

# Earthen Architecture in the Northern United States

## European Traditions in Earthen Construction

**I**n the United States, the use of earth for building is most frequently associated with Hispano-American traditions of adobe construction in the Southwest. There is also, however, in the northern United States a significant tradition of earthen wall construction that is related to techniques of northern European immigrants.

Early construction in the northeast by Dutch settlers exploited the insulative properties of earth used as infill in wood frame structures. “Wattle and daub” typically utilized small riven wood laths secured in stud cavities with wood strips or shallow mortises, and a mud and straw mixture to fill the frame openings of both interior and exterior walls. Exterior wall surfaces were typically boarded or sided with nailed lath and wood shingles, but interior walls were usually plastered and whitewashed directly on the surface of the nogging. Wattle and daub nogging is common in Dutch tradition houses in areas of Dutch settlement (the Hudson Valley and Northern New Jersey) of the 17th and 18th centuries. In the 19th century, traditional Ukrainian construction in North Dakota used a similar, if somewhat cruder, system of lath nailed on earthfast poles and filled with mud for dwelling construction.

*Greek Revival style mud brick residence in Bath, New York. Nearly all of New York State's mud brick buildings were constructed between 1840 and 1851 and reflect the Greek Revival, Gothic Revival, and Italianate styles popular at that time. Photo by the author.*



German-Russian builders in the mid-19th century in settlements as far east as western New York utilized mud brick for nogging within timber frames. In all of these systems earth was a significant component of the wall system, but the structure was basically wood. However, a number of contemporaneous traditions in the Northeast feature buildings constructed with load bearing earthen walls, similar to Southwestern adobes.

Perhaps the earliest method of load bearing earthen wall construction practiced in the northern United States was “cob” walling. Cob walling, a traditional English technique of monolithic earthen wall construction, used a mixture of moistened earth and straw. The mud and straw mixture could be laid as walls with or without the use of wooden form work. In New York State, the earliest documented extant earthen structures are two cob walled residences. The Lawrence Johnston House (1832 or 1833) and the William Gorse House (1836) are located a few miles apart in Penfield, Monroe County, near Rochester. While the Johnston House’s wall construction is now obscured by clapboard siding, several exposed areas in the interior show that the mixture of mud and straw was placed within wooden wall forms in layers about six inches deep. An account of the construction of the Gorse House re-published in a Penfield history states:

A pen was built on the ground and clay drawn from a nearby creek bed spread over the ground to a depth of about a foot. On this, cut straw was spread to a depth of three to four inches. Oxen were driven around and around inside the pen to thoroughly mix the ingredients. Plank forms about a foot high were set up on the wall foundations and filled with the clay mixture. As soon as the clay and straw had dried sufficiently to be self-supporting, the forms were raised and another course poured. Floor joists were laid across the walls and another layer poured on top, thus embedding the joists in the wall. When completed a year later, the house was given a thin

plaster coat of clay and the interior walls were plastered and kept white-washed.\*

An account of similar cob walled structures was given by author Stephen W. Johnson, who in 1806 in New Brunswick, New Jersey, published *Rural Economy: Containing a Treatise on Pisé Construction*. Johnson describes several mud walled buildings near Trenton, New Jersey, with “walls ... twenty inches thick, built of mud and straw, as the English ones are done.” As its title suggests, Johnson’s book was actually primarily a study of *pisé*, or rammed earth construction. Johnson’s interest in rammed earth construction was sparked by the the seminal writings of François Cointeraux, French agriculturalist and architect, whose publication of a series of cahiers on rammed earth construction in 1791 started a chain of translations and adaptations that reached the United States in the early-19th century. Cointeraux was not the first Frenchman to write about rammed earth construction, which had been chronicled by others reporting on *pisé* construction then common in the areas around Lyons. Cointeraux’ reports were backed by considerable personal experimentation, however, and he pursued the dissemination of his techniques with a proselytic zeal that soon attracted the attention of like-minded architects in Great Britain. By 1797, Cointeraux’ first and second cahiers on *pisé* construction were translated into English by noted English architect Henry Holland and published with new illustrative plates in the Communications of the Board of Agriculture of Great Britain. Holland’s translation was reworked and plagiarized in America by Stephen Johnson. Johnson’s book was illustrated with plates resembling Cointeraux’ original engravings, and it included sections on such disparate topics as road building and viticulture. Johnson’s book, and Holland’s translation, which was republished in the agricultural journal *The American Farmer* in 1821, sparked in the Mid-Atlantic and southeastern United States a series of experiments in *pisé* construction that were chronicled in agricultural journals in the first four decades of the 19th century. Responding to inquiries from the publisher of *The American Farmer*, Virginia planter John Cocke of Bremono Plantation near New Canton wrote of his construction of two small *pisé* buildings during the summer of 1816. Cocke indicated that he had followed the instructions in Johnson’s book, and praised the buildings “which have stood perfectly, affording the warmest shelter in winter and the

coolest in summer of any buildings of their size I ever knew.”

Writing in *The American Farmer* in 1824, a Dr. William W. Anderson of Stateborough, South Carolina, recounted his experimentation with rammed earth construction, which had begun with the construction of a 10' x 14' dairy in April 1821. Pleased with the results, Anderson constructed a rammed earth dwelling for house servants in July 1823. Anderson also appears to have used Johnson’s book as his instruction manual, and went on to construct five other structures of rammed earth on his plantation. The plantation’s buildings were listed in the National Register of Historic Places in 1972, and along with a local church constructed in the 1850s are believed to be the largest concentration of historic rammed earth structures in the eastern United States.

About the same time that Anderson was completing his complex of rammed earth buildings in South Carolina, and Gorse and Johnston were experimenting with cob wall construction outside of Rochester, English architect and horticulturist John Claudius Loudon was publishing his influential *Encyclopedia of Cottage, Farm, and Villa Architecture* (1833), a compendium of designs and prescriptions for construction that contained no fewer than 29 illustrations for cottages that Loudon proposed were appropriate for earthen construction. Loudon noted Cointeraux’ *pisé* experiments but also quoted the report of fellow Englishman John Denson whose *Peasant’s Voice* reported on the use of “clay lumps” or unburnt brick, for the construction of cottages in Cambridgeshire. English author John McCann has presented convincing evidence that this technique was developed in East Anglia at the end of the 18th century, and was not, as was earlier thought, an ancient traditional English construction method. Whatever its origins, and whether prompted by Loudon’s encyclopedia or simply immigrant English technique, buildings were being constructed of unfired mud brick near Toronto, Canada, as early as 1836. By September 1842, the Canadian publication, *The Church*, was reporting of the new Hurontario Church, “the new church is to be built of mud (or unburnt) brick, which in the opinion of the best informed architects, is the material of all others the fittest for the building with in this province.” In February 1843, *The British-American Cultivator*, a Toronto agricultural journal,



This Gothic Revival style residence in Geneva, Ontario County, New York, is typical of earthen buildings constructed in Geneva. Over 20 mud brick buildings had been constructed in Ontario County by 1855. Photo by the author.

reported that “houses, properly constructed (of unburnt brick) are warmer, more durable, and also cheaper than frame, and are destined to take the place of the log shanty, as well as the more expensive wooden walls.”

Unburnt brick construction was being championed at the same time in the United States by U.S. Commissioner of Patents Henry Leavitt Ellsworth. Son of U.S. Supreme Court Chief Justice Oliver Ellsworth, and brother of Connecticut Governor William Ellsworth, H. L. Ellsworth chronicled advances in agricultural science in his patent office reports of the 1830s and 1840s. Ellsworth's reports of 1842, 1843, and 1844 reprinted excerpts about unfired brick from Loudon's encyclopedia and *The British-American Cultivator*, and reported on Ellsworth's own successful experiments with mud brick construction in Washington, DC, and Grand Prairie, Indiana, that had begun in 1842. Ellsworth's influential reports were widely excerpted and reprinted in agricultural journals such as *The Cultivator* (Albany, N.Y.), and *The Genesee Farmer* (Rochester, N.Y.). The *New York Tribune*, which published an excerpt about unburnt brick construction soon after the first report's publication in February 1843, separately reprinted a sizable portion of the report in pamphlet form under the title *Useful Works for the People No. II*.

Ellsworth's motivation to experiment with this novel form of construction was apparent. Already a landowner in the Wabash Valley of Indiana, Ellsworth was to become an agent for federal lands in the area following his departure from the Patent Bureau in 1845. An illustration of Ellsworth's proposed “prairie cottage” in the 1844 report leaves no doubt that, in spite of his rather large (18' x 54') experimental brick structure in Washington, DC, Ellsworth was propos-

ing that unburnt brick would well serve those of modest means settling on the untimbered prairies of the then far west.

Ellsworth's intentions notwithstanding, the vogue spread to other areas. By 1855, more than 40 mud brick structures, most not nearly so simple as Ellsworth's prairie cottage, dotted a nine-county area in New York that spanned half the state. While the New York State examples have perhaps been documented best, similar buildings have been identified in Pennsylvania, Michigan, and Nebraska, and no doubt many more are known locally in adjacent states. In his 1967 study of historic construction technology in central Canada, *Building with Wood*, author John Rempel also confirms the popularity of the technique in neighboring York County, Ontario.

In New York State, Ontario County was quite certainly the center of this mud brick vogue; census records indicate that at least 22 mud brick structures had been built in the county by 1855, far more than in any other. At least 14 mud brick buildings were constructed in the village of Geneva alone. One contemporary account reveals that the initial use of unburnt brick in Geneva antedated Ellsworth's first published report, however, and the discrepancy between the brick sizes recommended by Ellsworth (12" x 7" x 5" and 12" x 6" x 6") and that of the majority of mud brick buildings in Geneva (15" x 12" x 6") suggests that immigrant English or Canadian practice may have served as a model for the earliest Geneva construction. It is apparent also that Geneva mud brick construction influenced others wishing to experiment with this construction technique; the 15" x 12" x 6" Geneva brick size can be found in buildings in Bath, Steuben County, and Interlaken, Seneca County.

Although the architectural treatises of the period were not silent on the subject of unburnt brick, few dealt with the mode at length or in adequate detail to assist a would-be builder. One notable exception was *The Architect* (1849), a journal published by the New York City architect William Ranlett. Ranlett's book may have been the first eastern publication to use the Spanish term “adobe” for the construction technique that previously had been identified as “unburnt brick,” “sundried brick,” “mud brick,” or even “Egyptian brick.” While Ranlett devoted only two pages and three designs to adobe construction, he gave detailed prescriptions for construc-



tion and undoubtedly his copiously illustrated pattern book lent a certain cachet to the novel building mode that had prompted so much publicity in the previous five years. It appears that Ranlett's work inspired the construction of what was by far New York's largest documented earthen building, the Judge Samuel Ludlow Residence in Oswego. Under construction in 1851, the Ludlow residence when complete had a major facade 70 feet long, two 2-1/2-story hip-roofed ells 45 feet long, and an adobe tower with a wood frame top that rose 40 feet. Until it was demolished recently, Ludlow's residence served as a convent for a neighboring Catholic high school.



When it was demolished in the 1970s, this board-and-batten sided building in Geneva was found to be load bearing mud brick construction, originally sided with wood. Photo by David Brumberg.

By the early 1850s, the mud brick vogue was slowing considerably, no doubt prompted in part by the difficulty of preventing exterior stucco finishes from failing. The stucco problem had been mentioned frequently in early accounts, and prompted at least two New York State builders to include horizontal wooden members within the walls between alternate layers of brick, so that the completed masonry building could be sided with wood.

Despite the generally glowing tone of the early press, not all later publications treated the topic so favorably. In his 1852 book *Rural Architecture*, Lewis F. Allen indicated "we are aware that unburnt bricks have been strongly recommended for house building in America; but from observation we are fully persuaded that they are worthless for any permanent structure, and if used, will in the end prove a dead loss in their application." *The Cultivator*, which in March 1847 had published an article about mud brick construction entitled "The Cheapest and Best

Mode of Building," was by February 1855 stating, "... this mode of building is falling into disuse, doubtless for some substantial reasons, among which is probably the difficulty of having every part done well, and especially the great difficulty of securing good cement, so essential to success." Some innovative builders, inspired by Orson Fowler's *The Octagon House, A Home for All* turned instead to what was to become the next heralded replacement for fired brick masonry—the gravel wall. As early as February 1846 one correspondent to *The Cultivator* offered a comparison of the two technologies: "I read in Ellsworth's report of last winter, the manner of building cheap houses of unburnt brick; but I think they have an improvement in Wisconsin over all others. The material consists of gravel and lime—one-eighth part lime, and the balance of coarse sand and any kind of gravel or small stones, mixed so as to make a mortar that will 'set' so hard as to stand well."

Few stylistic generalizations can be made about northern mud brick buildings. The buildings identified to date reflect then-current Greek Revival, Gothic Revival, and Italianate styles. Similarly, the buildings cannot be said to have been favored by one socioeconomic group; the 1855 census records values for the buildings in New York State ranging from \$100 to \$15,000. Today most remaining examples are in sound condition and all are occupied. Many retain their original exterior stucco finishes, although some have long been re-sided with wood clapboard, aluminum, or brick, and hide their identity from the casual observer. Quite certainly others remain to be found, unlikely relics of an innovative era in American masonry construction, confirming the claims of adobe's 19th-century proponents about the durability of earthen construction in the harsh climate of the northern United States.

#### Note

- \* John McAnn "Is Clay-lump a Traditional Building Material?" *Vernacular Architecture* 19 (Vernacular Architecture Group, 1988): 1-16.

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