BUILDING IN WOOD IN THE EASTERN UNITED STATES*

A TIME–PLACE PERSPECTIVE

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IF THE geography of settlement is ever to reach its full potential as the interpretable record of the historical events and cultural processes imprinted on the land, the components of settlements of all kinds must be systematically reduced to types and quantities before they are set against the revealing vagaries of reality.

It is the purpose of this study to examine a basic aspect of settlements—the methods of constructing buildings. In the timber-rich eastern United States other materials in common use in Europe declined in importance as the frontier moved westward. New Englanders never built extensively in anything but wood, and the stone construction of eastern Pennsylvania and the brick of Tidewater Virginia disappeared rapidly away from these nuclear areas.[1]

European America has known three general methods of building in wood: with framed walls; with walls of closely set vertical timbers; and with walls of horizontal timbers. Framing, typologically the youngest, begins with a skeletal structure of horizontal, vertical, and diagonal squared timbers, which is then covered in one of several ways. In this study framing is given less emphasis because it is already amply and expertly documented. It is the older building with timbers or logs, round or faced, vertical or horizontal, about which there is a lack of accurate information and little agreement on concept and nomenclature, and it is here that this study aspires to make its major contribution. However, with respect to areal distribution framing is of course of equal or even greater concern.

This article is the first part of an undertaking to describe and interpret the first settlements resulting from the westward movement out of established seaboard nuclei, roughly between 1790 and 1850, or between the opening of the trans-Appalachian West and the invasion of the grasslands. We propose to consider, in order, methods of building construction, types of buildings,

* The senior author gratefully acknowledges his indebtedness to the National Science Foundation and Louisiana State University for making possible some fifteen months of uninterrupted field study.

[1] The brick- and stone-using Dutch on the Hudson are not considered here because they were insignificant as a cultural source.

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fences and fencing practices, field forms and agricultural practices, and other aspects of settlements. In treating methods of construction no initial time limit can be set, for their antecedents reach back at least to the European Neolithic.

The procedure consists in the synthesizing of published materials with the results of extensive field observation. All too frequently there are no ready-made generic groupings. Every effort has been made to discover and adapt existing concepts and terms, and to reconcile conflicting usages. Definitions and nomenclature are proposed where they are nonexistent.

A strong emphasis on folk practices will be evident throughout. This is because they better serve the ultimate purposes of the undertaking to find origins and to trace diffusions and changes. Folkways are comparatively the simplest and most direct expression of fundamental needs and urges. They conform to type with a minimum of individual deviation, and thus attest to the innate conservatism of their practitioners. They are often areally, even when not numerically, dominant. Further, folk practices with respect to material things have been badly neglected in comparison with, say, traditional music and tales. Architects, for example, have largely disregarded the simpler folk methods and forms of construction in favor of more sophisticated methods and more pretentious structures. Finally, the new attack on rural poverty will surely accelerate the destruction of unchronicled folk structures and practices to the point where their record is beyond recovery.

Fully aware of the inability of two persons to familiarize themselves with all the details of building in wood, we proffer an open invitation to correct and extend the observations and conclusions of this presentation.

Antecedents of American Construction in Wood

It seems safe to assert that no significant method of wood construction employed in America before 1850 was developed here. Techniques were modified, and even perverted, but their European ancestry is certain. Seventeenth-century Europe provided half-timbering;[2] weatherboarding over heavy frame; vertical log, paling, and plank construction; and horizontal logs, planks, and timbers with various corner joinings. The wattle-daub and thatched huts, and even the more primitive "wigwams" of branches, rushes, and turf that appeared early in Massachusetts had their counterparts in contemporary England.[3]

[2] The term "half-timbering" is employed here in the full realization that its use is discouraged by architectural historians as misleading and confusing. However, we know of no substitute term to apply to heavy framing, commonly with horizontal, vertical, and diagonal squared members spaced as much as several feet apart, and with the interstices filled with various materials.

[3] Fiske Kimball: Domestic Architecture of the American Colonies and of the Early Republic (New York, 1922), p. 4.

Frame Construction

Framing is so old in Europe that it became the dominant method of building in the English seaboard settlements. It is typologically more advanced than the vertical construction from which it is derived. The frames were built of very heavy timbers (Fig. 1), with a safety factor far in excess of any possible demand. This is a major reason why so many of the older houses have survived. It was not until about 1830 that so-called balloon framing was devised, using much smaller and lighter timbers set closely together (Fig. 2). Balloon framing for dwellings began to be important only after 1850; barns continued to be heavily framed well into the twentieth century.

To the extent, then, that wood was used in the English and Dutch seaboard colonies framing was almost the sole method of construction. Except in the upland South and its culturally dominated periphery, frame construction was transmitted westward and became the near-universal form, quickly replacing the pioneer log house. The significant changes were from heavy to balloon framing and, much earlier, from half-timbering to an almost exclusive sheathing and weatherboarding.

Half-Timbering

Half-timbering—a heavy framing of squared timbers with a filling, or nogging, between them—was part of the cultural heritage of most Europeans in America at the time of the Revolution. Half-timbering was practiced in Britain, France, and Germany, and northward into southern Sweden, to mention only the important source areas. The nogging was sometimes brick (Fig. 3), sometimes clay clinging to rods, or "cats," set vertically or horizontally between the timbers (Fig. 4). Occasionally the filling was stone, or plastered wattle or lath. This skeletal construction eliminated the need for a large amount of lumber, presumably a reason for its wide use in Europe.

Half-timbering was common in the early seaboard settlements, but the timbers were frequently covered with siding, a not unexpected consequence of an abundance of cheap wood, just as the Old World thatch roof gave way to wooden shingles. Eventually the use of nogging was discontinued (but not, as has sometimes been suggested, exclusively because of the low lime content of American clays). This stage of constructional evolution was practiced by early New England settlers who came from heavily wooded southeastern England,[4] the one area where heavy framing was clapboarded without the use of nogging.

[4] Martin Shaw Briggs: The Homes of the Pilgrim Fathers in England and America 1620–1685 (London, 1932), p. 56.

Although surviving examples of half-timbering are fairly common in the easternmost states, notably in Virginia and in German areas of Pennsylvania, the method was not carried westward to any great extent. However, nineteenth-century German immigrants from Europe introduced half-timbering in Ohio (Fig. 5), Wisconsin, Missouri, and Texas, and perhaps elsewhere,[5] and the French in the Mississippi Valley (Fig. 6) have continued the practice virtually to the present.[6] Vestiges of half-timbering are occasionally seen in brick nogging within the light balloon framing of the latter nineteenth century (Fig. 7).

Vertical Posts, Planks, and Timbers

Building with closely set vertical members is so widespread, and so varied in detail, as to suggest that any common origin must lie in a remote European concept. Indeed, vertical post construction seems to have originated in the Near East in the Neolithic and to have spread across Europe as a major element in the Neolithic complex. By the late Neolithic it was a dominant form of construction in all of Europe except the far north, the western Mediterranean, and the Atlantic area of England, in the last two of which stone was of greater importance. Initially, the posts were driven into the ground a foot or so apart, and the spaces between them were woven in wattle or filled with clay and straw. During the late Neolithic, in the area of Jutland, the posts were set without interstices for added warmth, perhaps through influence from the palisades known throughout Europe. This type of close-set vertical timber construction spread slowly; it did not reach Russia until the third century before Christ, and England until Anglo-Saxon time.[7]

Vertical construction survives in an old Saxon church in Essex[8], composed

[5] For illustrations of half-timbering in Wisconsin see Richard W. E. Perrin: Historic Wisconsin Buildings: A Survey of Pioneer Architecture, 1835–1870, *Milwaukee Public Museum Publ. in History No. 4*, 1962, pp. 14–25. Zoar, Ohio, has a number of examples of German half-timbering, and so have the German settlements between San Antonio and Austin, Texas, though in the examples observed there the half-timbering was hidden by siding.

[6] French half-timbering in Louisiana uses both brick and clay cats as nogging. The brick nogging is referred to as *briquette entre poteaux*, the clay simply as *bousillage*. Plastered brick nogging appears in New Orleans, but more-rural bousillage is now invariably weatherboarded except, occasionally, for the front wall, which is protected by a broad roof overhang. Here the bousillage may be whitewashed and the wood framing left exposed, or the whole may be plastered over. This old practice explains the frequent appearance today of small rural frame houses with only the fronts painted white or whitewashed. The clay-wrapped rods, or "rabbits," of Louisiana bousillage are horizontally set, whereas in Europe they are more commonly vertical.

[7] S. J. de Laet: The Low Countries (translated by J. A. E. Nenquin; London and Toronto, 1958), pp. 62–88; Marija Gimbutas: The Balts (New York, 1963), pp. 103–104.

[8] Briggs, *op. cit.* [see footnote 4 above], pp. 56–57. Recent research indicates that the vertical logs were originally set in the ground and that the sill was introduced to preserve them (see H. L. Edlin: Woodland Crafts in Britain [London and New York, 1949], p. 137).

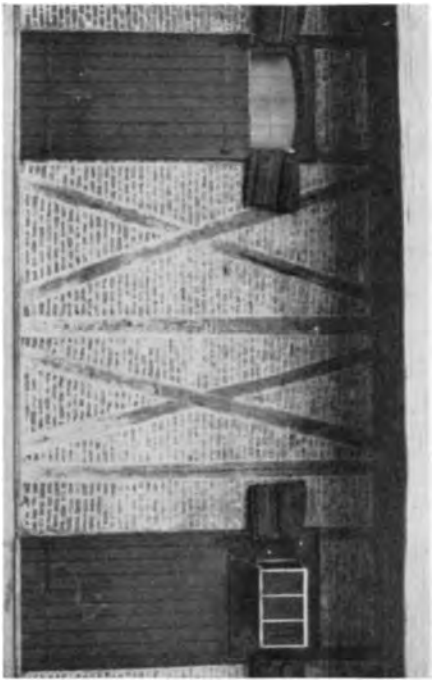
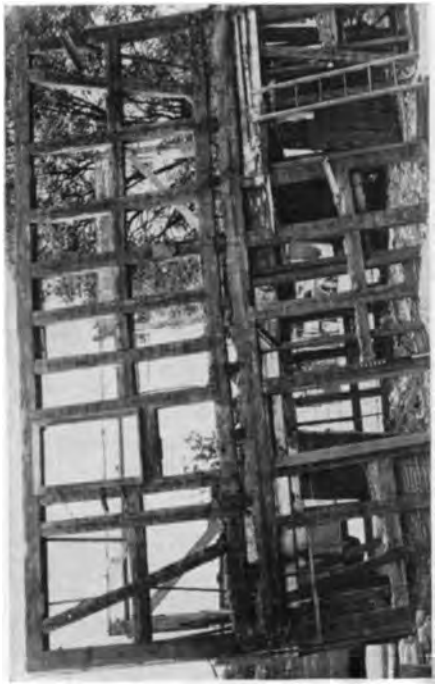


FIG. 3—Brick nogging in heavy frame, New Orleans.
FIG. 4—Clay cats in heavy frame, Louisiana. (Photograph courtesy W. Knipmeyer.)



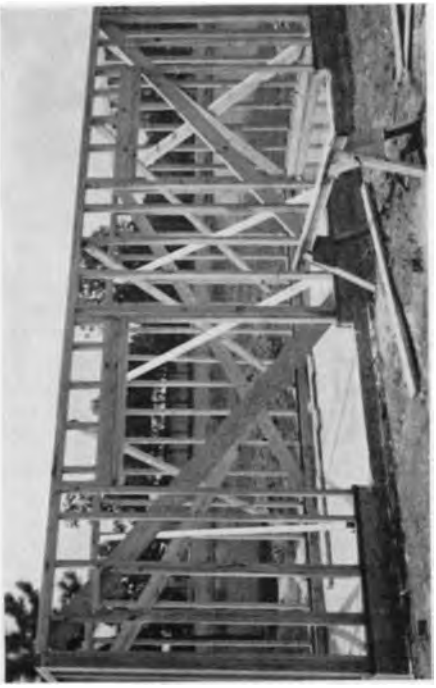


FIG. 1—Heavy framing, Indiana. (Photograph by L. Jones, courtesy Library of Congress.)
FIG. 2—Balloon framing, Louisiana.

FIG. 5—German half-timbering, Ohio.
FIG. 6—Half-timbering and clay nogging, Louisiana. (Photograph courtesy W. Knipmeyer.)

FIG. 7—Brick nogging in balloon framing, New Orleans.
FIG. 8—*Poteaux sur sole* construction, Cahokia Courthouse. (Photograph by A. J. Delong, courtesy Library of Congress.)

of vertical half logs between sill and plate, tongued and grooved on adjoining edges to produce a tight fit. Numerous examples of vertical construction have been noted in France, especially in Normandy.[9] Construction using vertical logs and timbers is cited for early New England,[10] and the medieval "pun-

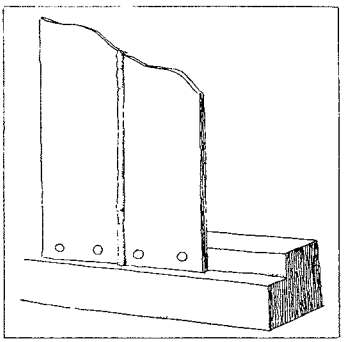


FIG. 9—Vertical plank construction.

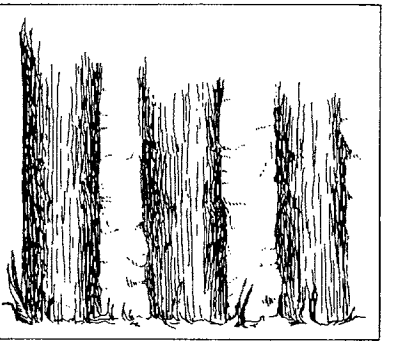


FIG. 10—*Poteaux en terre* construction.

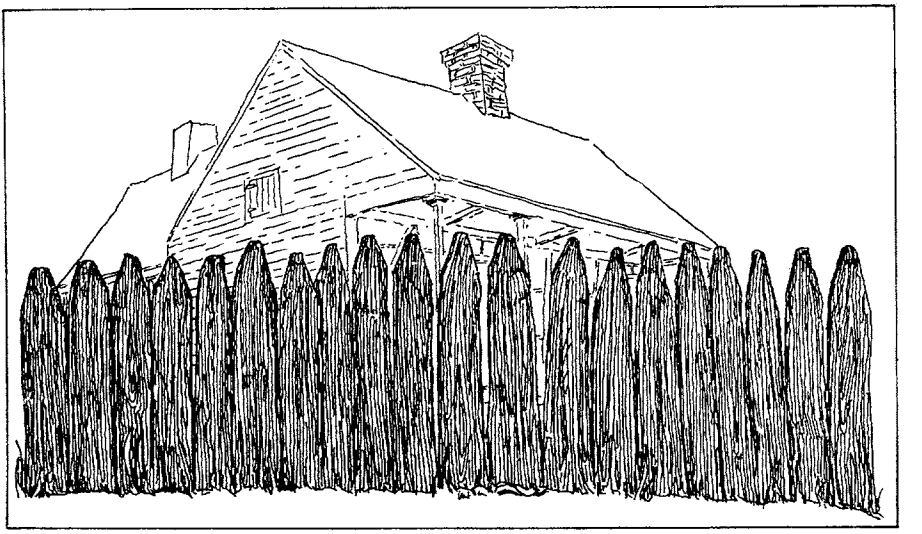


FIG. 11—*Barrière en pieux debouts,* Louisiana.

cheoning"—wattle-daub on upright posts—for Virginia.[11] The use of vertical oak planking (Fig. 9) to provide structural support in place of studding, which

[9] See Antonio di Nardo: Farm Houses, Small Chateaux and Country Churches in France (Cleveland, 1924), especially pp. 18, 75, and 82. Note that in contrast with half-timbering the vertical members are close together and lack diagonal or horizontal bracing.

[10] Kimball, *op. cit.* [see footnote 3 above], p. 6.

[11] Henry Chandlee Forman: Virginia Architecture in the Seventeenth Century (Williamsburg, Va., 1957), p. 30.

extended into the nineteenth century, has been traced from England.[12] Vertical board-and-batten construction has been postulated for Spanish Florida,[13] and Spanish records show that settlers in St. Augustine built houses "palisado" style before 1597.[14] Another example of vertical log construction is a twentieth-century Scandinavian barn in Wisconsin.[15]

But it was the French in America who employed vertical construction most extensively. *Poteaux en terre* (Fig. 10) or *pieux en terre* (a variant term is *pièces en terre*) was the earliest method used throughout the great arc of French colonial settlement extending from Acadia westward to the Great Lakes and southward to the lower Mississippi Valley.[16] Poteaux en terre consisted of close-set vertical posts tamped into a trench, pieux en terre of sharp stakes driven into the ground; the interstices, about as wide as the diameter of a post, were filled with clay and grass or with stones and mortar, sometimes plastered over or even covered with planks. Peterson[17] distinguishes poteaux as squared above ground, pieux as round posts. Here again usage has varied with time and place.

A variant, one might say an improvement, is the placement of the vertical members *sur sole* (on a sill) rather than *en terre;* from pictures, the old courthouse at Cahokia, Illinois, appears to be a surviving example (Fig. 8). The old term surely was *poteaux sur sole,* employed concurrently with *poteau en terre*[18] and *colombage,*[19] a term used at least on the upper Mississippi and in Canada to designate half-timbering. The two *poteaux* terms, then, referred to closely set, unbraced vertical timbers, *colombage* to more widely spaced, normally braced, vertical, squared timbers, the spaces between filled with various materials. At least two writers[20] have used *poteaux sur sole* to designate horizontal con-

[12] Kimball, *op. cit.* [see footnote 3 above], p. 6. See also John Frederick Kelly's description of "plank-frame" houses in Connecticut as early as 1690 (Early Domestic Architecture of Connecticut [New Haven, 1924], pp. 40–41).

[13] "Evolution of the Oldest House," *Notes in Anthropology,* Department of Anthropology, Florida State University, Tallahassee, Vol. 7, 1962, p. 7.

[14] Henry C. Mercer: The Origin of Log Houses in the United States: A Paper Read . . . at Doylestown, Pa., Jan. 19, 1924 (Reprinted from a Collection of Papers Read before the Bucks County Historical Society, Vol. 5, pp. 568–583), p. 572.

[15] Perrin, *op. cit.* [see footnote 5 above], p. 12.

[16] See, for example, [George-Marie Butel-] Dumont: Mémoires historiques sur la Louisiane (2 vols.; Paris, 1753), Vol. 1, p. 50, and Vol. 2, p. 50; and (for Quebec) Reuben Gold Thwaites, edit.: The Jesuit Relations and Allied Documents, Vol. 7 (Cleveland, 1897), p. 281 (Relation of 1635).

[17] Charles E. Peterson: Early Ste. Genevieve and Its Architecture, *Missouri Hist. Rev.,* Vol. 35, 1940–1941, pp. 207–232; reference on p. 217.

[18] Rexford Newcomb: Architecture of the Old Northwest Territory (Chicago, 1950), p. 21.

[19] In modern French *colombage* refers to frame construction.

[20] Richard W. Hale, Jr.: The French Side of the "Log Cabin Myth," *Proc. Massachusetts Hist. Soc.,* Vol. 72, 1957–1960, Boston, 1963, pp. 118–125; and Marius Barbeau: The House That Mac Built, *The Beaver: A Magazine of the North,* Outfit 276, December, 1945, pp. 10–13.

struction, which is surely a perversion, even if it is popular modern usage.

In French America, only among the Mississippi and Great Lakes settlements did vertical construction long remain popular. In Canada it gave way generally to horizontal timber construction or stone, and Dumont[21] records the change to brick or half-brick and half-wood (half-timber) structures in New Orleans in the early eighteenth century. In rural Louisiana poteaux en terre persisted well into the nineteenth century. To this day pieux en terre remains faintly alive in Louisiana in the form of a tight paling yard fence (Fig. 11), *barrière en pieux debouts,* in the original form of which cypress palings are driven into the ground.

In the attempt to account for the prevalence of vertical construction among the French in America it has been suggested that it was inspired by Indian vertical post stockades or palisades and buildings or was borrowed from the Gulf Coast Spaniards. Neither suggestion seems tenable in view of the fact that the earliest form of construction in French Canada was poteaux en terre,[22] which was introduced into Louisiana by the Canadian Iberville.[23] Moreover, since conclusive evidence indicates that vertical post construction of palisades and buildings reaches back to the European Neolithic, it would seem unnecessary to seek further for explanation of its American incidence. It is in keeping with the evidence to assume for the present that a method of construction which was very old and largely vestigial in western Europe experienced a brief rejuvenation in timber-rich colonial America.

Horizontal Logs, Timbers, and Planks

Construction in which the individual members are placed horizontally, close together, and one above the other has been used nearly everywhere in the New World. It appeared most widely in the upland South, only slightly less so in the timber houses of French Canada. Every form of horizontal construction employed in America has ample European precedent, and again it is unnecessary to invoke either local borrowing from the Indians or independent invention.

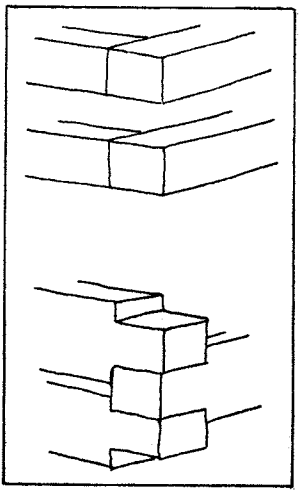
The fundamental distinction is the manner in which the horizontal members are joined at the corners. The variety of techniques employed is considerable. A basic difference distinguishes two all-inclusive groups—the utilization or nonutilization of corner posts or supports to which the hori-

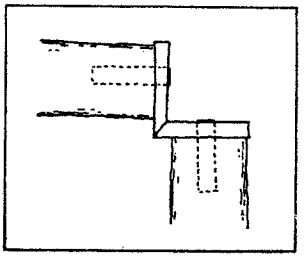
[21] *Op. cit.* [see footnote 16 above], Vol. 2, p. 50.

[22] In addition to the "Jesuit Relations" cited in footnote 16, see Richard Colebrook Harris: A Geography of the Seigneurial System in Canada during the French Regime (unpublished Ph.D. dissertation, The University of Wisconsin, 1964), pp. 147 and 278.

[23] See Dumont, *op. cit.* [see footnote 16 above], Vol. 2, p. 7.

zontal timbers are attached. To the second group belongs the method commonly used in American log houses, in which the timbers are so notched at the ends that they become immovable when locked to the timbers above and below. In some marginal areas, however, the original and effective type of





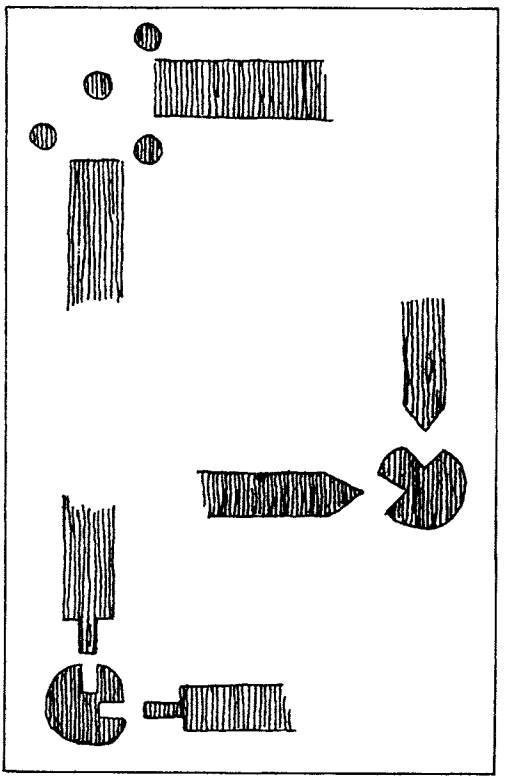


FIG. 12 (upper left)—Even tiers (above) and alternating tiers (below).

FIG. 13 (right)—Methods of corner-post construction. (After Hale [see text footnote 20], p. 121.)

FIG. 14 (lower left)—Hog-trough corner construction.

corner-timbering has deteriorated to the point where the timbers no longer lock and must be secured by some other means.

All horizontal construction may be descriptively classed as having either even tiers or alternating tiers (Fig. 12). In the first group the timbers of the corresponding tiers of the four walls lie even with one another; in the second the timbers in one wall lie half a thickness above or below those of the corresponding tiers in the adjoining walls. This latter relative position is inherent in all "true" corner timbering.

There are several methods of providing corner support for even-tiered

horizontal timbers. One consists of a vertical post with continuous grooves from top to bottom, into which the tapered ends of the horizontal logs are dropped. In another the vertical post is mortised to receive the tenoned ends of the horizontal pieces. A third utilizes four posts driven into the ground at each corner ("Canuck" style), so arranged that the horizontal timbers are held in place (Fig. 13). A possibly related form is a "hog trough" of heavy planks, the apex set into the corner, the wings abutting the ends of the horizontal logs, to which they are spiked or pegged (Fig. 14).

The support of horizontal timbers by corner posts is an old form of construction in Europe. It was apparently carried across much of the continent from Silesia by the Lausitz urnfield culture in the late Bronze Age.[24] Examples persist in southern Sweden,[25] in the Alps, and probably elsewhere. In French America horizontal timber construction came early but was later than poteaux en terre to be widely practiced.[26] *Pièce sur pièce,* as the method is commonly called,[27] was used, at least sparingly, throughout French America. Although it has been impossible to localize the European source of pièce sur pièce construction as carried by the French to America, its ancient appearance in Europe and its present-day survival there militate against an independent New World origin.

Pièce sur pièce was the prevailing method of wood construction in early French Canada. The old Hudson's Bay Company buildings and remote police posts are overwhelmingly of this type. The American practice of notching the ends of the logs has invaded Canada, in some parts fairly recently,[28] but it has by no means displaced the older method, which is still very much alive. One of the merits of the Canadian method is that construction with corner (and intermediate) posts, unlike the American corner-timbering, permits the

[24] V. Gordon Childe: The Bronze Age (New York and Cambridge, England, 1930), pp. 206–208.

[25] Sigurd Erixon: The North-European Technique of Corner Timbering, *Folkliv,* No. 1, 1937, pp. 13–60, especially Fig. 25 and Pl. XIV.

[26] Harris, *loc. cit.* [see footnote 22 above].

[27] Hale, *op. cit.* [see footnote 20 above], p. 121, cites the use of *pièce sur pièce* for the "notch and saddle" construction that found its way into Canada from the United States. Again, this may be a modern usage, but it is a perversion of the term used for corner-post construction before American notching was introduced into Canada, probably about 1740 (see Mercer, *op. cit.* [see footnote 14 above], p. 571). Incidentally, Mercer's citation, for 1727, clarifies a misunderstanding sometimes expressed that Canadian French laws opposed the use of timber for construction in towns where stone was available. Surely this measure was directed against the fire hazard inherent in closely set wooden buildings, rather than against log or timber construction as such.

[28] Mercer (*op. cit.* [see footnote 14 above], p. 571) refers (citation for 1664) to a church constructed of "... round wood dovetailed at the corners," which sounds much like an American-style structure. Dovetailing, however, was known to every joiner; the logs may have been dovetailed into a corner post. If this was a case of alternating tiers and true corner-timbering, it must have been an isolated freak.

utilization of short logs and at the same time puts no restrictions on the size of the building[29] (Fig. 15).

Horizontal construction with corner posts has generously invaded the areas of the United States peripheral to Canada—New England, New York,

FIG. 15—*Pièce sur pièce* construction, Brown's Valley, Minnesota. (Photograph by C. E. Peterson, courtesy Library of Congress.)

the Upper Lakes region, and the northern Great Plains states.[30] It occurs also in areas as remote from Canada as Pennsylvania, Virginia (Fig. 16), and Tennessee, in these last surely a direct importation from Europe by Germans. Also non-French in origin, and hence evidence of the once-widespread European practice, are timbers tenoned into corner posts, found in seventeenth-century garrison houses of the New England frontier.[31] There are

[29] A limit to the size of a corner-timbered building is imposed by the very weight of the timber and by the tapering of tree trunks to an unusable disparity in dimension between the two ends; twenty-four to thirty-six feet has been advanced as the average maximum practicable length. There is no widely practiced means of enlarging a corner-timbered house except by adding a story; for the logs are not commonly spliced, and building a new structure poses the problem how to connect it with the old.

[30] Philip W. Sultz, in "From Sagebrush to Hay and Back Again," *American West*, Vol. 1, No. 1, 1964, pp. 20–30, shows a number of pictures of buildings, chiefly, one may surmise, in western Wyoming. On pages 26, 27, and 30 are shown respectively a house, a jail, and a church, all of which appear to have corner-post construction. The other buildings illustrated are corner-timbered.

[31] Stuart Bartlett: Garrison Houses along the New England Frontier, *Pencil Points*, Vol. 14, 1933, pp. 253–268; reference on p. 255.

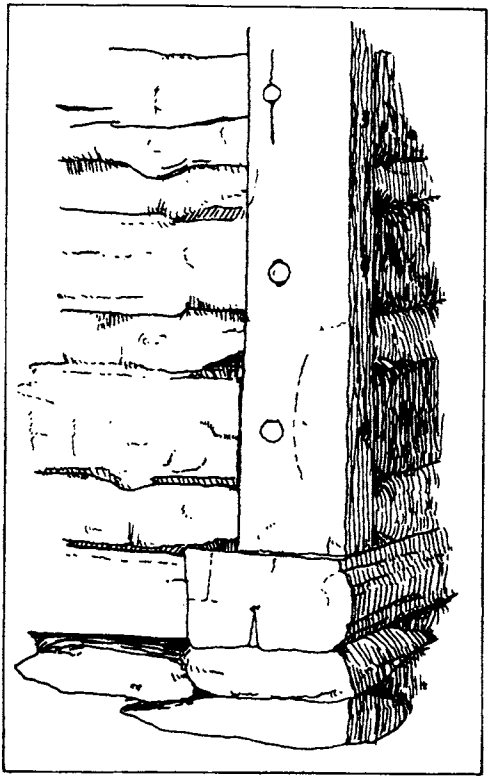


FIG. 16—Corner-post construction, northern Valley of Virginia.

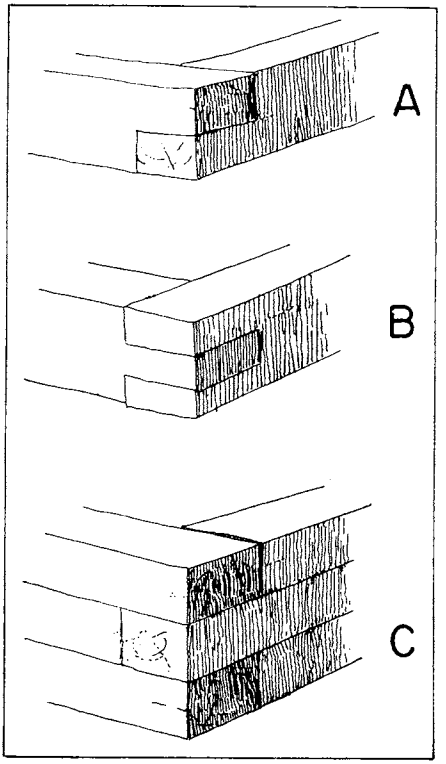


FIG. 17—False corner-timbering. A, lap or rebated joint; B, tongue and groove; C, butt joint.

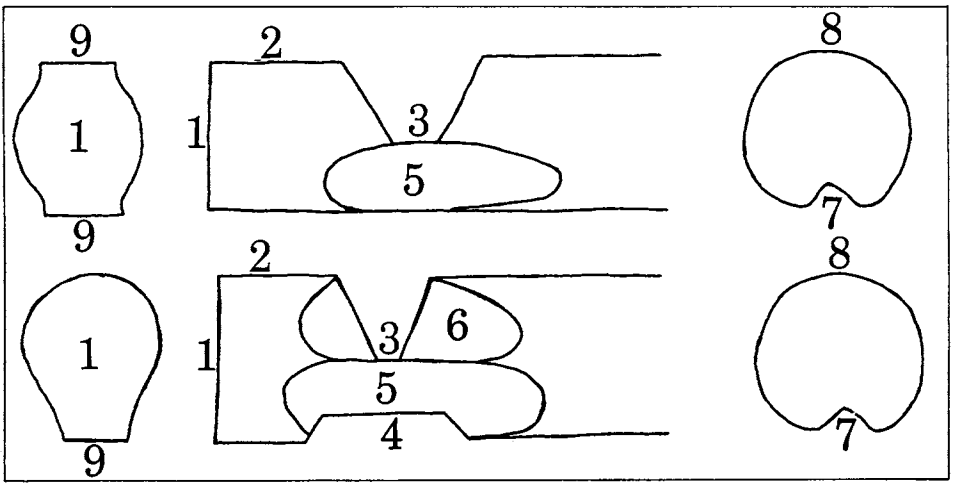


FIG. 18—Erixon's terminology [see text footnote 25] for log ends of corner-joints. 1, crown; 2, head; 3, top notch; 4, bottom notch; 5, lower necking; 6, upper necking; 7, long groove; 8, the back of the log; 9, butt end.

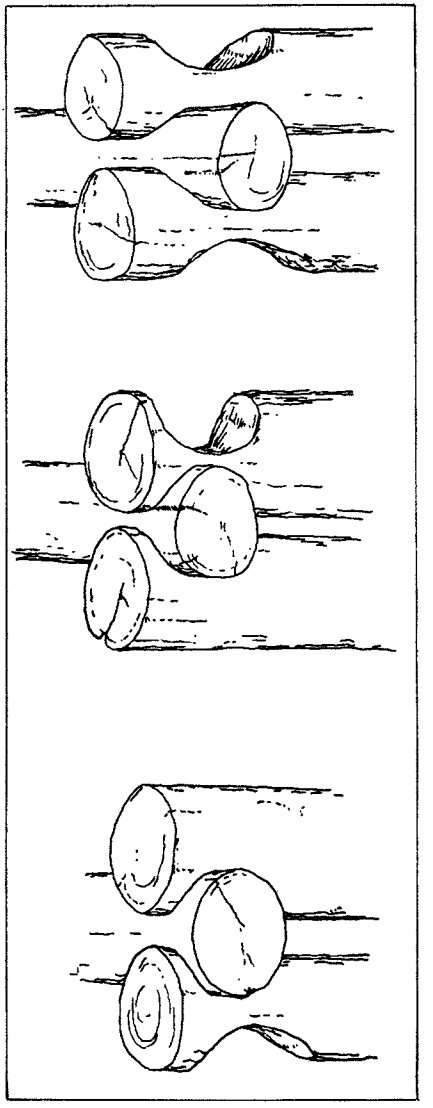


FIG. 19—Saddle notches.

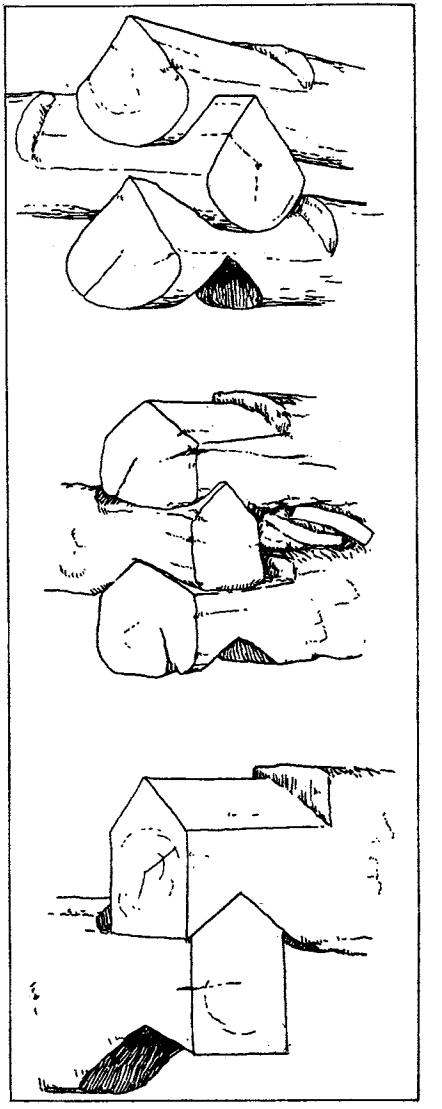


FIG. 20—V notches.

rather frequent later references to this method of construction for northern New England.

TYPES OF CORNER–TIMBERING

There are several methods without corner posts, all of European origin, in which horizontal timbers are notched and fitted in alternating tiers in a manner to lock them continuously from bottom to top. In what might be

termed "false" corner-timbering the tiers are even and the interlocking, if present, is restricted to one tier (Fig. 17). False corner-timbering had appeared in the New England garrison houses by the middle of the seventeenth century,[32] not long after the arrival of the log-using Swedes on the Delaware. Although later examples might suggest by their nature and location a stimulus diffusion from the areas of true corner-timbering to the south, false corner-timbering is more likely to have originated as a product of English carpentry than as an indirect inspiration from Swedish settlers. From New England false corner-timbering spread through upstate New York and as far west as Michigan, but it never attained any great areal or numerical importance.

In the eastern United States six methods of producing a truly corner-timbered joint are employed: saddle notching, V notching, diamond notching, full dovetailing, half dovetailing, and square notching.[33] In all but the last each log is locked into the ones above and below it, and the necessity of nailing or pegging is eliminated.

Saddle notching is the simplest method and is usually used on logs left in the round. For the corner to be tight the logs must extend somewhat beyond the plane of the wall, and the application of siding is difficult. Although in modern rustic cabins and in frontier structures the end of the log may extend a foot or more beyond the plane of the wall, in traditional American practice the end rarely extends more than a few inches. There are three forms of saddle notching: double notching, in which the notches are on both sides of the log; and single notching, in which the notch may be either on the top or on the bottom (Fig. 19).

The V notch seems to have developed directly from the saddle notch on the bottom of the log only. Instead of being rounded, the notch is cut sharply in a V, into which the chamfered head of the lower log fits (Fig. 20). If the log is left in the round the crown is pear-shaped; if the log is hewn the crown is shaped like the gable end of a house—indeed, it is often referred to as "roof topping." In V notching the ends of the log are cut off flush; the square or box corner thus produced permits the addition of board siding or, rarely, brick veneer.

In the diamond notch (Fig. 21) both the top and the bottom of the end of the log are chamfered to produce a diamond-shaped crown. Diamond notching, which bears a superficial and probably accidental similarity in the

[32] Bartlett, *op. cit.* [see footnote 31 above], p. 254.

[33] The nomenclature proposed by Erixon (*op. cit.* [see footnote 25 above], p. 14) for the constituent parts of corner-timbering is used here and is illustrated in Figure 18.

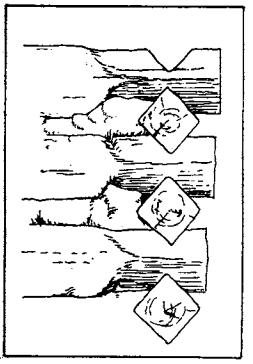


FIG. 21—Diamond notch.

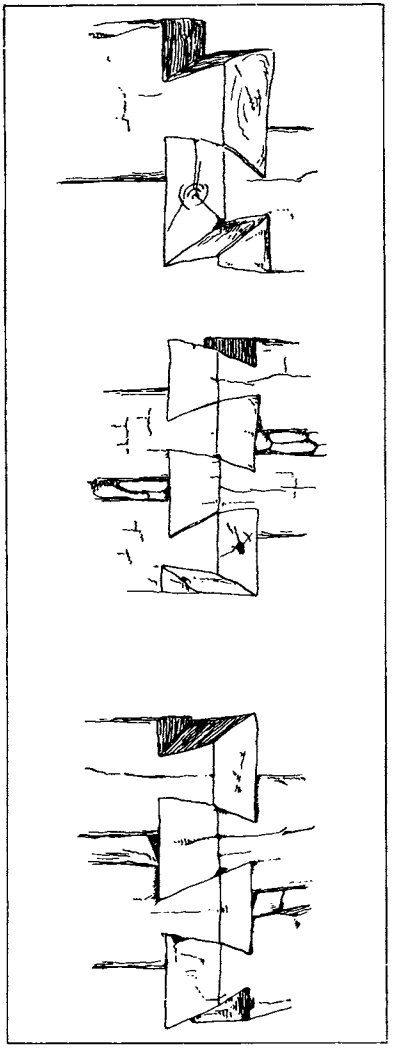


FIG. 22—Full-dovetail notches.

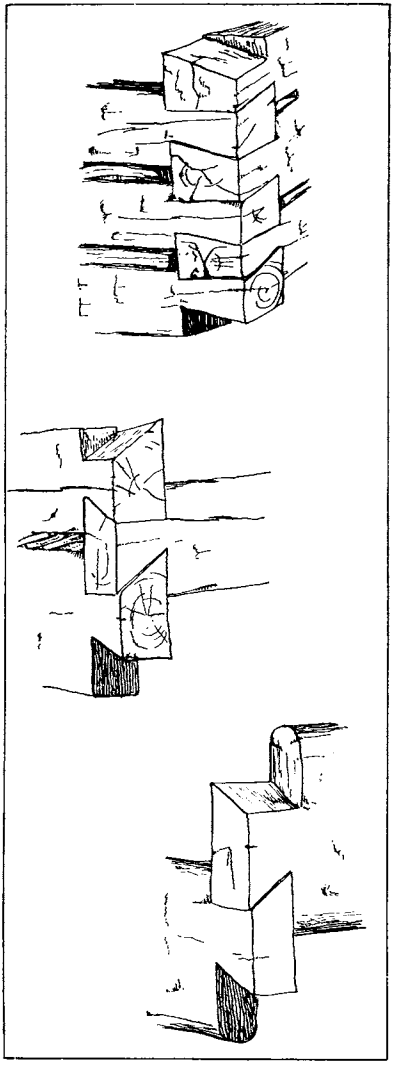


FIG. 23—Half-dovetail notches.

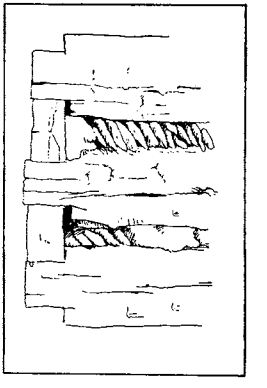


FIG. 24—Square notch.

shape of the crown to some Scandinavian types, seems to have been developed from V notching.[34]

Full dovetailing is the most complicated of the methods commonly used in American corner-timbering, and the most difficult to execute. It effectively locks the logs in both directions, produces a box corner, slopes downward on every face (so that water drains out), and is employed both on hewn and, though rarely, on round logs (Fig. 22). The dovetail is familiar to every joiner of timber, yet many who could apply it in framing a house did not use it when corner-timbering logs. For example, in New England dovetailing was used in the early garrison houses[35] but was seldom, if ever, used in the log construction of ordinary houses. Elsewhere, in areas of log construction, dovetailing was applied to all kinds of buildings.

In half dovetailing, also known to all woodworkers, the head of the notch slopes upward but the bottom is flat (Fig. 23). It is, in effect, half of a V notch, yet it seems to have been developed from a full dovetail. The top angle of a full-dovetail notch is more acute than the bottom angle, and the bottom angle was easily straightened to produce the half dovetail, which is no less effective than the full dovetail but much easier to make.

The square notch is simple, and familiar as a tenon to a woodworker (Fig. 24). It lacks the structure to lock the logs, a deficiency sometimes remedied by drilling and pegging through two squares or more. The square notch degenerated in different areas from both the V notch and the half dovetail. The two forms are distinguishable by the shape of the log: the V notch and its derivative square notch are found on logs square or rectangular in section (that is, about eight by twelve inches); the half dovetail and its derivative square notch are usually found on planked logs (that is, logs hewn to some six inches in thickness and about fourteen to thirty-six inches in width).

[34] In support of his theory that the American log cabin is of Swedish origin, Mercer (*op. cit.* [see footnote 14 above], p. 582) states that the "notch and chamfer" (V notch) corner-timbering is Scandinavian. Further, the log house in America as pictured in many books and labeled seventeenth-century Swedish is roughly V-notched and has wide, chinked interstices (see, for example, Ernest Pickering: The Homes of America [New York, 1951], p. 9, Fig. P–1). However, Mercer (pp. 577–579) quotes Dutch visitors who, traveling in 1679–1680, contrasted the English frame house with the Swedish log house in which the logs are notched a foot from the end. Two things are learned from this description: first, by 1680, only five years before large numbers of Germans began arriving in eastern Pennsylvania, the English colonists had not adopted Swedish construction; second, authentic seventeenth-century Swedish log houses were corner-timbered like those found today in Sweden and not like those in America labeled seventeenth-century Swedish. Mercer (p. 579) states also that he knows of no definitely Swedish or seventeenth-century log houses that were extant in America in the early twentieth century. It seems, therefore, that the so-called seventeenth-century Swedish houses in America are more recent than that and, although conceivably built by Swedes, reflect Pennsylvania German log-construction techniques rather than Swedish.

[35] Bartlett, *op. cit.* [see footnote 31 above], p. 255.

What is probably a variant of the square notch is the half notch (Fig. 25). It is only occasionally used exclusively but frequently appears with the square notch as a means of adjusting the position of a particular timber.[36]

No other method of corner-timbering has significant distribution in the eastern United States, but odd methods are occasionally encountered, es-

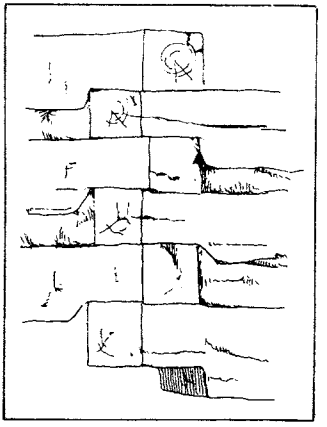


FIG. 25—Half notch.

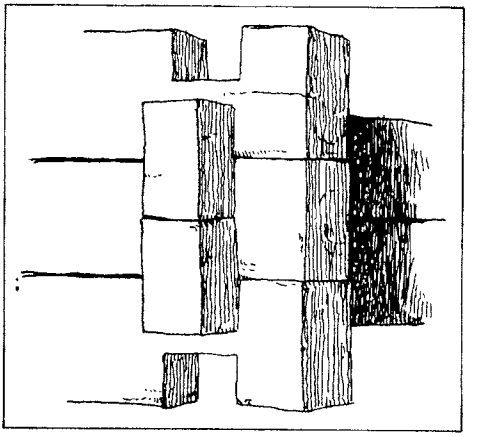


FIG. 26—Double-notch joint.

pecially in the areas settled relatively recently by Scandinavians and Finns. One such is the double-notch joint (Fig. 26), named by Erixon[37] as the form most commonly used in Sweden. In the United States it is encountered commonly in the Upper Lakes states—and in Hollywood movie sets ranging in locale from Wounded Knee, South Dakota, to Charleston, South Carolina. A popular brand of toy logs is of this type. In both the movies and the toys the use is an unfortunate and unnecessary violation of the verities of time and place.

The double-notch joint seems to have been widely distributed in Europe at one time; outside Fennoscandia surviving examples are known in the Spreewald, near Berlin, in Poland, in Switzerland, and in southwestern France. Its more recent popularity in northern Europe was apparently not matched in the source areas, for it did not have an effective early introduction into America.

[36] Our attempt to compile a synonymy of terms for corner-timbering has yielded nothing worthwhile. The only usage that might conceivably prove confusing is the apparent employment of "halved" for our "square" notch by Mercer (*op. cit.* [see footnote 14 above], p. 80).

[37] *Op. cit.* [see footnote 25 above], p. 30.

Distribution and Development of Corner-Timbering

Horizontal log construction employing true corner-timbering originated in the Mesolithic with the Maglemosian culture,[38] which was centered in Denmark, southern Sweden, and northern Germany. By the Bronze Age horizontal logs had replaced vertical posts as the commonest method of construction from France to Russia and from Norway to Czechoslovakia.[39] Prehistoric horizontal log construction was universally characterized by round logs notched on the top or on both sides, a foot or more from the end of the log.

Horizontal log construction was not part of the cultural equipment of the Dutch, English, or French emigrants to the New World,[40] since it had receded during the early medieval period into the wooded mountainous sections of an area bounded on the west by an arc reaching from Scandinavia through Germany into the Alps, and possibly into the Pyrenees. The Swedes who settled on the Delaware in 1638 were the first to employ horizontal log construction in what is now the eastern United States. The log work of Scandinavia was similar to that found throughout Europe in the Bronze Age: the log were generally left in the round; the notches were on the top or both sides of the log about a foot from the end, producing a characteristic overhang; and each log was grooved along the entire length of its bottom to fit tightly with the log below it. Although log houses were certainly built in New Sweden, references to them are strangely few. The first mention of log houses outside New Sweden is in 1669 for Maryland, in 1680 for North Carolina,[41] but there is no evidence that the houses were truly corner-timbered, or that they were inspired by Swedish sources. The Swedes had little contact with their English neighbors, and their log work did not spread beyond New Sweden; in fact, they soon abandoned it for stone and brick.[42] Even their normally conservative religious architecture was English or American rather than Swedish.[43]

Beginning in the late seventeenth century, and reaching a peak in the early

[38] Karl Schuchhardt: Vorgeschichte von Deutschland (Berlin, 1934), p. 29.

[39] Childe, *op. cit.* [see footnote 24 above], p. 206; Gimbutas, *op. cit.* [see footnote 7 above], p. 74.

[40] C. F. Innocent (The Development of English Building Construction [Cambridge, England, 1916], p. 109) finds no evidence that log construction was ever practiced in England. Pierre Deffontaines, in "Les hommes et leurs travaux dans les pays de la moyenne Garonne" (Lille, 1932), Plate 26, shows what is unquestionably corner-timbering in an old abandoned structure in southwestern France, but this seems to possess no significance with respect to French practice in America.

[41] Kimball, *op. cit.* [see footnote 3 above], p. 7.

[42] C. A. Weslager: Log Structures in New Sweden during the Seventeenth Century, *Delaware History*, Vol. 5, 1952–1953, pp. 77–95; reference on p. 92.

[43] Thomas Jefferson Wertenbaker: The Founding of American Civilization: The Middle Colonies (New York and London, 1938), p. 241.

eighteenth, great numbers of Scotch-Irish and Germans[44] arrived in Pennsylvania and settled just west of the English. The Pennsylvania Germans used horizontal log construction of the type which they had known in Europe, and which may still be found there, particularly in Bohemia, Moravia, and Silesia.[45] The previously stone- or mud-using Scotch-Irish quickly adopted Pennsylvania German log construction, primarily because of its practicality in timber-rich America. Pennsylvania German log work, and subsequent American log work, were characterized by logs notched near the end, a method that eliminated the overhang and produced a box corner. Spaces between the logs were filled—"chinked"—with clay, stones, poles, or shingles. The logs were usually squared, split and faced, or planked. Logs were hewn for a variety of reasons. A large log could be handled more easily when reduced in size; and a large round log took up interior space and produced an irregular wall that was hard to utilize. Primarily, however, hewn logs were thought to produce a tighter building, more finished in appearance.

In the German areas of southeastern Pennsylvania three forms of corner-timbering are found: saddle notching, V notching, and full dovetailing. In the saddle notching, in contrast with that of prehistoric Germany and modern Scandinavia, the notch is usually only on the bottom of the log, and as close to the end as possible. Saddle notching was used primarily for barns and other outbuildings, and for temporary structures, which were less carefully constructed than houses. Pennsylvania German houses and the better-built barns and outbuildings were either V-notched or, less often, full-dovetailed.

The Pennsylvania German forms of corner-timbering were carried from southeastern Pennsylvania in all directions by the Germans and the Scotch-Irish (Fig. 27). The earliest movement, beginning about 1732, led into central Maryland and the Valley of Virginia. All three corner-timbering forms may be found in the northern Shenandoah Valley, but during the movement east into the Blue Ridge and south through the Valley of Virginia V notching came to predominate (Fig. 28) to the virtual exclusion of the other forms.

[44] The Scotch-Irish were primarily Lowland Scots who had emigrated to Ulster. The Pennsylvania Germans, also known as the Pennsylvania Dutch, were primarily from the Rhenish Palatinate and Switzerland, but were also from Bohemia, Silesia, Moravia, Württemberg, and Hesse.

[45] Moravian log work is much like that introduced by the Germans into Pennsylvania (see *Ethnographica*, III–IV, Moravské Museum v Brně, 1962). Polish log work, on the other hand, more nearly resembles Swedish practice (see H. Grisebach: Das polnische Bauernhaus [Beiträge zur polnischen Landeskunde, Ser. B, Vol. 3; Berlin, 1917]). It now begins to appear that the primary source of log construction in America not only was not Swedish, but neither was it Rhenish German or Swiss. More-likely conveyers were the Germans who came from Moravia, Bohemia, and Silesia. To this day it is the local tradition that the Schwenkfelders who arrived from Silesia in 1734 brought V notching to Pennsylvania.

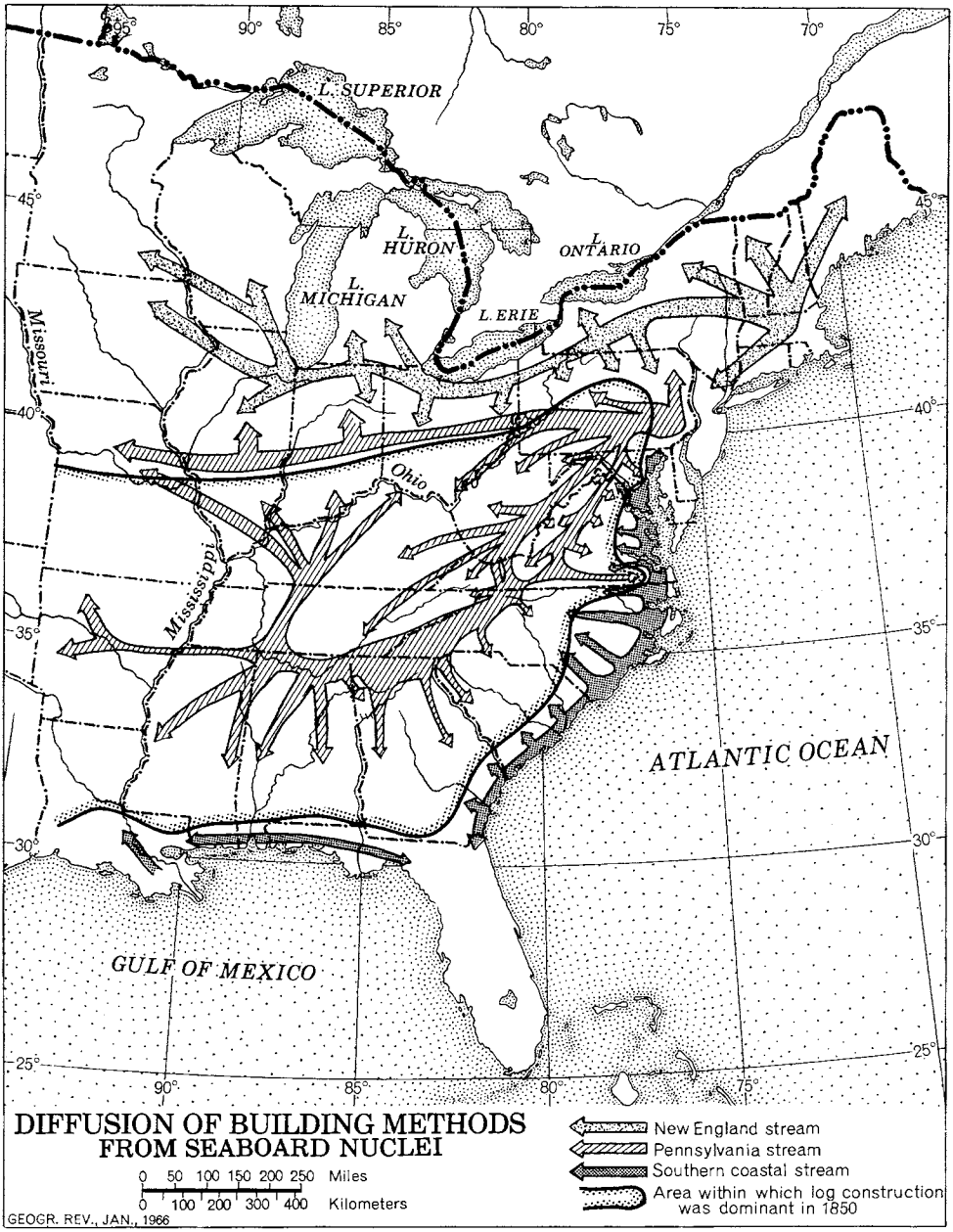


FIG. 27—Diffusion of building methods from seaboard nuclei, and areas of predominantly log and frame construction as of 1850. Routes are diagrammatic. Variation in width of streams suggests strength of diffusion.

FIG. 28—Distribution and dominance of methods of horizontal log construction. Based on approximately one thousand individual examples. Differences in weight of terms are indicative of relative importance.

FIG. 29—Clapboarded frame house, South Carolina.

FIG. 30—Stovewood construction, Wisconsin. (Photograph courtesy R. W. E. Perrin.)

Although barns and outbuildings were often constructed as carefully as houses in the Valley and Blue Ridge of Virginia, the corner-timbering was frequently of lower quality than that used in houses, and occasionally the logs were left in the round.

The English east of the Blue Ridge received the concept of horizontal log construction more by diffusion than by direct migration. Although they employed the Pennsylvania German handling of the logs, they developed new corner-timbering types from V notching instead of reproducing it. The square notch is the commonest form of corner-timbering east of the Blue Ridge, particularly in the Virginia Piedmont, where also a few buildings use the half notch exclusively. The diamond notch is found only rarely outside the general area of the North Carolina–Virginia border from the Tidewater to the Piedmont. The saddle notch is commonly found east of the Blue Ridge and well into the Tidewater, but it is restricted to smaller outbuildings; the Tidewater English retained rived cypress shakes or clapboards over timber framing as the prevailing method of folk construction (Fig. 29).

The movement from eastern Pennsylvania down the western Appalachian valleys began later than that down the Valley of Virginia, yet the same three forms of corner-timbering—saddle notching, V notching, and full dovetailing —may be found in the Alleghenies along the northern section of the Virginia–West Virginia border. In this area, where half dovetailing, which was probably brought to America from Europe as a dormant aspect of full dovetailing, first became commonly employed, are farms where the houses are full dovetail and the outbuildings half dovetail; farther south in the Alleghenies, however, into southeastern West Virginia and Kentucky and adjacent Virginia, and down the Cumberlands, half dovetailing predominates on buildings of all kinds, though a few have V notching, and numerous outbuildings and barns have saddle notching.

The two Appalachian streams, one coming down the Valley of Virginia bordering the Blue Ridge and the other down the Allegheny Front, met in southwestern Virginia, northwestern North Carolina, and northeastern Tennessee, and here saddle notching, V notching, and half dovetailing all commonly appear, even on the same building. In this southern Appalachian region, corresponding roughly to the early settlement areas of Watauga, Holston, and Nolichucky, half dovetailing came to prevail on houses and on carefully made barns and outbuildings, and saddle notching—usually with the notch only on the bottom, occasionally with the notch only on the top—became dominant on temporary cabins, or "pole shacks," and on less carefully made barns and outbuildings. However, V notching was still used, rarely on

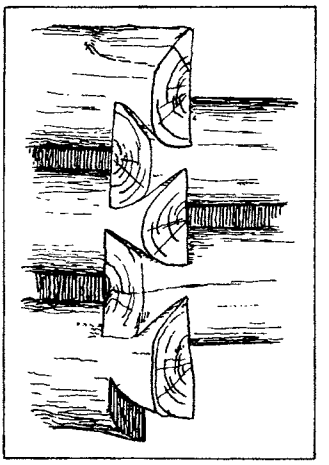


FIG. 31—Semilunate crown on half-round logs.

houses but frequently on barns. In the southwestern Appalachian region half dovetailing degenerated into square notching as V notching had done in the Virginia Piedmont.

Saddle notching, V notching, square notching, and half dovetailing, the last strongly predominant, were carried through the Tennessee Valley, and thence southeast into Georgia, south into Alabama, southwest into Mississippi and Louisiana, and west into Arkansas and Missouri. Although the log work of the mountainous areas of Arkansas and Missouri is comparable in quality with that of the Tennessee Valley, in the Deep South the quality declined with distance. Here, where horizontal log construction is still very much alive, saddle notching is strongly dominant on barns and outbuildings, and square notching and half dovetailing are frequently encountered on older houses. In some southern areas where the pines were so small that they could not be used if hewn, the logs were split, and the half-round section was used with the flat side facing inward. Half-round logs usually were half-dovetailed but sometimes were square-notched or notched only on the bottom, to produce a semilunate crown approximating the full dovetail (Fig. 31).

A stream of log construction in which half dovetailing greatly predominated but square notching, saddle notching, and V notching were also employed flowed northward through the Tennessee Valley and central Kentucky into southern Illinois, Indiana, and Ohio, where it encountered a stream in which V notching was strongly dominant moving westward from Pennsylvania (Fig. 27).

Only the northward flow of Pennsylvania corner-timbering into the westward-moving New England stream was largely ineffectual. Here it encountered false corner-timbering and the conceptually different French method of setting horizontal timbers into corner posts, and was overlain by more-recent exotic, but excellent, log construction techniques introduced from Fennoscandia directly into the Great Lakes region. The predominance of the simpler methods of corner-timbering—square and saddle notching—over V notching and dovetailing in the northern tier of states tends to support the conclusion that the migrating New Englanders, like the English of the Tidewater, regarded log construction as so temporary as to be unworthy of the skills they undoubtedly possessed as workers in wood.

The horizontal log construction with true corner-timbering that came to characterize the American frontier was, then, not a New World adaptation to environment, nor was it a Scandinavian introduction; rather, it was introduced by the Pennsylvania Germans and carried by them and by the Scotch-Irish in all directions from southeastern Pennsylvania (Figs. 27 and 28).

For completeness, "stovewood" construction, found most abundantly in Wisconsin but also in Michigan and Quebec,[46] should be mentioned. In some half-timber structures stovewood-length logs form the nogging. In others they are laid horizontally in lime mortar to form unbraced walls (Fig. 30). Barns, sheds, two-story buildings, and lumbermen's shanties with stovewood construction have all been observed.

Summary

In the American westward expansion between 1790 and 1850 wood became even more important as a building material than it had been on the seaboard. Nevertheless, every significant method of construction employed had its European antecedents. In the exuberance fostered by an endless supply of wood, construction methods were revived that were no more than vestigial in much of western Europe, if indeed they were even traditional. This is true of construction using closely set vertical or horizontal timbers.

During the early colonial period wood-saving half-timbering, then widely practiced in western Europe, was fairly common. It died out rapidly in favor of siding over the framing and thus was insignificant in the westward movement. Only the Louisiana French held steadfastly to half-timbering. In this and other respects construction practices in the French pockets stood in strong contrast with those of incoming, frontier Americans. These had no equivalent of the French poteaux en terre, poteaux sur sole, and pièce sur pièce. In complement, the French rarely adopted American log construction.

In the New England stream the heavily framed, clapboarded house was dominant until the substitution of light balloon framing in the latter half of the nineteenth century. This was true also of the western projection of the Middle Atlantic States and of that of the Tidewater South. Where their influences prevailed, the log house was regarded as a temporary structure, to be replaced by traditional forms as soon as circumstances permitted. Only in the upland South was log construction the accepted practice.

Great changes have taken place in the construction, materials, and forms of buildings since 1850. Still, a survey of farm housing published in 1939[47]

[46] Richard W. E. Perrin: Wisconsin "Stovewood" Walls: Ingenious Forms of Early Log Construction, *Wisconsin Mag. of History*, Vol. 46, 1962–1963, pp. 215–219.

[47] "The Farm-Housing Survey," *U. S. Dept. of Agric. Misc. Publ. No.* 323, 1939, Table 2.

revealed that some 97 percent of the rural dwellings sampled were built of wood (frame, 93.2 percent; log, 3.7); 1.8 percent of brick; 0.5 percent of stone; 0.4 percent of earth; and 0.4 percent of concrete. Thus, true to the tradition strengthened during the westward movement, wood was the overwhelmingly dominant building material, at least for the humbler dwellings.

Log houses, though of course far fewer than in 1850, conformed in their relative abundance to the old pattern. From the seaboard westward along the New England route log houses were few. This was true also of New Jersey (for some reason Pennsylvania and New York were not sampled) and the Tidewater counties of the South. Percentages climbed sharply in the upland South, even into the southern parts of Ohio, Indiana, and Illinois. In Halifax County, Virginia, well out in the Piedmont, the percentage of rural log dwellings rose to 42. In the more recent "frontier" sections of the Upper Lakes and the wooded West[48] log construction was well represented.

The next stage of our work should shed greater light on the cultural meaning of the several methods of timber construction, on their associations with different groups of peoples, on their place in the westward movement, and on their relative importance during the change from frontier to settled community. The first step will be to relate specific methods of wood construction to specific types and forms of folk housing. It should then be possible to match the idealized results of a systematic approach against the revealing vagaries of reality.

[48] The figures are 48.8 percent for Albany County, Wyoming, and 25.4 percent for San Miguel County, New Mexico, but the New Mexican log house is possibly not entirely of Anglo-American provenance.