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## “Swedish” Colonial Yellow Bricks: Notes on Their Uses and Possible Origins in 17th Century America

### ABSTRACT

Small bricks of yellow color are often found at early colonial sites along the eastern seaboard. These building elements are usually associated with Swedish and Dutch constructions of the 17th century. Despite their frequency at such sites, little has been written about them and still less research has been conducted regarding their history. In order to initiate a study of this class of artifacts, some basic information is presented along with the limited data derived from the yellow brick remains recovered during excavations directed toward revealing an early house foundation in Governor Printz Park (36DE3) in southeastern Pennsylvania. These remains are believed to include the 1643 foundation of the “Printzhof,” the core of the earliest European Settlement within the boundaries of modern Pennsylvania.

Yellow bricks, of a size somewhat smaller than those familiar red bricks used over the past 200 years, are a characteristic feature of early Swedish and Dutch settlements. During the first half of the 17th century, a Swedish “colony,” really little more than a trading station, was established on the Delaware River about where modern Wilmington now stands. The third Swedish colonial governor, Johan Printz, built his own house on Tinicum Island, which is upriver from Wilmington (Figure 1).

Excavation to locate the “Printzhof,” the residence and “mansion” of Governor Johan Printz, were conducted in 1937 and again in 1976 at 36DE3 and produced a considerable number of fragmentary and whole yellow bricks. The revealed building foundations may indeed date to 1643 when the “Printzhof” was first built (Becker 1977, 1978), but the evidence is far from conclusive. Among the solid indications that the central and earliest foundation (Figure 2,A) is a 19th century construc-

tion are the associated artifacts, which include pipes from the period, remains of artifacts made by Native Americans, as well as the yellow bricks.

Yellow bricks are known from a number of other Swedish and Dutch colonial sites along the eastern seaboard of North America. In addition to those from the suspected “Printzhof” in Delaware County, Pennsylvania, other 17th century Swedish sites along the Delaware River (once called the South River) and the Dutch settlements at New Amsterdam (New York) and Orange (Albany) have yielded examples of these durable remains of continental influence in the colonies. Although these bricks frequently are preserved on and received from archaeological sites, a fact which may result from both the durability incurred by firing at high temperatures and their large size relative to other artifactual remains, almost nothing has been published regarding the origins and use of this type of brick. Some fundamental information comes from research and experimentation by Herbert O. and Josephine F. Albrecht and from their correspondence with Professor C. L. Temminck Groll, Technische Hogeschool, Delft, Holland (1977, pers. comm.).

Early historians frequently referred to yellow bricks found in association with colonial occupation, but their data often originated in oral traditions. For example, Henry Ashmead (1884: 227) noted that the chimney of the Governor’s mansion at Tinicum was “said to have been made of small foreign bricks of a pale yellow color.” This suggests that the entire chimney was constructed of these bricks, but Ashmead made no statement regarding the possible origins of the material. Smith (1862: 31) believed that only part of the chimney was made of such bricks. Possibly indicating that only a small number of them had been imported. Such unreferenced, abbreviated entries appear to be the only mention of these yellow bricks in the historical literature.

Small yellow bricks, in common use throughout Sweden and Holland during the 17th century, often appear in ships’ inven-

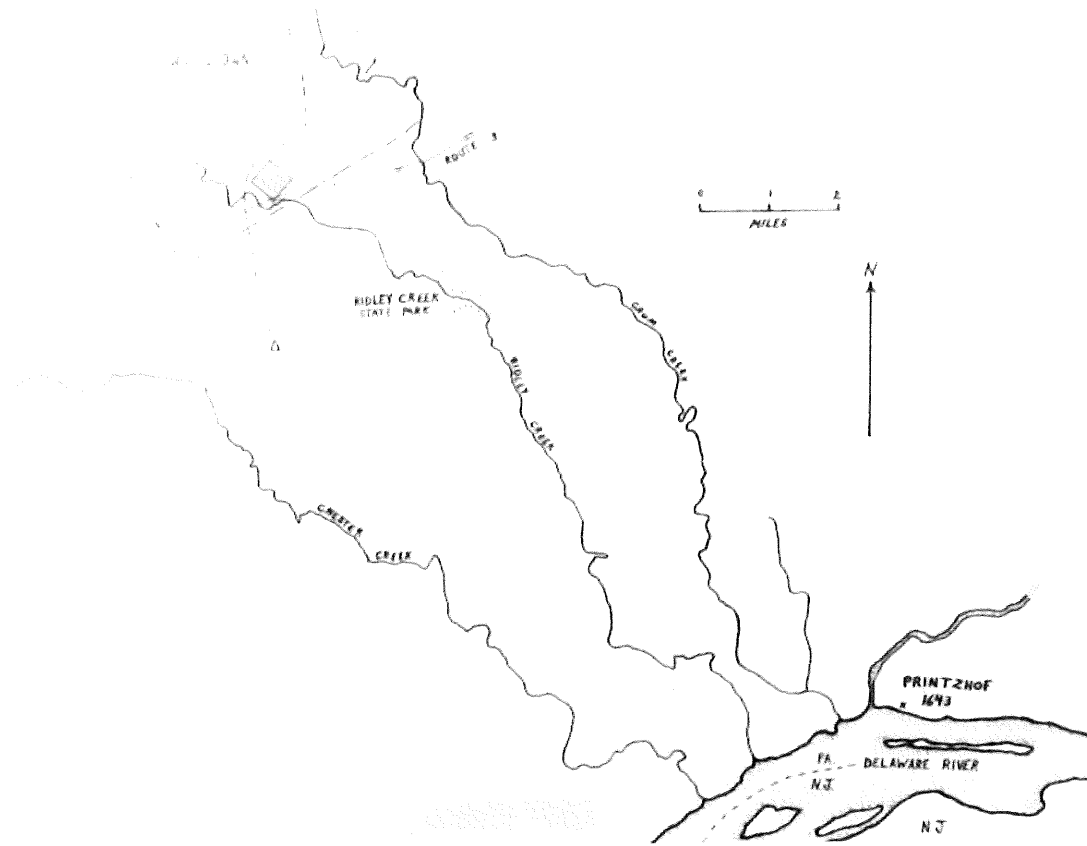


FIGURE 1. Location of the "Printzhof."

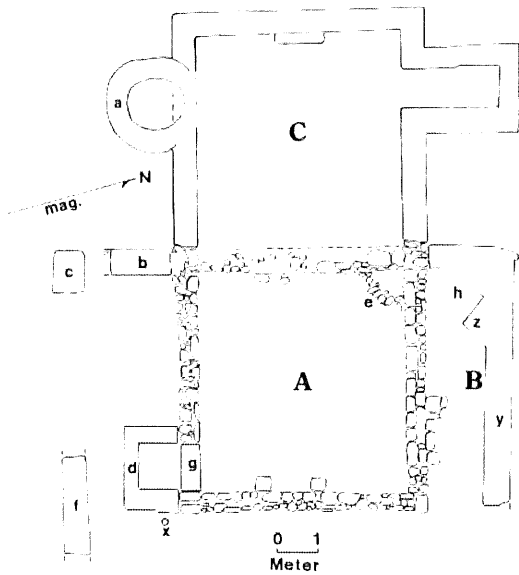


FIGURE 2. Schematic plan of the building foundation thought to be the "Printzhof."

ories and are noted as ship's ballast (Johnson 1911: 193, 198, 242, etc.). The total number of these bricks in documents noted by Johnson is never large, but the references occur with sufficient frequency to lead one to assume that examples of these European bricks might be recovered from the various excavations of Swedish settlements or from areas surrounding colonial Dutch or Swedish outposts.

The actual number of whole and fragmentary bricks recovered during the 1937 and 1976 excavations in Governor Printz State Park is not so large that it precludes the possibility that all of this material could have been imported as a minor portion of the ballast of one ship. Other authors discussing the brick at Tinicum (e.g., Schiffer 1976: 219) generally quote Ashmead's very brief note on the subject as given above. No authors offer anything useful regarding the use of brick in chimney

construction. Schiffer's earliest reference to any chimney in colonial America dates to the year 1735, over 100 years after the initial construction began on Tinicum Island.

The lack of homogeneity in the substance of each brick has been noted. Variations in the "clay body" can be seen in the varied inclusions, such as fragments of red brick and also hard, black, stratified lumps of one or more unidentified materials. Professor C. L. Temminck Groll (1977, pers. comm.) explained the methods of firing bricks in the 17th century as well as other details of manufacture, such as the process that would produce the red surface color found on some of the "Printzhof" bricks. Both of these aspects of brick manufacture are explained below together with comments regarding the particular suitability of these bricks for use in the New World.

The red coating noted on many of the yellow bricks from the suspected "Printzhof," as well as that on an example from Fort Orange (Albany) probably resulted from a deliberate attempt to make them "brick colored." This was a common practice in the Netherlands prior to the 17th century. The red coloring used to dye or stain the surface of these yellow bricks is called in Dutch "dodekop" (dead-head) (Temminck Groll 1977, pers. comm.). Known as colcothar in English, this brownish red oxide of iron is obtained from heating ferrous sulfate in the process of making hydrochloric acid. How this pigment was employed to achieve the reddish color on the bricks is unknown, but the surface redness, to a depth of 1 or 2 mm, suggests a staining process.

The yellow bricks recovered from the excavation in Governor Printz State Park do not possess the even lines and right angles found in modern building bricks. This characteristic leads some observers to assume that the bricks were discards from European kilns and had been used as ballast in ships bound for the New World. In fact, the shape of the bricks resulted from the use of high firing temperatures. Rather than being warped, these bricks are simply well fired, or burned at very high

temperatures into a very hard and durable product.

Professor Temminck Groll has provided the following historical information regarding these unusual bricks. Yellow bricks were popular in the western provinces of the Netherlands from the end of the 16th century until well into the 18th century. The standard size of these unusually small bricks ranged from 33 × 70 × 165 mm to 32 × 76 × 178 mm. The clay for them came from the region of Gouda (better known for its cheese) in the province of South Holland. The specific sources were along the Hollandse Ijssel River, not to be confused with the Ijssel River separating the provinces of Gelderland and Overijssel.

There are three kinds of such yellow bricks based on how hard the clay was fired. The softest yellow bricks were fired at low temperatures and therefore are the most regular in shape. These could be used for building exterior walls but were best suited for interior walls and interior sections of chimneys. When in vogue, these soft bricks were used for buildings of every size in both town and country including churches and official buildings. The yellow bricks made from these clays are called "Ijsselsteen" when fired to a medium hardness. They are generally equal in size, quite regular in shape, and of a quality suitable for use in external walls of buildings. These are common in historical buildings throughout the Netherlands, and are still produced by firms for use in historic restorations.

The most well fired bricks, called "Ijsselklinkers," are extremely strong and durable but tend to be quite irregular in shape due to qualities inherent in the clay which cause them to warp when fired at high temperatures. Their great strength enables them to be used for paving stones or for roadways.

Old yellow brick roads are still common throughout the northern provinces of the Netherlands and have been observed by the author. Temminck Groll also notes that the region of the Hollandse Ijssel has the worst agricultural land in the Netherlands, and that

brickmaking was once a great industry. The relatively poor local farmers often could afford to build walls but one brick thick, with smaller buildings having walls as little as one-half brick thick. The durable hard fired bricks (Ijsselklinker) are believed by Temminck Groll to have been the kind most commonly exported from this region to other parts of the Netherlands, primarily for use in roads; many of these have survived for over 300 years. Examples of these durable bricks have also been found in Curacao and St. Eustatius, as well as in Ghana, according to Temminck Groll. John Cotter (1977, pers. comm.) notes that large numbers of such bricks were found at the St. Croix (Maine) site, which dates to 1603, and that these were probably imported. H. O. Albrecht took sample pieces of the yellow brick from what is believed to be the "Printzhof" and fired them at 950°C without affecting appreciable change; this indicates that they had been well fired originally. Only when heated to 1020°C did these bricks begin to vitrify. While demonstrating that the sample bricks are at least equal in quality to the Ijsselklinker exported from the Netherlands, this research does not eliminate a possible New World origin for the "Printzhof" samples.

The data regarding yellow bricks found at New World sites suggest either of two conflicting interpretations: (1) the large size and differential preservation of these hard bricks, compared to most artifacts from early sites, does not prove that they had existed in great numbers. In fact, the total volume of yellow brick material recovered from the "Printzhof" is so small as to have been easily achieved by a small shipment of bricks. One must consider that intact examples of these bricks may have been recovered from the site by "souvenir hunters." Despite this possibility a single small consignment of Ijsselklinkers shipped to the New World could have provided for the total number of yellow bricks found in Essington, and this may also be the case at other sites of that period. Quite certainly at least

some bricks were imported as ballast; (2) great numbers of such bricks may have existed, the products of a New World brick industry which developed quite early in the 17th century, possibly at Fort Orange. No bricks appear to have been made on the South (Delaware) River, at least not before 1657. The latter explanation would be far more probable if the actual quantities of bricks found were as great as the numbers and volume suggested by some.

An early brick industry in the areas along the Delaware settled by the Swedes and Dutch may have produced such bricks. These colonists would have had access to numerous small pockets of alluvial ball clays (water transported, kaolin-like) similar to those known from the area of Gouda in the Netherlands and elsewhere in northern Europe. These coated clay deposits, much like those found in the area around Lewes, Delaware also "burn" (fire) to a yellow or light gray color. Other deposits of similar clays are located all along the Delaware coast and bays, but no direct evidence has yet been produced to indicate that these were ever used in a native brick industry producing yellow bricks, at least in the area south of Fort Orange.

Specific evidence indicating that no bricks were being produced on the Delaware River prior to 1657 may be found in communications which passed between New Amstel (in modern Delaware) and Fort Orange (now Albany, New York). The Dutch gained complete control of the South (Delaware) River in 1655, but they did not gain a particularly lucrative trading market nor a self-sustaining agricultural station. The arrival of Cornelis Hogeboom, a brick maker, in New Amstel (1 September 1657) was an event of special note (Fernow 1877: 196). Hogeboom's son and his brother's son were both at Fort Orange, which can be demonstrated to have had a brick industry at the time. A request sent to Fort Orange from New Amstel on 29 October 1657 for a shipment of bricks and boards indicates that these goods were to be had at that village, but it

does not indicate whether they were imported or locally produced. The correspondence between J. Alrichs at New Amstel and Petrus Stuyvesant includes important information on the conditions in New Amstel, and information vital to this study. Shortly after Alrichs's request of 29 October a "party of bricks" and 250 boards were received and acknowledged along with a request for another 7,000 or 8,000 bricks (Fernow 1877: 200–01). The letters demonstrate that the bricks most certainly were shipped as ballast aboard the galiot that traveled between New Amstel and Fort Orange on a regular basis.

On 14 November 1657, only 15 days after his request for bricks to Stuyvesant, Alrichs wrote to note that a party of bricks made at Fort Orange had arrived aboard the galiot as ballast. Alrichs noted that he would have the galiot discharged of the bricks and other goods and re-ballasted within two or three days (Fernow 1877: 201–02). This letter asks for another shipment of 7,000 or 8,000 bricks. The frequent repetition of an order of this size must reflect either the capacity of the galiot or the use to which the bricks were put.

Another letter from Alrichs to Stuyvesant the following year (5 September 1668) requested Stuyvesant to fill an order for Fort Orange brick. Alrichs noted that the bricks were given to the inhabitants of New Amstel to make chimneys, and that between 7,000 and 8,000 were for the building or masonry of Fort Altena (Fernow 1877: 224–25).

The bricks from the excavations at the "Printzhof," built about 1643–1645, may have originated in Europe. The number of bricks that could have been shipped as ballast on a vessel of the size of "De Waegh," one of the few Swedish ships to reach the South River between 1640 and 1655, is not known. Since the total number of bricks known from the "Printzhof" excavations is rather small, all could have come as ballast aboard ships from the Old World, and therefore they may not have been produced at Fort Orange. A crucial question at this time regards the date at which bricks were first made at Fort Orange. Quite

possibly red brick manufacturing developed quite early and precluded any interest in developing the more limited potential of a yellow brick industry.

The uniform, well fired quality of the Printz Park bricks suggests that they are Ijsselklinker exported from Europe, but the possibility that they are New World products cannot be ignored. Their uniform, well fired structure could reflect the abundance of wood in the New World, which would enable brick makers to easily achieve great firing temperatures. Distortions in the shape of such well fired bricks could be compensated for in this New World environment by the availability of wood that also made easy the production of high quality mortar from shell and limestone. Sand of a quality suitable for building was another plentiful resource, and no comparable mortar was available in the Netherlands. Masons in the Netherlands conserved resources through the use of very regular (smooth surfaced) brick which could be laid with a very thin layer of mortar. The uneven surfaces of well fired bricks used in the New World could be compensated for by using a thick mortar layer. The quality of this early mortar at the "Printzhof," which probably was used in thick layers, must have been poor since very little survives adhering to the bricks.

In the Hudson Valley (Albany area), extant structures using such yellow bricks are still known, but in more southern areas where Swedish and Dutch settlements were concentrated (from the South or Delaware River to Richmond, Virginia) no standing buildings of 17th century yellow bricks remain. The dimension of the bricks recovered in excavation at these latter sites may be continental (i.e., small) in size; at least they are smaller than bricks which typify later constructions by settlers from the British Isles.

The dimensions of the 17th century yellow bricks noted by Temminck Groll are similar to most of the yellow bricks recovered from the excavation at Governor Printz State Park in Pennsylvania. However, a small number of

larger yellow bricks was also recovered at these excavations. These measure about 44 × 100 × 215 mm, dimensions which appear to be unknown in the 17th century Netherlands (Temminck Groll, 1977 pers. comm.). Also, brownish red bricks of approximately this size, though somewhat thinner, were used during the 17th and 18th centuries. The larger bricks from the Essington excavations may reflect English influence, trade, or brickworks contemporary with the 18th century occupation. They tend to be more similar in size to more recent red bricks. Numerous red bricks of various sizes, but all close to contemporary red brick size of about 58 × 90 × 200 mm, were also found in the excavations.

Very few intact yellow bricks have been preserved from the "Printzhof" excavations. The small number recovered in 1976 probably represents a small portion of those bricks actually surviving. As noted earlier, these continue to be the "souvenirs" held in highest regard by "visitors" to the site.

Despite these deprivations, some idea of brick size and uniformity may be gained from the list of whole and fragmentary bricks which survive from the 1937 and 1976 excavations. The total number of fragments of bricks found in the excavations was 240 of which 26 (1.1%) were dyed red. Only 11 intact bricks were recovered, none of which showed traces of red dye (Figure 3). The dimensions of each of these 11 bricks is provided in Table 1. The lengths vary from 142 to 218 mm, with a mean of 168 mm. The range of variations in size appears to be considerable, although most bricks are from 65 to 85 mm wide and 30 to 40 mm thick. The most common thickness is 35 mm. The small number of bricks measuring about 45 mm thick and 105 mm wide (Figure 3) suggests a different source, time period, or concept of brick making.

A trace element analysis (Becker 1976) might determine sources for the Printz bricks and for samples of similar bricks from Fort Orange. Bricks from structures such as the

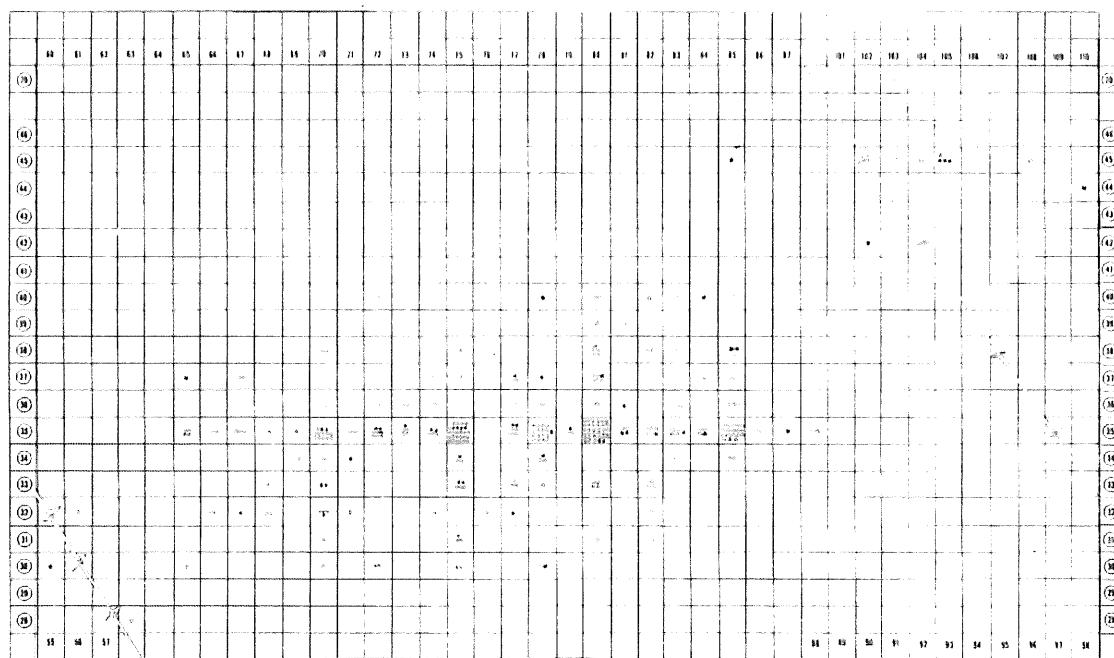


FIGURE 3. Scattergram of whole and fragmentary yellow bricks recovered from the excavations at Governor Printz State Park (36DE3). Whole bricks are represented by triangles, fragments by circles. The fragments which have been stained red by colcothar or some other dye are represented by solid circles.

TABLE 1  
DIMENSIONS IN MILLIMETERS OF INTACT YELLOW BRICKS FROM  
GOVERNOR PRINTZ STATE PARK

Length	142	163	165	165	167	168	172	174	178	178	218
Width	75	80	80	75	74	70	75	85	85	85	105
Height	35	39	38	35	35	35	35	36	35	35	45

"Tile House" in New Castle, Delaware, which was torn down in 1884, are also of similar size and color. Examples are preserved in the Amstel Museum, Delaware and a small sample (approximately 50 mg) probably would be made available for a program seeking to locate origins for all of these bricks and to determine their origins. Ceramic samples from numerous archaeological situations have been tested by these methods. These tests have produced great quantities of useful data on pottery as well as all varieties of stone artifacts (Harbottle 1970).

Although a number of suggestions concerning origins for these yellow bricks have been noted, the primary objective of this paper is to interest archaeologists and historians concerned with this period in the specific problem. Several research methods can be used in gathering relevant information, but archaeologists must become sensitive to this category of artifacts as a potential means of dating sites and as a way of determining economic connection among the New World colonies and between the New World and the Old.

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