

# WASHINGTON, D.C.'S VANISHING SPRINGS AND WATERWAYS



GEOLOGICAL SURVEY CIRCULAR 752

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By Garnett P. Williams

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**United States Department of the Interior**

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## ENGLISH-METRIC EQUIVALENTS

English unit	=	Metric equivalent
gallon	=	3.785 liters
foot	=	0.3048 meter
yard	=	.9144 meter
mile	=	1.609 kilometers
acre	=	4047 square meters

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## ABSTRACT

This paper traces the disappearance or reduction of the many prominent springs and waterways that existed in Washington, D.C., 200 years ago. The best known springs were the Smith Springs (now under the McMillan Reservoir), the Franklin Park Springs (13th and I Streets, NW.), Gibson's Spring (15th and E Streets, NE.), Caffrey's Spring (Ninth and F Streets, NW.) and the City Spring (C Street between Four and One-Half and Sixth Streets, NW.). Tiber Creek, flowing south to the Capitol and thence westward along Constitution Avenue, joined the Potomac River at 17th Street and Constitution Avenue. In the early 1800's, the Constitution Avenue reach was made into a canal which was used by scows and steamboats up to about 1850. The canal was changed into a covered sewer in the 1870's, and the only remaining visible surface remnant is the lock-keeper's little stone house at 17th and Constitution Avenue, NW.

Because of sedimentation problems and reclamation projects, Rock Creek, the Potomac River, and the Anacostia River are considerably narrower and shallower today than they were in colonial times. For example, the mouth of Rock Creek at one time was a wide, busy ship harbor, which Georgetown used for an extensive foreign trade, and the Potomac River shore originally extended to 17th and Constitution Avenue, NW.

## INTRODUCTION

Imagine what today's District of Columbia territory looked like several hundred years ago. Forests and thickets covered about half of the area. Indian tribes found plentiful supplies of clear water. Several swampy zones were prominent, such as along what is now Pennsylvania Avenue between the White House and Capitol, and around what is now the Ellipse just south of the White House. The springs, together with some shallow dug wells, were the chief sources of drinking water for the district's settlers until 1859. As the city became established and underwent years of growth and development, most of these springs

disappeared. So did most of the city's famous creeks, such as Tiber Creek, St. James Creek, Reedy Branch, and Slash Run, many of which played key roles in supporting early Washington's important slaughterhouses and grist mills. Even the larger waterways, such as Rock Creek, the Potomac, and the Anacostia, in many places are much shallower and narrower than when the settlers arrived. In those days such rivers were essential navigational arteries, but that function has diminished over the years. Now they are important chiefly in regard to parks and recreation.

Looking at the mass of concrete, asphalt, and buildings that covers much of today's thriving and bustling city, it is hard to imagine where most of the once-prominent springs and creeks were located. Similarly, almost all remnants of the famous Washington City Canal have now disappeared. The Canal once traversed the city from Georgetown, passed close to the White House and Capitol, and emptied into the Anacostia near the Navy Yard. Also, many residents of the city would be surprised to know that until about 90 years ago, the Potomac's shore came up to 17th Street and Constitution Avenue, NW.

This paper traces these and other changes that have occurred with the waters of the Washington, D.C., area during several hundred years of urbanization. Unavoidably, emphasis is given to those regions for which more information is available.

In collecting material, I have received, and gratefully acknowledge, the generous assistance of Perry G. Fisher of the Columbia Historical Society and Roy L. Orndorff, retired Director of Sanitary Engineering, Washington, D.C. Mr.

Orndorff and Frederick Gutheim also reviewed the original manuscript and provided helpful suggestions.

## SPRINGS

The sparkling springs were the best source of drinking water in Washington's earliest days. After about 1800, for the convenience of having water closer to home and readily available in congested areas, pumps gradually became more and more popular, drawing water from wells. It was illegal to clean fish, water horses, or wash clothes at any public springs, pumps, wells, or hydrants. The springs and wells furnished most of the city's drinking and fire-fighting water until 1859, by which time the demand was greater than the supply and river water was introduced. Even after this date the people were reluctant to discontinue using the spring water for drinking purposes. However, by the early 1880's, most residents no longer used spring water. Soon after the beginning of the 20th century, the city water system completely replaced the old springs in the District, with the possible exception of a few that were privately owned. Nearly all of the District's 62 operating public shallow wells were ordered closed in 1907, being polluted or of questionable quality.

Of the many springs that formerly were so popular in the area, probably the best known were the Smith or Congressional Springs, the Franklin Park Springs, Gibson's Spring, Caffrey's Spring, and the City Spring. Table 1 lists some of the springs of early Washington.

The Smith (Congressional or Effingham) Springs were on the farm of J. A. Smith, near the middle of what is now the McMillan Reservoir, immediately southwest of the grounds of the U.S. Soldier's Home. These three springs produced 7, 4½, and 3 gallons per minute, respectively (Duhamel, 1926, p. 209), and were probably the most copious and important of the area's springs. From about 1832, the waters were piped for a distance of about 2½ miles down North Capitol Street to the Capitol, Treasury, and Post Office buildings. Additional routes supplied as many as 12 fire plugs along Pennsylvania Avenue and other fire hydrants as far as 14th Street, W. At the Capitol, the waters were contained in two reservoirs—one just west of the building (capacity 78,827 gallons; this reservoir is now buried under the steps of the Capitol), and another, with a capacity of 111,241 gallons, just to the east (Clark, 1923, p. 202). (The eastern reservoir was covered over in the late 1850's and is now under a parking lot.) The Smith springs were in use from 1832 to 1905 (U.S. Army, 1949, p. 1) and are still marked by a circular brick structure in the McMillan Reservoir.

The City Spring, also known as the Ridge Spring, was located on the north side of C Street between Four and One-Half and Sixth Streets, NW. This was also one of the largest springs in the city and was used from about 1802 to at least 1900. It is the first recorded piped supply in Washington, D. C. (1808). In the early 1800's the City Spring furnished water to the Center House

TABLE 1. — *Springs of old Washington, D.C.*

Spring and location	Reference	Remarks
1. Smith (Congressional or Effingham), McMillan Reservoir area	Duhamel, 1926; Clark, 1923; U.S. Army, 1949	See text.
2. City (Ridge), north side of C St. between 4½ and 6th Sts., N.W.	Brown, 1930; Johnston, 1962; Washington Evening Star, 1888.	See text.
3. Caffrey's (Hotel, Burnes', St. Patrick's, Federal), northwest corner of 9th and F Sts., N.W.	Sessford, 1908; Johnston, 1962; Busey, 1898.	See text.
4. City Hall, near northwest corner of 5th and D Sts., N.W.	Sessford, 1908; Roy Orndorff, oral commun., 1974; National Republican, 1884.	See text.
5. Franklin Square, between 13th and 14th and I and K Sts., N.W.	Washington Evening Star, 1888, 1906, 1912; Sessford, 1908; Somervell, 1930.	See text.
6. 13th and K Sts., N.W., and vicinity . . .	National Republican, 1884; Elliott, 1837	See text.
7. Gibson (Cool, Young's, Stoddert's, Federal), 15th and E Sts., N.E.	Johnston, 1962 . . . . .	See text.

TABLE 1. — *Springs of old Washington, D.C.* — Continued

Spring and location	Reference	Remarks
8. Capitol Hill, foot of Capitol Hill near Pennsylvania Ave., northwest of Capitol.	Duhamel, 1926 .....	Site marked today by brick grotto.
9. Spring Garden, south side of canal just west of 6th St., West.	Hines, 1866 .....	See text.
10. Carroll, intersection of New Jersey and Virginia Aves., SE.	National Republican, 1884 .....	Actually a group of several springs.
11. Pennsylvania Ave. and 2d St., SE. ....	Washington Evening Star, 1888 .....	Several springs, giving rise to a little stream which eventually flowed into St. James Creek.
12. Intersection of North Carolina Ave., D. and 3d Sts., SE.	Do.	
13. Gales (Eckington), just northeast of intersection of 1st St. East and Boundary St. (Florida Ave.)	Do.	
14. Reedbirds Hill, North Capitol and M Sts.		See text.
15. Dunlop, just east of present U.S. Soldier's Home	Duhamel, 1926 .....	Water rights sold by Elizabeth Dunlop to U.S. Government for \$500, probably about 1835.
16. Along or near right bank of Anacostia River, between about C St. North and C St. South	Busey, 1898 .....	Many small springs.
17. Post Office, northwest corner of 7th and E Sts., NW	National Republican, 1884 .....	Water piped down 7th St. at least to Pennsylvania Ave.
18. Leech, on New York Ave. between 5th and 6th Sts., NW	Washington Evening Star, 1888 .....	So-named because Dr. Devaughn, a noted cupper and leecher, kept leeches there.
19. Blue House, on 10th St. between K St. and Massachusetts Ave., N.W.	Do.	
20. Willow (Willow Tree), just north of L St. between 4th and 5th Sts., NW.	Do .....	Gave rise to a prominent stream that flowed through the city and into Tiber Creek.
21. Just southeast of intersection of 10th and M Sts., NW	Washington Evening Star, 1888, 1906.	
22. On Massachusetts Ave. between 15th and 16th Sts., NW	Proctor, 1949; Padover, 1946 .....	Drained into Slash Run. In 1807 Nicholas King reported to Thomas Jefferson the elevation and distance of this spring relative to the White House, probably in contemplation of using it as a source of water for that building.
23. South side of Rhode Island Ave., just east of Connecticut Ave., NW.	Proctor, 1949.	
24. Brown's, just north of Boundary St. (Florida Ave.), between 14th and 15th Sts., NW.	Do .....	Produced a sizable stream which led to Slash Run.
25. On 18th St. near Boundary St., NW ..	Washington Evening Star, 1888 .....	Near Brown's Spring.
26. On 13th St. near Boundary St., NW ..	Roy Orndorff, written commun., 1974	On Sept. 21, 1872, \$50 was authorized from city funds to enlarge the spring to 4 feet in diameter, to cement the wall, and to install an iron pump.
27. Moore's, vicinity of 11th and Boundary Sts., NW.	Washington Evening Star, 1888 .....	The origin of one of the branches of Tiber Creek.

TABLE 1. — *Springs of old Washington, D.C.* — Continued

Spring and location	Reference	Remarks
28. 11th St. between Florida Ave. and Euclid St., NW	Duhamel, 1926 .....	On the grounds of Cardozo High School (formerly Central High School) and the former Garfield Hospital.
29. Head of Reedy Branch, about 13th and Harvard Sts., NW	Do.	
30. James White, near northwest corner of Georgia Ave. (16th St.) and Ingraham St.	.....	Proctor (Evening Star, Dec. 9, 1945, p. C-6) states that this spring, referred to by L'Enfant, existed up to about 1925.
31. Octagon House, northeast corner of 18th St. and New York Ave., NW.	Busey, 1898; Hines, 1866; Duhamel, 1926; Evans, 1935.	See text.
32. Easby's Point, D and 26th Sts., NW. (just east of today's Kennedy Center)	Duhamel, 1926. .	
33. On Virginia Ave., between 26th and 27th Sts., NW	National Republican, 1884.	
34. East bank of Rock Creek near K St ..	Proctor, 1946 .....	This spring reportedly provided Georgetown residents with their best drinking water after the construction of the K Street Bridge in 1792. The water was sold around Georgetown for 2 cents a bucket.
35. P and 22d Sts., NW., near or on the eastern bank of Rock Creek	Clark, 1923; National Republican, 1884 .	City Water Dept. records, July 24, 1873, say that "Alex R. Shepherd desires that this fine spring of water be cleaned out *** so as to make it of use to man and beast *** " Reportedly a favorite spot for courting couples. At least during mid-1880's supplied the Metropolitan car stables in Georgetown by a pipe which went under the P Street Bridge.
36. Quarry Road, just east of Rock Creek and opposite the zoo.	Proctor, 1942a .....	The only supply of drinking water for the neighborhood's early residents in the late 1880's.
37. Pierce Mill, in the present Tilden St. a few hundred feet west of Rock Creek.	The Evening Star, Feb. 20, 1916 .....	The spring for the Pierce homestead. The springhouse still exists.
38. Corner of Wisconsin Ave. and Q Sts., NW., in Georgetown.	Taggart, 1908 .....	Waters eroded a ravine southward to the Potomac.

at the corner of Ninth and D Streets, NW. (Brown, 1930, p. 321), and to residences in the 600 block of Pennsylvania Avenue, NW. (Johnston, 1962, p. 105). In the late 1800's it supplied the National Hotel and other buildings, as well as hydrants in the neighborhood (Washington Evening Star, 1888). An article published July 1, 1900, in an unidentified newspaper (apparently either the Star or National Republican) stated that this spring "still supplied hydrants in the neighborhood."

Caffrey's Spring (also known as Hotel, Burnes', St. Patrick's, and Federal Spring), on the northwest corner of Ninth and F Streets, NW., provided

more than 2 barrels per minute (Sessford, 1908, p. 276). Various pipelines and outlets were added as the city developed. The Corporation Act of July 26, 1815, appropriated \$50 for increasing the steps, making a paved footway and placing a railing around the spring. This water source was used until about 1870, at which time it was largely abandoned when the Board of Public Works reduced F Street to a lower grade (Busey, 1898, p. 159).

A spring just 50 feet west of City Hall, near the northeast corner of Fifth and D Streets, NW., was another important source of water for early Washington. From this "large reservoir of the

finest spring water \* \* \* a line of more than 2,500 ft. of iron pipes was laid \* \* \* (Sessford, 1908, p. 292). Incidentally, wooden pipes (bored logs) were also used extensively when Washingtonians first began piping water, and as late as 1948 the city engineers were still finding remnants of such lines, often in surprisingly good condition (Roy Orndorff, oral commun., 1974). The City Hall Spring supplied pumps on Second Street as far as the Lafayette House, and another line of pipe went west down Louisiana Avenue (now Indiana Avenue) to Seventh Street (National Republican, 1884).

Franklin Park or Square, between 13th and 14th and I and K Streets, NW., originally was low and marshy ground, and "there were a number of springs upon it, the water being of most excellent quality" (Washington Evening Star, 1888). The Federal Government bought this square in 1829–32 and immediately piped the waters to the White House and the State, War, Navy, and Treasury Departments (Sessford, 1908, p. 300, 304; Somervell, 1930, p. 612; Washington Evening Star, 1906). The springs, of course, had been in use for many years prior to 1832, and as early as 1819 the Government had taken steps to purchase them. For 75 years, beginning in 1832, these famous springs served Government and other nearby buildings. In the 1880's the flow decreased somewhat, possibly due to the digging and construction of the foundation pits for some of the tall hotels to the west and northwest of the square (Washington Evening Star, 1912). The waters eventually became contaminated and were condemned — much to the displeasure of many local residents — by the D.C. health officer in 1906 as deleterious to public health.

At least one spring — and possibly as many as three — was located just east of Franklin Square, in the vicinity of K Street from 12th to 13th Streets, NW. Henry Larman of the City Water Department (National Republican, 1884) states that a spring "rises just outside the (Franklin) square, under the sidewalk on 13th Street \* \* \* ." Water from this spring was piped east as far as Ninth and I Streets, NW. (four blocks) and south as far as 14th Street and Ohio Avenue or C Street, NW. In the 1880's it supplied hydrants on 12th and 13th Streets. An article in the Evening Star of February 20, 1906, spoke of a spring near the residence of Gen. John Davidson, whose house was on the square between 12th and 13th and K and L

Streets, NW. Finally, Elliott (1837, p. 112) in his description of Washington mentioned that "a new spring has been opened on K and 12th Streets, W. \* \* \* affording upwards of 60 gallons of water per minute \* \* \* ." (The latter rate of production may be somewhat exaggerated, otherwise such a spring could have been the most famous of all Washington's springs.) I have not been able to determine whether the above references all pertain to the same spring or to different springs.

The Gibson Spring, in the eastern part of the city at about 15th and E Streets, NE., was one of the best known of early Washington's springs. Johnston (1962, p. 106) says it was also called Cool Spring, Young's Spring, Stoddert's Spring, and that "later it became known as Federal Spring, a duplication of name with Caffrey's Spring \* \* \* ." An ice plant was built at this site \* \* \* ." The spring water was used for cooling at the ice plant until about 1958–59.

The Act of August 10, 1850, appropriated \$250 to take such means as may be necessary to preserve the springs on the south side of the canal immediately west of Sixth Street, West, and, if practicable, to turn the water from all of them into one reservoir. These springs probably were on the piece of ground which Hines (1866, p. 84) describes as "Spring Garden," located on the east side of Seventh Street, between B Street, South, and Maryland Avenue, SW.

"On that part of Reedbirds Hill between the Red Chalk Hill Road and Tiber Creek \* \* \* , on the southeasterly slope of the hill toward the creek, was a spring of clear and cool water that often quenched the thirst of blackberry hunters and others \* \* \* ." Reedbirds Hill was at about North Capitol Street (formerly Red Chalk Hill Road) and M Street, and the above quote is taken from an old, undated and unidentified newspaper article that discussed Tiber Creek and adjacent areas. The City Water Department records have an 1875 letter which mentions a spring in North Capitol Street near M Street — probably the same spring.

Busey (1898, p. 159) states that "near Hamburg Wharf was a large spring, from which the residents in the city obtained water prior to 1800." (Hamburg Wharf stretched from about 19th to 22nd Streets, NW., along B street or Constitution Avenue, this being the approximate shoreline of the Potomac in those days.) Busey probably got his information from Hines (1866, p. 10). This spring is probably the same one referred to by Duhamel

(1926, p. 219) as being at or near the Octagon House (northeast corner of 18th Street and New York Avenue, NW.) and as being one of only two springs in the area south of G Street and west of 17th Street, NW., to the river. Probably it is also the spring that Evans (1935, p. 3) refers to as "located about half a mile from the old Glass House or Factory which was situated in Hamburg between 21st and 22nd Streets."

Although a few springs reportedly still flow in the vicinity of Rock Creek, nearly all of the District's original springs, including those in table 1, have disappeared. Some dried up, possibly because rain water began to be diverted into sewers instead of filtering into the ground. In a number of cases, spring waters were piped to sewers. Other springs have been filled in and paved over in the development of the city.

## STREAMS

Many of the springs helped produce creeks of varying sizes. The channels of these creeks wound through the District's forests and swamps and eventually into Rock Creek, the Potomac River, or the Eastern Branch (Anacostia River). Away from the original downtown region, the early settlers built many slaughterhouses and grist mills along the streams. In the city's center and in built-up communities, the streams provided water for reservoirs used in case of fire. Over the years, however, man has filled in or converted to underground sewers nearly all of the area's original streams, thereby relegating them to extinction together with the springs.

The accompanying map (fig. 1) shows the downtown area's original streams and shorelines, to the extent that I have been able to locate them. The original boundaries and features of figure 1 are based on the maps of A. Boschke (1856-59), James Kearney and others (1838), A. C. Harmon (1931), James R. Dermott (1797), Joseph M. Toner (E. F. M. Faehtz and F. W. Pratt, 1874), Arthur B. Cutter (1952), Campbell Graham and S. T. Abert (1849), William T. Partridge (1895?), And. Ellicott (1792; upper Anacostia), the map accompanying the Commissioners Proceedings of 1793, on several references cited in this paper (especially Hines, 1866; Proctor, various dates; Taggart, 1908), and on anonymous articles in the *Evening Star*. The canal routes are based on Boschke's 1856-59 map. Present-day features and shorelines were taken from the U.S. Geologi-

cal Survey's 1:24,000-scale topographic map "Washington, D.C., and Vicinity" (1965).

Probably the most famous of early Washington's streams was Tiber (or Goose) Creek. The Tiber, flowing right through the middle of Washington and into the Potomac, had quite a career—from crystal-clear waters which afforded drink to the thirsty and shelter to the wildlife, to a role of service to man by providing a means of transporting materials and merchandise to the city's center, thence to a period of strain when it was forced to have its downtown section made into a canal and to accept the refuse of man, and finally to its present demise—entombment as an underground sewer.

In its prime, the Tiber was a formidable stream that drained about half of the original District of Columbia area (fig. 1). The headwaters began as little rills about 3½ miles north of the Capitol. Many such little branches originated along Rock Creek Church Road in the northern part of the present U.S. Soldiers Home; others began a bit southeastward from that area, for example, in the vicinity of Catholic University and at the approximate neighborhood of the present Rhode Island and Montana Avenues, NE. Flowing generally southward, the little rivulets gradually joined ranks and formed into larger branches. Four main branches were well developed as the flows reached Boundary Street (Florida Avenue). From west to east, these branches crossed Boundary Street at Eighth Street West (Reedy Branch), First Street West, Second Street East, and 11th Street East, respectively. The two western branches came together on "O" Street between North Capitol Street and First Street West, forming a channel no more than about 10 feet wide. Several blocks farther—near M Street, just west of First Street East—the third branch added its waters to the stream. From this point on, the Tiber flowed southward between North Capitol Street and First Street, East, crossing back over North Capitol at E Street and then southwesterly, reaching B Street (Constitution Avenue) at Second Street, West. Meanwhile, the fourth main branch had combined with the stream on Massachusetts Avenue, just east of North Capitol Street, in the area now covered by Union Station. Just south of Constitution Avenue, within sight of the Capitol, Tiber Creek changed direction and began meandering westward to the Potomac. Its course thus went along what is now the Mall and Constitution

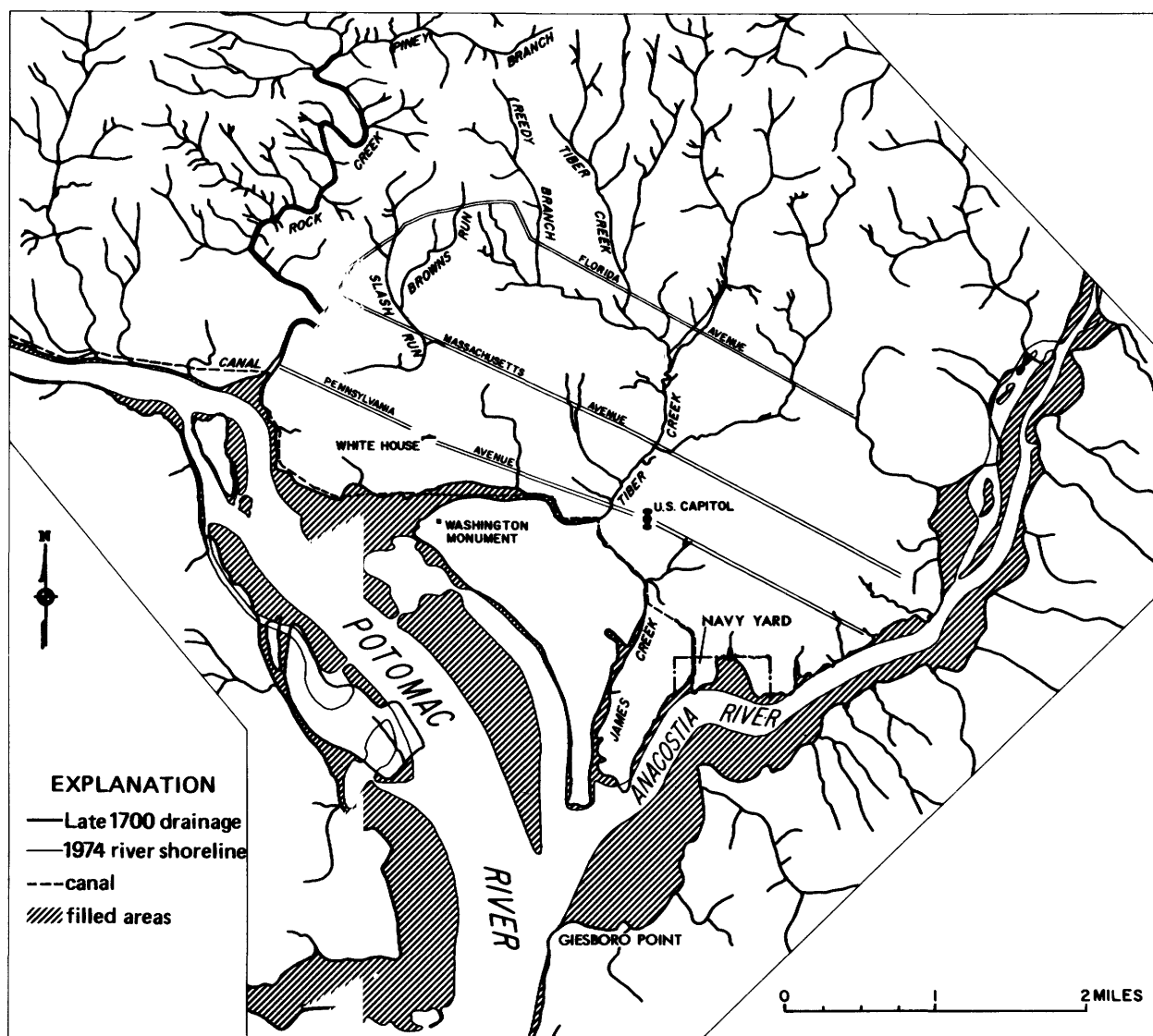


FIGURE 1. — Stream network and river shorelines of the central Washington, D.C., area in the late 1700's, compared to 1974 river boundaries. Selected reference streets and points and the 19th-century canals are also shown.

Avenue, and its northern shore at places reached as far north as C Street, North. Gradually widening along this route, the Tiber emptied into the Potomac at 17th Street, West (fig. 1), at which point the creek was about 700–800 feet wide (Bryan, 1904, p. 136).

Along the branch crossing Boundary Street at First Street, West, only a few hundred yards north of Boundary Street, George Beale and his brother made an artificial lake which they stocked with fish and used for boating. In the neighborhood of First and N Streets, probably on the third of the four branches, just before it joined the western

branch, was Pierce's or Notley Young's Mill, later known as Logan's Mill, which was operated until about the time of the Civil War. The adjoining pond, known as Logan's Pond, was a favorite swimming hole for boys. Other popular swimming holes, such as the "Blue Cork" and "Piggory," were found on the Tiber between H and F Streets. The one at the latter street was about 30 feet wide and quite deep in the middle — certainly over the heads of many boys. Although the stream itself was not necessarily this large throughout that section of the city, it was undoubtedly of considerable size. Duhamel (1926, p. 213) says that "in 1856,

when the creek was on a rampage after a storm, Foy's Tavern on New Jersey Avenue beside the stream was washed away. This was probably about D street and opposite the Depot." Many old stories tell of horses, cows, and people drowning in the Tiber.

Two more important tributaries joined the Tiber in the downtown area. The first originated at the Willow Spring, at L Street between Fourth and Fifth Streets, NW. This Willow Spring branch flowed southward and picked up the waters from the Leech Spring in the northwest corner of Judiciary Square (Fifth and G Streets, NW.). Emerging from Judiciary Square on Fourth Street between D and E Streets, the creek emptied into the Tiber a few yards south of First and C Streets, NW. Along the Willow Spring Branch were located slaughterhouses, the jail, the infirmary, and soap factories.

The second important downtown tributary begin in the vicinity of Franklin Square. The Franklin Square springs produced a creek which formed a small lake in the marshy area near 13th and I Streets, NW. From this lake a stream flowed southward to the corner of 13th and H Streets, furnishing Cover's Tanyard with water. From there, the stream swung to the southeast, and after reaching the corner of about 10th and G it again turned to the south, emptying into the Tiber at about 10th and B Streets. Several springs, especially Caffrey's Spring at Ninth and F Streets, contributed their waters along the route, and this Franklin Square Branch (known to many as Goose Creek, as was the Tiber itself for some time) was well known to be a sizeable stream. Hines (1866, p. 35) says that around 1800 the only place it could be forded with a cart was near the southwest corner of 11th and H Streets, NW. At F Street, near Ninth Street, the ravine carrying the stream was some 14 feet deep (Bryan, 1916, p. 304). (This was quite hazardous at night, with no street lights. On one occasion, Mr. Philip Fendall, a leading member of the bar, fell in and broke his leg in two places (Bryan, 1916, p. 304).) Archways spanned the stream at F Street, E Street, and Pennsylvania Avenue. Herring were caught as far up as E Street. Tides also exerted their effects on the stream, and Proctor (in *The Star* of July 9, 1944, p. C-5) states that up to 1810, long boats, carrying 6 cords of wood each, were able to come up this stream northward as far as E Street. The Franklin Square branch was gradually filled in

during the mid-1800's, the section between E and F Streets being completed in 1858 (Bryan, 1916, p. 304).

The Tiber's banks were originally covered with large trees and bushes. Fish — shad, herring, eels, pike, catfish, perch, and many others — were caught at least as far upstream as Pennsylvania Avenue and Second Street, NW., near the Capitol.

Bridges began to be built over the Tiber as early as 1795. Construction of wharves, culverts, and arches gradually increased in the decades of the 1800's. Thus, the Tiber and its downtown tributaries began their transformation under the long, inexorable process of urbanization. During 1809-15, the Tiber was converted into a canal from its outlet at 17th and Constitution eastward to the Capitol. (Washington's canals are discussed below.) Goods and materials — firewood, lumber, marble, limestone, sand, produce, and merchandise of all sorts — were transported up the Tiber (and later up the canal) to the many wharves along B Street.

During the early- and mid-1800's, the trees and other vegetation bordering the Tiber were almost entirely cut down and removed. By 1870 the Tiber's valley in the D. C. territory north of the Capitol consisted of virtually bare hillsides with practically no trees left. The canal along B Street was even more unsightly. For years, it received much of the downtown area's sewage. Fishmongers and other proprietors in the old Centre Market (on Constitution Avenue between Seventh and Ninth Streets, NW.) threw the offal and refuse from their stands into the adjacent canal. Sediment, released to a considerable extent by the removal of vegetation upstream, had been accumulating in increasingly bothersome deposits since the settlers first arrived. By 1870 the Tiber was in very bad condition, both aesthetically and sanitarily.

The stage was set, therefore, for drastic action. The territorial form of government, with its Board of Public Works, in power from 1871-74, and the city commissioners who governed in the years immediately thereafter, instituted and achieved a massive city-wide improvement program. Old buildings were torn down, many streets were upgraded, and many miles of sewer line were laid to supplement the existing sewer lines. The canal was filled in (1871-80) and a covered sewer built in its place. The Tiber, as far north as Boundary Street (Florida Avenue), was almost wholly

transformed into an underground sewer. And in that form it remains to this day, hidden by streets, buildings, and parking lots, unknown to most citizens, its flow vastly diminished, but still alive nevertheless. Today's inquirer can find the Tiber, or evidences of it, in many places — including the bricked tunnel going through the basement of the Acacia Mutual Life Insurance Company at New Jersey and Louisiana Avenues, NW., the wharves, pilings, and clam shells that are revealed whenever any excavations are made to construct buildings along Constitution Avenue, and the large tunnel passing under the Rayburn Building, carrying the Tiber's waters along their redirected route to the Anacostia River.

Draining the area south of the Capitol to the Anacostia was St. James (James) Creek. This stream began two blocks southwest of the Capitol, near Maryland Avenue and Third Street, SW. (not far, in fact, from the southern shore of Tiber Creek). It flowed southeastward for about half a mile to South Capitol and E Streets, turned south for a short distance and then southwestward, emptying into the Anacostia in a small bay between Greenleaf's Point and Buzzard Point. Several springs southeast of the Capitol — including those at Second and Pennsylvania, SE., and the Carroll Springs — gave rise to small branches which joined the creek at South Capitol and E Streets. James Creek was a respectable stream from this point downstreamward.

From about I Street southward, the creek flowed through marshy area. It was navigable for scows and small boats, and in the early days it was a favorite area for bird hunters.

The upstream reach of James Creek — from its headwaters down to about South Capitol and G Streets, South, or about one-third of the creek's total length — was permanently replaced by the Washington City Canal (discussed below), when the latter was built (1802–15).

The remaining downstream part of James Creek deteriorated during the following decades and by the mid-1860's was widely believed to be a malarial breeding ground. Plans were launched in 1866 to convert the entire creek into a canal and to fill in and reclaim the adjacent marshy sections. The resulting James Creek Canal, which actually had been part of L'Enfant's original plan of the city, was completed in 1876.

Predictably, with mud and sewage constantly entering the canal, and with foul odors developing

therefrom, the canal soon became impractical for shipping and unpleasant to be near. In addition, citizens fell into the unfenced waterway at an astounding rate, sometimes resulting in as many as one drowning per month. After many years of complaints and agitation, it was decided in 1916 to cover the canal. This work began immediately and was finally finished about 15 years later. So the eventual fate of James Creek has been conversion into a sewer and concealment under a city street — aptly named Canal Street.

A main artery in the northwest section of the District was Slash Run. This important tributary of Rock Creek began as two little rivulets several blocks north of Boundary Street (Florida Avenue), between 16th and 17th Streets, NW. (fig. 1). The two channels united just above Boundary Street, and Slash Run (so named for the forests and bogs it drained) proceeded southward, crossing Boundary Street just east of 18th Street, NW. On P Street between 17th and 18th Streets, NW., the stream was joined by Brown's Run, which flowed southwesterly from its origin at Brown's Spring, just north of Boundary Street near 15th Street. Slash Run then curved southeastward to touch the western edge of Scott Circle, before swinging south again to cross 17th Street at L Street, NW. From here, the stream headed westward between L and M Streets until it was within a few yards of 22d Street, on L Street. At this point Slash Run turned north and slightly west, emptying into Rock Creek at 23d Street between N and O Streets, NW.

Much of the area drained by Slash Run was swampy, although the stream itself had a well-defined channel with a hard bottom. Many spots along its course were favorites for berry-picking and swimming. Bird hunting was also popular, for example, in flat-bottomed boats along L Street between 18th and 19th Streets, NW. Slaughterhouses were numerous along Slash Run's banks, especially before the Civil War, and some of these establishments were still in operation along the upper reaches at the beginning of the present century (Fisher, 1974, p. 4).

Following the usual pattern, the marshy areas and Slash Run itself were gradually polluted during the 1800's, and a very offensive odor became associated with the stream, no doubt due mainly to the contributions from the slaughterhouses. When the Board of Public Works came into power in 1871, Slash Run began to be converted into a

covered sewer. The swampy areas and the stream channel began to be filled in, in some places to a depth of 10 to 12 feet (LaForge, 1924, p. 33). Within a year or two, the "Slash Run Sewer," 10 feet wide, had been built for a distance of one-half mile upstream from the outlet at Rock Creek (Keim, 1874, p. 34). Other increments were added during the following decades. In this manner Slash Run, a major stream of early Washington, gradually disappeared along with many of its contemporaries.

Rock Creek formed the border between the original District of Columbia and the Maryland town of Georgetown. The mouth of Rock Creek 200 years ago formed a broad bay (fig. 1) about one-fourth mile wide at the outlet. This bay narrowed upstreamward, so that the channel in the vicinity of M Street probably was about the same width then as now. The land that has been filled in during the intervening years has been contributed in part by the creek and in part by man.

The Rock Creek bay was a key part of the thriving foreign shipping trade in early Georgetown. Wharves and docks lined the bay's shores. Along the eastern bank these wharves began about 200 to 300 feet from the Potomac and extended up the creek to within 100 feet of K Street. The wharves were in constant use until about 1831. In early days, sailing vessels drawing as much as 20 feet of water frequented the Rock Creek harbor, and one visitor in 1788 noted a small brig from Amsterdam taking in tobacco from a warehouse on Rock Creek at a point just below P Street (Taggart, 1908, p. 194).

Erosion of sediment in the upstream reaches, probably associated with the agricultural and constructional activities of the settlers, provided Rock Creek with extra tons of sand and silt to transport. This was mostly dumped in the harbor where the stream's mean velocity was suddenly lowered due to the considerable widening of the channel and to the impeding influence of the tide. In 1792 and in 1816, legislation was passed to prevent the citizens from contributing to sediment deposition and its harmful effects on navigation.

A bridge — Rock Creek's first — was erected at M Street in 1788. A second was built at K Street in 1792. As Rock Creek at that time was quite wide at K Street, it was first necessary to build a 1,300-foot causeway from the Georgetown side. Some land was reclaimed to the north and south of the causeway, thus decreasing the size of the harbor.

More area was reclaimed by 1830, by which time a quay across the mouth of the bay was finished, in connection with the Chesapeake and Ohio Canal. With this development, Rock Creek's harbor, from the mouth to the K Street bridge, was reduced to 8¼ acres (Abert and Kearney, 1834, p. 88), and the outlet to the Potomac was only about 200 feet wide. The construction of the canal did away with the east-bank wharves and radically altered the character of the neighborhood as far up as K Street (Proctor, 1946). Also, the reduced size of the harbor, combined with the increasingly vexing sediment problem, necessitated the periodic use of a dredging machine to remove the sand and gravel that was continuously arriving from upstream. This problem never was completely solved, and the silting up of Rock Creek and the Potomac played an important role in eventually strangling Georgetown's foreign trade. Additional reclaiming in the basin was done as time went by, so that today Rock Creek's once-bustling harbor has completely disappeared, and the outlet in the Potomac is virtually the same width as the creek for miles upstream.

In the early 1800's, vast amounts of herring and other fish were caught in Rock Creek. Grist mills — especially wheat and rye — were a very popular industry along the stream. Various other small factories were located on the banks, and parts of the Godey lime kilns, dating from the mid-1800's, still remain today near the Whitehurst Freeway.

A short distance upstream, in the reach from about L Street to P Street, large quantities of refuse were being dumped onto the Rock Creek valley sides in the late 1800's. These dumpings were virtually obliterating the attractive natural features of the stream. By 1900, the former broad places had been "narrowed to precipitous slopes of ashes and other rubbish, the unrestricted deposits of years" (Rock Creek and Potomac Parkway Commission, 1916, p. 17). During the first 2 decades of the present century, very serious consideration was being given to either covering the creek entirely and conveying the waters in an underground tunnel, or removing most of the voluminous trash dumpings, widening the valley to a semblance of its original form, and creating a scenic open valley, including a parkway. The open-valley recommendation of the Rock Creek and Potomac Parkway Commission was accepted.

Rock Creek was rescued from the fate that has claimed the other streams in the District, and the natural beauty of the creek was restored.

The policies of converting waterways to covered sewers, or of simply filling the channels completely, were practiced on all the other little streams in the southern part of the city and on most of those in the northern part. The only surviving reaches of original streams, in nearly all cases, are in those few areas that have been made into parks by legislation. Thus Piney Branch and Broad Branch, each of which began near what is now the District line, are today represented only by the lower mile or so of their originally much more extensive routes. Even these few vestiges remain only by virtue of being included in Rock Creek Park. Maddox Branch, emptying into the Potomac, is mostly preserved in Battery Kemble Park. Foundry Branch, though its territory is still largely in a semblance of its natural state in Glover Archibold Park, has pretty much dried up and is not even designated as an ephemeral stream on U. S. Geological Survey topographic maps. A glance at Boschke's 1856-59 map, compared with a modern map, shows that almost all of the many tributaries of Rock Creek, Piney Branch, Broad Branch, and other prominent early-day streams have been obliterated. This is also true of the northeast sector of the city, where none of the original streams have survived except for the lower mile or so of Hickey Run, near the National Arboretum.

## CANALS

Any account of Washington's historical waterways certainly must include the old canals. Born in the minds of George Washington and Pierre L'Enfant, the canals were intended to be a major transportation artery in the scheme to build Washington, D.C., into an important port and trade center. Toward this end, the early efforts, spearheaded by George Washington, centered on establishing canal transportation from the head of ship navigation at Georgetown to as far into the interior of the continent as Cumberland, Md. Then, during the planning of the city of Washington, an important feature in L'Enfant's and Washington's thinking was a canal through the middle of Washington, linking the Potomac with the Anacostia Rivers. Although eventually completed in spite of periodic setbacks, the canals

were a failure due to the development of the railroad, silting of channels, shortage of funds, and other reasons.

During 1785-1850, the canal that eventually came to be known as the Chesapeake and Ohio (C & O) Canal was built. This traversed 184 miles from the west bank of Rock Creek through Georgetown and along the shore of the Potomac to Cumberland, Md. The section from the present District line down to Rock Creek was completed between 1828 and 1831.

From the time of its completion in 1850, the C & O Canal fought a losing battle against railroads, highways, eastern seaports, and floods. It finally ceased commercial operation in 1924 after another damaging flood. In 1938, the U.S. Department of the Interior purchased the waterway, restored much of the lower section, and has since maintained it as a recreational and scenic asset (U.S. Commission of Fine Arts, 1968, p. 52).

L'Enfant, with President Washington's backing, included in his original design of the capital a magnificent canal that would run right through the center of the city. From the Potomac (mouth of Tiber Creek) it would head east nearly to the Capitol and then proceed generally southeast, splitting into two branches south of the Capitol. One branch would empty into the Anacostia just west of the Navy Yard, and the other branch would trend to the southwest, incorporating James Creek, which entered the Anacostia in a small bay just east of the arsenal (Greenleaf's Point).

One of the main purposes of the canal was to provide a means of transporting goods to the center of the city, thus obviating the need to haul them from the river front. Also, L'Enfant expected the canal to be a beauty waterway which would contribute to the aesthetic value of the city.

Although started in the mid-1790's, the Washington City Canal was almost entirely constructed during 1802-15, especially over the last 5 years of this period.

The route of the canal followed rather closely that of L'Enfant's plan, except that the James Creek branch of the original plan was not included. Beginning at 17th and Constitution, NW., the canal ran eastward along the edge of the mouth of Tiber Creek to 15th Street and Constitution Avenue and then continued eastward to a point between Seventh and Sixth Streets, West.

Along this stretch it followed the general route of the Tiber Creek for the most part, and where it did not, the creek channel was filled in, so that its waters were entirely routed through the canal. The channel along this important reach had a width of about 150 feet. The canal then turned southward for 775 feet to a point about on today's Washington Drive, on the Mall, and the width narrowed to 90 feet. Bending eastward again, the canal went a little more than two blocks to Third Street, West, directly in front of the Botanic Gardens and the Capitol (fig. 2); then south for a block to Maryland Avenue, the channel width being 70 feet; southeastward from there for 2,365 feet to South Capitol and E Streets, South; south for two blocks to just above G Street; southeastward again, this time for 1,988 feet, to Second Street, East; south along the latter street to N Street, South (the width from Maryland Avenue having been 40 feet); and thence into a 100-foot-wide basin which emptied into the Anacostia at about "O" Street, South. The total distance covered was 15,330 feet, or nearly 3 miles (Washington, D.C., 1865, p. 5). Originally, the canal was about 4 feet deep.

The Washington City Canal period (1815–71) began with great promises, most of which were never completely fulfilled. On the positive side, the canal did provide a cheaper and more convenient avenue for transporting goods to the center of the city, from both the Potomac and Anacostia Rivers. For this purpose, wharves had been built along the canal, especially along the more important Constitution Avenue stretch. Among the earliest were those at 12th and 17th Streets, built about 1804 (Gatchel, 1932, p. 153). Bridges were erected across the canal at various points, for example 14th, 12th, Seventh Streets, and elsewhere. Only boats drawing 3 feet of water or less were admitted to the canal (Heine, 1959, p. 9). These carried such cargoes as firewood, lumber, stone, and market items into the center of the city. In the canal's early days, small steamboats from the Potomac traveled up the Constitution Avenue reach of the canal as far as the Centre Market, between Seventh and Ninth Streets, NW. (Brown, 1930, p. 96). In 1825, a landing place or wharf exclusively for steamboats was built at 14th and Constitution (Bryan, 1916, p. 104) and soon entertained a lively business. The canal also served, at least at times, as a short cut for barges and scows to travel between the Potomac and Anacostia.

The Washington City Canal was used intermittently in these ways from 1816 to about 1850.

With the C & O Canal being built from Rock Creek in Georgetown to the hinterland, and with the Washington City Canal extending from 17th and Constitution to the Anacostia, all that was needed was a segment between 17th and Constitution and the Rock Creek basin to form a complete canal route from the Navy Yard on the Anacostia to Cumberland, Md. This Washington extension of the C & O Canal was started sometime around 1831 and was finished in 1833. It began in the mouth of Rock Creek near H Street, went southeastward for about 1 block to just east of 27th Street at G Street, then south for three blocks to Easby's Point, thence southeast again to a point between 21st and 22d Streets on Constitution Avenue, and straight east from there to 17th Street. This entire route was within a few yards of, and parallel to, the shore of the Potomac. At 17th and Constitution, a lock was built to lower the boats into the Tiber Basin, and the stone house built in 1837 for the lock-keeper still stands today — the only visible remnant of the extensive canal that once passed through Washington.

Alexandria, doing a substantial shipping business of its own, also wanted a connection with the C & O Canal. Accordingly, the Alexandria extension of the C & O Canal was built during 1833–43. This crossed the Potomac at Georgetown on a specially-constructed aqueduct bridge, came down the Virginia shore to the Alexandria city limits, and then turned east into the Potomac.

Only a year or two after its inauguration, the Washington City Canal was having problems with what proved to be its major enemy — sediment. The movement of the tide — influential throughout the canal's Constitution Avenue reach from the Potomac, and throughout its southern section from the Anacostia — brought in and deposited significant amounts of sand and silt. The effective water depth was decreased, and navigation was seriously hindered. Often the river vessels could get no farther than the mouth of the Old Tiber at 17th Street, and from there the cargoes had to be scowed in to the wharves along the canal. During the following three decades, efforts (never wholly successful) were made to keep the canal dredged. Combined with many other factors, including chronic lack of maintenance funds, a lower-than-expected amount of business (especially after the arrival of the



FIGURE 2. — Washington City Canal and U.S. Capitol about 1858. (Photograph from Library of Congress collection.)

railroad), and a continuous influx of sewage and garbage, the sediment problem made the canal virtually useless by the early 1850's. For the next 15 years, in spite of a few feeble attempts to rescue it, the canal was allowed to stagnate into an unsightly, smelly, and dangerous open sewer. The Board of Public Works, starting in 1871, began filling in the canal from the Rock Creek Basin to the Anacostia. Except for about the last two blocks, between L and N Streets, South, the city commissioners who assumed city responsibilities from the Board virtually completed the project by 1881 (Tindall, 1914, p. 240; Greene, 1882, p. 2). The Constitution Avenue section actually was partly made into a covered sewer by building a new wall parallel to one of the walls of the canal, arching over the intervening space to form the conduit, and filling in the unneeded channel space outside the sewer. Some of this old sewer is still in use, carrying storm water and air-conditioning cooling water from Federal buildings to the Tidal Basin.

Navigation on the Alexandria extension of the C & O Canal ended in 1886 with the condemnation of the Aqueduct Bridge. According to U.S. Coast

and Geodetic Survey maps, the Virginia part of this canal remained intact at least until 1902, but as of 1910 it was almost completely filled in.

As mentioned above, the lower part of James Creek was made into a canal in 1876. This came up to the Washington City Canal at South Capitol and G Streets but did not connect with it due to the presence of the Pennsylvania Railroad tracks. (The City Canal was being filled in during this period, anyway.) The James Creek Canal was filled in over a period of about 15 years, beginning about 1916. Its burial completed the disappearance of Washington's once-prominent canals.

## ANACOSTIA RIVER

The eastern branch of the Potomac, or Anacostia River, was the area's most suitable shipping route in colonial days. The head of navigation was the port town of Bladensburg, Md., about 1½ miles above the present District line. Chartered in 1742, Bladensburg reportedly was a busy port in tobacco shipping until about 1800 (Gottschalk, 1945, p. 228). The fishing industry also was active as far up as Bladensburg, but by 1816 it had dwindled in this town to just curing

and packing herring (Proctor, 1942b). During the 19th and 20th centuries, sedimentation, associated with the increase of agriculture and of "development," has progressively choked the river. Both the width and depth of the channel have decreased considerably during this period. For example, a 1937 survey revealed that between 1891 (or 1867, date is questionable) and 1937 the Anacostia's channel in the 1½ miles from Bladensburg to the District's northeast line filled, on the average, 3 feet and narrowed from an average width of 70 yards to an average of 25 yards (Williams, 1942, p. 20).

Equally serious sedimentation has occurred along the Anacostia within the District of Columbia. The boundaries originally proposed for the Federal City were modified slightly about 1791 for the specific purpose of including the lower part of the Anacostia, because of the latter's magnificent harbor potential. Tobias Lear in 1793 wrote that the Anacostia "has in all parts of it, as far as the city extends, from 20 to 35 feet of water" (Lear, 1905, p. 124). These figures agree with the soundings shown on the Dermott map of 1797. Boschke's 1856 map, with soundings shown as far up as the 11th Street bridge, shows these depths to have diminished by several feet. A U.S. Army Corps of Engineers' survey of 1891 found the channel to have a navigable depth of 18 feet as far up as the Navy Yard, 13 feet from there to the Pennsylvania railroad bridge, thence 6 to 10 feet to the Benning Road Bridge, and less than 6 feet (usually less than 3 feet) between there and Bladensburg (Hains, 1892, p. 1065). The river was building extensive flats, sand bars, and sandy islands with the sediment brought down and deposited by floods (Williams, 1942, p. 15; Hains, 1892, p. 1065-1066; Duryee, 1953, p. 77). The consensus among those who study sedimentation problems is that most of this sediment was made available only when man cleared away the protective cover of vegetation in upstream areas, for agriculture, construction, and other purposes, without simultaneously taking measures to minimize soil erosion. In fairness, of course, the importance of taking such precautions was not widely understood at the time (nor is it fully appreciated today, for that matter). Compounding the river's silting problem was the fact that by 1891 nearly half of the District's sewage was discharged into the Anacostia. In the mid-1890's, malaria, generally attributed to the favorable

mosquito-breeding conditions on the marshes and flats, increased significantly in the region bordering the Anacostia.

Some tentative efforts toward improving the channel were initiated in the late 1800's. The Navy Department began dredging in the vicinity of the Navy Yard in 1871. About 1890, Congress provided some funds for improving the Anacostia from the mouth to the Navy Yard, and this limited project was completed in 1892.

Lt. Col. Peter Hains of the U.S. Army Corps of Engineers provided a big stimulus toward awareness and action in 1891 when he proposed a detailed program for improving the channel up to the Navy Yard (Hains, 1892). A navigable channel 200 feet wide by 24 feet deep would be dredged, and the marshy areas would be reclaimed with the dredged material. During the following few years, local citizens groups and the 1901 McMillan Report added their suggestions and encouragement toward improving the river.

In 1902, Congress authorized a program of dredging and reclamation in the reach below the Navy Yard (11th Street) Bridge. This work, carried out by the U.S. Army Corps of Engineers, began immediately and was mostly completed during the following 15 years, assisted by periodic supplementary appropriations. The dredged material sometimes contained objects of genuine historical interest, such as old coins dating back to the 18th century and solid cannon balls of various sizes (Duryee, 1953, p. 79). By the end of the project, some 460 acres had been reclaimed along the left (south) bank of the river, from Giesboro Point to the bridge at the Navy Yard (fig. 1). Thus, a significant part of what is today the U.S. Naval Station, north and west of the Anacostia Freeway, was under water until about the turn of the present century. Periodic dredging is still done to keep the channel navigable.

In 1911, Congress appropriated \$100,000 to improve the river from the Navy Yard northward to the District line (Harts, and others, 1916, p. 4). The project was launched about 1912 and was still going on, to a minor degree, in the 1940's and 1950's. The nature of the improvements was reconsidered, and plans were changed to varying extents, from time to time, but the general ingredients of dredging and reclamation always remained. As a result, the Anacostia, while somewhat narrower and probably shallower than in pre-Colonial times, is more attractive and proba-

bly larger in cross section than it would have been without the improvements. Parts or all of such features as the Kenilworth Aquatic Gardens, Kingman Lake, and Anacostia Park are due to these reclamation projects. Thus, although man brought on the Anacostia's sedimentation problem, he has in some cases found beneficial and agreeable solutions, or partial solutions.

## POTOMAC RIVER

Helped by its excellent Potomac harbor, with waters as much as 25 feet deep, early Georgetown built up a lively trade with Europe, South America, and the West Indies. This trade developed in the middle and late 1700's and lasted through the first half of the 1800's. Tobacco, brought by farmers from the nearby countryside, was the chief export. So important was this crop that at times it was used locally in place of currency (Taggart, 1908, p. 153). Other prominent products were flour, leather, soap, candles, and beer (Martin, 1835, p. 491). The fishing industry flourished, and Georgetown sent large quantities of Potomac shad and herring to distant points in Maryland, Virginia, and Pennsylvania (Taggart, 1908, p. 194). It was a period of great prosperity for Georgetown business, and to a significant extent such business was possible because of the navigability of the river.

Sedimentation was recognized as a potentially dangerous problem at an early date. Georgetown passed a law in 1792 prohibiting the throwing of dirt into the Potomac without having first made a frame of logs or erected a stone wall for the purpose of containing such dirt.

Ocean-going ships apparently sailed into the Georgetown harbor in different channels at different periods. Originally, there were two channels or deeper sections in the Potomac leading to Georgetown. The two routes went around the east and west sides, respectively, of Theodore Roosevelt Island.

Reports differ as to whether the Virginia (western) channel, passing between the Island and Virginia and now called Little River, was navigable for large vessels prior to 1784. Duhamel (1935, p. 133 and p. 141) felt that John Smith and Henry Fleete, in their separate 17th-century voyages up the Potomac to Little Falls, "no doubt passed up the channel on the west side of the Island" and that this was the main channel of the Potomac until about 1805. Latrobe (1812), on the

other hand, says that up to 1784 the passage between the Island and the Virginia shore not only was shallow but was much obstructed by detached rocks and was considered practical only for rowboats. The earliest maps have no depth soundings and are not sufficiently detailed to shed light on this question. For example, Augustin Herrman's 1670 map shows the western passage to be decidedly wider than the eastern route, with the Island virtually hugging the Maryland shore. Robert Brooke's 1737 map, on the other hand, shows the Island definitely closer to the Virginia shore. G. W. P. Custis, quoted by Jackson (1878, p. 71) said that in early days (mid-1700's) both branches of the river around the island were open and that the eastern branch was used as the ship channel to Georgetown.

Thomas (1963, p. 45-46) suggested that the two channels have alternated as the main channel. The western one, being a short cut for floodwaters, would be scoured after major floods and would serve until deposition had gradually made it shallow again, by which time the eastern channel would assume preference.

In any case, a severe flood, including huge blocks of ice, swept down the river in the winter of 1783-84 and tore open the western passage to a depth of 25 feet. This "Little River" channel immediately became the main shipping passage for about the next 20 years. During this period, however, a bar below the Island, at the junction of the two channels, grew at a steady rate and began impeding the movement of larger vessels in both channels. In 1805, a dam or causeway was built between Virginia and the head of the Island to close off the western channel, with the hope that the increased flow in the Georgetown channel would flush out the accumulating sediments. This marked the end of the western channel as a boat route and introduced a period of gradual filling-in of Little River. Such deposition still continues today. The fill has come from natural sedimentation on those occasions when the river overtops the causeway and when storms wash in sediment from the adjoining slopes, and from artificial fill dumped in by man. Almost two-thirds of the channel at the north end of the Island, or about 6 acres of land, was filled in along the Virginia shore from 1863 to 1931, and further artificial filling has been carried out more recently (Thomas, 1963, p. 48). Thus, Little River today is relatively narrow and does not resemble its appearance in its days of

grandeur as a main channel for trans-Atlantic ships.

Directing the Potomac entirely into the eastern or Georgetown channel routed not only all the water but also all the increasing amounts of sediment into that region. The channel bar continued to develop from the lower end of Theodore Roosevelt Island. At least as early as 1815, Georgetown began using a "mud machine" to deepen the channel so that larger ships could get to the harbor (Bryan, 1914, p. 505). Congress appropriated money in 1833 for more extensive dredging, and by 1835 the depth over the bar had been increased from 10 or 12 feet to about 15 to 19 feet, which was enough to float large ships (Jackson, 1878, p. 44). However, more dredging of the main channel was required in subsequent years at various places, and this has continued to the present.

Sedimentation also became noticeable in several spots that were not in the ship channel (Hains, 1883). During the mid-1800's, marshy zones and eventually dry land was formed by natural accretion along the eastern edge of Theodore Roosevelt Island. This land extended southward, close to the Virginia shore. The southern extension, about as long again as Theodore Roosevelt Island, eventually was severed by the river and became an island in its own right — now known as Columbia Island. Later, for example about 1911–20, some artificial fill was added to Columbia Island (Thomas, 1963, p. 48), extending it to the south. The Island now supports the traffic circle at the west end of Memorial Bridge and a complex system of major highways. The narrow waterway called the Boundary Channel, separating the Island from the Virginia mainland, approximately marks the original shore of the river.

Probably the most prominent areas of accretion were along the eastern shore. From Easby's Point (27th and about D Streets, NW.), following the shoreline south and east along Constitution Avenue to 17th Street, NW. (Tiber Bay), a large shoal region had been forming since at least the early 1800's. A second bothersome shoal or bar formed only a few yards further south, where later (1808) was built Long Bridge (now 14th Street, or George Mason Bridge). The bridge slowed the current and accelerated the depositional process. By 1870, these shoal areas, collectively amounting to over 300 acres called the Potomac Flats, were

sufficiently built up to be above water at low tide (Chappell, 1973, p. 15). They were widely regarded as a menace to health and had a decided stench due to receiving large amounts of city sewage (Hains, 1894, p. 57).

In 1874, work began on a project designed to remedy the irritating dual problems of the smelly, growing flats and the need for a dumping area for the increasing amounts of sediment dredged from the shipping channel. This project was to pour material dredged from the channel directly onto the adjacent flats, thus reclaiming acres of land and extending the city out to what had been the middle of the river (Chappell, 1973, p. 18–19) (fig. 3). For the first few years, this was done in piecemeal fashion, without a coherent overall plan for the entire region. The project was modified in 1876 to preserve and dredge the Washington channel, a strip of deeper water hugging the District shore from the arsenal up to Long Bridge, and along which a number of wharves and businesses were established. (This channel, at the time of Ellicott's 1792 survey, extended much farther north, past Easby's Point, and was considerably filled in over the years by the Potomac River and Tiber Creek.) After about 3 years of surveys and proposals of general unified plans for this river activity, Congress in 1892 adopted a program calling for dredging the Washington and Georgetown channels to admit the largest ships, reclaiming the Potomac Flats, and constructing a sluicing (tidal) basin at the head of the Washington harbor (which otherwise would become a dead-end inlet) to keep that harbor in proper sanitary condition.

Work began in November of 1882. The overall project was under the auspices of the U.S. Army Corps of Engineers, and nearly all the work was contracted out to private firms. By 1890, the initial dredging and tidal basin were mostly completed, and the flats, including Tiber Bay, were filled in to above high tide. (Of course, the sedimentation in the river did not stop, and dredging had to continue, both to keep the channels deep and to provide more fill for the reclamation.) Construction of a seawall around the reclaimed land and further filling were done over the following 20 years to about 1911 (Chappell, 1973, p. 53–94).

The entire massive undertaking covered a distance of nearly 3 miles and provided the city with what is now East and West Potomac Parks and the Tidal Basin. Thus all of these areas, including

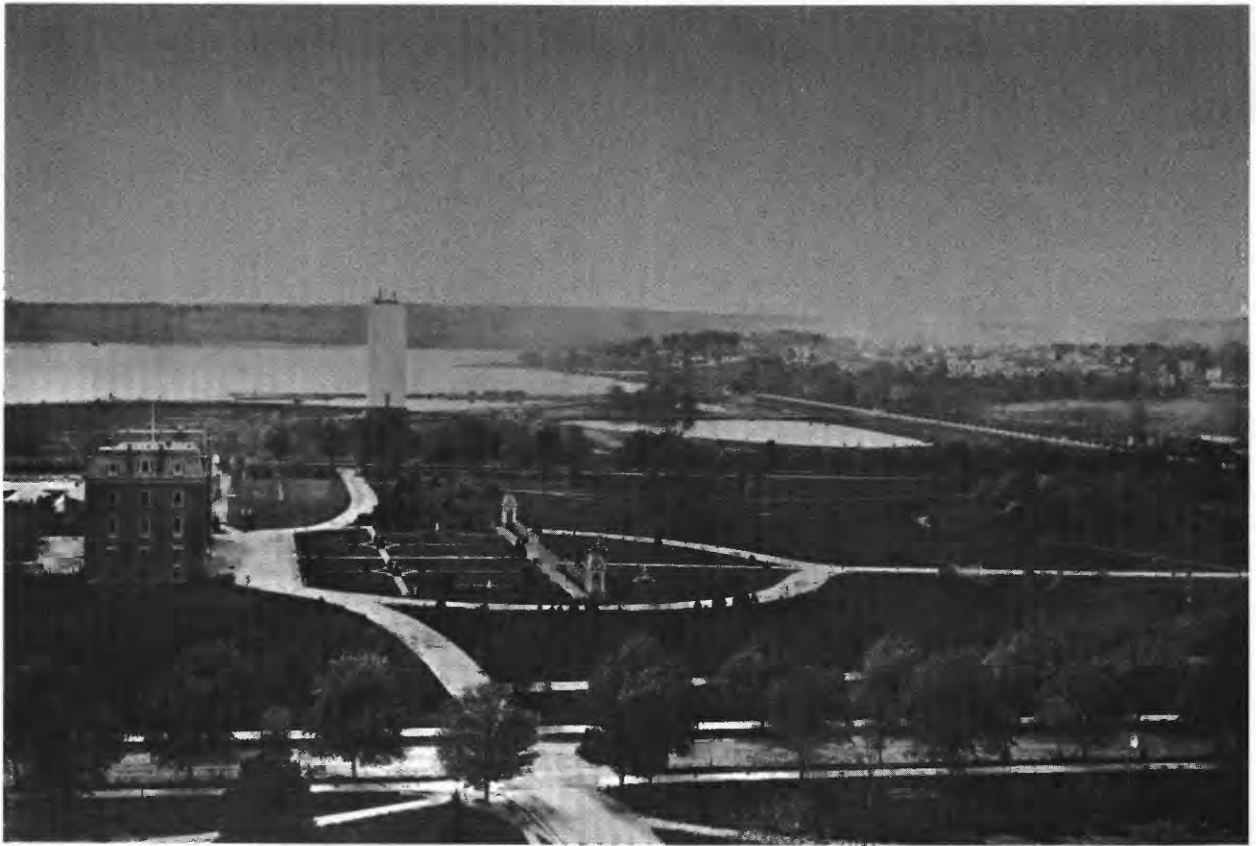


FIGURE 3. — Looking west along the mall, view of Agriculture Department (left), Washington Monument (only partly completed), and Potomac shoreline, 1866. Note: Potomac shore extending in to about 17th and Constitution Avenue. (Photograph from Library of Congress collection.)

the spots on which we see the Lincoln Memorial, Reflecting Pool, Jefferson Memorial, the golf course, and Hains Point, until about a hundred years ago were under water as part of the Potomac River (figs. 1 and 3).

Further reclamation has been done along the Virginia shore south of 14th Street Bridge, during the present century. The most notable change in this area has been in the National Airport region. The promontory that originally jutted into the river at this location was about 1 mile from Giesboro Point on the opposite shore. Reclamation for National Airport (1938–39), using sediment dredged from the river, extended the western shore into the river nearly a quarter of a mile in addition to enlarging the land area northward and southward.

Thus, with the regions mentioned above and other river zones in the vicinity of Washington, D. C., having been filled in with sediment, the

Potomac of today is a considerably smaller river than it was a few centuries ago. It is interesting to speculate on the extent to which it will be further reduced by sediment deposition and reclamation in another century or two.

## CONCLUSIONS

What can we learn from this pattern of disappearance of the natural waters of an area?

Sediment has played a very important, and usually underestimated, role in restricting the use of our larger waterways. Rock Creek basin, the canal, the Anacostia, the Potomac, all have diminished in width and depth due to the influx of sediment. The available evidence — historical, geological, and engineering — from other studies strongly suggests that most of this sediment has been made available to the river during the last 200 years by man's carelessness. Unless greater efforts are made to retain freshly exposed dirt on construction sites and on newly plowed fields,

there will be a continued disappearance or shrinking of our streams and (or) a considerable expense in keeping them dredged.

Some of the disappearance of springs and creeks within the District is a necessary consequence of building a city. Also, given a sufficient supply of water and a filtration plant, we cannot claim to be dependent on springs and streams for our basic water needs. But these cannot be sufficient justifications for eliminating all of our natural surface waters. Cities, to be enjoyable and inspiring places in which to live, need more than asphalt, steel, and glass. The beauty of Rock Creek alone, with its accompanying park, shows the advantage of protective legislation for at least the more scenic streams.

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