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HISTORY OF BRICK IN CHARLOTTESVILLE AND ALBEMARLE COUNTY

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INTRODUCTION

When the Colonists arrived at Jamestown, there were two bricklayers (William Garret and John Herd), who probably were also brickmakers and one mason (Edward Printo), on board in the original crew of 144 persons that arrived from England on May 13, 1607 (Lane, 1984). Additional artisans (bricklayers) were also advertised for in succeeding groups of colonists to arrive in 1609 and 1610 (Bruce, 1896). Craftsmen at that time were well paid; wages for laying brick in the colonies was 40 pounds of tobacco for 1000 bricks molded and laid (Bruce, 1896). A pound of tobacco was equal to 2 1/2 to 3 shillings (Betts, 1944). Some of the early brick, made from local sandy and silty clay, were porous, soft, and available only in limited quantities; smaller bricks, for cellar floors and fireplaces, were imported from Holland (Lane, 1984; Harrington, 1950). The first brick house (16 feet by 24 feet) in the colonies was built on the Page tract, near the James River, in the early part of the 17th century (Yonge, 1936). The bond of the brickwork of the tower of the fourth "old church" built on the original site at Jamestown (1639-1647) was known as "English bond" and was introduced by German or Dutch brickmakers and bricklayers (Yonge, 1936). English bond is brickwork made of alternate courses of stretchers and headers, with a one-half brick piece next to the corner header.

By the middle of the 17th century, brick was generally used for all chimneys, because local stone was not available (Bruce, 1896). Prices of brick during the century varied from 15 shillings per 1000 brick in 1668 to 8 shillings per 1000 brick in the 1690s, probably due to an over supply. Around this period, a shilling was equal to 12 pence or 1/20 pound (pound = 20 shillings).

Later in the century, England attempted through regulations to force landowners, whose plantation had a minimum of 100 acres, to erect a dwelling-house of brick and that it be twenty-four feet in length and sixteen feet wide, with a cellar attached (Bruce, 1896). The regulations were never imple-

mented. Near the end of the century, brick were so commonplace that they were even being used for supporting the marble slabs of tombs (Bruce, 1896)

EIGHTEENTH CENTURY

Peter Jefferson, Thomas Jefferson's father, acquired land near Shadwell in 1735 and built a wooden house with a brick foundation around 1737. Clay for the brick probably came from an adjacent hillside (Figure 1). Red, plastic clay which develops as residuum over the underlying metabasalt rocks of the Catoctin Formation is an excellent raw material for making brick. When Albemarle County was separated from Goochland County in 1762, the brick courthouse (in present-day Court Square), four miles west of Shadwell, became the county seat. At the time of the Revolutionary War, Charlottesville still only consisted of the courthouse, a brick tavern and about a dozen brick houses around the courthouse (Malone, 1948). Clay residuum derived from the Catoctin Formation, off the slope of the hill to the east of the courthouse, was probably utilized to make the brick for the buildings. During the latter part of the 18th century, brick was the prominent building material because of the suitable clay in the Piedmont area. Presently the only remaining fine Flemish bond brickwork, where molded bricks are laid perpendicular to each other and the walls are 2-brick thick, in Charlottesville is the Butler-Norris House at 410 E. Jefferson Street, circa 1785 (Department of Community Development, 1976; Figure 2).

Thomas Jefferson's mountaintop Monticello was a busy place in early 1769, when excavation for the first outbuilding took place, and thousands of bricks had to be made. There was no well at the time and water was scarce. Since water was critical in brick-making, it had to be carried by hand from springs in the lowlands, up the mountain (Malone, 1948; Betts, 1944).

Betts (1944) notes that 164,820 stock and place brick were produced at Monticello in 1769 and Bear and Stanton (1997a)

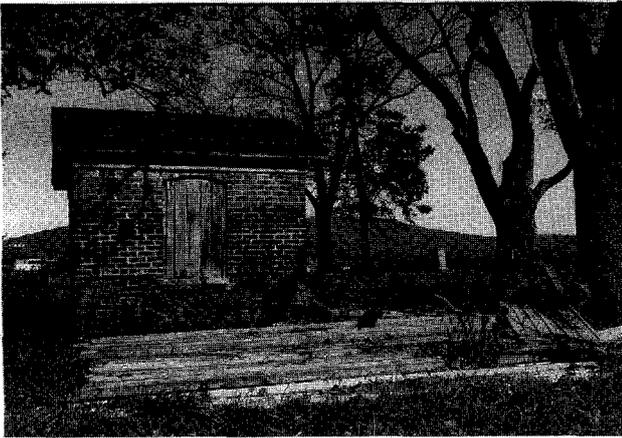


Figure 1. Birthplace of Thomas Jefferson at Shadwell, Albemarle County.

note that Jefferson contracted with George Dudley to make 100,000 workable (stock and place) brick over 2 years. One hundred thousand brick were produced in 1773-1774. Brodie (1974) notes that during the first two years of his marriage (1772-1773), Jefferson's slaves molded and fired thousands of brick at Monticello. John Brewer produced 90,000 workable brick in 1778; two people who worked for Stephen Willis (Jefferson's lead workman at Monticello) laid 14,000 brick in July and August, 1778 (Bear and Stanton, 1997a; Betts, 1944).

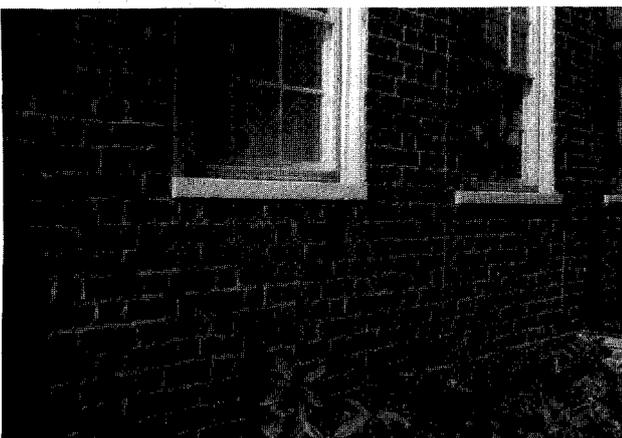


Figure 2. Butler-Norris house at 410 E. Jefferson Street, with Flemish bond brick-work, circa 1785, City of Charlottesville.

Betts (1953) noted that a demicord of earth (cube) would make 1000 brick and a man could dig up 4 or 5 cubes a day. Betts (1953; from page 102 of Thomas Jefferson's Farm Book) also notes that a cubic yard of earth probably weighs 1000 pounds and that a man could mold 2000 bricks a day. In 1807, a reference noted that clay earth was dug and cleaned of stone at the "farm brick yard", probably to make the 40,000 brick for the South Pavilion of Monticello, as noted by the Massachusetts Historical Society. In reference to the brick yard, Amos Cummings (written communication, 1902) noted that red clay (residuum over the Catoclin Formation) at the nearby brick yard was in the area of Levy's ice house. Brick for Monticello and Poplar Forest in Bedford County were made in brick kilns at the places where they were needed (Betts, 1953). Betts (1953) also notes that in the later part of the century, brick making took place "on the Rivanna River at the Shadwell plantation". It is known that most of the brick used to build houses, in Albemarle County, in the 1700s, were produced on the site. An example of such a house, located south of Charlottesville, was built in 1790, and has recently (1990) been renovated with some additions (Figure 3).

Brodie (1974) states that after years of postponement, Jefferson finally decided to remodel Monticello in 1793. From January, 1793 through the summer of 1794, Jefferson's slaves made brick, so many that in a letter to George Wythe in October, 1799, Jefferson said that "We are now living in a brick kiln". It is known that brick were produced in two types of kilns (clamp and permanent) in Colonial times, however one of the most important things was to have a good clay, which was very weathered (plastic), or could be dug and let sit over the winter to disintegrate; the clay could then be molded, dried and burned to produce a workable brick. A "clamp" kiln was actually made out of raw brick that were piled in the shape of a kiln and a fire was built inside. Brick near the flame were overfired and brick on the outside were underfired. The underfired brick could be used between the walls for sounding or for fireproofing. If you wanted to refire the brick, they would have to be "soaked" with water so the moisture content would be similar to that of a new batch of unfired brick. This kiln was similar to an early temporary kiln in Europe, where bricks are fired without a kiln. A "permanent" kiln was built in a central area where a number of brick would be required for an extended period.

Another type of kiln was a "scove kiln", where raw bricks were piled in a manner which provides fireplaces at the base of the structure pile of brick. The outside of the pile was plastered over with clay before firing (Rhodes, 1968).

In the latter part of the century (1798), Jefferson brought James Dinsmore (originally from Northern Ireland) from Phila-

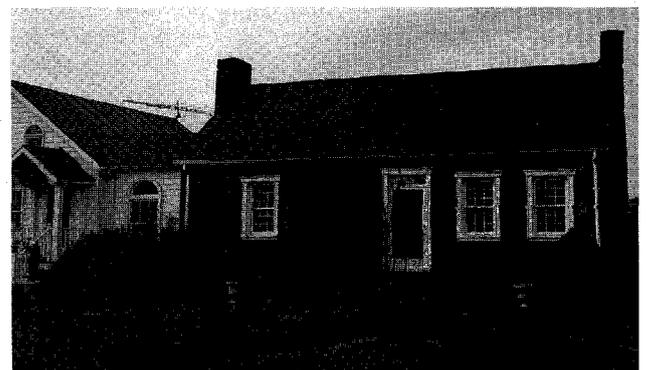


Figure 3. House, built in 1790, that has been renovated, Red Hill area, Albemarle County.

delphia to Monticello. Dinsmore worked for Jefferson at Monticello, was involved in working on buildings at the University of Virginia and building the estate "Estouteville", in the southern part of the county in 1828-1830 (Lay, 1991; Figure 4). Toledano (1994) notes that Dinsmore built several conservative Federal Style residences, which include high gable ends of "handsome brickwork" that enclose a high-pitch roof, in the City of Charlottesville. He further states that such a Federal Style building was the Liver's and Vowles's townhouses (presently the 1817 Inn & Restaurant at 1211 West Main Street) built by Dinsmore in 1817 (1823 according to Lay, 1991; or 1828 according to Rawlings, 1935) (Figure 5).

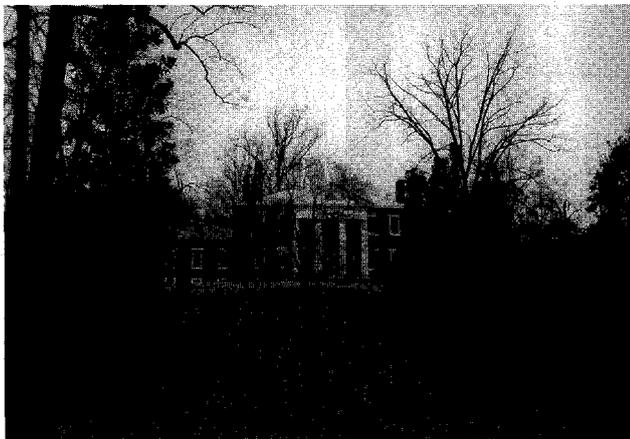


Figure 4. "Estouteville", built in 1828-1830, Albemarle County.

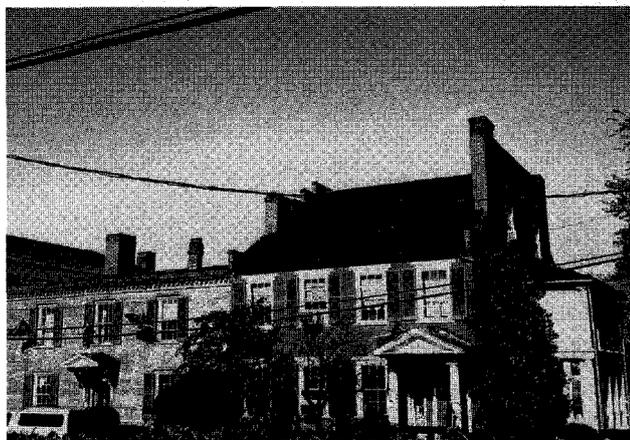


Figure 5. Livers's and Vowles's townhouses, built in 1823 (presently 1817 Inn & Restaurant) at 1211 West Main Street, City of Charlottesville.

NINETEENTH CENTURY

On June 1, 1814, Jefferson states that a buck and a doe, from "Enniscorthy", were put into the paddock enclosing the brick yard (Betts, 1944). Enniscorthy is a 1760s plantation built on the old Plank Road (State Road 712) about three-quarters of a mile west of the Scottsville Road; this is the estate to which Jefferson fled from Monticello during Tarleton's Raid of 1781 (Rawlings, 1935). When Jefferson built Poplar Forest in Bedford County, he hired Hugh Chisholm, who worked on site as a brickmason from 1806-1811 (Lane, 1984). During July, 1817, with plans for construction of the University of Virginia underway, Thomas Jefferson noted that in Lynchburg, bricklayers had a new method of molding "stock-brick in oil"

that produces a beautiful brick. He hired brick makers and a master brickmason (Captain John M. Perry), who utilized clay from the University property to make the brick that was used in the building of Pavilion I of the University of Virginia (now the Colonnade Club) (Bruce, 1920). Captain Perry and his associate (Matthew Brown) eventually worked on Pavilions III, V, and VIII (Lay, 1991). Nelson (1962) notes that the brick were burned by Perry, Thorn, Carter and Phillip, and Nathaniel Chamberlain. In December of 1817, Jefferson hired additional bricklayers from Lynchburg to build two additional pavilions. Lynchburg contractor, Matthew Brown, supplied and laid brick for several of the pavilions. Thomas Jefferson commented on one of the buildings constructed by Brown and said that it exhibited "the most beautiful brick work he had seen" (Bear and Stanton, 1997b). Their wages were \$15 for laying 1000 place brick and \$30 for laying oil stock brick.

In 1819, Captain Perry of Charlottesville, agreed to furnish 300,000 brick, however a Mr. Carter and a Mr. Phillips, also local, agreed to provide the same number of brick at a lower cost. Accounts reveal that the University manufactured 180,000 brick in one month for a cost of \$539.68 (Bruce, 1920). Around 1840, Court Square in downtown Charlottesville was dominated by the legal profession in buildings constructed mainly of brick made from the excellent clay soil in the area (Albemarle County Historical Society, 1996). In 1838, Alan Hawkins built a small cottage on the east-southeast side of what is now 5th Street SE (personal communication, Antoinette Roades, 1997; Figure 6). Brick in this structure appears to represent another house in the area built in Flemish bond brickwork.

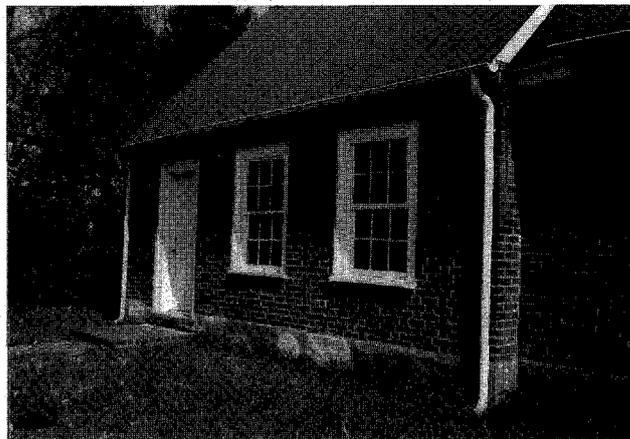


Figure 6. Cottage built in 1838, on 5th Street SE, with Flemish bond (?) brickwork, City of Charlottesville.

From 1849-1857, when the tunnels were cut through the Blue Ridge Mountain and its foothills for the railroad, bricks were used for arch supports in three of the four tunnels (Greenwood, Brooksville, and Blue Ridge). When the Brooksville tunnel (859 feet) was being constructed, Joseph Dettor was originally contracted for making the brick (Hunter and Dooley, 1989). The brick were deemed inadequate by the engineer, Claudius Crozet, and the best of the brick were used in the first and most easternmost Greenwood tunnel, where the rock in the 538 foot tunnel was more competent and quality of the brick was not as critical. Construction cost for the Greenwood tunnel was \$74,000 (Meeks, 1983). However, because of the poor quality, water began oozing through the brick during freeze and thaw conditions and the arch began to loosen. The Greenwood tunnel was replaced with a cut through the hillside in 1941-44 and the old tunnel was sealed with concrete (Figures 7 and 8).

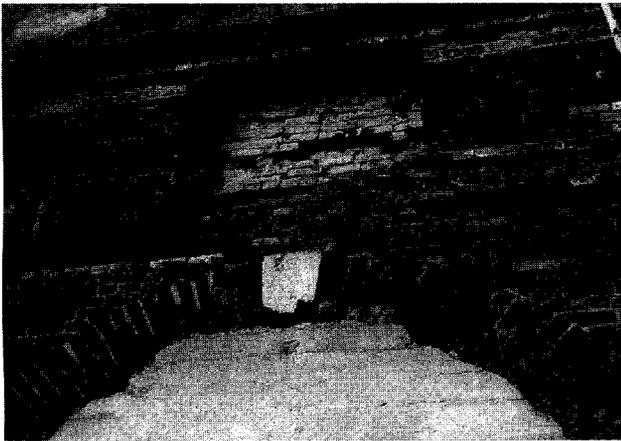


Figure 7. Brick work above the concreted east entrance, Greenwood tunnel, Greenwood, Albemarle County.

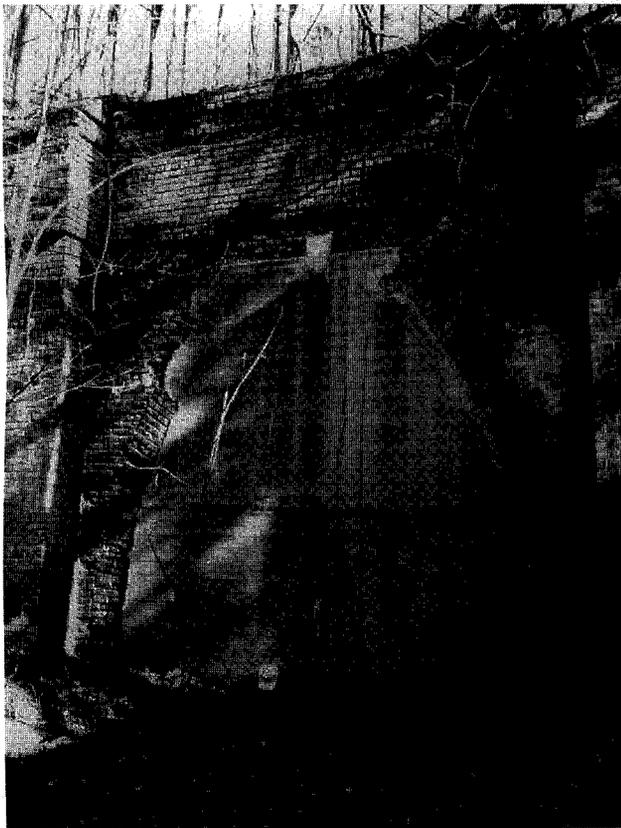


Figure 8. Brick around the concreted west entrance of the Greenwood tunnel, Greenwood, Albemarle County.

In early 1853, Robert Harris was next contracted to produce brick for the Brooksville tunnel. The Brooksville tunnel, which cost \$114,000 to construct, was destroyed with construction of Interstate 64 in the 1960s (personal communication, T. M. Gathright, 1997). The brick in the main Blue Ridge Tunnel (5,078 feet) was contracted to Robert Richardson, a Waynesboro brickmaker at a cost of \$8.20 per 1000 brick. Almost 800 feet of the tunnel, where the rock was incompetent, were arched with brick in 3 separate and detached lengths, including 483 continuous feet from the west portal (Figure 9). The Blue Ridge Tunnel, which was 21 feet high and 16 feet wide, was "holed through" on Christmas Day, 1856 at a total cost of \$488,000 (Meeks, 1983). The fourth tunnel is the 80-

foot "Little Rock" tunnel, unlined with brick, and located 0.6 mile west of the crossing over the railroad of present-day Interstate 64. This short tunnel, which is still being used, was enlarged when the railine was improved in 1941-44 (Meeks, 1983).

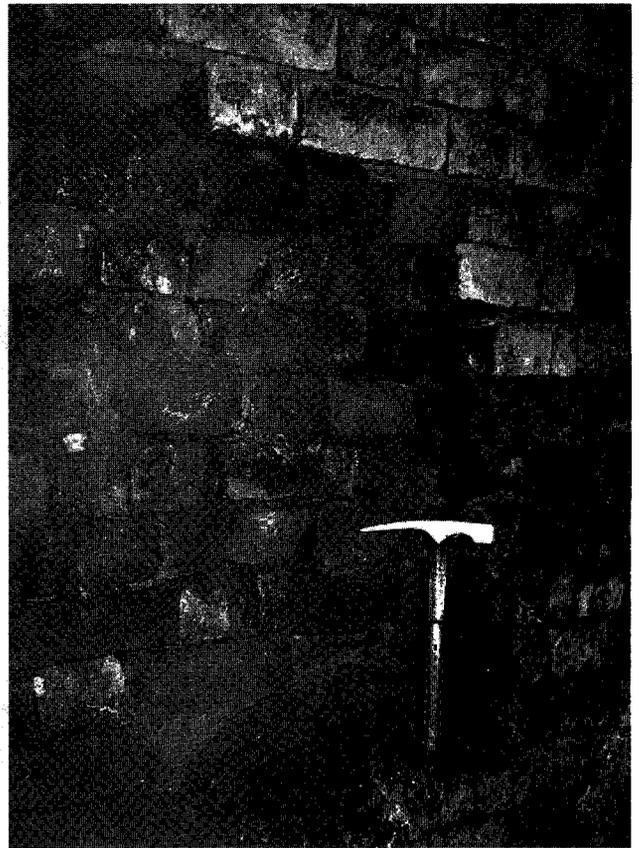


Figure 9. Brick lining, just inside west portal of the Blue Ridge tunnel, Augusta County.

The first train through the 4 tunnels and into the Valley occurred on April 13, 1858 (Moore, 1976). The Blue Ridge Tunnel was abandoned, because of the need to move supplies for World War II, and a larger new tunnel was bored in 1941-44. Two concrete walls were constructed in the Blue Ridge Tunnel in the middle of the twentieth century, mainly for additional support (Figure 10). In the 1950s, the use of the interior of the tunnel between the two concrete walls, was investigated for gas storage.

During the early 1880s, William "Dyer" Wheeler, a master builder in Charlottesville, operated a brick yard south of the intersection of Gordon Avenue and 12th Street; this is the present location of the playgrounds of Venable School. Mr. Wheeler reportedly built the houses at 400 and 406 Ridge Street before 1883 (personal communication, Antoinette Roades, 1997) (Figure 11).

After the Rotunda at the University of Virginia was burned in October, 1895, it was decided that the necessary brick would be produced in the vicinity of the University. It was noted that the brickyard should be carefully chosen and the clay would be dug out, raked, screened and allowed to weather through the winter. The weathered material would be more plastic and thus produce a better brick than could be purchased in the local market (Bruce, 1921).

Around 1889, Robert Lee Updike began making brick, by hand, in a field just west of Barksdale Avenue and present-day Cherry Avenue in south Charlottesville. This operation evidently continued through the end of the century.

Toward the end of the nineteenth century, it has been noted that many houses in the Red Hill area were built with clay from the hillside "near the old oak tree", across the intersection of State Road 631 (Old Lynchburg Road) with State Road 708 from the Mt. Olivet Church (personal communication, G. P. Wilkes, 1995)(Figure 12).



Figure 10. Concrete wall with drainpipe, inside the Blue Ridge tunnel, near the middle of the Blue Ridge Mountain, Albemarle County.



Figure 11. Brick house at 400 Ridge Street, built before 1883, City of Charlottesville.



Figure 12. Area near the "old oak tree", now fallen, across from the Mt. Olivet Church where clay-material was dug to make brick for many houses in the Red Hill area in the 1890s, Albemarle County.

TWENTIETH CENTURY

In approximately 1909, the brick operation of Robert Lee Updike was moved to the southeast of 7 1/2 and Elm Streets; this was northwest of the original site. Robert Updike and his brothers, Abraham (Abe), E. Byrd, Eston, and Walter (operation listed as R. L. Updike and Bros. plus there is a separate operation listing for Eston Updike in Watson, 1911) made bricks from clay residuum over the quartz-biotite gneiss of the Lynchburg Group (Charlottesville Formation). The pit was in the hillside toward present-day 5th street and across Cherry Avenue, behind the present-day IGA supermarket. The clay was formed in molds and fired in square kilns, as noted on the Sanborn Insurance maps, 1920. Robert (Bob) Updike's house at 7 1/2 and 9th Streets as well as many houses on 7 1/2 Street, Ridge Street and around the courthouse area were made of brick produced at about this time (Figure 13). Mules were used at the plant to haul the raw material from the pit.



Figure 13. Brick house at 701 Ridge Street, built with Updike brick in the early 20th century, City of Charlottesville.

It is also noted in the State Corporation Commission Index to Charter Books, 1870-1981, that a Charlottesville Brick Company was incorporated in 1903 and their charter was revoked in 1915; the company was incorporated again in 1924, but the charter was again revoked in 1927 (written communication, Virginia State Library & Archives, 1991).

In 1913, Eston and Walter Updike formed a partnership and built new and larger kilns south of present-day Cherry Avenue. In 1920, Eston purchased Walter's share and operated the plant as Eston Updike (Figure 14). A company store was on the property and served everyone who worked at the company. Warwick (1974) notes that Eston Updike operated a brick plant on the "old Lynchburg Road". Eston Updike issued brass cheques (amounts from 5 cents up to \$1.50) for time worked at the brick plant (personal communication, Elsie Eggleston, 1991). These cheques (script) could be used at the company store during the week and at the end of the week, could be exchanged for "real" money (Figure 15). According to records, brick (standard wire-cut smooth face brick) production in the city of Charlottesville and Albemarle County, by several producers, mainly Eston Updike, was about 12,671,000 from 1908-1920; no records are available after that date until 1942 and again in 1947 (Table). If the short tons (4600) of clay material produced during 1942 and 1947 are included; another 2,300,000 brick (on the average, 1000 brick can be produced from 2 tons of clay material) were produced, for a total of 14,971,000 brick.

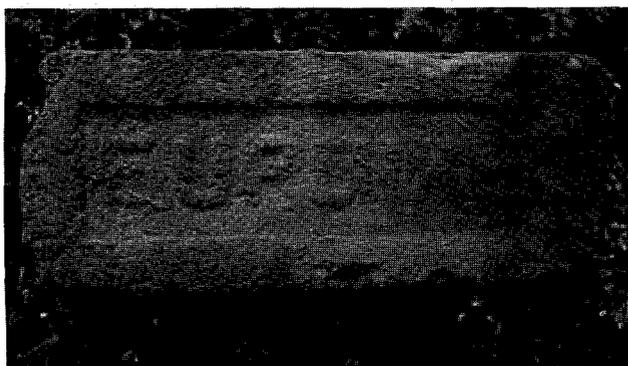


Figure 14. Brick with "EUPDIKE" stamped in the middle, from Eston Updike brick works, City of Charlottesville.

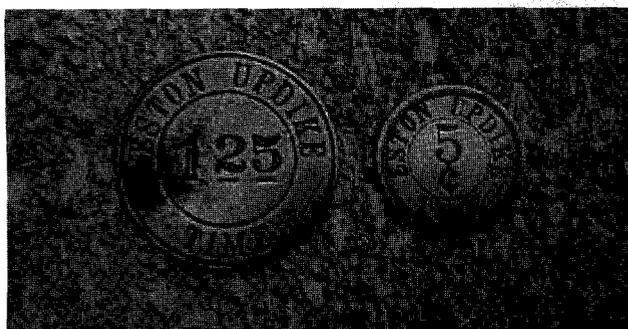


Figure 15. Brass cheques "script" issued by Eston Updike for use at the company store in the 1920s, City of Charlottesville.

By the mid-1920s, the clay deposit was reportedly running out. Eston Updike sold the business to several businessmen: Samuel A. Jessup, Price Yancey, and Nathaniel Burnley; they formed the Monticello Brick Company. The Virginia State Library & Archives (written communication, 1991) note that the Monticello Brick Company was incorporated in 1925. The Daily Progress (1926) contained an article around the first of June, noting the new Monticello Brick Company, under the management of General Manager J.H. Keller, formerly of the Staunton Brick Co., was open for business. The company would produce a Colonial style sand-finished residence brick (Figure 16). With new kilns being installed, total capacity of

the plant would be over 50,000 brick per day. It is also noted in the article that the local plant will produce the brick for the new University Medical School. About 20 men were employed by the company, which owned about 10.5 acres from which the clay raw material would be mined for many years. The office for the Monticello Brick Company (now 420 7 1/2 Street SE) was reportedly located on the western end of the brick property (Figure 17).

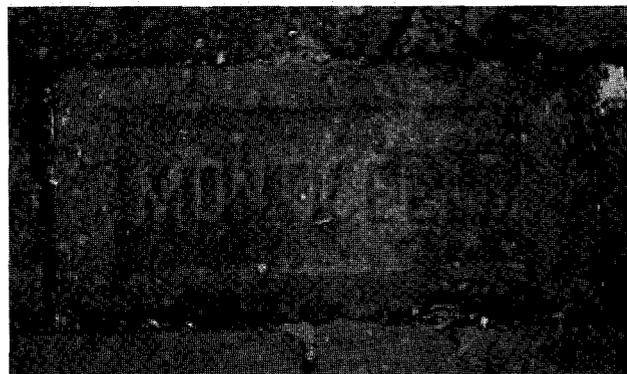


Figure 16. Brick with "MONTICELLO" stamped in the middle, from Monticello Brick Company (1920s-1930s), City of Charlottesville.



Figure 17. Former office of the Monticello Brick Company, late 1920s (now 420 7 1/2 Street SE), City of Charlottesville.

Around 1930, beehive kilns were installed and conveyors were used at the plant. In beehive kilns, the green brick were piled up in a beehive shape and fired with heat from the combustion chamber below. This allows for the heat to rise up through the brick. In 1930, brick from the Monticello Brick Company were used for testing of physical properties of common brick in Virginia (Whittemore and Dear, 1930). This company was the main brick works in the area for about 15 years. Indeed many of the Updike family were listed in the city directory during these times as bricklayers; names listed include Eston, A. Leslie, Godfrey M., and W. Edward Updike. The Updike family was involved in the brick making and laying of brick for more than 50 years in the Charlottesville area. One person who mainly worked on weekends at the brickyard, in the late 1930s, notes that the clay was extremely sticky when wet; he made brick, putting them in six-brick molds and after air drying, would stack them in the beehive kilns (about 10 of them) for firing at night. Most of the kilns were wood-fired, with coal being used in only a few. He was paid about \$1.50

for an 8-hour day (personal communication, L. V. Tonsler, 1997). The corporation charter for Monticello Brick Company was dissolved in 1942 (written communication, Virginia State Library & Archives, 1991).

1940-PRESENT

James T. Clarke, who was a bookkeeper for the Monticello Brick Company in the 1930s, purchased the brick operation after he was discharged from the Air Force in 1945 (personal communication, J.T. Clarke, 1991). Mr. Clarke signed a \$15,000 note, with Sam Jessup, for the company. He utilized three beehive kilns that were fired with pine slabs from nearby woodyards. The bricks were steam dried through pipes at about 1800 degrees F; the bricks had to be fired hot due to limited plasticity (lack of clay) of the raw material. Green brick were removed from the molds and hand-rolled to the kilns and loaded on steel pallets in the kilns. McGill (1953) notes that Old Colonial Brick, Inc. (successor (?) to Monticello Brick Co.) produced some brick in the Charlottesville District between 1944 and 1949. The Virginia State Library & Archives (written communication, 1991) notes that Old Colonial Brick Inc. was incorporated in 1941 and dissolved in 1951.

Around 1946, Charlottesville took about 10 acres of the

site, south and north of present-day Cherry Avenue where Tonsler Park and the IGA supermarket now stand. These parcels were not being used by the brick company at the time. In 1948, the quality of the remaining material was very poor for making brick and the plant was sold. The pipe was sold to a junkyard. A company rebuilt one of the beehive kilns to make tile, then discovered the poor quality of the raw material. A firm in New England advertised that it was interested in the steel pallets. Mr. Clarke hauled the steel pallets up north and sold them for \$1000. A reference was noted in production records of the U.S. Bureau of Mines that in 1949, the Potomac River Clay Works, Alexandria, Virginia purchased the machinery in the plant.

A reference, also in the U. S. Bureau of Mines production records, noted that in 1947, Franklin Clay Manufacturing Co. operated an open pit in Albemarle County and produced 4000 short tons of clay material. There is no additional information available on the company or the location of the raw material pit.

Since the late 1940s, there has been no brick production in the immediate area. Samples have been taken, evaluated and indicate the potential of raw materials from seven sites in the county for structural clay products, including brick, tile (structural and quarry), and refractories (Sweet, 1988). The best raw

material in the county consists of Triassic shale and clay residuum in the Scottsville Mesozoic age basin. Samples taken by Calver and others (1964) and Sweet (1982) note that this material is plastic, fires hard, and is very suitable for various structural clay products. Sweet (1986) has taken the only samples in Albemarle County and in the City of Charlottesville that were tested and found suitable for medium-duty and super-duty refractories. Both of these samples were taken from the residuum over a felsite dike; the amount of raw material available is limited.

REFERENCES CITED

Albemarle County Historical Society, 1996, Downtown Charlottesville-Map & Guide brochure, 2 p.

Bear, James A., Jr., and Stanton, Lucia C., editors., 1997a, Jefferson's Memorandum Books: Accounts, with legal records and miscellany, 1767-1826, Vol. 1, Princeton University Press, Princeton, New Jersey, 807 p.

Bear, James A., Jr., and Stanton, Lucia C., editors., 1997b, Jefferson's Memorandum Books: Accounts, with legal records and miscellany, 1767-1826, Vol. 2, Princeton University Press, Princeton, New Jersey, p. 808-1624.

Betts, E. M., 1944, Thomas Jefferson's Garden Book: The American Philosophical Society, Philadelphia, Pennsylvania, 704 p.

Betts, Edwin M., editor., 1953, Thomas Jefferson's Farm Book: Princeton University Press, Princeton, New Jersey, 552 p.

Brodie, F. M., 1974, Thomas Jefferson-An intimate history: W. W. Norton & Company, Inc., New York, 591 p.

Bruce, P. A., 1896, Economic history of Virginia in the seventeenth century: MacMillan and Co., New York, vol. II, 647 p.

Bruce, P. A., 1920, The History of the University of Virginia: The MacMillan Co., vol. I, 376 p.

Bruce, P. A., 1921, The History of the University of Virginia: The MacMillan Co., vol. IV, 376 p.

Table. Brick-Clay Production in Charlottesville/Albemarle County*

Year	Quantity (thousands)	Value	Company/Site/County
1769	165	-	Monticello
1772			
1773	100	-	Monticello
1773			
1774	100	-	Monticello
1778	90	-	Monticello
1807	40	-	Monticello
1908	1500	\$10,500	
1909	661	4,407 est.	R. L. Updike & Bros.
1910	743 est.	4,953 est.	Eston Updike Charlottesville Brick Co.
1911	2019	13,730	Albemarle Co./Eston Updike
1912	975	5,825	Charlottesville Brick Co.
1913	1000	5,000	Albemarle Co.
1914	1642	13,230	Albemarle Co.
1915	2000	14,000	Albemarle Co.
1916	1699	13,517	Albemarle Co.
1917	90	900	Albemarle Co.
1918	100	1,200	Albemarle Co.
1919	40 est.	495 est.	Eston Updike
1920	200	4,000	
1921-1941	NO RECORDS Clay (short tons)		
1942	600	300	Monticello Brick Co.
1943	None		
1944	Out of Business		Monticello Brick Co.
1945	Idle		Monticello Brick Co.
1946	Idle		Monticello Brick Co.
1947	4000	3,000	Monticello Brick Co. (Franklin Clay Manuf. Co. - Operator)
1948	No Report		
1949	Idle		
1950	Out of Business		

*Production figures for 1700s and 1807 from Betts, 1953; production figures for 1908 from Watson, 1909; production figures for 1909-1910 from Watson, 1911; production figures and notes for 1911-1951 from U. S. Bureau of Mines production file data.

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Calver, J.L., Smith, C.E., and LeVan, D.C., 1964, Analyses of clay, shale and related materials-west-central counties: Virginia Division of Mineral Resources Mineral Resources Report 5, 230 p.

Department of Community Development, 1976, Historic Landmark Study: The Michie Company, Charlottesville, Virginia, 105 p.

Harrington, J.C., 1950, Seventeenth Century brickmaking & tilemaking at Jamestown, Virginia: in Virginia Magazine of History and Biography, Vol. 58, p. 16-39.

Hunter, R.F., and Dooley, E.L., Jr., 1989, Claudius Crozet: University Press of Virginia, Charlottesville, Virginia, 224 p.

Lane, Mills, 1984, Architecture of the Old South-Virginia: Abbeville Press, Inc., New York, N. Y., 263 p.

Lay, K. Edward, 1991, Dinsmore and Neilson - Jefferson's master builders: in Colonade, Vol. VI, n. 1, p. 9-13.

Malone, Dumas, 1948, Jefferson the Virginian: Little, Brown & Company, 470 p.

McGill, W. M., 1953, Memorandum report on brick clays in Virginia: Virginia Geological Survey, 39 p.

Meeks, S. G., 1983, Crozet: X-High Graphics, Elkton, Virginia, 104 p.

Moore, J. H., 1976, Albemarle Jefferson's County 1727-1976: University Press of Virginia, 529 p.

Nelson, Wilbur A., 1962, Geology and mineral resources of Albemarle County: Virginia Division of Mineral Resources Bulletin 77, 92 p.

Rawlings, Mary, 1935, Ante-bellum Albemarle: The Peoples National Bank of Charlottesville, Virginia, 104 p.

Rhodes, Daniel, 1968, Kilns-design, construction and operation: Chilton Book Co., Philadelphia, Pennsylvania, 240 p.

Sweet, P. C., 1982, Virginia clay material resources: Virginia Division of Mineral Resources Publication 36, 178 p.

Sweet, P. C., 1986, Clay-material samples collected 1981-1984: Virginia Division of Mineral Resources Publication 68, 107 p.

Sweet, P. C., 1988, Clay-material testing program, 1957-1986: Virginia Division of Mineral Resources Publication 76, 46 p.

Toledano, Roulhac, 1994, The 1817 Inn & Restaurant: in The Observer, Vol. XVII, n.24, p. 21.

Warwick, L. H., 1974, Memoirs of Linwood H. Warwick: PA-98, Part I, Albemarle County Historical Society, 10 p.

Watson, T. L., 1909, Annual report on the mineral production of Virginia (1908): Virginia Geological Survey Bulletin I-A, 141 p.

Watson, T. L., 1911, Biennial report on the mineral production of Virginia (1909 and 1910): Virginia Geological Survey Bulletin VI, 123 p.

Whittemore, J. W., and Dear, P. S., 1930, Physical properties of common and face brick manufactured in Virginia: Virginia Polytechnic Institute, Engineering Experiment Station Bulletin, vol. 23, no. 6, 40 p.

Yonge, S. H., 1936, The site of old "James Towne" 1607-1698: L. H. Jenkins, Inc., Richmond, Virginia, 131 p.