Obtaining Water and Discarding Waste: An Overview of Attitudes and Practices in Nineteenth-Century Alexandria, Virginia

By
Steven J. Shephard, Ph.D.
Alexandria Archaeology

Alexandria Archaeology Publications
Number 4

Paper presented at the First Joint Archaeological Conference,
January 5-9, 1989, Baltimore, Maryland

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Foreword

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This paper was originally presented at the First Joint Archaeological Conference in Baltimore, Maryland, January, 1989.

Pamela J. Cressey, Ph.D.
City Archaeologist
1991

Obtaining water and discarding waste are two human necessities. The difficulty in meeting both of these needs increases as population increases. As settlements grow, dealing with this difficulty becomes not only a concern of the individual, but one of the community as well. The English colonies faced an expanding challenge in these areas as towns developed in the seventeen, eighteenth and nineteenth centuries. Alexandria, Virginia, was typical of these colonial and then American towns along the Atlantic Seaboard.

The study of water supply and waste disposal in early Alexandria was precipitated by the excavation of numerous wells and privies beginning in the 1960s. Many more of these features, while not being excavated, were recorded as to size and location. In all, some level of information is available on 78 wells, privies and cisterns. These structures vary as to size, location and construction technique. This paper considers some of the factors which influenced where and how these features were built.

There are five basic types of structural features that have been found in Alexandria which relate to water procurement and waste disposal. These are: wells, privies, wells that have been converted to privies, reservoir cisterns and filtration cisterns. The wells are made of, with few exceptions, stretcher laid brick forming a circular shaft with no mortar between the bricks. It is not always certain if brick-lined shafts classified as privies or a well/privies were originally built as wells. It does seem doubtful that such substantial and deep shafts would be constructed for use as privies. In addition, many of these shafts have sand at their bases which would seem to have been

deposited there (the natural layer being clay) for the purpose of filtering water. Two brick shafts have been excavated, which contain wooden pumps at the bottom, indicating their original construction as wells. About nineteen percent of all brick shafts have wooden planks, placed vertically, lining the shaft between the dirt and the bricks. This wood may be a support to the bricks, or a sheathing to help retain the water. The average diameter of these shafts, of whatever materials or function, is about four feet and the average depth is about fifteen feet. The range of diameters varies from two and a half to seven feet, while the range of depths vary from six and a half to twenty-six feet.

Box-privies are easily recognized, being wooden boxes set in the ground to contain the waste from outhouses above them. Brick structures are classified as cisterns if they have a solid brick floor and have some form of interior sealing to insure the retention of water. One filtration cistern has been excavated. It had a wall dividing the chamber and was filled with alternating layers of gravel, charcoal and sand. (This structure will be discussed more fully later.) Wells and well/privies have been found both in the basements of residential and commercial structures and in the backyards of these structures. Privies and cisterns have always been found in the rear yard areas of residential and commercial properties.

Where and how these features were built should logically relate to what the people who built and used these conveniences thought about water supply and waste disposal. That there was a change in methods of water procurement and removal of wastes is

evident from the fact that the majority of these features were eventually filled up with trash and sealed over. Documentary records indicate that the municipal government increasingly regulated matters of water supply and public health and a private water company offered a supply of clean water to the citizens of Alexandria by 1852. In order to better understand the structure, function and location of these utilitarian features, the conceptualization of household needs, personal hygiene and spread of disease by the people of the time must be investigated.

Ideas concerning personal hygiene and household needs, involve both what was considered necessary by the individuals in a household and what was convenient. A supply of water was necessary for everyday cooking and washing needs. Although bathing was not common even into the nineteenth century (Shyrock 1960:90), clothes did get washed even if infrequently.

Water could be gotten in Alexandria from one of the streams in the area or from the Potomac River itself. In 1787, a resident of Alexandria wrote in a letter that "part of the daily business (of women of the 'lower orders') is to carry Water from the River in large Tubs on their heads" (Winsor Letter, 1787). There was also a medicinal spring in the north end of town and there is evidence that water was available by-the-bucket from vendors (Common Council Minutes 1821;Report of Alexandria Water Company 1852). Public wells were also available at the intersections of certain streets and these increased in number throughout the first half of the nineteenth century. While these public wells represented an effort on the City's part to provide neighborhoods with a good supply of water, it could be that these

wells actually contributed to the spread of disease. Research in recent years has indicated that water carried from public pumps to houses is often contaminated and the incidence of enteric diseases is increased (Gowings 1988:4).

For ease of access and dependability of supply, the household well seems to have been the preferred water source for families who could afford one. Location of the well under the house in a basement would have protected the water source, made it conveniently near and would have made fetching water in inclement weather an easier task. The location of some wells on lot boundaries suggests that some neighbors were sharing wells and perhaps shared the construction costs as well. The same considerations for construction and location of wells apply to cisterns.

Ready access to a privy was certainly a necessity for every household. Due to the odor associated with these structures, however, the desirable location was not in the basement, but rather at the rear of the yard. References to the offensiveness of privies in urban areas and their becoming "nuisances" to be dealt with by municipal authorities are frequent in the eighteenth and the nineteenth centuries (e.g., Glaab and Brown 1967:87; Shryock 1960:103). It was generally accepted during this time period that one cause of disease was the inhalation of fumes, or "miasma", given off by decaying animal and vegetable matter (Anderson 1984:211). The privy, then, needed to be located a distance from the habitation.

After a number of citizens died immediately after drinking from public water pumps in this same city, the engineer and

architect Benjamin Latrobe, proposed a theory as to the cause. He observed that each house had its privy which drained into a hole in the ground and that in the streets close to the footpaths there were pumps from which water for drinking and cooking was drawn. He concluded that the well water was contaminated by the sewage which gave off poisonous fumes. When a person put his mouth to a pump spout to drink and pumped the handle, "this fatal effluvium" was taken into his system. He proposed attaching iron drinking ladles to the pumps and after this was done no further deaths were reported (Blake 1956:11).

Archaeological investigations in Alexandria indicate that individual household privies may have been typical of only the more affluent areas of town. Excavations in a neighborhood settled by free blacks in the first half of the nineteenth century found a lot that had been used as a community privy area. There probably had been a number of outhouses on platforms on the lot that were moved around over time producing a layer of waste across the entire property. When houses were built there, the lot was capped with a layer of clay. The residents were not using shaft-type privies until after about 1870 (Henley et al. 1983:43).

A variation of the shaft privy is the barrel privy. It is constructed by a hole being dug, a set of two or three stacked wooden barrels, or "hogsheads", being placed in the hole and then dirt filled in around the barrels. Four of these have been found in Alexandria. They are shallower--ten to fourteen feet deep--than the majority of the brick shafts. Obviously this type of structure is easier to build, less expensive and more impermanent

than brick shafts. Whether these barrel shafts were originally built as wells or as privies is uncertain. One of the barrel privies had a sand base, typical of wells. On the other hand, three of the shafts contained privy material. The artifacts from these features indicated that household trash began to be deposited in each of these structures in the first or second quarters of the nineteenth century.

The potential for the pollution of wells by privies was widely recognized at least by the latter part of the eighteenth century. A citizen writing to a Philadelphia paper in 1799, stated that "the necessaries are dug above the depth of the pumps. Therefore, the situation of the poisons the above things contain are communicated to the water, and the poison is drank as well as breathed".

Concerns over the spread of disease affected the location and maintenance of all types of wells and privies. Epidemics of cholera, yellow fever, typhoid fever, diptheria and smallpox decimated the populations of towns in America in the eighteenth and nineteenth centuries. Fear of these ravages prompted theories as to the causes and prevention of these diseases. Although a wide variety of factors, such as mental states, heredity, tainted airs and waters, and impure "humors" were suspected as causing illness (Shryock 1960:51-53), two general concepts were the most pervasive. These were the contagionist and anticontagionist theories. Contagionists believed that epidemic diseases were caused by individuals infecting other individuals and that isolation of effected persons was the proper preventative measure. Anticontagionists believed that it was not

individuals that spread disease but rather contaminated air, food or water (Shryock 1960:71; Nye 1960:78). Germ theory was not accepted to any significant degree until the 1870's in the United States (Shryock 1960:134). Nevertheless, the commonly held contagion and anticontagion theories, in combination, resulted in improved sanitation practices in many towns including street cleaning, removal of garbage heaps, regular cleaning of privies, and draining of stagnant water, community-wide vaccination, as well as the development of quarantine regulations.

The Common Council of Alexandria began to institute regulations relating to public health beginning at the turn of the nineteenth century. These resulted from the continual threat of epidemic diseases. In the summer of 1794, an epidemic of yellow fever originating from the West Indies struck Philadelphia. In order to avoid the same fate, a Health Officer, Dr. Elisha C. Dick, was appointed to quarantine vessels suspected of carrying the disease. By January of 1794, fifty-five vessels had been quarantined and the epidemic was avoided. Interestingly, although Dr. Dick effectively carried out his duties as Health Officer, his personal belief was that "the malignance of the Philadelphia disease was entirely local and not transportable" (Shomette 1985:97). In later years Alexandria was not so fortunate. The town was ravaged by yellow fever epidemics in 1797, 1800, 1802, 1803, 1804 and 1821 (Swain 1988:89). Dr. B.H. Hall of Alexandria, wrote in a letter that the suspected source of the spread of fever in the 1803 outbreak was "a pile of oyster shells containing putrid fish [that] was burned in a kiln near the center of town" (Hall Letter, 1803).

He goes on to say that it was recognized, however, that some of the people who came down with the fever did not live in the vicinity of the kiln. In 1832, it was cholera that claimed at least 33 Alexandria residents (Shomette 1985:170). Other east coast cities were struck by cholera as well, and one cause of the disease was given as "impurity or peculiarity of the water in the city wells" (Baker 1948:163). Perhaps the number of deaths resulting from these epidemics would have been even greater had not certain sanitation measures, besides quarantines, been taken in the early years of the century.

Public health measures taken by the Alexandria Common Council included establishing a Board of Health in 1800, digging public wells throughout the first half of the century, passing ordinances protecting the Chalybeate or natural spring from contamination beginning at least by 1818, paving streets, building street gutters and keeping them clean, controlling wandering animals, and establishing a system of garbage collection within the business district by 1856 (Swain 1988:90). A number of ordinances were passed which related specifically to the growing offensiveness of privies and their contaminating effect on the water supply. An 1807 law required residents to keep their privies clean and in good repair, while setting a fine of two dollars a day to each citizen whose privy "suffered to become a nuisance" (Arnold 1983:47). In 1810, an ordinance was passed forbidding the digging of wells to be used as privies and limiting the use of wells currently being used as privies to a period of ten years (Alexandria Gazette, May 19, 1810). The next year, this ordinance was expanded to prohibit the

construction of all privies except for those with above ground storage boxes or buckets which had to be cleaned regularly. Existing privies could still be used as long as they were not considered nuisances. In addition, no wells could be used as privies unless they were already being used for that purpose (Arnold 1983:28). How well these ordinances were enforced is not known. In 1811, scavengers were appointed to go through the town each Friday and remove "all filth and dirt which shall incommode the inhabitants" to outside the town for dumping (Arnold 1983:50). A scavenger was appointed yearly and was restricted to cleaning wells and privies only between the hours of eleven p.m. and four a.m. and thus became known as a "night scavenger" (Perge 1980:18). By 1874, the night scavenger only emptied privies by appointment and charged a set per-foot cleaning fee determined by Common Council (Arnold 1983:50).

The necessity for a steady supply of clean water was met by the creation of the Alexandria Water Company in 1851. The motivation for piped-in water was a combination of concerns for public health, for an effective means of fighting fires and for supporting manufacturing establishments using steam power. Robert H. Miller, a leading Quaker merchant in Alexandria, was a major influence in the founding of the Water Company and in fact became its first president. It was in keeping with his character, that when his backyard was excavated in 1977, a large brick water filtration cistern was discovered. The round plaster-lined cistern was six and a half feet deep with an inside diameter of eight and one half feet. The outer wall was constructed of header laid bricks bonded with whitish gray sandy

mortar. The floor was two brick courses thick, with a layer of mortar covering the inside surface. A brick partition wall divided the interior, forming two chambers--one containing one-third of the interior volume and the other the remaining two-thirds. Attached to the lower portion of this wall were two additional brick walls, forming a brick vault on each side of the partition wall. These interiors of the two vaults were connected by means of a hole in the base of the partition wall. Each vault was filled with well-defined alternating layers of gravel, charcoal and sand (McLoud 1980:6-7). These layers acted as a filter, the water in the larger chamber flowing down through one filter vault, through the partition wall, then perculating up the other filter to the small chamber from which the cleansed water could be drawn. No piping or other fixtures were discovered during excavation. The source of the water to fill the cistern was probably rainwater collected from the roof. No evidence of a cistern cover was found, but insurance maps indicate that there was a small brick structure enclosing the cistern (McLoud 1980:13).

Research into the history of filtration systems indicates that this cistern was constructed between 1825 and 1836 (McLoud 1980:14). The artifacts recovered from the cistern suggests this structure was filled with household trash in the 1880s. This filtration cistern does not seem to be the only one built by Miller. Cisterns are mentioned in notices for the sale of other residences owned by him (Miller 1988). The fact that all of the eleven Miller family children survived to maturity (Swain 1988:56), may in part be the result of having this supply of

filtered water.

With this brief review of nineteenth-century needs for water, waste disposal and public health measures in mind, some preliminary conclusions can be drawn concerning Alexandria's wells and privies. The structure and depth of the brick shafts suggests that most were originally built to serve as wells. The fact that the bricks were laid without mortar implies that the intention was to tap the water table. The reason for the sheathing of the exterior of the brick shaft with wood, is less clear, although the result would seem to be that the well would fill with water drawn from a greater depth and thus be less contaminated. There is no evidence in Alexandria, that soil differences required differences in construction technique. Using stacked barrels to build a well was cheaper and easier. There is the possibility that this type of well or privy was built in some cases as a temporary measure until a brick shaft could be sunk. In other cases this could be a reflection of the economic means of the household.

If it was possible to determine the construction dates of the various shafts, then type of construction might reflect changes in building techniques through time. Unfortunately, this is very difficult to do in that artifacts associated with the actual construction phase of the well or privy are not usually recovered. Instead, the features contain household trash deposited after the primary use of the shaft is over. There is no significant difference in the artifact dates between wells and privies or between wells and privies of different materials. The overall pattern of dates reflects the increasing disuse of the

shafts through time--that is, eleven percent of the shafts with artifacts were filled in the late eighteenth and early nineteenth centuries, thirty-two percent were filled in mid-century, and forty-six percent were filled in the late nineteenth and early twentieth centuries. Interestingly, four shafts, or eleven percent of the total, seem to have been continuously used as trash receptacles from the early nineteenth to the early twentieth centuries.

Excavations on one particular block located nineteen brick, brick and wood, and barrel type shafts. By comparing both artifact fill dates and location of shafts in relationship to lot lines, the archaeologist, Leith Smith, drew certain conclusions relating to shaft types and probable construction dates. He reasoned that because of their fill dates (c.1825-1850) and their location on the earliest settled street face, that the four barrel well/privies found were probably the features constructed first. The brick and brick and wood shafts seem to be of later construction due to their specific location in the rear of lots with dwellings built c.1870-1907, and because of the artifacts in their fills which date from the second half of the nineteenth to the early twentieth centuries (Smith 1983:10-12).

It seems, then, that Alexandrians, beginning with the founding of the town in 1749, sunk shafts in the ground to serve as wells and privies. Most wells were brick-lined, although some possibly temporary wells or privies were made by sinking barrels into the ground. Poorer households continued to use this less expensive construction method. As human nature would have it, the supply of fresh water seemed vast and contamination of the

water table by privy waste increased at a slow rate. The ever present threat of epidemic diseases was a concern, but there were conflicting theories of how these diseases were spread. By 1800, with a population of nearly 5,000, measures were needed to protect the water supply and safeguard public health. One private reaction may have been the sheathing of newly built brick wells in wood in order to tap the deeper cleaner water supply and prevent contamination by surface water. Some private wells, considered contaminated, were converted to use as trash receptacles and privies. Instead of using the public wells, some households built cisterns to hold rainwater. Certain more affluent citizens even built private water filtration systems. The Common Council reacted by constructing more public wells and inacting numerous ordinances relating to public health and sanitation. Eventually the Alexandria Water Company provided a reliable source of water for household use, fire fighting and manufacturing. The need for private wells declined, but the expenditure involved with installing water closets extended the use of outhouses into the early twentieth century for some residents.

Research into the history of Alexandria's water supply and methods of discarding waste as related to the domestic structures supplying these needs, provides some enlightenment, but leaves many questions unresolved. This brief overview demonstrates the need for more research, especially as regards well and privy construction in the nineteenth century and how changing building techniques reflect changing attitudes toward health. The information gathered on these features in Alexandria and on other

similar structures investigated elsewhere, will provide a basis for this continuing research at Alexandria Archaeology.

References Cited

Alexandria Gazette, May 19, 1810 and May 1, 1820.

Anderson, Letty
1984 Hard Choices: Supplying Water to New England Towns. Journal of Interdisciplinary History, XV:2: 211-234.

Baker, Moses N.
1948 The Quest for Pure Water--The History of Water Purification from the Earliest Records to the Twentieth Century. The American Water Works Association, Inc., New York.

Blake, Nelson M.
1956 Water for the Cities: A History of the Urban Water Supply Problem in the United States. Syracuse University Press, New York.

Common Council Minutes, City of Alexandria, VA, January 20, 1821

Glaab, Charles N. and A. Theodore Brown
1967 The History of Urban America. The MacMillan Co.,New York.

Gowings, Donald D
1988 Retrospective Study of the Cholera Outbreak of Alexandria, Virginia in 1832. Paper on file at Alexandria Archaeology, Alexandria, Virginia.

Hall Letter, Dr. B.H. Hall,1803. On file at the Lloyd House Library, Alexandria, Virginia.

Henley, Laura A., Ann M. Palkovich, and Jonathan Haas
1983 The Other Side of Alexandria: Archaeology in an Enduring Black Neighborhood. In Approaches to Preserving a City's Past, Preservation Planning Series, pp. 41-44. U.S. Department of the Interior and the Alexandria Archaeology Program.

McLoud, Melissa
1980 Urban Water Technology: An Alexandria Cistern and Filtration System. Paper on file at Alexandria Archaeology, Alexandria, Virginia.

Miller, T. Michael, Research Librarian, Lloyd House Library, Alexandria, Virginia. Personal Communication.

Nye, Russel B.
1960 The Cultural Life of the New Nation 1776-1830. Harper and Row, New York.

Perge, Catherine
1980 A Historical Survey of Alexandria's Water Supply, 1755-1852. Paper on file at Alexandria Archaeology, Alexandria, Virginia.

Report of the President and Directors of the Alexandria Water Company to the Stockholders, May, 1852. Alexandria Water Company, Alexandria, Virginia.

Shomette, Donald G.
1985 Maritime Alexandria, An Evaluation of Submerged Cultural Resource Potentials at Alexandria, Virginia. Report on file at Alexandria Archaeology, Alexandria, Virginia.

Shryock, Richard H.
1960 Medicine and Society in America: 1660-1860. Cornell University Press, Ithaca, New York.

Smith, J. N. Leith
1983 Archaeological Report on the 1100 Block of King Street. Report on file at Alexandria Archaeology, Alexandria, Virginia.

Swain, Perry Carpenter
1988 Robert Hartshorne Miller, 1798-1874, A Quaker Presence in Alexandria. M.A. thesis, Department of American Studies, George Washington University, Washington, D.C.

Voges, Nettie Allen
1977 Everyday Life. In Alexandria: A Towne in Transition, 1800-1900. J.D. Macoll and G.J. Stansfield, eds. pp.192-203. Alexandria Bicentennial Commission and the Alexandria Historical Society, Alexandria, Virginia.

Winsor Letter, Olney Winsor, 1787. On file at the Lloyd House Library, Alexandria, Virginia.