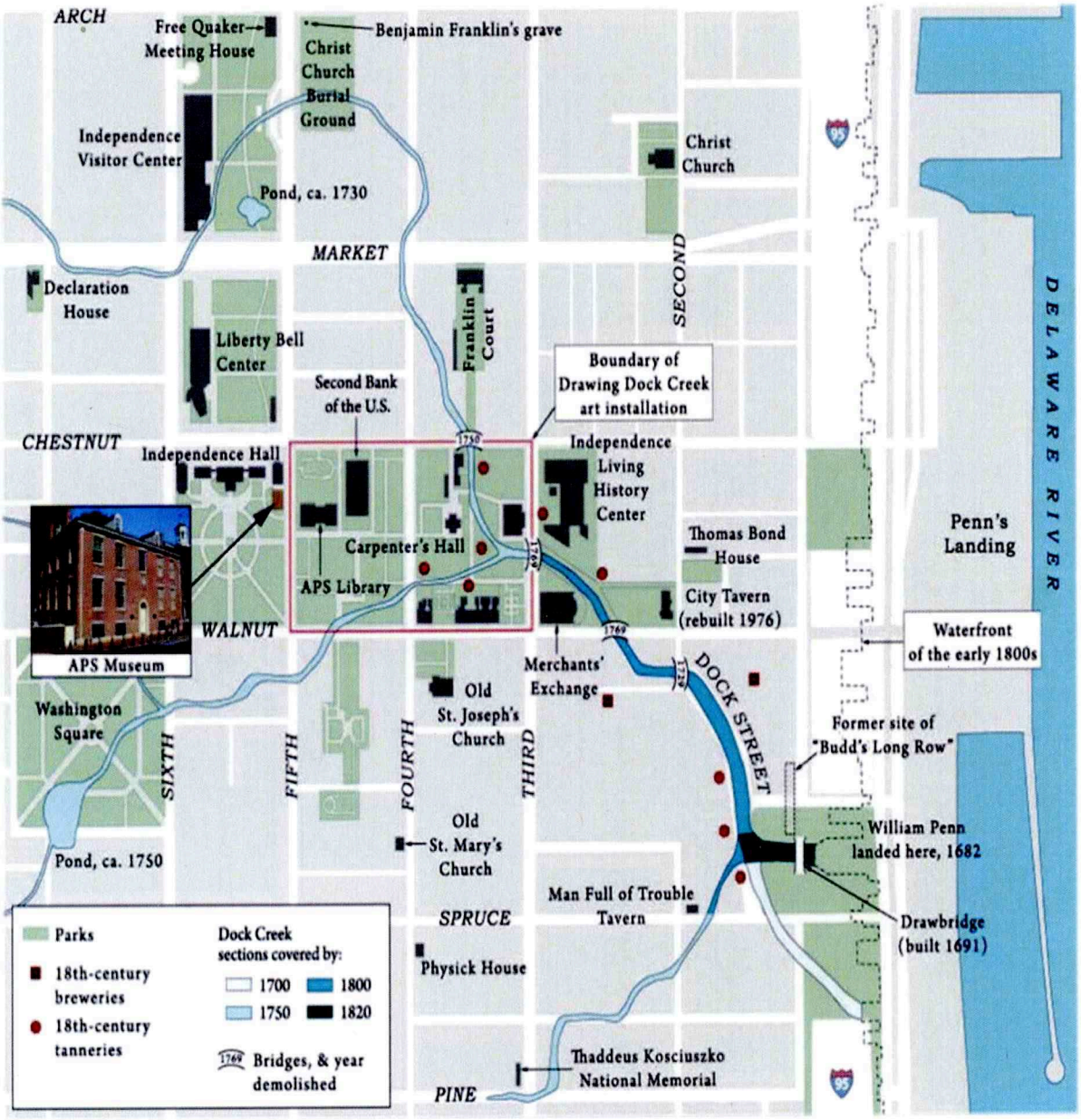


Figure 17. APS Installation Map

This rendering was used to illustrate a brochure for "Drawing Dock Creek," a 2008 installation by Winifred Lutz. The installation commissioned by the American Philosophical Society (APS) Museum depicted a portion of the creek over the terrain where it once flowed. Note the bridges across the creek and the years in which they were demolished and the dates (color coded) by which various portions of the creek were arched and covered. *(Map created by APS Museum)*

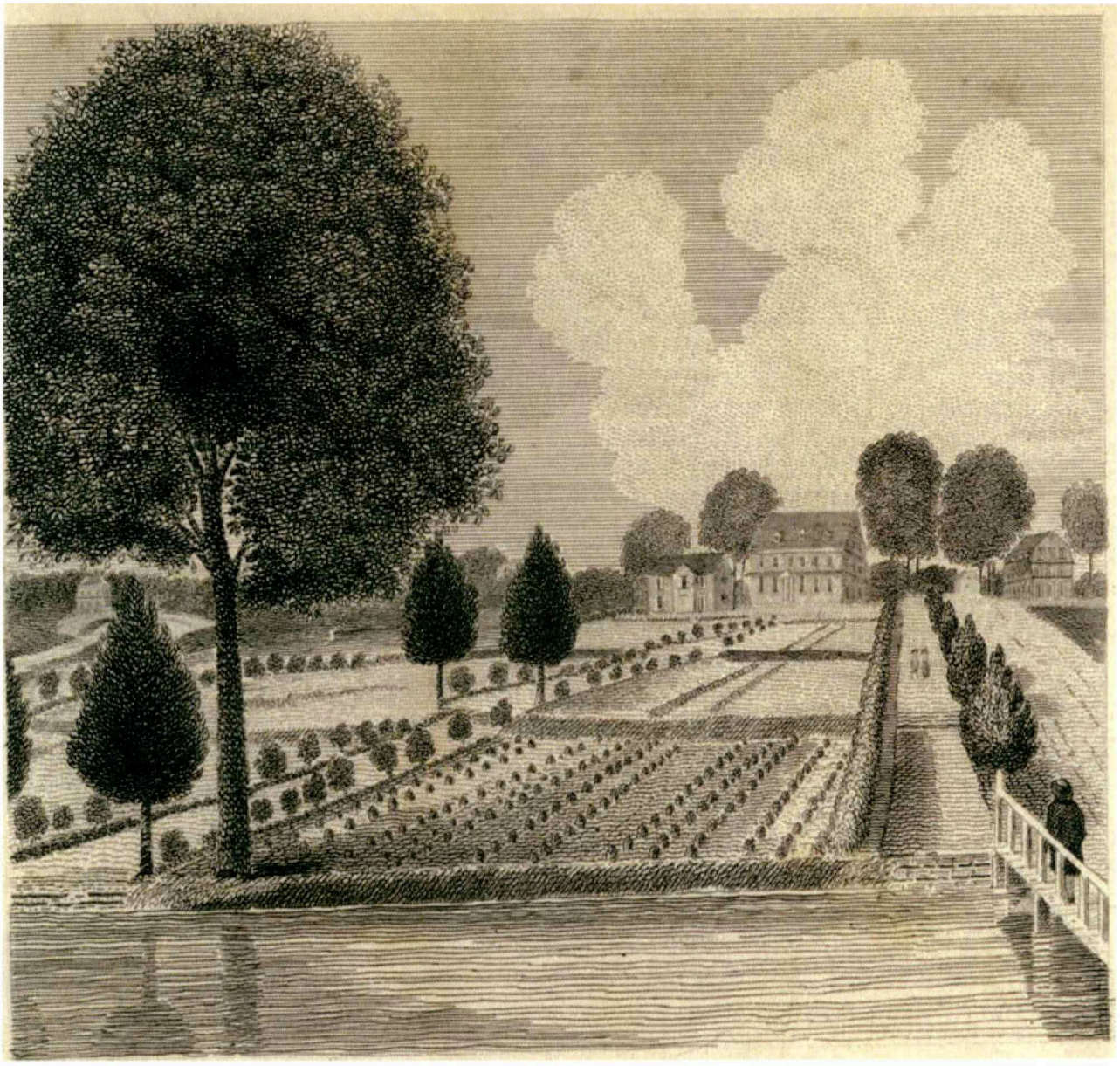


Figure 18. Clarke's Hall and Dock Creek

The grand Clarke's Hall stood at the southeast corner of Third and Chestnut Streets on a tract that extended from Third to Hudson's Alley between Chestnut Street and Dock Creek. It was constructed about 1694 by William Clarke, a wealthy lawyer. The bridge carrying Third Street over Dock Creek is in the right foreground. The First Bank of the United States would be constructed (1795-98) on the property to the rear of Clarke's Hall adjoining Dock Creek. (Library Company of Philadelphia from John F. Watson's *Annals of Philadelphia*)

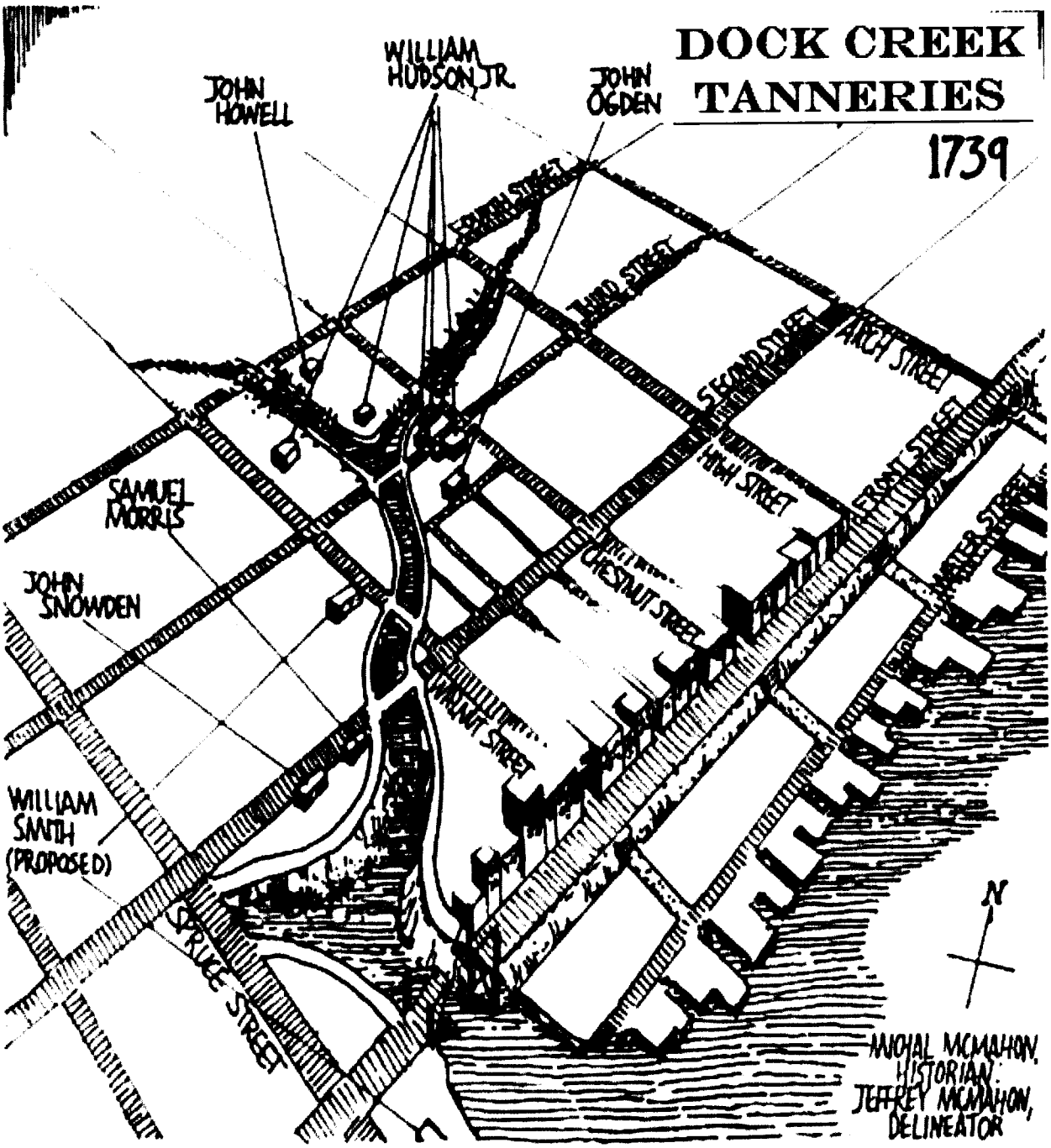


Figure 19. Leather Tanneries Near Dock Creek

This illustration depicts the concentration of leather tanners operating in the area of Dock Creek in 1739. (*A. Michal McMahon, historian; Jeffrey McMahon, delineator)*



Figure 20. Working the Beam

Raw skins were placed on a beam where a distinctively curved knife was used to remove fat and surplus tissue prior to tanning. (*Library of Congress from a woodcut from Hans Sachs, Eygentliche Beschreibung aller Stande...mit kunstreichen Figuren by Jost Amman. Frankfurt, 1568.*)





Figure 21. Stripping and Delivering Bark

In the top photograph, strippers peel hemlock bark that was widely used in tanning leather. Below mule-drawn sleds deliver bark for use at a leather tannery near Tupper Lake, N.Y., circa 1905. (*Northern Woodlands, May 27, 2001, Courtesy of the Adirondack Museum.*)

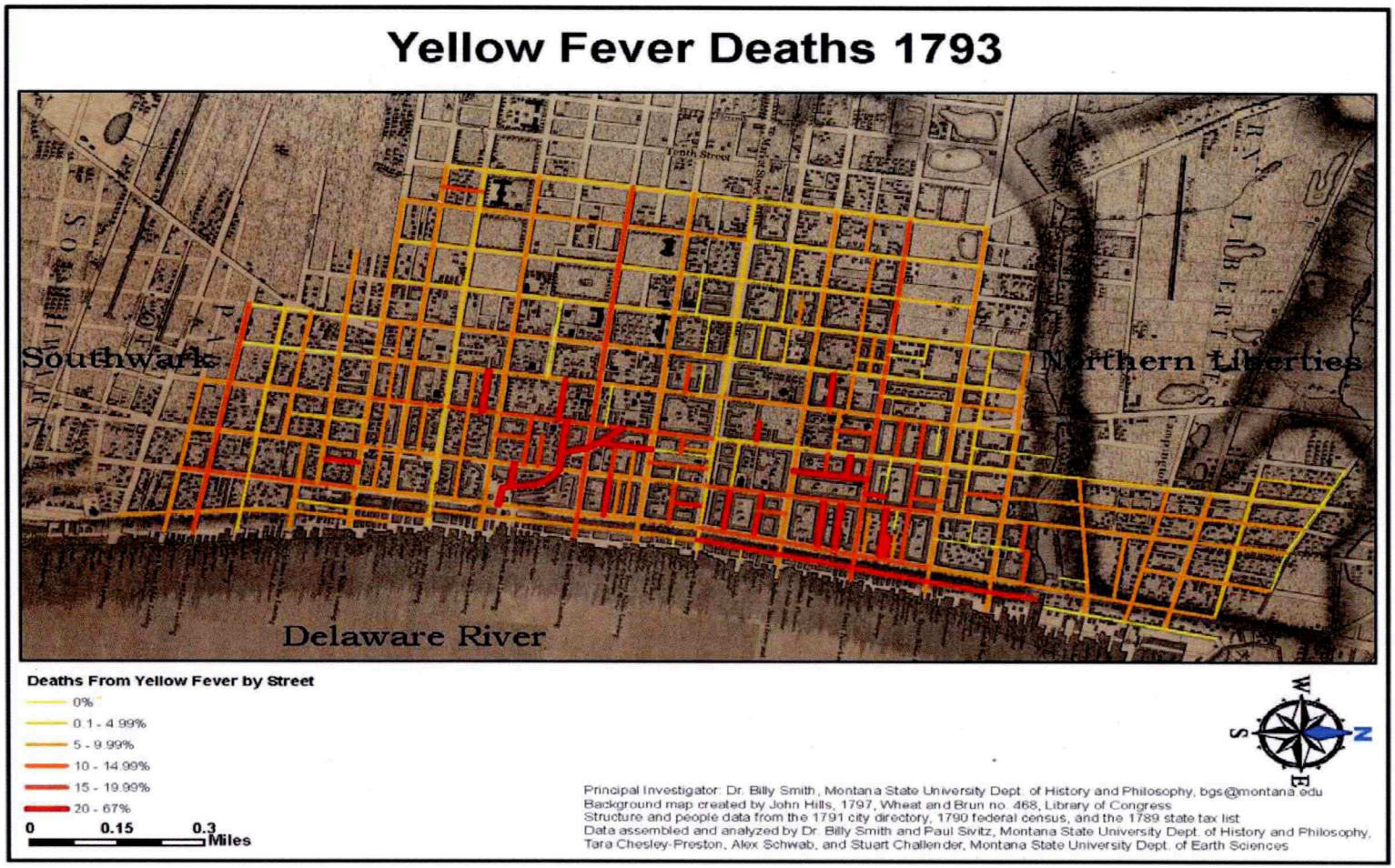


Figure 22. Philadelphia Yellow Fever Deaths, 1793

This map plots yellow fever deaths by street address in 1793, the year of Philadelphia's great yellow fever epidemic. Note the high incidence of fatalities among Dock Street residents. Most of the creek had been covered by then. (*Dr. Billy Smith and Paul Sivitz, Montana State University*)



Figure 23. Market Atop Covered Creek

The produce market established on Dock Street after Dock Creek was arched and covered grew into the city's wholesale food distribution center, shown above in1908. It was relocated to South Philadelphia in 1959. (*Library of Congress*)

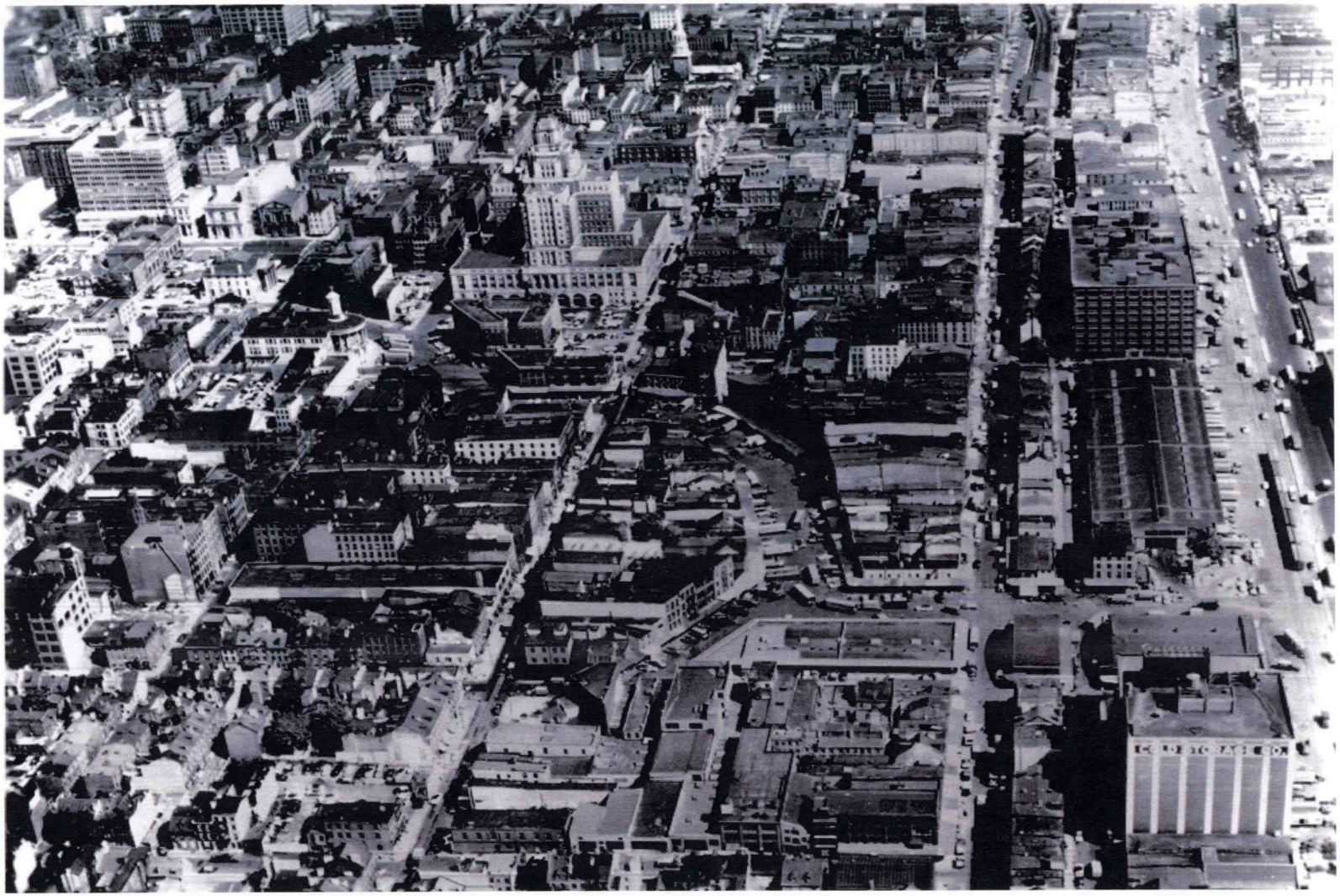


Figure 24. Aerial View of Dock Street

The city's wholesale produce market is evident in this aerial photograph of Dock Street between Third and Front Streets. Begun after Dock Creek was arched and covered, the market continued there until relocated in 1959. (*Independence National Historical Park, courtesy of Philadelphia Redevelopment Authority.*)

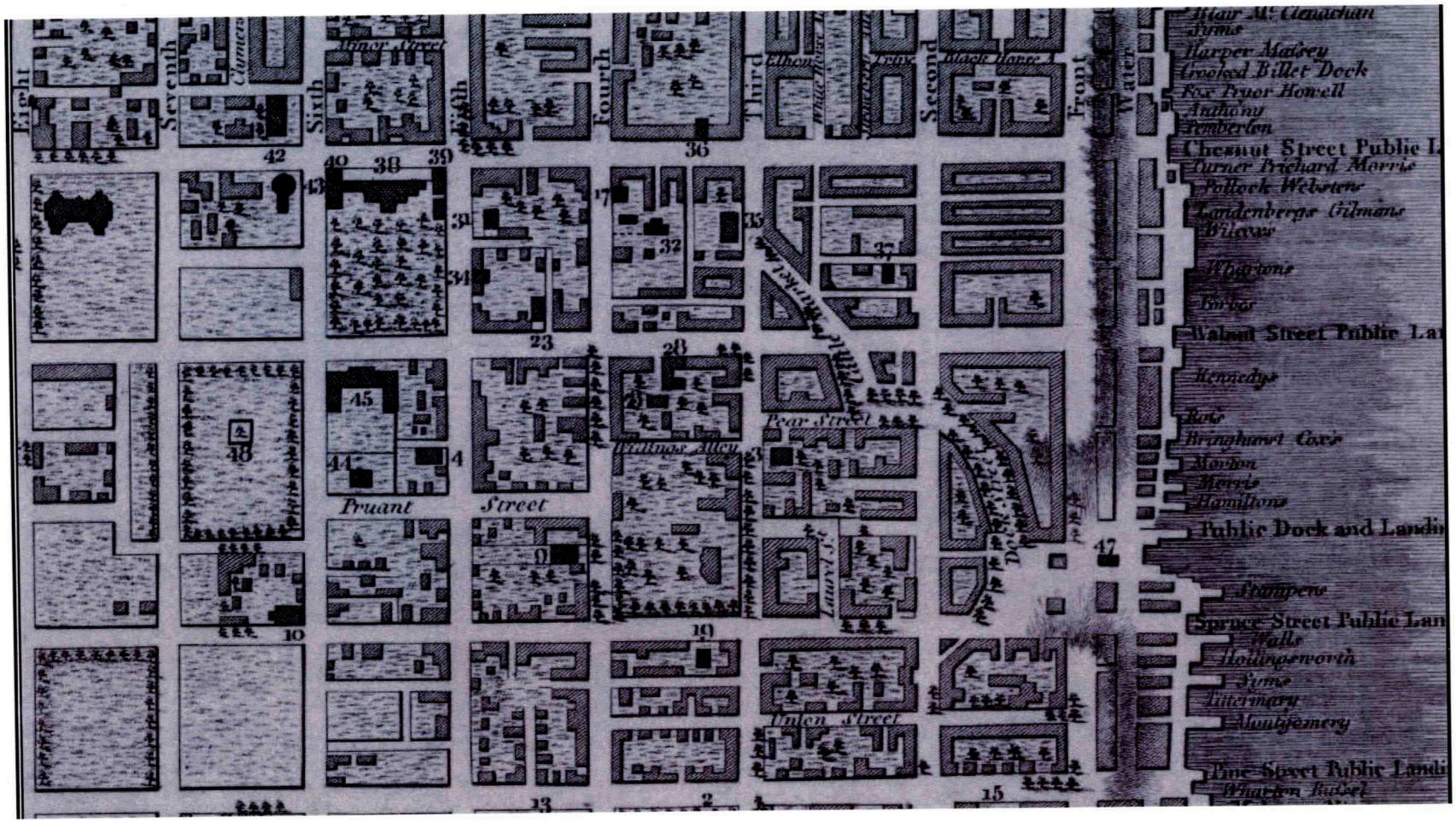


Figure 25. Covered Sections of Dock Creek in 1796

This map is excerpted from a "Plan of Philadelphia and Its Environs" drawn by surveyor and draughtsman John Hills in 1796. By that time, only the public landing at the mouth of Dock Creek remained uncovered. The tree-lined Dock Street represents the only break in the city's historic street grid. Note that the upper segment of the covered creek, between Pear Street (now Thomas Paine Place) and Third Street, is designated as a cattle market. (Library of Congress)

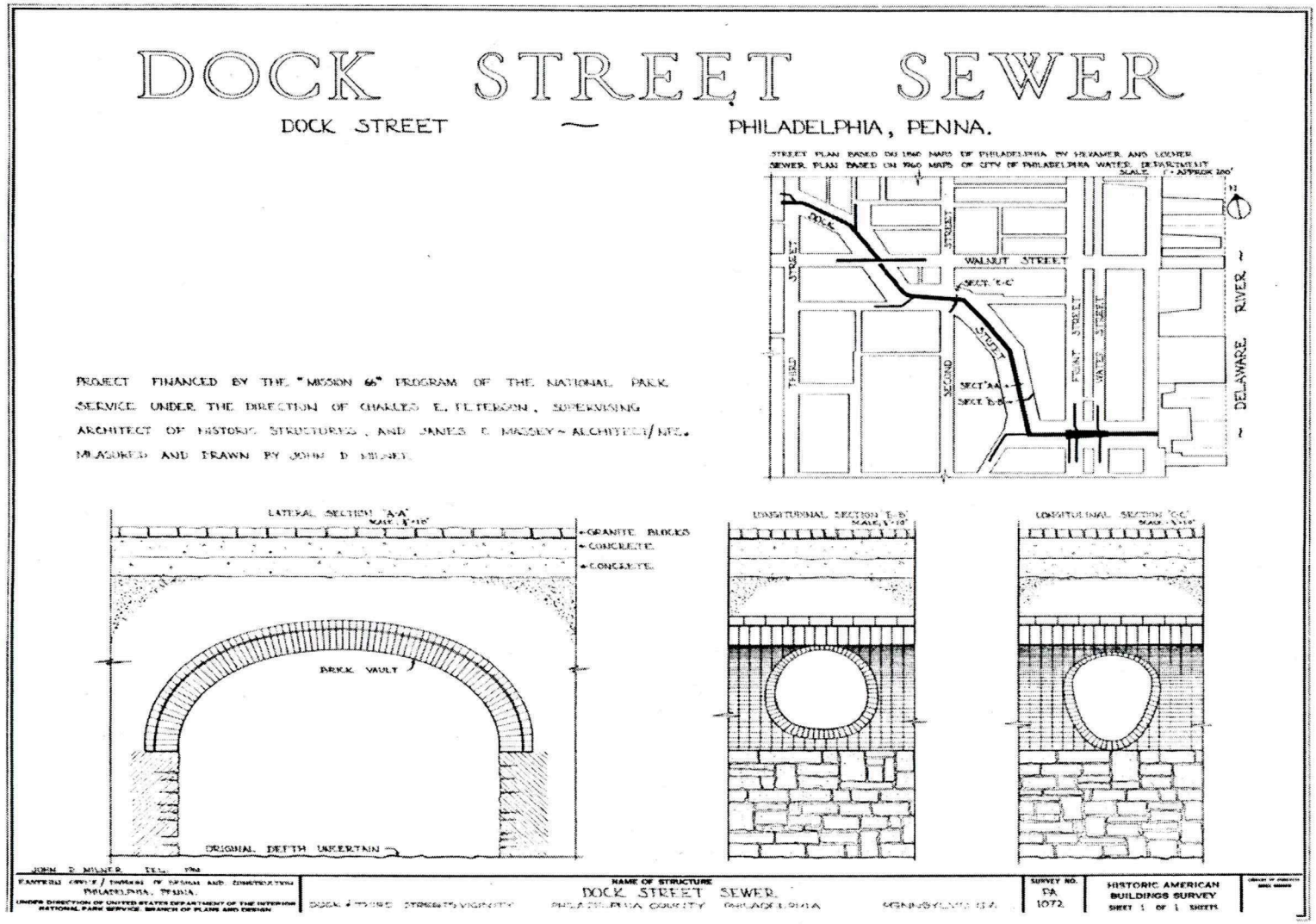


Figure 26. Dock Street Sewer

This plan of the Dock Street Sewer was drawn for the National Park Service in 1962 based on Philadelphia Water Department maps. Connecting sewer lines are shown as are cross-sections of the main arch over the creek and connecting conduits. (*Library of Congress*)

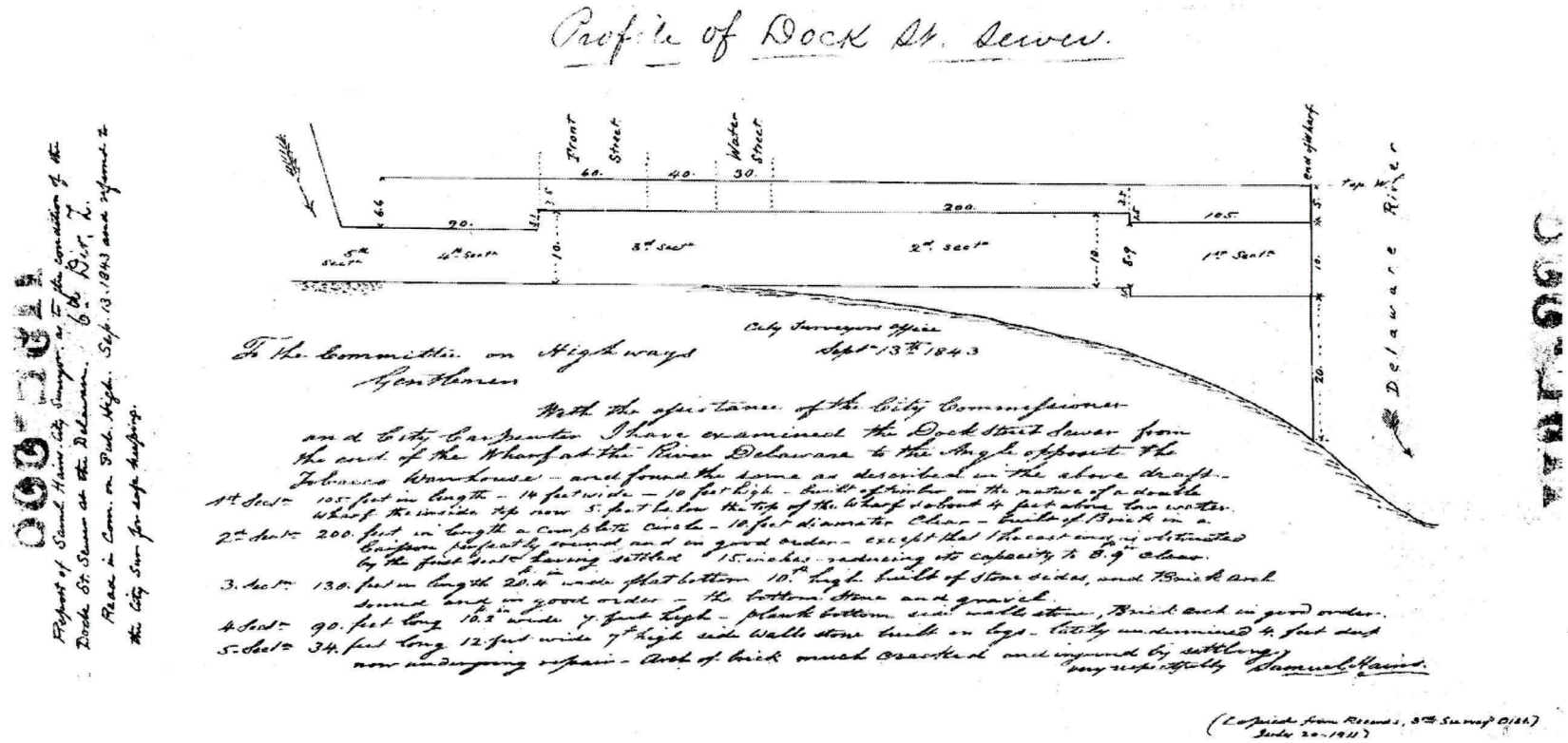


Figure 27. Dock Street Sewer Profile by City Surveyor, Sept. 1843

"With the assistance of the City Commissioners and City carpenter, I have examined the Dock Street sewer from the end of the wharf at the e opposite the River Delaware to the angle opposite the tobacco warehouse – and found the same as described in the above draft: 1st Section--105 feet in length, 14 feet wide-- 10 feet high-- built of timber in the nature of a double wharf-- the inside tip now 5 feet below the top of the wharf and about 4 feet above low water. 2nd Section--200 feet in length a complete circle—10 feet diameter clear—built of brick in a caisson perfectly round and in good order—except that the east end is obstructed by the first section having settled 15 inches–reducing its capacity to 8 ft 9 in clear. 3rd Section--130 feet in length 20.4 wide flat bottom 10 feet high built of stone sides and Brick arch sound and in good order. 4th Section--90 feet long 10.2 wide 7 feet high—plank bottom side walls stone. Brick arch in good order. 5th Section--34 feet long 12 feet wide 7 feet high side walls stone built on logs—lately undermined 4 feet deep now undergoing repair—Arch of brick much cracked and injured by settling." (PhillyH2O.org from Philadelphia Water Department Historical Collection)



Figure 28. New Sewer through Old

City Water Department inserts new sewer main through old brick sewer line under Dock Street in 1960. (*Independence National Historical Park*)

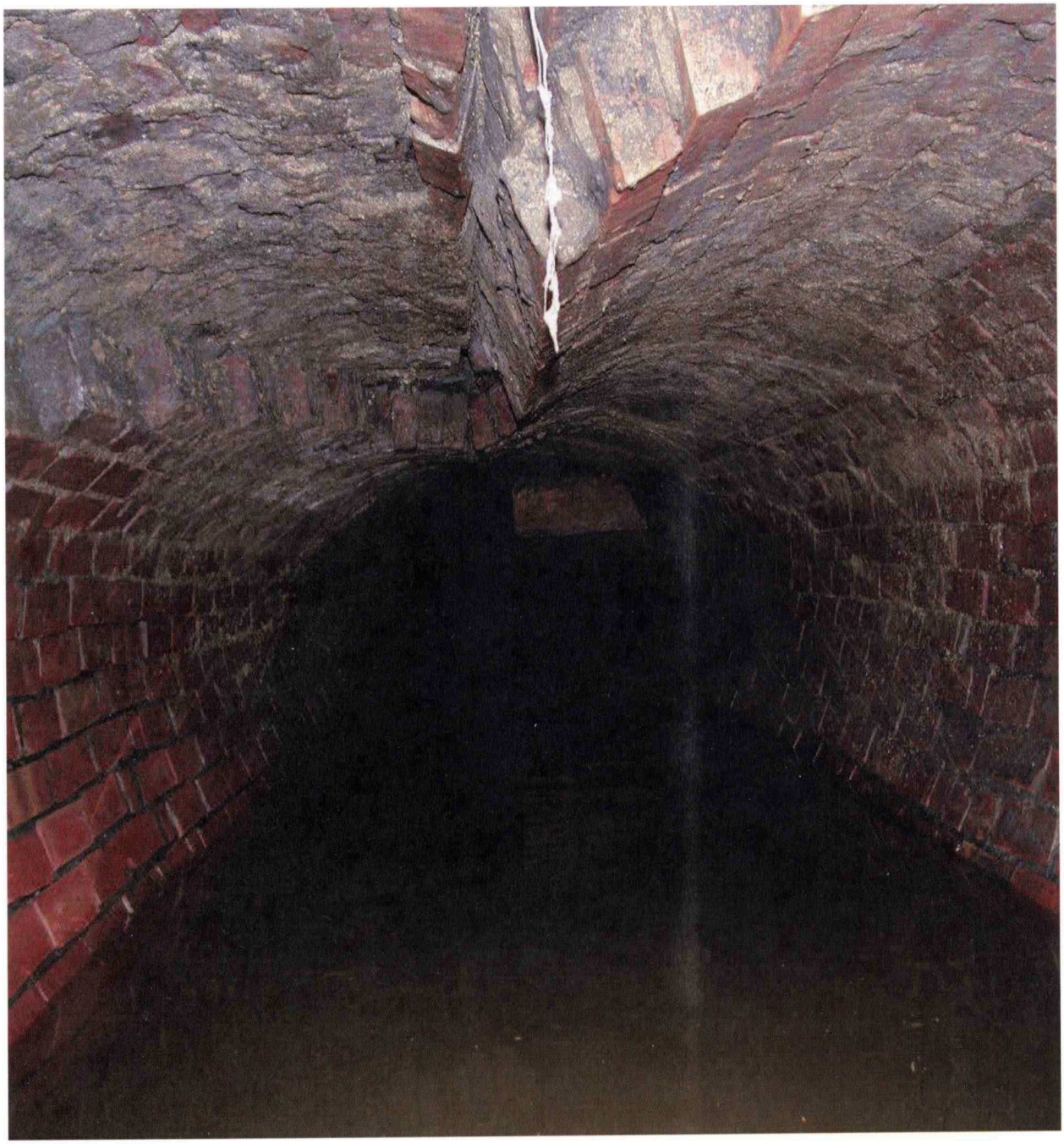


Figure 29. Dock Creek Sewer Repair, 2003

Top section of the Dock Street sewer near Third Street just south of the First Bank following the collapse of a portion of the sewer in 2003. The Philadelphia Water Department repaired and reinforced this portion of the sewer and also installed a manhole for access. (*Independence National Historical Park*)

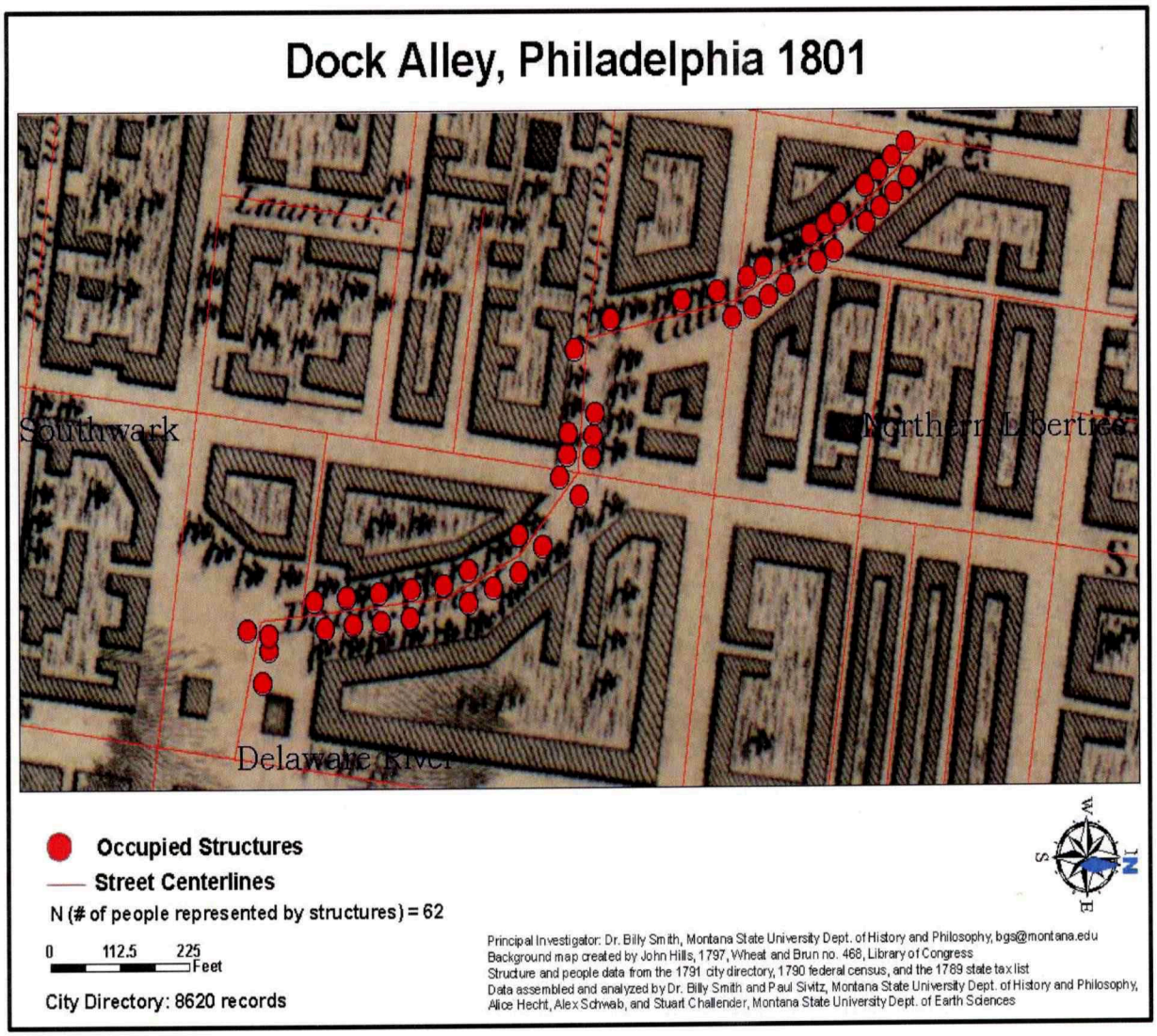


Figure 30. Dock Street Structures, 1801

This map plots the location of occupied structures along Dock Street in 1801. It was compiled by Dr. Billy Smith and his associates at Montana State University, using data from the city directory, state tax list and federal census. The names of residents of these structure and their occupations are provided in Table 4 of this report.

TABLES

1. Dock Creek Bridges
2. Dock Creek Closures
3. Yellow Fever Deaths
4. Dock Street Residents, 1801
5. Pollen Analysis

Table 1. Dock Creek Bridges

YEAR *	BRIDGE	EVIDENCE
1682	Front Street	Wooden drawbridge constructed. This bridge was repaired and replaced repeatedly over the years.[1]
1683 1699	Chestnut Street Wooden bridge Stone arch bridge	Evidence of these dates is contained in a residents' petition of 1719 asking the city to repair the 1699 bridge.[2]
1705	Second Street	Common Council appoints overseers for work and repairs to Society Hill and Second Street bridges, suggesting that the latter was built or under construction then.[3]
1717	Walnut Street	Common Council appoints overseers for repairs to brick bridges at Second Street and Walnut Street, indicating that Walnut Street Bridge had been built by then. The following year, Samuel Powell requested a discount in his stall rents as compensation for building a bridge over Dock Creek at Walnut Street.[4]
1720	Second Street	Common Council approves contract for £125 to build bridge over Dock Creek at Second Street 25 feet wide. Citizens ask that bridge be widened to full width of the street. Council agrees to share additional cost with them.[5]
1740	Third Street	A new stone bridge replaced an earlier wooden bridge.[6] Watson provides an accounting of construction costs of the new bridge. [7]
1763	Front Street	Stone bridge erected across Dock Creek at Front Street, replacing wooden drawbridge.[8]

** Dates are approximate, based on available information.*

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[1] Scharf and Westcott, 2148.
[2] Watson, 371, 372.
[3] MCC, June 1, 1705
[4] MCC, Aug. 9, 1717
MCC, Dec. 29, 1718
[5] MCC, May 11,1720
MCC, June 14, 1720
[6] Scharf and Westcott, 2147.
[7] Watson, p.340.
[8] MCC, April 10, 1764.

Table 2. Dock Creek Closures

YEAR	PORTION ARCHED/FILLED	EVIDENCE
1765-1767	Walnut Street to Third Street	Pennsylvania Statutes, c. DXXXIV of 1765.
1784	Little Dock Creek west of main branch	Liggett, 84.
1784	Walnut Street to public landing west of Front Street	Pennsylvania Statutes, c. MCXI of 1784; Scharf and Westcott , Vol. 1, 433-34)
1791	Funding provided to arch Dock Creek between Third and Fourth Streets	Dunlap's *American Daily Advertiser*, Sept. 6, 1791
1805	City councils direct that Dock Creek branch crossing the present Washington Square between Walnut and Sixth Streets be arched and covered	Scharf and Westcott, Vol. 3, 1845.
1818	Public landing west of Front Street	Philadelphia Ordinance, CCXLVII
1839	Inlet east of Front Street	Closed during construction of Delaware Avenue. (Liggett, 87.)

Table 3. Yellow Fever Deaths by Address, 1793

Market street and north thereof,	Houses.		Dead.	White Inhabitants.		Blacks.	
	shut.	op'n		fled.	rem.	fled.	rem.
Market street, Oct. 5,	162	112	39	799	794	8	55
Water st. Oct. 5 & 7,	74	51	131	221	281	4	27
Front street, Oct. 8,	103	62	126	381	417	1	39
Second street, Oct 9,	117	52	120	451	403	7	22
Third street, Oct. 10,	94	58	58	420	465	11	26
Fourth street,	53	44	42	138	500	7	35
Fifth street, Oct. 11,	52	54	29	162	410	2	22
Sixth street,	26	55	13	119	333	1	34
Seventh street,	22	26	8	106	170	1	7
Eighth street,	21	34	3	89	229	0	13
Ninth street, Oct. 12,	5	12	5	19	75	1	2
Arch street, Oct. 16,	91	90	92	433	512	9	47
Race street,	103	85	118	373	644	6	32
Vine street, S. side,	24	31	37	81	167	1	8
Ellfry's alley,	14	5	23	6	42	0	0
Drinker's alley,	1	1	8	0	4	0	0
Coates' alley,	1	3	11	13	26	0	0
New street,	36	20	46	92	180	3	0
Moravian alley,	10	11	37	26	50	0	0
Church alley, Oct. 19,	13	3	3	32	35	1	1
Watkins's alley,	5	1	11	20	12	0	0
Quarry street,	7	5	10	18	53	0	4
Cherry alley,	31	39	28	99	268	0	25
South alley,	5	10	2	15	69	0	1
North alley,	6	10	2	36	70	0	4
Sugar alley,	21	22	4	79	148	0	14
Stirling alley,	4	6	9	13	41	0	0
Crown street,	4	8	7	10	125	0	0
Apple-tree alley,	7	11	18	17	57	0	7
Creason's alley,	6	18	8	51	72	0	10
Shiveley's alley,	8	22	3	25	105	0	11
Filbert street,	1	6	1	6	37	0	0
Pewter-Platter alley,	11	19	32	56	105	0	3
Coombs's alley,	8	13	29	57	81	0	5
Chancery lane, Dec. 2	6	5	9	22	31	0	0
Hoffman's alley,	3	10	1	21	51	0	0
Baker's alley,	0	5	3	0	19	0	7
Benner's alley,	1	0	0	7	0	0	0
Branch street,	19	10	20	37	90	0	0
Brook's court,	2	5	2	14	17	0	1
Pearrie' alley,	2	5	4	11	33	0	0
Groffs' alley,	0	4	5	8	18	0	0
M'Cullough's alley,	2	6	10	6	34	1	0
Mulberry court,	4	0	1	14	0	0	0
Priest's alley,	1	1	0	5	0	0	6
Say's alley,	1	1	0	5	0	0	6
Shepperd's alley,	1	7	5	7	14	0	0
Steinmetz's alley,	0	8	0	0	25	0	0
Stiles' court,	1	0	1	7	0	0	0
Market st. & northw'd	1178	1066	1152	4627	7332	64	474

South of Market street.	Houses.		Dead.	White Inhabitants.		Blacks.	
	shut.	op'n		fled.	rem.	fled.	rem.
Waterstreet, Nov. 22,	88	48	56	205	317	2	10
Front street,	157	61	94	666	511	28	101
Second street,	145	83	92	609	524	25	91
Third street,	94	39	87	364	241	24	42
Fourth street,	52	55	61	213	389	7	74
Fifth street,	18	63	31	128	289	5	58
Sixth street,	12	29	15	51	225	2	35
Seventh street,	3	7	2	14	59	0	0
Eighth street,	8	24	18	62	211	0	16
Ninth street,	2	5	1	2	38	0	0
Penn street,	22	17	14	111	108	3	8
Chesnut street,	88	56	88	484	338	18	32
Walnut street,	48	53	84	211	426	9	74
Spruce street,	54	63	55	243	399	9	57
Pine street,	29	39	19	159	284	14	17
South street, N. side,	10	18	5	31	93	4	28
Lætitia court,	3	11	18	24	64	0	0
Black Horse alley,	8	1	6	17	30	0	0
Strawberry lane,	1	2	0	0	8	0	4
Strawberry alley,	23	13	23	108	75	2	0
Elbow lane,	9	5	11	60	29	2	8
Beetle's alley,	3	5	5	8	36	0	5
Carter's alley,	13	10	14	71	59	0	0
Gray's alley,	6	10	19	30	43	0	13
Norris's alley,	7	5	6	43	14	0	4
Dock Street	**14**	**25**	**78**	**57**	**134**	**0**	**5**
[illegible]	[illegible]						
Cypress alley,	3	7	20	23	43	0	1
Pear street,	7	6	19	17	53	0	5
Lombard street,	19	60	25	68	297	13	44
Mifflin's alley,	3	6	7	1	21	0	0
Elmsley's court,	4	8	9	24	39	0	6
Laurel court,	3	3	6	19	17	0	1
Shippen's alley,	2	19	11	5	102	0	26
Willing's alley,	1	4	6	3	30	0	1
Blackberry alley,	1	5	3	3	16	0	2
Carpenter street,	1	3	0	2	17	0	7
Crooked Billet,	1	0	0	7	0	0	0
Gaskill street,	10	15	7	5	113	0	7
George st. to So'th st.	1	6	1	8	22	0	5
Little Water street,	2	12	5	1	69	4	1
Lodge alley,	1	0	1	6	0	0	0
Relief alley,	3	0	1	8	6	0	0
Stamper's alley,	1	13	6	5	67	0	8
Taylor's alley,	0	2	1	3	6	0	1
York court,	1	1	2	5	0	1	6
Zachary's court,	0	2	0	0	13	0	0
Patton's alley,	2	3	3	8	14	0	0
Smith's alley,	0	3	5	0	18	0	0
South of Market st.	1009	969	1068	4289	6133	174	833

Hazard's Register of Pennsylvania, Vol. X (July 1832 – January 1833), 116.

*Table 4. Dock Street Residents, 1801**

First Name	Last Name	Occupation	address
John	Richards, jun.	currier	5 Dock street
Samuel	Richards	lime seller	5 Dock street
Thomas and Joshua	Fisher	merchants	5 Dock street
Edward	Dunant and Thomas Gilpin	merchants	7 Dock street
James	Shields	grocer	7 Dock street
John	Lyman	shoemaker	9 Dock street
Thomas	Shields	gentleman	13 Dock street
Henry	Prall	windsor chair maker	15 Dock street
William	Lowber	currier	17 Dock street
James	Whitaker	windsor and fancy chair maker	19 Dock street
C.F.	Rousset	merchant	23 Dock street
Joseph S.	Lewis	merchant	25 Dock street
Samuel and Miers	Fisher	merchants	27 Dock street
Francis and John	West	merchants	29 Dock street
John	Underwood	merchant	33 Dock street
Thomas	Murgatroyd and Sons	merchants	35 Dock street
Daniel	Thuun	merchant	37 Dock street
Thomas	Brown	cooper	39 Dock street
Soloman	Willis	turner	61 Dock street
Peter	Yorke	shipmaster	61 Dock street
John	Melbeck	broker and commission merchant	63 Dock street
F.H.	Holtzbecher and Harmes	merchants	65 Dock street
Israel	Paxson	currier	67 Dock street
James	Ker	coach maker	71 Dock street
Joseph	Dubree	tavernkeeper	73 Dock street
Andrew	Dixon	cabinet maker	77 Dock street
John	Aitkin	cabinet maker	79 Dock street
	Keen and Sellers	curriers	81 Dock street
	Wilson and Elaphant	upholsterers	83 Dock street
Martha	Smallwood	tavernkeeper	8 Dock street
John	Moore	shoemaker	8 Dock street
William	Allen	innkeeper, painter and glazier	8 Dock street
Sarah	Wiley		8 Dock street
John	Craig	merchant	12 Dock street
Thomas	Baker	sea captain	14 Dock street
	Levi, Hollingsworth	merchant	16 Dock street

Dock Residents, 1801

Moore	Wharton	merchant	18 Dock street
George	Oakley	gentleman	20 Dock street
Robert	Oakley	currier and tanner	22 Dock street
T.	Walter	blacksmith	26 Dock street
Woolery	Gross	trader	26 Dock street
Elizabeth	Brooks	widow	26 Dock street
Thomas	Pole	printer	30 Dock street
Edward	Pole	auctioneer	32 Dock street
Edward	Pole and co.	auctioneers	34 Dock street
Edward	Ellaways and co.	merchants	42 Dock street
Alexander	Russell	mariner	46 Dock street
John	Magnus	taylor	46 Dock street
Samuel	Elliott	currier	54 Dock street
	Breintall		54 Dock street
Benjamin W.	Morris and co.	merchants	58 Dock street
John	Ramsey	currier	62 Dock street
Eliza	Person	pastry cook	64 Dock street
J.C.	Warren and co.	tanners and curriers	70 Dock street
John	Cameron	bookbinder and stationer	72 Dock street
George	M'Clure	druggist	74 Dock street
William	Smith	taylor	72 Dock street
Richard	Phillips	ornamental gilder on glass	74 Dock street
William	Haydon	japann'd furniture manufactory	78 Dock street
John	Miller, jun.	merchant	80 Dock street
Godfrey	Gebler	blacksmith	82 Dock street
George	Gass	constable	84 Dock street

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Structure and people data from the 1791 city directory, 1790 federal census, and the 1789 state tax list
Data assembled and analyzed by Dr. Billy Smith and Paul Sivitz, Montana State University Dept. of History and Philosophy, Alice Hecht, Alex Schwab, and Stuart Challender, Montana State University Dept. of Earth Sciences

* Figure 30 maps the occupied structures along Dock Street in 1801.

Table 5. Dock Creek Pollen Analysis

Table 1. Latin and vernacular plant names.

Arboreal

Oak--*Quercus*
Chestnut--*Castanea*
Beech--*Fagus*
Walnut--*Juglans*
Hickory--*Carya*
Birch--*Betula*
Alder--*Alnus*
Hazel--*Corylus*
Red maple--*Acer rubrum*
Pine--*Pinus*
White spruce--*Picea glauca*
Black spruce--*Picea mariana*
Hemlock--*Tsuga*
Cedar family--Cupressaceae
White ash-type--
Fraxinus americana-type
Elm--*Ulmus*
Willow--*Salix*
Poplar/cottenwood--*Populus*
Black gum--*Nyssa*
Basswood-*Tilia*
Sycamore--*Platanus*
Black locust-type--*Robinia*-type
Honey locust-type--*Gleditsia*-type
Holly--*Ilex*

Nonarboreal

Ragweed-type--*Ambrosia*-type
Goldenrod-type--*Solidago*-type
Dandelion-type--Liguliflorae
Mugwort--*Artemisia*
Grass family--Poaceae
Eurasian Cereals--Cerealia
Wheat--*Triticum*
Barley--*Hordeum*
Oats--*Avena*
Wild Oats-*Avena fatua*
Rye--*Secale*
maize--*Zea mays*
Goosefoot-type--*Chenopodium*-type
Carrot family-Apiaceae
Mustard family-Brassicaceae
Currant--*Ribes*
Dock-type--*Rumex mexicanus*-type
Sorrel-type-*Rumex acetosella*/
acetosa-type
Nightshade-type--*Solanum*-type
Ground Cherry-type--Physalis-type
Tomato-type--*Lycopersicum*-type
Meadow rue--*Thalictrum*
Yellow sweet clover-type--*Melilotus*-type
Red clover-type--*Trifolium*-type
Mint family--Lamiaceae
Grape family--Vitaceae
Hemp family--Cannabinaceae
Rue family--Rutaceae
Leadwort family--Plumbaginaceae
Suurge--*Euphorbia*
Elderberry-type--*Sambucus*-type
Phlox family--Polemoniaceae
Geranium family--Geraniaceae
Purple loosestrife--*Lythrum*
Barberry--*Berberis*
Heath family--Ericaceae
Pink family--Caryophyllaceae
Sedge family--Cyperaceae

Plant pollen found in Dock Creek area during Engineering Study of Merchants Exchange Building in 1995. This 'Exploratory Pollen Analysis' project was seeking evidence of environmental change and human land use.

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