

"TOOLES OF ALL SORTS TO WORKE"<sup>1</sup>:  
A BRIEF LOOK AT COMMON WOODWORKING TOOLS  
IN 17TH-CENTURY VIRGINIA

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## INTRODUCTION

Tools, usually made of stone or bone, have long been of great interest to Chesapeake archaeologists. Prehistorians spend a significant portion of their time studying the ways tools were made and the indications of their uses to determine how people lived. Using comparisons of the materials, manufacturing technologies, and designs of tools, those archaeologists and anthropologists have been able to determine trading patterns and cultural relationships between peoples. To most historical archaeologists, curators, social historians, and even historians of technology, however, "trade tools" — hand tools and implements used in the manufacturing trades — of the past three or four centuries have long been second-class objects. We have not asked the same questions of them nor applied the same investigative methodologies to them that we have applied to prehistoric materials or, for that matter, many types of later artifacts. We have not noted the specific, often detailed ways in which old tools differ from each other and from our own modern versions, and we rarely have pondered the reasons for, or the significance of, those differences. We have not looked seriously at patterns of tool ownership and use, and possibly of more importance, we rarely have delved into the historical record to expand our understanding of the significance of the individual tools and tool groups we have recovered.

There are valid explanations why historical archaeologists have neglected tools. We excavate them in far fewer numbers than ceramics, glass, hardware, and structural remains. Many recovered tools are seriously decayed, making their study difficult and their conservation complex and expensive. Little published information about pre-19th-century tool forms is available, and as a result, the identification and analysis of recovered tools, beyond determining their generic functional types, is difficult. Even when analysis proceeds to that extent, we frequently find we have only enough information to suggest the basic types of craft activities that took place on the recovery site. Unless we make it a priority to carefully study period craft practices, even those conclusions can be clouded by our romanticized perspective regarding hand craftsmanship.

The purpose of this paper is twofold. The first is to examine, in the context of the historical record, a selection of 17th-century woodworking tools found at several Chesapeake sites. After presenting a brief review of the documentary evidence regarding tools used in 17th-century Virginia manufacturing trades, I will concentrate on those tools used for general-purpose woodworking and briefly describe their types and functions. The second purpose is to demonstrate that tools can be powerful cultural indicators through which we can learn about the people who owned and used them and about the work they undertook. I do not claim that either purpose will be definitively fulfilled. We are just beginning to study early trade tools, and many of my conclusions will be in the form of suggestions of possibilities. I hope that the approaches taken will pique the interest of historical archaeologists, however, if only to the extent that we begin to value tools as significant cultural artifacts worthy of much greater attention and further study.

#### TRADE TOOLS IN 17TH-CENTURY VIRGINIA: THE HISTORICAL RECORD

A considerable amount of information about late 18th-century trade tools and their uses in the colonies is available to us in the form of surviving tools, tool catalogs, documents (such as probate inventories, newspaper advertisements, and store records), technical encyclopedias, prints, trade cards, and a wealth of surviving wooden products. However, many of these sources of information, especially Chesapeake-specific sources, do not exist for earlier periods. Few trade tools dating to the early 18th century or before survive here or in England. The first English tool catalogs date to the second half of the 18th century. Pre-1700 trade cards and newspaper advertisements featuring tools are rare. Few 17th-century wooden products survive from the Chesapeake to reveal tool use.

Finally, the number and variety of 17th-century Chesapeake probate inventories and other records mentioning tools are small compared to documentation surviving from the 18th century.

Fortunately, we have Randle Holme's 1688 Academy of Armory (1972) and Joseph Moxon's Mechanick Exercises, or the Doctrine of Handy-Works Applied to the Arts of Smithing, Joinery, Carpentry, Turning, [and] Bricklayery (1989). Holme, in his compendium of heraldic devices, describes and illustrates, albeit crudely, a variety of trade tools. Moxon's work was the first English how-to-do-it book of trade practices, originally released in pamphlet form beginning in 1678. It gives us detailed information about the tools and technology of these late 17th-century English trades and, hence, potentially reliable insights about their counterparts in America.

In contrast, little information of any sort about tools survives from the middle and early years of the 17th century. For this period, any mention of tool types or use, a single find of a dated tool, or the discovery of a documented product of the region can lead to major revelations. We know more about earlier trade tools and Continental tools than we do about Anglo-American tools of the 17th century. Excavations at medieval sites in England have recovered a sizable number of tools. In addition, architectural historians and decorative arts students have begun to look at medieval structures and products from a technical perspective to determine tool use, and recent studies of medieval paintings and manuscripts have led to insights about building tools and techniques (Goodman 1964; Basing 1990).

The documentary information about specific tool types used during the first years of settlement in Virginia is limited to incidental comments in narratives and administrative records. They indicate that tools were important Indian trade items from the first years of European contact. But, once settlers were faced with the harsh realities of the Chesapeake, there was a concern that the colony's tools be carefully conserved. During the early years at Jamestown, John Smith noted that "our best commoditie was Yron which we made into little chissels" (Hatch and Gregory 1962:265). Faced with the loss of tools through carelessness, abuse, and black market trading, the colony's "Lawes Divine, Morall, and Martiall" (1612) directed that colonists abusing or stealing tools did so "vpon paine of whipping" (Force 1963:15).

Slightly later documents suggest that the Virginia Company and its investors were well aware of the need for tools and sought to improve their supply. Tools figure prominently in a 1618 list of supplies and provisions for settling Smythes Hundred. The 35 men to be sent to Smythes Hundred were equipped with clothing, shoe leather, thread, awls, pitch, rosin, arms and armor,

pickaxes, shovels and spades, agricultural tools, kettles, fishing equipment, nails, pit saws, cross-cut saws, hand saws, hewing and broad axes, hatchets, hammers, crows (for pulling nails), iron wedges, a grindstone, files, piercer bits, gimlets, chisels, and augers. "Tooles for a Brick yard" and "A greate piece of Bellows and Anvile for a Smith" were included in an addendum of "things wanting" (Kingsbury 1933:94-98). The list of expenses incurred in furnishing the Margaret, a ship outfitted from July to September 1619, for the establishment of Berkeley Hundred, contained large quantities of tools for carpentry, coopering, and tailoring (Kingsbury 1933:178-189) (see Appendix). Nevertheless, many colonists must have arrived without adequate implements to deal with the wilderness, for several years later, the Company made it a point to inform prospective settlers of the specific tools they would need. The Company's well-known 1622 broadside (Figure 1) recommended that those who "transported themselves" take along, in addition to agricultural tools and household implements, a wide range of tools for woodworking: axes; saws; hammers; chisels; augers, piercers, and gimlets for boring holes; hatchets; froes for splitting; and a grindstone (Goodman 1980:26-27). It is not surprising that these implements were general-purpose woodworking tools, the basic kit of tools necessary for rudimentary household and farm construction and maintenance.

After the demise of The Virginia Company in 1624, the documentary trail grows sparse until the third quarter of the century, when probate inventories that list the tools owned by individual householders and artisans and stocked by storekeepers begin to appear. These inventories reveal that colonists had access to a selection of carpentry, masonry, coopering, shoemaking, textile making, tailoring, needlework, and — to a lesser extent — metalworking tools. Historians of the Chesapeake have begun to tabulate broad categories of tool ownership during the late 17th century (Walsh 1977; Carr 1988; Russo 1988; Carr and Walsh n.d.). Their investigations allow us to determine who owned tools and to examine changing patterns of tool ownership. As a result, we are able to determine the basic types of craft activities pursued. To my knowledge, however, no one has comprehensively surveyed 17th-century Chesapeake probate and store inventories for the purpose of recording what specific tools were owned or offered for sale. Only with that information in hand can we determine what groups, or kits, of tools individuals owned, and draw conclusions about the specific tasks they undertook and the ways they went about them.

Nevertheless, the findings of these historians, as well as a preliminary study of 26 probate inventories of Virginia planters, artisans, and storekeepers from six Virginia counties dating from 1646/7 to 1700 (Table 1), supports Governor Edmund Andros' contention in his report to the Board of Trade in

# THE INCONVENIENCIES THAT HAVE HAPPENED TO SOME PER- SONS WHICH HAVE TRANSPORTED THEMSELVES from England to Virginia, without provisions necessary to sustaine themselves, hath greatly hindred the Progress of that noble Plantation: For prevention of the like disorders hereafter, that no man suffer, either through ignorance or misinformation; it is thought re- quisite to publish this short declaration: wherein is contained a particular of such nec- essary, either private families or single persons shall have cause to furnish themselves with, for their better safety at their first Landing in Virginia, whereby all greater miseries may be avoided, in part, directions how to provide themselves.

| Apparel.  | Tolls.   |
|---|--|
| One Monmouth Cap  | ii. s. d.  |
| Three falling bands   | ii. 03   |
| Three shirts  | ii. 03   |
| One walle-coate   | ii. 02   |
| One lace of Canarie   | ii. 07   |
| One lace of Fine  | ii. 00   |
| One lace of Cloth   | ii. 08   |
| Three pair of Irish stockings   | ii. 04   |
| One pair of hose  | ii. 03   |
| One pair of garters   | ii. 01   |
| One dozen of points   | ii. 03   |
| One pair of Canarie scillets  | ii. 08   |
| Seven ellis of Canarie, to make a bed and<br>bedfitter, to be filled in the same 8.s.   | ii. 08   |
| One rug for a bed 8.s. which with the bed<br>furnishing for two men, will be<br>true ell Canarie, to make a bed at<br>Sea for two men, to be filled with straw,<br>iii. 5 | ii. 08   |
| One coarse Rug at Sea for two men, will<br>cost iiij. s. for one  | ii. 03   |
|   | ii. 00   |
|   | For a family<br>of 6. persons<br>and so far<br>as for<br>more or less<br>after the rate<br>hereof.   |
| Eight bushels of Meale  | ii. 02   |
| Two bushels of pease at 3.s.  | ii. 05   |
| Two bushels of Oatemale 4.s. 6.d.   | ii. 09   |
| One gallon of Mustard   | ii. 06   |
| One gallon of Oyle  | ii. 06   |
| Two gallons of Vineger 1.s.   | ii. 00   |
|   | For a family<br>of 6. persons<br>and so far<br>as for<br>more or less<br>after the rate<br>hereof.   |
| One Armes compleat, light   | ii. 17   |
| One long Peice, plus foot or fute and a halfe,<br>neare Musket bore   | ii. 02   |
| One fownd   | ii. 05   |
| One belt  | ii. 01   |
| One hand-steel  | ii. 06   |
| Twenty pound of powder  | ii. 18   |
| Sixty pound of shot or lead, Piboll and<br>Goose shot   | ii. 05   |
|   | For Sizer, Spier, and fust, and at Sea for 6. men  |
|   | So the full charge of Apparel, Vichall, Armes, Tooles,<br>and household there, and after this rate for each person,<br>will amount unto about the summe of |
|   | ii. 10   |
|   | The payllage of each man is  |
|   | ii. 06   |
|   | The payllage of their provissons for a man, will bee about<br>halfe a Tun, which is  |
|   | ii. 10   |
|   | So the whole charge will amount to about   |
|   | ii. 20   |
|   | Nay, booke, lynes, and a tent must be added, if the number of people be greater,<br>as also some time.   |
|   | And that is the said proportion that the Virginia Company doe<br>allow to their Tenants which they send  |

Whoever transports himselfe or any other at his owne charge into Virginia, shall for each person so transported before Midsummer 1625, have to him and his heires for ever fifty Acres of Land vpon a fift, and fifty Acres vpon a second divition.

Imprinted at London by FELIX KYNGSTON, 1622.

FIGURE 1. Virginia Company Broadside, 1622. Courtesy of the John Carter Brown Library at Brown University.

1697 that most Virginians occupied themselves planting tobacco and corn. If we are willing to accept the premise that the Governor did not consider building construction or general-purpose woodworking as "manufactures," the trade tools enumerated in the inventories concur with his statement that the only manufactures carried on were tanning and shoemaking, linen and woolen production when those commodities were not supplied from England, and the making of barrel staves for export. Andros goes on to say that only recently had ships been built in Virginia, and even their iron work, rigging, and sails came from England (Governor's Correspondence 1691-9).

The Governor may have downplayed colonial manufacturing to some extent. Nevertheless, based upon the documentary evidence regarding tools, it appears that after the first burst of attempts to establish specialized manufactures, such as glass and ironmaking, the later 17th-century colonists in Virginia curtailed those efforts and relied on English imports whenever possible. We have little documentary information about the relatively small quantities of tools that might have been used in trade activities other than general woodworking, coopering, and basic textile and leather working.

While the inventories examined list a few tools for coopering and leather and textile production, and future research may reveal information about tools used in other trades such as blacksmithing, gunsmithing, and wheelwright's work, the tools about which we currently have the most documentary information are those for domestic woodworking. The occurrence of these tools in the Virginia inventories is presented in Table 1. The most commonly owned tools during the latter years of the 17th century were the same types as those recommended for settlers in the century's first decades: axes, saws, chisels, wedges, hatchets, froes, boring tools, hammers, grindstones, adzes, and drawknives (adzes and drawknives, although not included in the Smythes Hundred or broadside listings, appeared in the supplying of the Margaret). Documents reveal the names of these tools, but they tell us little about their exact forms, the specific jobs they could be used to perform, and their qualities. For that type of information we have to turn to archaeology. Fortunately, but not coincidentally, we can do that because these are the same types of tools that we most frequently find on 17th-century Chesapeake archaeological sites.

#### TOOLS FOR WOODWORK

Although colonists universally relied upon a host of wooden products, and woodworking in a variety of forms no doubt comprised some of the most frequently practiced craft activities in the early Chesapeake, the recovery of

woodworking tools is probably disproportionately large in relation to the quantities and varieties of all types of tools used. Trade tools found their way into the ground through a very selective, and restrictive, group of events.

Many trades practiced in the 17th-century Chesapeake were carried out indoors. If they were not actually performed inside a dwelling or shop — as was probably the case with most leatherworking, textile manufacture, and gun repair other than forging — they were undertaken either under a covering of some sort or in a very restricted outdoor area. Examples of this are blacksmithing or coopering, often conducted under a shed, or a shoemaker working in his yard on a pleasant day. Under these circumstances, probably few tools were lost at all.

It is likely that most artisans who depended upon their tools for their living tended to keep close watch on their working implements. If they dropped a tool, they noted the fact and picked it up, a task that is relatively easy in a closed environment. Most trade tools were of a size easily recovered, and if our 17th-century indoor craftsmen did drop a tool and lose it, then it most frequently would have been something very small, such as a needle, a shoemaker's tack, an awl, or a small drill bit, and often not worth a diligent search. Almost all of these small tools were iron or steel, and few have survived in the earth.

Few 17th-century trade tools were actually consumed through their use. Granted, edge tools were sharpened away and some tools broke, but even many of these could be re-edged or repaired, or the iron or steel of which they were made could be refashioned into something else. Artisans have always had a reputation for being conservative, and unless possessed by a fit of temper, most would never have thrown a potentially repairable tool onto the trash pile. No doubt some bits and pieces of iron or steel tools were eventually thrown away because they were deemed useless, but the vast majority of tools that were disposed of probably were made of wood or some other organic material that was easier to fabricate anew than to try to repair (17th-century glues were not usually adequate for repairing organic material subject to the stresses endured by most tools). Many of these organic tools or tool components may have gone directly into the fire, but even if that was not the case, they rarely have survived burial. While we might at first expect to find an occasional tool made of non-ferrous metal, it is important to note that, with the exception of thimbles and possibly pewter molds, few 17th-century trade tools were made of pewter, copper, brass, or bronze.

So what then is in the ground for us to find? Certainly we can expect to recover a few fragments in trash pits and to occasionally find remnants of tools lost as a result of sudden catastrophes: fires, military actions, and floods. Barring such misfortune, however, the tools most likely to be buried were those

NOTES TO TABLE 1 (Continued)

tradesmen and stores, or indirectly through his compilation of inventories whose contents are listed "room-by-room." Inventories were chosen because they included listings of individual tools rather than the much more usual "Parcell of carpenter's tools" or the like. All inventories are taken from the Books of Wills and Deeds of the indicated counties.

(2) Tools in bold were recommended in the 1622 Virginia Company Broadside.

(3) Slashed dates indicate dates taken/dates recorded.

(4) Tool descriptors, although often enlightening, are omitted for brevity.

(5) In addition to woodworking tools, some decedents also owned tools for leatherwork, metalwork, and textile production.

(6) Francis Sherwood was a cooper. His estate also contained five pairs of compasses, three jointers, three howels, three heading knives, two crosses (crozes), two round shaves, two cooper's vices, a file, a pair of iron compasses, a cresset, and a bung borer. Sherwood is one of the very few 17th-century Virginia tradesmen whose inventory includes specialized woodworking tools.

(7) Nicholas Bond (1670) also owned a fore plane and a hand plane.

(8) Nathaniel Bradford (1690/2) was probably a shoemaker and tanner.

(9) John Thompson also owned "a sett of Coopers tooles" and "15 Indian hatchetts."

(10) These tools were likely for Stanford's "own use." Some other store inventories also contain tools for their owner's personal use.

(11) Jonathan Hubbard's store (1668) also included: six lathe lines(?), two bung bow(?), two round shaves, three cooper's compasses, a heading knife, a cooper's adz, a cooper's ax, a cross and cross stock (croze), 15 bits, 12 carving tools, a pair of carpenter's compasses, two rie(?) bits, a plow plane, three plow plane irons (blades), three smoothing planes and irons, a fore plane and two irons, a long plane and two best irons, and two chalk lines with rolls, as well as tools for non-woodworking trades. An ax and five wedges were designated as household stuff.

(12) Jonathan Newell's store (1671/2) also included three round shaves and a pair of large compasses.

(13) Eleven of Edward Phelps' axes are listed as "lopping axes." His inventory also includes 53 planing irons and 10 "iron polls"(?).

(14) Richard Willis' inventory also includes two ragg stones for sharpening.

|                      |    | Early Documents |  | Personal Inventories |  | Storekeeper Inventories |  |
|----------------------|----|-----------------|--|----------------------|--|-------------------------|--|
| Axes:                |    |                 |  |                      |  |                         |  |
| Felling/Narrow       |    |                 |  |                      |  |                         |  |
| Broad                |    |                 |  |                      |  |                         |  |
| Other or Unspecified |    |                 |  |                      |  |                         |  |
| Hatchets:            |    |                 |  |                      |  |                         |  |
| Iron Wedges          |    |                 |  |                      |  |                         |  |
| Frees                |    |                 |  |                      |  |                         |  |
| Adzes                |    |                 |  |                      |  |                         |  |
| Draughts:            |    |                 |  |                      |  |                         |  |
| Saws:                |    |                 |  |                      |  |                         |  |
| Two-hand (CROSS-CUT) |    |                 |  |                      |  |                         |  |
| Whip (PLT.)          | 4  | 1               |  |                      |  |                         |  |
| Hand                 | 24 | 2               |  |                      |  |                         |  |
| Tenons (tenon)       |    |                 |  |                      |  |                         |  |
| Unspec (fixed)       |    |                 |  |                      |  |                         |  |
| Hammers:             |    |                 |  |                      |  |                         |  |
| Claw:                |    |                 |  |                      |  |                         |  |
| Spoon:               |    |                 |  |                      |  |                         |  |
| Mortise              |    |                 |  |                      |  |                         |  |
| Augers               |    |                 |  |                      |  |                         |  |
| Plasters             |    |                 |  |                      |  |                         |  |
| Gimbets              |    |                 |  |                      |  |                         |  |
| Lathing Hammer       |    |                 |  |                      |  |                         |  |
| Pincers              |    |                 |  |                      |  |                         |  |
| Spokeshaves          |    |                 |  |                      |  |                         |  |
| Hinges               |    |                 |  |                      |  |                         |  |
| Grindstones          |    |                 |  |                      |  |                         |  |
| Saw wrench           |    |                 |  |                      |  |                         |  |

TABLE 1. Woodworking Tool Ownership in 17th-Century Virginia Probate Inventories

NOTES TO TABLE 1

(1) With the exception of those from York County, which comprise the majority of probate inventories in this survey, the inventories examined do not represent the results of systematic or comprehensive county record searches. I am indebted to Martha Katz-Hyman for identifying York County inventories that contain listings of trade tools, and to Harold B. Gill for supplying me with other inventories, either directly by allowing me access to his notes regarding Virginia

odds and ends (also usually fragments) that found their way into a corner of a shed and were later forgotten or, more significantly, those tools that were used away from a fixed workplace or over a site large or complex enough that they were misplaced or not practically retrievable.

That is exactly what the pattern of survival supports. We find agricultural tools and pieces of hardware that were unknowingly dropped in the field or on the way to or from the garden. We find building construction tools that easily could have fallen into an inaccessible recess in the structure or into a builder's trench. We find wood harvesting and splitting tools and farm implement- and building-maintenance tools that were left where they broke or where a job was completed — at an outbuilding, at the woodpile, or in the woods — and later forgotten.

Given this pre-selection of lost tools and the small chance for survival of tools made of organic materials, it is no wonder that the tools we recover are principally general-purpose woodworking tools and, of those, a very consistent range of types. The most commonly recovered, essentially intact, trade tools are the large iron or steel tools that our knowledge of trade practices indicates were used in the situations described above: axes, wedges, carpenter's hammers, and heavy chisels. We find fragments of saws that either were discarded or were put aside in the expectation of re-using their steel. We also recover a surprisingly large number of large drill bits or gimlets, possibly because they were used in quantity for construction and repair, and their small size allowed them to be easily misplaced.

An examination of tools recovered from 17th-century contexts in Virginia and Maryland has revealed examples of all these tools, and a small number of other general-purpose woodworking tools as well. Since this group of tools, by and large, reflects both the types with which early settlers most frequently equipped themselves and the types most commonly owned by later 17th-century colonists, its examination and analysis presents a good starting point for studying 17th-century trade tools and their implications.

The discussion of the tool types that follows is based only on examples that appear to derive from diagnostic 17th and early 18th-century contexts. I have not included many probable 17th-century tools that were retrieved from later 18th-century contexts, nor examples from sites excavated before archaeological practice involved the determination of dated contexts. As a result, I have eliminated many tools found in the early excavations at Jamestown, Yorktown, and Williamsburg. While this severely limits the tool sample studied, at present it seems the best course, since one of our purposes is to develop firm typologies of 17th-century types. Once those are established, it is quite likely

that at least some currently undated tools can with certainty be identified as 17th-century examples. Please also note that while I have had an opportunity to examine the entire range of tools recovered from a few sites (Flowerdew, St. Mary's City, Causey's Care, Martin's Hundred, and Mathews Manor), in the case of others, I have studied and present here only examples selected for inclusion in study collections or individual tools brought to my attention by excavators or conservators.

### Axes and Hatchets

By far the most frequently owned trade tools were for felling timber and reducing it to workable pieces of wood. Of these, axes of one type or another were the most common (Figures 2 and 3). Thirteen of the 20 personal inventories (as opposed to storekeepers' inventories) listed one or more axes. Merchants kept much larger stores. Edward Phelps of York County included 56 axes in his 1677 store inventory, and Richard Willis, a Middlesex County storekeeper, had 118 in 1700.

The basic implement for chopping down trees and chopping off limbs was the felling ax — "felling" in the sense of making the tree fall. Once a tree had been cut down with a felling ax, there were several ways to reduce it to workable pieces. If a large square balk was needed as a framing timber for a building, for example, the workman could square the log using a felling ax or, more efficiently, a broad ax. The workman pared off slabs of wood along the side of the log, leaving a relatively flat surface. Both types of axes could be used to roughly shape wood for joining.

Traditionally, the distinction between felling and broad axes is a straightforward one. Although both were made in a variety of forms, felling axes normally have narrower blades that are symmetrical when viewed from above and are sharpened with a double bevel like that of a knife. Their blade shape, balance, and sharpening are designed for chopping. Broad axes, on the other hand, have broader, more radically flaring blades. Those intended for hewing are sharpened on one side only, like a chisel or plane blade, and their eyes are offset so that the back of the blade is flat. This blade shape and sharpening suits them for the paring motion used to square logs.

Many of the axes recovered archaeologically, however, pose problems with this typology. The axes illustrated in Figure 2 seem to fit the traditional definition of felling axes. The classification of others as broad axes (see Figure 3) is much less certain. They are all of a similar pattern, with the symmetrically flaring blades and relatively broad edges we associate with broad axes, yet all but

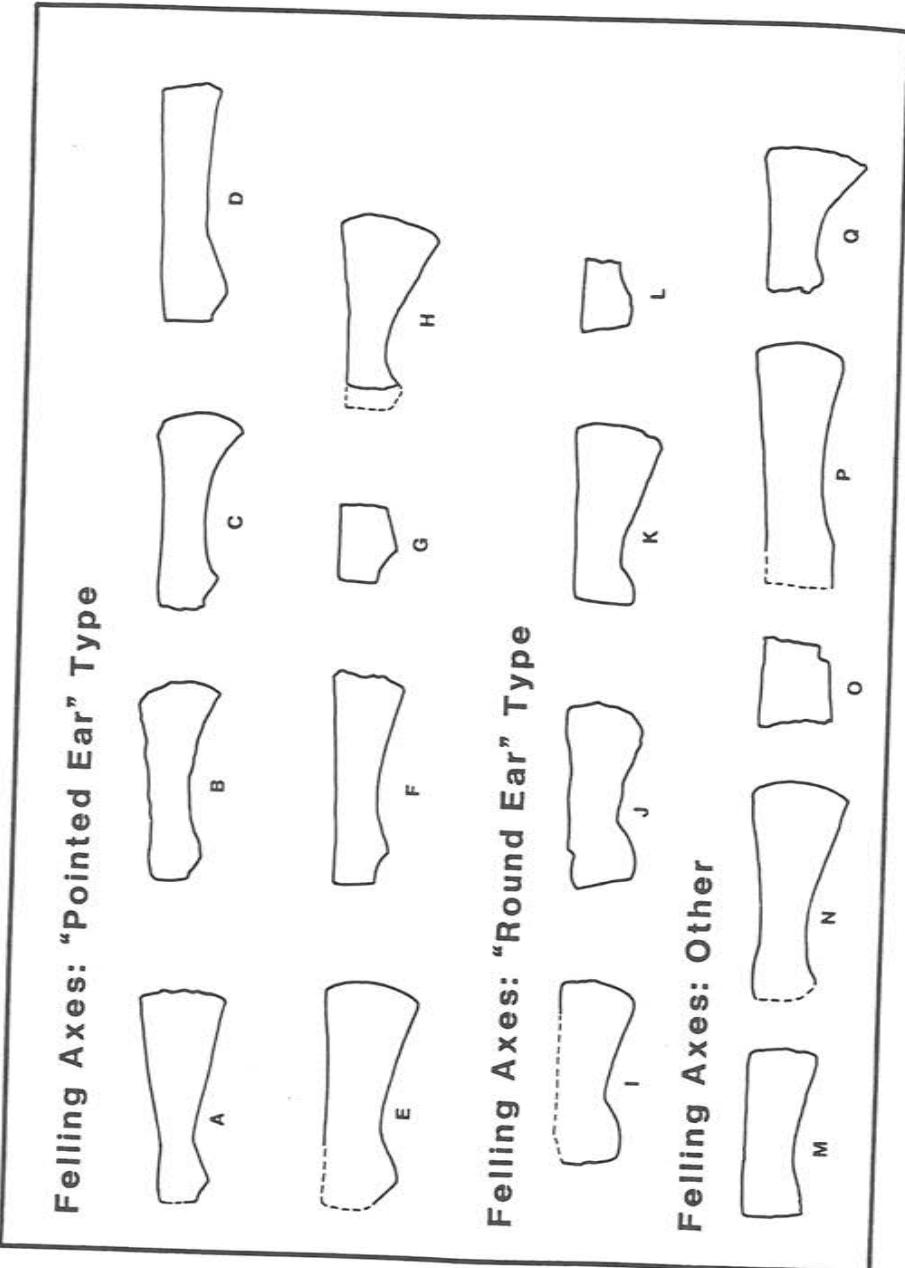


FIGURE 2. Felling Axes

#### CAPTION FOR FIGURE 2

FELLING AXES: A. Martin's Hundred (1738A) 1620-45. B,C. Jordan's Point (44PG302/F-110 EU#766) 1620-35. D. Kingsmill Tenement (KM562D), early-to-mid 17th century. E. Jordan's Point (44PG300/1E 106) 1620-35. F,G. Mathews Manor (Weber Collection), mid-17th century. H. St. Mary's City (STI-13-1468MM/AH) 1635-1700, broken through eye. I,J. Jordan's Point (44PG302/F-110S EU#766) 1620-35. K. Flowerdew Hundred (44PG86) probably 1620-30 (surface find). L. Martin's Hundred (2076B) 1620-40, eye fragment. M. Harbor View Fort (SK192/19Y) 1620-30. N. Jordan's Point (44PG300/7E 195) 1620-35. O. Martin's Hundred (2080A) 1620-40, eye fragment (original blade configuration unknown). P. Jordan's Point (44PG300/1E 68) 1620-35. Q. Drummond site (GL242) 1680-1710 (possibly to ca. 1720). (All 1/8 scale.)

#### CAPTION FOR FIGURE 3

BROAD AXES: A. Martin's Hundred (1755E) 1620-45, broken through eye. B. Martin's Hundred (Ax: 4115A #92, socket: 4143A #2) ca. 1620. C. Martin's Hundred (2115A) 1620-40. D. Chesopean site (44VB48) probably 1625-50. E. Pettus site (KM152C) mid-to-late 17th century, blade only. F. Jordan's Point (44PG332/1B) 1620-35, most of blade missing. G. Jordan's Point (44PG300/1F) 1620-35, a hewing ax with one side flat. H. Mathews Manor (WS203, Weber Collection) mid-17th century. (All 1/8 scale.)

SPECIAL PURPOSE AXES: I. Cooper's ax, Martin's Hundred (1771J) 1620-40. J. Cooper's ax, Mathews Manor (WS238, Weber Collection) mid-17th century. K. "Bearded" ax, Causey's Care (44CC178/2) pre-1665, eye broken off. L. Jordan's Point (44PG300/1E 61N) 1620-35. (All 1/8 scale.)

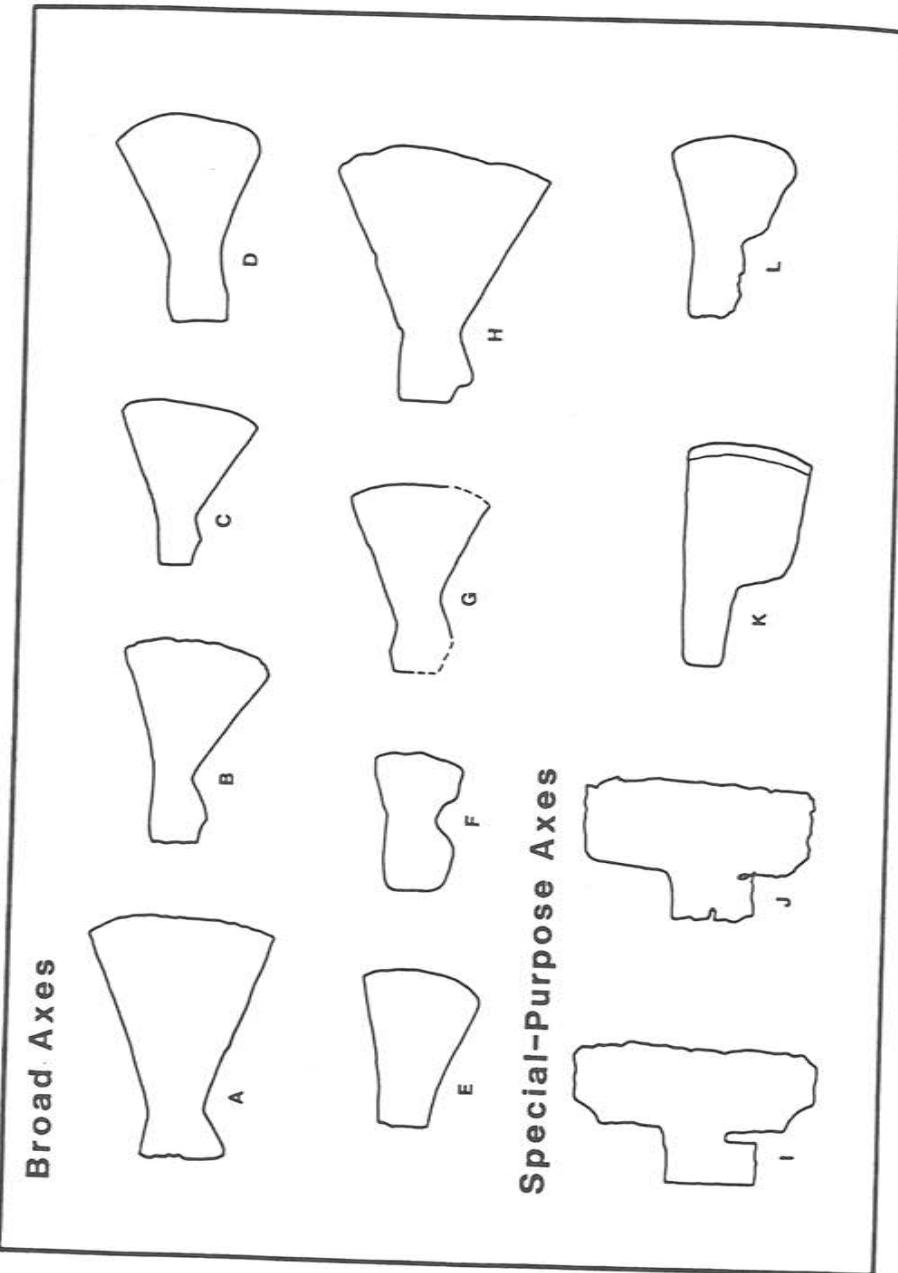


FIGURE 3. Broad and Special Purpose Axes

one (Figure 3G) are symmetrical when viewed from the top and appear to have been sharpened with double bevels. This suggests either that axes of this form were intended for chopping rather than hewing, or that many 17th-century hewing axes had the same basic eye configuration and sharpening bevels as felling axes. Either conclusion makes it difficult for us to determine whether the 17th-century term "broad" refers only to the relative width of the blade or to the intended function of the tool. Since these axes have been found in two distinct sizes, however, it is possible that the narrower of the "broad" axes (with the exception of Figure 3G) are actually a type of felling ax, while the huge axes from Mathews Manor and Martin's Hundred (Figure 3A and H) are the only true broad axes, in the 17th-century sense, recovered. Given the documentary evidence, this ratio of broad to felling axes is not improbable. We also have recovered several special-purpose broad axes, and they are illustrated as such in Figure 3.

The 17th-century probate inventories also include "narrow" axes. We have thought that felling and narrow axes were the same tools, but it may be that the long, narrow axes (Figure 2D and 2F) were, strictly speaking, "narrow" axes, while the chopping axes with wider blades were "felling axes." Even if that is the case, both types could have been referred to colloquially as "narrow" to distinguish them from broad axes.

Hatchets, like axes, traditionally have been made either for general-purpose chopping, and sharpened with a bevel on both sides of the blade, or for hewing, and beveled on only one side. Both types were known in 17th-century Virginia, judging by inventory entries of "joiner's" (hewing type), "broad" (possibly hewing), and "narrow" (chopping) hatchets. The distinction between small axes and large hatchets is often a difficult one to draw, and some of the smaller axes illustrated could have been mounted on short helves and intended for lighter work. To my knowledge, we have recovered no tools that are indisputably hatchets.

#### Wedges, Froes, Adzes, and Drawknives

Another method for converting logs to usable wood was by splitting. After small logs were cut to suitable lengths, they could be split using an ax. However, one could work much larger stock more quickly and accurately by driving iron or wooden wedges into the wood using a large wooden mallet or club (Figure 4). One could also split wood by driving a froe — a long, thin wedge with a handle at right angles to the blade — into the end grain of shorter logs to rive off wedge-shaped boards suitable for a variety of applications from shingles and

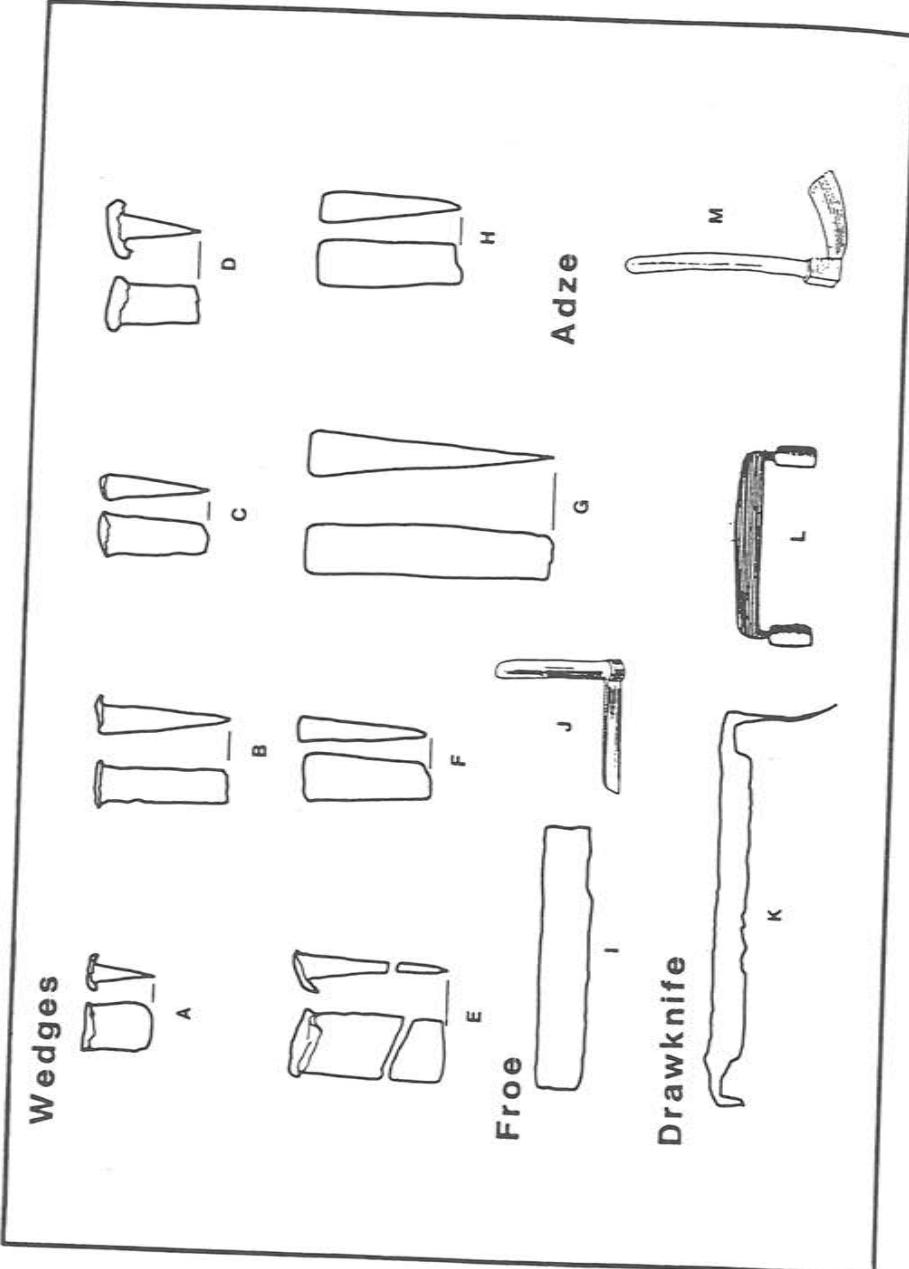


FIGURE 4. Wedges, Froes, Drawknives, and Adzes

#### CAPTION FOR FIGURE 4

WEDGES: A. Flowerdew Hundred (44PG65/193N3D-4) "Enclosed Compound" 1618-60. B-D. Martin's Hundred (1738A, 1752, 1731) 1620-45. E. Flowerdew Hundred (44PG65/122,123-40) "Enclosed Compound" (surface) 1618-60. F. Causey's Care (44CC178/39/2P) pre-1665. G. Pettus site (KM151C) mid-to-late 17th century. H. Kingsmill Tenement (KM353B) early-to-mid 17th century. (All 1/8 scale.)

FROE: I. Pasbehay site (JC298/105G) (1625-1650) (1/8 scale). J. Illustration adapted from Smith (1975) (not to scale).

DRAWKNIFE: K. Causey's Care (44CC178/39/1/2L) pre-1665 (1/8 scale). L. Illustration from Moxon (1989) (not to scale).

ADZE: M. Illustration adapted from Nicholson (1812) (not to scale).

#### CAPTION FOR FIGURE 5

TWO-HAND (CROSS-CUT) SAWS: A. Martin's Hundred (3012C) ca. 1620. B. Basse's Choice (TW13/102A) 1620-40, one of two end-pieces, possibly from same saw, that survive. C. Causey's Care (44CC178/39/2P) pre-1665. (All 1/8 scale.) D. Illustration from Moxon (1989) (not to scale).

WHIP OR PIT SAWS: E. Illustration adapted from Smith (1975) (not to scale). F. Causey's Care (44CC178/39/6L) pre-1665. G. Causey's Care (44CC178/39) pre-1665. H. Tooth fragments, Flowerdew Hundred (44PG65/190-191) "Enclosed Compound" 1618-60. I. Causey's Care (44CC178/39) pre-1665. J. Causey's Care (44CC178/6/8H) pre-1665. K. Pettus site (KM54A) mid-to-late 17th century. (All 1/8 scale.)

HANDSAWS: L. Illustration adapted from Moxon (1989) (not to scale). M,N. Jordan's Point (44PG302/F-110 EU#766) 1620-35. O. Jamestown (COLO J 10374, Project 103, Feature 40, Fill) no date, but probably early 17th century. P. Compass saw, Kingsmill Tenement (KM353C) early-to-mid 17th century. (All 1/8 scale.) Q. Illustration from Moxon (1975) (not to scale).

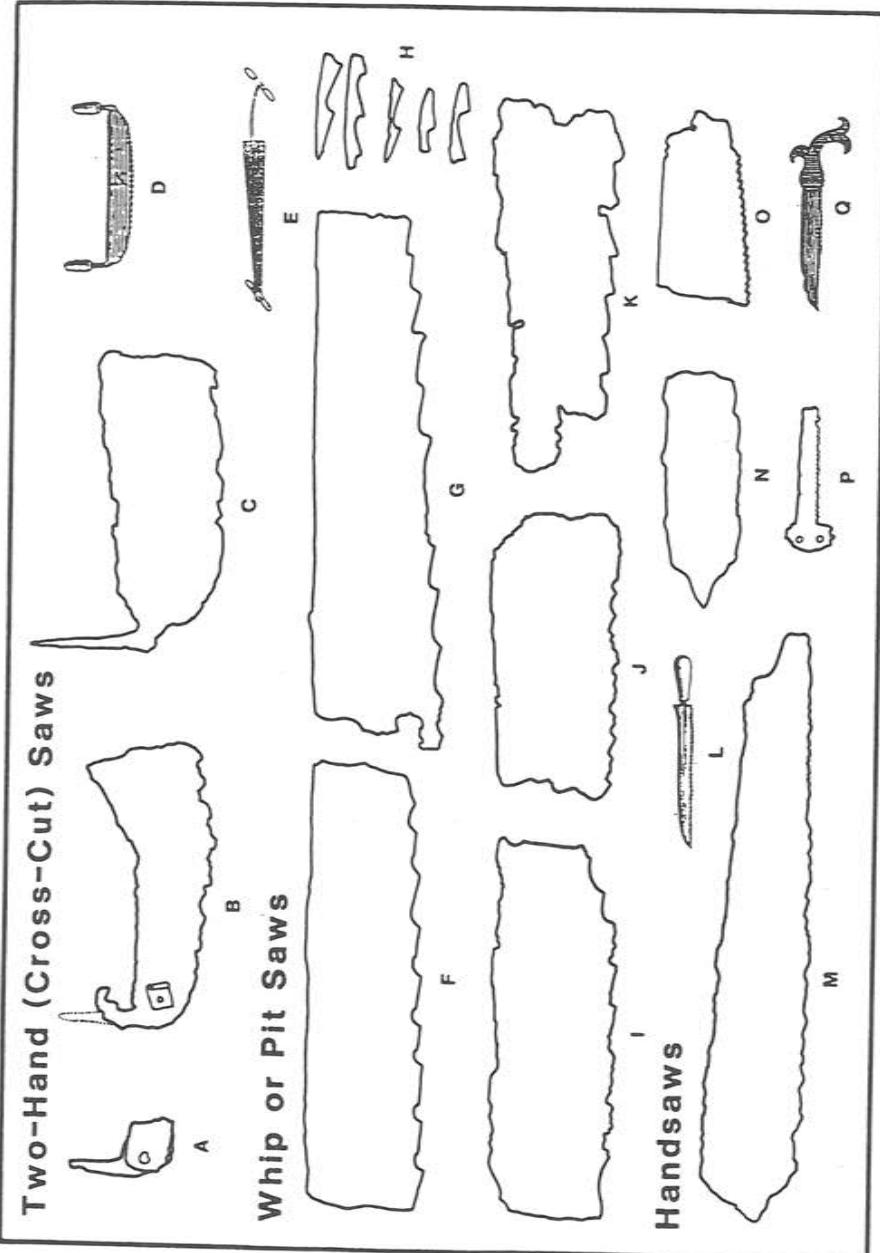


FIGURE 5. Saws

clapboards to furniture components. Froes also could be used to further split boards into the width desired and to split saplings into strips for barrel hoops, baskets, and laths.

Of the 20 decedents in the inventory survey who were not storekeepers, 14 owned at least one iron wedge or a froe or both. In spite of their apparent popularity, however, we have discovered relatively few wedges and froes on 17th-century sites. I know of only one froe, found at Governor's Land in a refuse pit (Figure 4I). The reason may be that, while a number of the other tools in our kit were employed in the immediate vicinity of the structures excavated, splitting tools often were used in more remote locations. Settlers may have used them most frequently to prepare building materials at the source of the wood rather than at the building location (Why haul the entire log when it is easier to haul the partially worked product?) or for splitting out products, such as fence rails, near both the source of the material and the site where they were needed. Both the froe and wedges vary little from later examples. Several wedges show extensive mushrooming as a result of being pounded (see Figure 4).

Adzes may have been used in conjunction with axes and splitting tools (Figure 4M). Looking vaguely like a hoe, these tools served to chop or pare away the irregularities of split or squared wood. Wielded by a skilled user, they were capable of leaving a surface that could be improved only by using planes or chisels. Adzes also were useful shaping tools, allowing the quick contouring of complex shapes such as ship's timbers or wooden water troughs. Twenty-four adzes appear in the inventories (two of these, owned by Francis Sherwood, could have been cooper's adzes), but 17 of them were in stores. That may explain why, to my knowledge, none have been recovered from 17th-century sites.

Another tool for smoothing and shaping was the drawknife. With the wood held in a clamp of some sort, drawknives were pulled over the work to shape and smooth shingles, clapboards, tool handles, and utensils. Seven appear in the inventories, of which one is in a store and another is described as a "cooper's." Only one has been recovered archaeologically, at Causey's Care, and it appears to differ little from general-purpose carpenter's drawknives of the 18th century (Figure 4K). Several other drawknife-like tools have been recovered from sites and identified as drawknives, but they have long, curved blades and probably had either two handles extending straight out from the blade or one straight and one down-turned handle. These tools are more likely currier's or tanner's knives, used in the production of leather.

## Saws

Two-man, or cross-cut, saws were used to saw logs or beams into shorter sections, a method that was more accurate, resulted in less waste, and was often easier work than chopping. Sawn logs were also easier to split with accuracy, since the sawn end of the log allowed more precise positioning of wedges or froes. Seven of our 20 non-storekeeping decedents owned "two-hand" saws, and several fragments have been recovered from area sites (Figure 5). The most complete of these are saw ends with integrally forged tangs (the upturned "pin" over which the handle fits) found at Basse's Choice and at Causey's Care. The Basse's Choice example (Figure 5B), of which both ends survive as fragments, has sheet-metal "stops" riveted to each end of the blade just forward of the handle tangs. These stops prevented the end of the saw from running through the log as the sawyers pulled the saw to and fro.

While two-man, cross-cut saws were used for the coarse dismembering of logs, hand saws and whip, or pit, saws imply a much more studied and careful approach to woodwork. There is only one reference in the inventories to a pit saw and it is in a store; however, fragments of them occasionally survive on early sites. They were used to saw logs into boards. One sawyer stood on the log, which was elevated on trestles or suspended over a pit, while a second sawyer, the "pit man," stood below and provided much of the muscle power. The top sawyer held the saw by a handle attached with a wrought-iron "tiller." The pit man's handle was a wooden or iron device called a "box" that was held onto the saw blade with a wedge. This permitted the sawyers to easily remove the box in order to withdraw the saw from the log. Pit sawing was a much slower process than splitting, but it resulted in more accurately dimensioned lumber with less waste.

The identification of small fragments of saws according to type is usually based upon the tooth configuration. Cross-cut saws traditionally have been sharpened with symmetrical teeth so that the saw cuts on both the forward and return strokes. Pit saws are intended to cut only on the down stroke, and therefore their teeth are raked in one direction. Most, if not all, fragments of large saws recovered from the Chesapeake area have hook-like teeth and therefore have been identified as pit saws. While that is probably the case, caution with these identifications is appropriate, because the teeth of the cross-cut saw recovered at Basse's Choice appear to have been similarly shaped. This may indicate a reworking of the saw, but it could also indicate that at least some 17th-century cross-cut saws were made with raked teeth.

Handsaws, which the inventories indicate were more commonly owned, were used then as now to cut boards to the size required and to shape wood for joining. Few handsaw fragments survive, probably due to the thinness of the iron or steel from which they were made, but a remarkable handsaw blade was recovered at Jordan's Point (Figure 5M). This blade is virtually complete and is of a style that apparently had completely disappeared in England and America by the 18th century. The handle was mounted on a tang extending from the center of the saw's heel, and the upper nose of the saw is decoratively shaped. The tang-end of another, similar saw was recovered at Jordan's Point (Figure 5N), and although from an undated context, a saw fragment with its toe similarly decorated was recovered at Jamestown (Figure 5O).

## Hammers and Chisels

Seventeenth-century Virginians also commonly owned tools to assemble wooden objects. The use of hammers, which seven of our decedents owned, and nails provided the quickest means of accomplishing those tasks (Figure 6). The hammers most commonly recovered are claw hammers, equipped with a set of claws opposite the striking head and therefore useful not only to drive nails, but also to pull them. Typically, the top surfaces of these hammer heads form graceful arcs. The heads are relatively thin when viewed from the side, and their small, rectangular eyes are therefore rather shallow. Although not recovered with the heads, it is likely the hammers were mounted on their handles by means of metal straps that passed through the eyes and were peened over to secure the head. The handle in turn was fitted between the extensions of the straps below the head and riveted in place (see illustration from Moxon 1989, Figure 6G).

A hammer of very different form was excavated at Flowerdew (Figure 6F). Although its context could be later (1690-1730), it is almost certainly a very early type. Instead of a claw, it has a thin peen opposite the striking face that could be used to drive small brads in restricted locations. Although this generic form of hammer is still made today, the decoration of the head, like the decoration of the Jordan's Point saw, was of a style that apparently disappeared in the early years of the 18th century.

Nailing was a quick and acceptable way to join wood. Nevertheless, in many other situations, joinery, or the fitting together of wooden components by mating shapes, was much more effective and durable. The colonists possessed a range of tools for this work. We have already mentioned that axes, hatchets, adzes, saws, and drawknives could be used for shaping joints, but the basic tools for more refined work were saws and chisels. Chisels were made in three types:

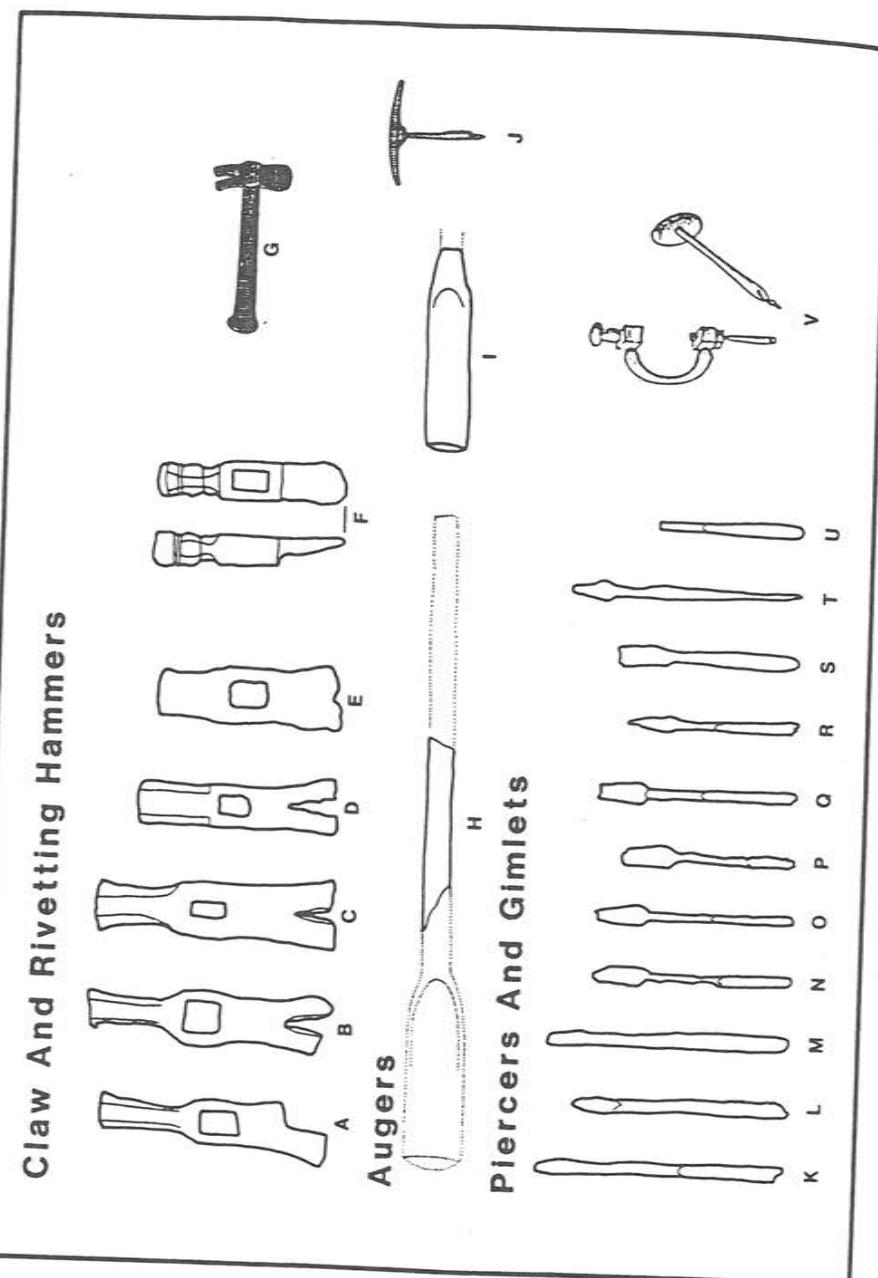


FIGURE 6. Hammers, Augers, Piercers, and Gimlets

#### CAPTION FOR FIGURE 6

HAMMER HEADS: A. The Maine (GL109A) pre-1626. B. The Maine (GL13B) pre-1626. C. Flowerdew Hundred (44PG64/2C/SWQ) "Temporary Pit Dwelling" 1618-30(?). D. Kingsmill Tenement (KM376B) early-to-mid 17th century. E. Kingsmill Tenement (KM415A) 1690-1710. F. Flowerdew Hundred (44PG66/508A1-53) "Flowerdew Town" earthfast structure 1690-1730. (All 1/4 scale.) G. Illustration from Moxon (1989) (the odd perspective shows both the top of the hammer head and the straps and handle) (not to scale).

AUGERS: H. Jordan's Point (44PG300/7/E) 1620-35, encrusted and configuration approximate. I. Kingsmill Tenement (KM393A) 1635-50 (this site may have 18th-century contamination). (All 1/4 scale.) J. Illustration from Moxon (1989) of what appears to be a Continental type auger (not to scale).

PIERCERS AND GIMLETS: K. Martin's Hundred (3013G) ca. 1620. L. Boldrup Well (44NN40/7V) 1630s. M. Kingsmill Tenement (KM393F) 1635-50. N. The Maine (GL110A) pre-1626. O. The Maine (GL127A) pre-1626. P. The Maine (GL124A) pre-1626. Q. Flowerdew Hundred (44PG65/190/53-22) "Enclosed Compound" 1618-60. R. Martin's Hundred (2103B) 1620-40. S. Causey's Care (CC178/6/36C) pre-1665. T. Kingsmill Tenement (KM415A) 1690-1710. U. Flowerdew Hundred (44PG65/190KZ-48) "Enclosed Compound" 1618-60. (All 1/4 scale.) V. Illustrations of piercer (left) and gimlet (right) from Moxon (1989) (not to scale).

tanged, socket, and mortise (Figure 7). Once again, there is a discrepancy between the inventories and the rate of recovery of these tools. While a large number of chisels were recorded in store inventories, only four of the other inventories indicate that the decedents owned them. Yet, we have recovered at least a dozen from period sites.

Tanged chisels have a pin-like tang that fit into a hole in the handle and a shoulder or bolster against which the end of the handle rested (Figure 7A-G). Most tanged chisels examined have a shank emerging from the bolster that is essentially square or rectangular in section until, several inches ahead of the bolster, it broadens quickly to form a slightly flaring blade. Woodworkers normally used tanged chisels for relatively light cutting and paring.

A number of tanged chisels from undated contexts at Jamestown (Figure 7D and E), one from Flowerdew (Figure 7F), and one from St. Mary's City (Figure 7G) — all of which could be 17th century in date — have "three-quarter" bolsters. A mortise chisel from Flowerdew (Figure 7Q) also has this type of bolster. Instead of wrapping completely around the shank, these bolsters form shoulders only on the shank's top and sides. This feature is otherwise very rare and does not, to my knowledge, appear on any 18th-century chisels. This design is odd since it would appear to accomplish no purpose. The bolster does not allow the entire chisel to lie flat against the work, as the lower side of the handle still would project below the chisel blade's bottom surface. This design may even weaken the handle mounting.

Socket chisels were used for heavier chopping and cutting (Figure 7I-O). The rear portion of the blade was forged in the shape of a hollow socket into which the forward end of the wooden handle fit, making the tool more durable when struck with a mallet. All socket chisels recovered from 17th-century contexts have sockets that are hexagonal in section. By the late 18th century, sockets were universally round in section.

While tanged and socket chisels were used to shape a variety of wooden objects that could not be easily chopped, sawn, or cut with a drawknife, or that required a greater degree of precision in their fabrication, mortise chisels were designed to perform a more specialized function (Figure 7P-R). They are narrow, long chisels used only to cut deep slots into wood in order to create the mortises of mortise-and-tenon joints. The only mortise chisels identified as such in the inventories were three in the store of Jonathan Hubbard of York County (1668). The three excavated examples examined have almost parallel tops and bottoms. One was designed to cut mortises 5/16 in. wide (Figure 7P), another to cut 3/8 in. mortises (Figure 7R). The third (Figure 7Q), with an unusually flaring blade and a three-quarter bolster, was found at Flowerdew. It is either

a variant type designed to cut approximately 1/2 in. mortises, or its blade, which without the flair would cut 1/4 in. mortises, was reforged in a make-do effort to produce a wider tool, possibly for use as a paring chisel.

### Boring Tools

Boring tools also were used in joining processes (Figure 6). Augers, the largest of the hole-boring tools, served not only for general-purpose drilling, but also to remove much of the waste in mortises of large mortise-and-tenon joints before chopping out the remainder with chisels. Carpenters also used augers to drill holes for the large treenails or pegs used to secure architectural members. The three excavated augers examined appear to be "spoon" types, with approximately half-cylinder bodies terminating in closed cutting ends (Figure 6H and I).

Piercers were drill bits. When a bit was mounted onto the end of a crank-shaped wooden handle, it was considered to be "stocked" (what we today call a brace and bit). Stocked piercers were used to drill small holes, including those for pegs that held together the joints of small-scale objects. Gimlets, also used to drill small holes, look like small augers with their bits mounted in a wooden handle perpendicular to the blade. Although they drilled holes at a slower rate than a stocked piercer, because their handles had to be turned with intermittent twists of the wrist, gimlets had the advantages of being simpler, smaller, less expensive, and less time-consuming to fit with a handle. From one perspective, they were also handier, since their handles were permanently attached and their use did not require that they be interchanged in the stock each time a different size hole was required. Only one of the non-store inventories listed a gimlet, but the storekeeper Jonathan Hubbard had 186 in his 1671/2 inventory.

It is often difficult to differentiate between piercer bits and gimlets, as both were roughly the same size, and their working ends can be similar. Seventeenth-century examples of both tools have flat tangs. The principal difference between the two types may have been that the broad surface of gimlet tangs tapered to a point so that the tang could be riveted over to fix it into the handle (Figure 6R), while the tangs of piercer bits taper much less and have blunter ends (Figure 6Q). The poor condition of excavated examples precludes any firm conclusions about the form of the cutting edge of these drilling tools, but it is likely that they had either pointed or rounded, closed ends.

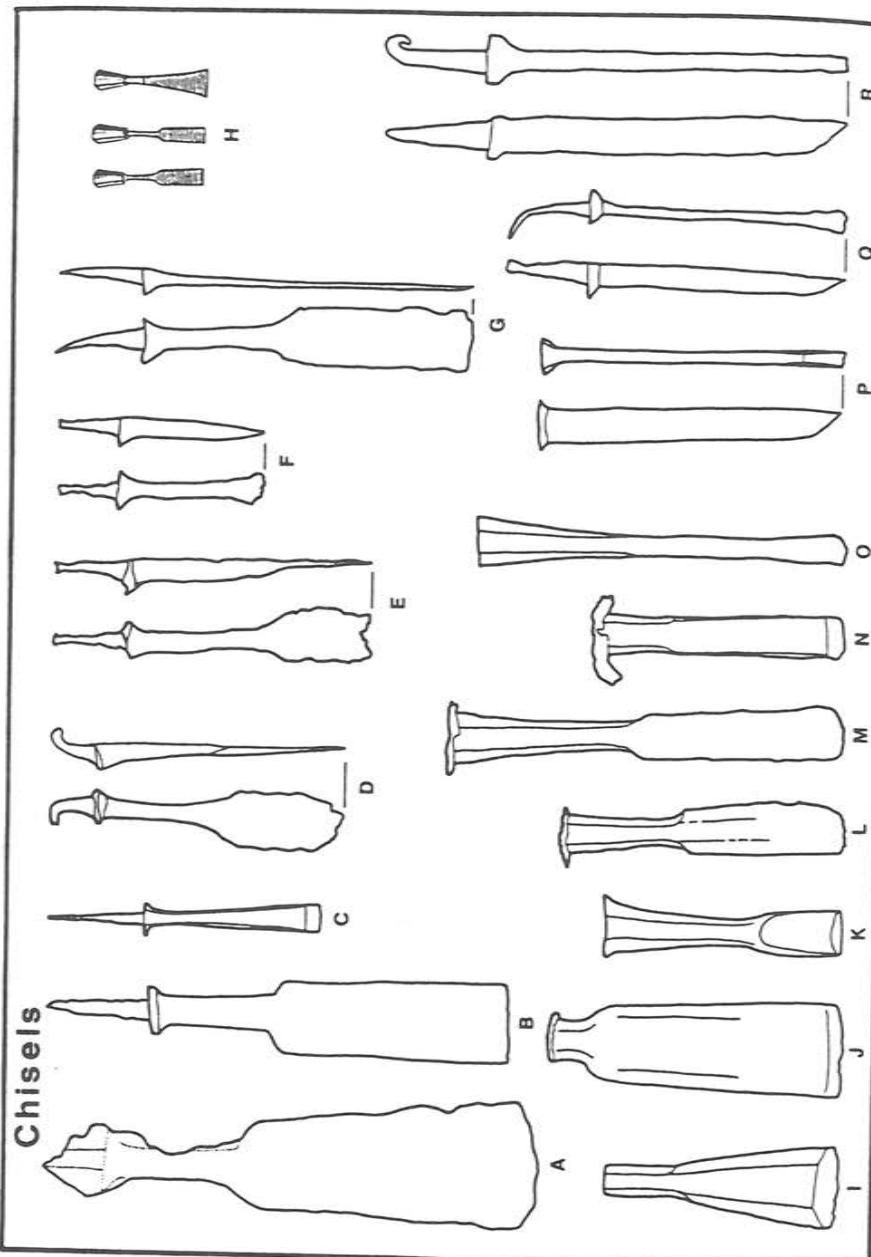


FIGURE 7. Chisels

CAPTION FOR FIGURE 7

TANGED CHISELS: A. Jordan's Point (44PG302/F-320 EU#889) 1620-35, tang-end encrusted and bolster and tang configuration approximate. B. Causey's Care (CC178/50A) 1680-1710. C. Drummond site (GL250B) 1680-1710. D. Jamestown (COLO J 5278, 96:100-152) no date. E. Jamestown (COLO J 1862, B87, Depth 4-5 ft.) no date. F. Flowerdew Hundred (44PG66/578J2-412) "Flowerdew Town" earthfast structure 1690-1730. G. St. Mary's City (ST1-23/72C/JF) 1678-ca. 1720. (All 1/4 scale.) H. Illustrations of tanged chisels from Moxon (1989) (not to scale).

SOCKET CHISELS: I. Portion of shank and blade only, Flowerdew Hundred (44PG65/193F/M-17) "Enclosed Compound" 1618-60. J. Portion of shank and blade only, Pettus site (KM82P-2) mid-to-late 17th century. K. Pettus site (KM110A) mid-to-late 17th century (this piece is actually a gouge). L. Drummond site (GL235M) probably late 17th century. M-O. Kings Reach (18CV83) 1690-1715. (All 1/4 scale.)

MORTISE CHISELS: P. Drummond site (GL222V) 1650-80. Q. Flowerdew Hundred (PG3/25) Flowerdew Hundred Plantation (surface) date unknown. R. Causey's Care (CC178/39/4B) pre-1665. (All 1/4 scale.)

## TOOL MAINTENANCE

Seven of the inventoried estates contained grindstones and two included saw wrests (see Figure 8). Grindstones were used to sharpen all sorts of edged tools ranging from those for woodworking to agricultural implements. Saw tools consisted of a file, to shape and sharpen dulled teeth, and wrests, to bend the teeth slightly outward in an alternating pattern so that the saw cut was wider than the saw blade, thus preventing binding and making the saw easier to control. Small, round-headed wrests (Figure 8E and F), a type that apparently does not survive the 18th century as an English form, were used to set handsaws, while much larger and heavier, parallel-sided wrests were used to set cross-cut and pit saws.

## THE CULTURAL IMPLICATIONS

While I would like to draw specific, detailed conclusions about domestic woodworking tool ownership and use patterns in 17th-century Virginia based upon this documentary and archaeological evidence, any attempt to do so at this point would be premature. As the small number of recovered artifacts and the broad range of sites from which they were retrieved suggests, we do not yet have sufficient material to undertake the quantification of data such analyses would require. Nevertheless, the information in hand about these tools suggests some broader, preliminary hypotheses regarding work, products, and economic and cultural ties with England.

The widespread ownership of axes, wedges, and froes indicates that chopping and splitting were among the primary activities of Virginians. The inventory data and the archaeological evidence together suggest that a majority of settlers were equipped to clear land and to reduce trees to firewood, rails, and rough structural components of buildings. Many colonists probably were proficient users of these tools. About 1608, John Smith noted that two gentlemen "within a weeke...became Masters, making it their delight to hear the Trees thunder as they fell." It took a bit longer, however, to toughen the "Gallants'" hands, since according to Smith, "the Axes so oft blistered their tender fingers, that commonly every third blow had a lowd Oath to drowne the Eccho" (Purchas 1906:499).

The widespread use of splitting, which is a wasteful but efficient way to reduce logs to usable wood, was practiced much less generally in England during this period than earlier (Forman 1988:35). The new Americans revitalized a technology well suited to their labor-scarce, timber-rich environment. Unlike

New Englanders who relied heavily on sawmills established on their fast-moving rivers and streams shortly after settlement, Virginians by and large continued to depend upon muscle power to convert logs to lumber throughout the century.

A second insight stems from the fact that while many individuals owned axes, froes, wedges, saws, and other tools for roughly converting trees to usable lumber, the probate inventories indicate that they tended to own only a few of the other tools needed to create products made of carefully fitted and joined wood. The inventories also suggest that even this sporadic ownership of chisels, boring tools, tenon saws, and hammers may have declined during the last quarter of the century. As a result, few of the decedents in our sample had the tools required to do more than the most rudimentary woodwork. In all likelihood, the majority of Virginians owned tools primarily to undertake rough work, such as: clearing; making fences, tobacco poles, plantation sheds, and agricultural tool handles; and maintaining equipment and buildings. They probably did not engage in the construction of furniture, complex agricultural implements, or houses. Construction of even a relatively simple, earth-fast "ordinary Virginia house" or the simplest joined furniture required considerably more tools, and more tool-using skills, than the average planter appears to have possessed (cf. Carson et al. 1981). While the typical tool owner probably could produce the roughly dimensioned materials needed to make these more elaborate products, most planters during this period must have turned to specialist artisans for their actual construction. The apparent decline in common ownership of tools for finer work toward the end of the century suggests that, as time went on, the dependence upon these specialized artisans may have increased.

While we have little direct information about the tool kits used by specialized artisans, we can make some educated guesses about them. Carpenters and joiners probably owned most, if not all, of the tools we have discussed. In addition, they required other tools for measuring, joining, and finer finishing. Adding several planes, a pair of compasses, and possibly an iron carpenter's square to the basic tool kit elevated it from a group of domestic woodworking tools to the purchased (as opposed to artisan-made) components of a standard carpenter's kit of the period (Goodman 1976:40-51). Those who engaged in even finer work, such as architectural joinery and the construction of furniture, also must have owned the even more specialized tools that we know were in Virginia. Based on archaeological finds, store inventories, and surviving products, these included: planes for smoothing, cutting joints, and decorating; measuring and layout tools such as rules, try squares, gauges, and chalk lines; and carving chisels and gouges. Coopers had specialized tools required in their trades, as no doubt did wheelwrights and turners. Many more inventories of

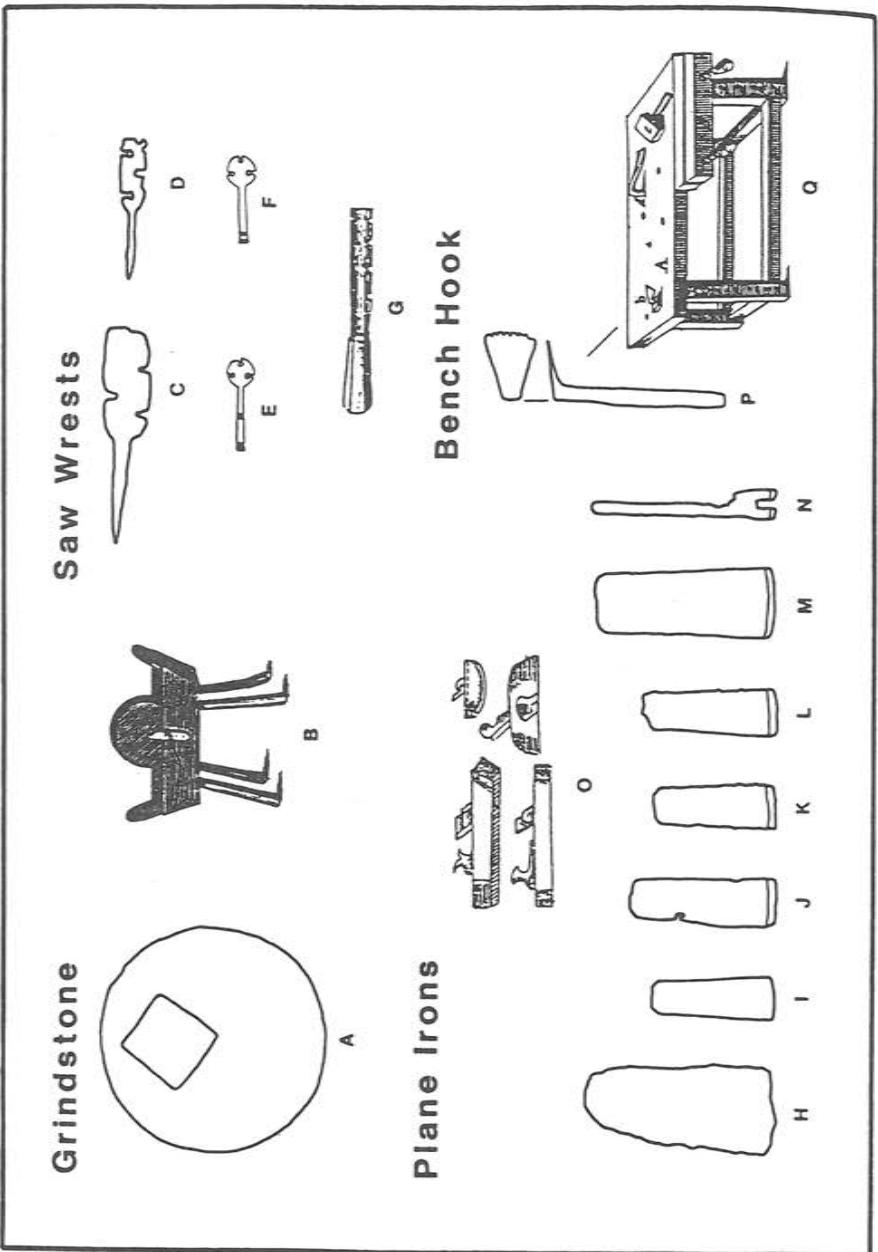


FIGURE 8. Grindstones, Saw Wrests, Plane Irons and Bench Hooks

#### CAPTIONS FOR FIGURE 8

GRINDSTONE: A. Drummond Site (GL442) late 17th century (1/8 scale). B. Illustration from Moxon (1989) (not to scale).

SAW WRESTS: C. Causey's Care (44CC178/39/2P) ca. 1665. D. Flowerdew Hundred (44PG66/508V2A3-27) "Flowerdew Town" earthfast structure 1690-1730. E. Drummond Site (GL250B) 1680-1710. F. Flowerdew Hundred (44PG66/508B1-92) "Flowerdew Town" earthfast structure 1690-1730. (All 1/8 scale.) G. Illustration from Moxon (1989) (not to scale).

PLANE IRONS: H. Jordan's Point (44PG302/F-320 EU#889) 1620-35. I. Flowerdew Hundred (44PG64/179Q) "Dwelling House" 1624-60. J. Chesopean Site (44VB48) (dug in the 1950s) probably 1625-50. K. Flowerdew Hundred (44PG64/179Q) "Dwelling House" 1624-60. L. Causey's Care (CC178/39/1L) ca. 1665. M. Causey's Care (CC178/6/8H) ca. 1665. N. Flowerdew Hundred (44PG65/193L1-6) "Enclosed Compound" 1618-60. (All 1/8 scale.) O. Illustration from Holme (1972) (not to scale).

BENCH HOOK: P. Flowerdew Hundred (44PG66/508B3/CD1-1) "Flowerdew Town" earthfast structure 1690-1730 (1/8 scale). Q. Illustration from Moxon (1989). The bench hook is shown at "b" (not to scale).

17th-century carpenters, joiners, and turners survive in New England records than those of Virginia (Goodman 1976:40-51; Forman 1988:39-62). While this reflects a more widespread practice of these trades in New England, it is likely that the tool kits employed by comparable artisans in both regions were similar.

We also can conclude that both artisans and homeowners had simple wooden tools and jigs of one sort or another. In the case of the planter, he almost certainly had a chopping block and various mallets or mauls and possibly a horse for sawing logs, a brake to hold wood that was being split, and a shaving bench to hold wood being shaped for shingles or tool handles. The specialist woodworker may have had these implements, as well as a workbench and its fittings. At least some woodworkers had lathes. Most of these tools probably were homemade, and there is little chance of anything more than a bench stop or a lathe center surviving in the ground.

One function we call upon archaeology to serve is to inform us about the activities that occurred at specific locations. The discovery of axes, wedges, and froes at the majority of sites excavated tells us only that chopping and splitting took place there. Pit saw fragments and chisels indicate somewhat more refined work, possibly the preparation of architectural building materials. In most cases we do not know what other tools were owned by a site's inhabitants, and the conclusions we can safely draw from the archaeological evidence are likely to be an understatement of the activities undertaken. In other cases, however, the evidence for finer or more specialized woodworking is indisputable. The cooper's ax, compasses (Figure 9F-H), and carving tools or gouges (Figure 9A-D) recovered at Martin's Hundred indicate that barrels and finer woodwork were made there. Plane blades found at Jordan's Point, Causey's Care, and the Chesopean site (Figure 8) suggest that either more finished woodworking was undertaken by their inhabitants or that they were storing tools for such work. The large plane blade found at Jordan's Point (Figure 8H) may be for a cooper's jointer. The tools recovered at Flowerdew Hundred, however, suggest the most sophisticated woodworking. Inhabitants there owned plane blades for smoothing (Figure 8I and K); a mortising chisel for cutting mortise-and-tenon joints (Figure 7Q); a plane for cutting the tongue portion of tongue-and-groove joints (Figure 8N); and most significantly, a bench hook (Figure 8P) that not only implies the presence of a joiner's bench, but the woodworking associated with it.

To this point, we have considered these tools strictly from the standpoint of their functions. If we look at them closely as objects in and of themselves, they reveal other aspects of life in the early Chesapeake. Based upon the evidence of Moxon (1989) and Holme (1972), most appear to be essentially of the same types and designs as those used in England during the latter 17th

century. The settlers in the Chesapeake brought their English tool kits with them, and despite some adaptations in the use of those kits to accommodate New World conditions, Virginia artisans on the whole continued the tool-using traditions of the mother country. That in turn implies that, while some Virginia products may have been comparatively rough and ready ones, they probably were most often those developed (or re-developed) in Virginia and made with adapted technology: rail fences, earthfast dwelling frames, and wall and roof coverings. Those products that conformed more closely to contemporary English models, such as furniture, architectural finishing work, and cooperage, would more likely have been made with a purer English technology and also probably to English standards of technical competence (Forman 1988:39-40). Students of material culture are in the process of determining to what extent the passage of time and increasing cultural distance from England altered Americans' approaches to making their own versions of essentially English products, but so far there is little evidence to be found for such differentiation in the 17th century based upon the tool kits employed.

Most tools found on Virginia sites appear to be commercially manufactured imports from Europe. Local blacksmiths may have routinely made some technically simpler tools, such as wedges and froes. The ax found at the Chesopean site (Figure 3D) was accompanied by the wedge-like drift used to form its eye, suggesting that it was a local product. Tools undoubtedly were frequently repaired and at least occasionally modified in Virginia. Still, based upon both store inventories and archaeological finds, the evidence suggests that, after the first hard years at Jamestown, the flow of basic tools from Europe was adequate, and they were readily available to the colonists. There was little economic incentive for 17th-century Virginians to manufacture these tools, and that remained the case throughout the 18th century.

The majority of excavated tools probably are of English manufacture. Even so, they display a variety of differences in details, such as ax eye and blade shapes, chisel shank and bolster designs, and hammer-head neck and claw configurations. As is the case with ceramics, many of these details reflect not only functional evolution, but also the manufacturing trends and customer preferences of specific English localities. Regional variations are well documented in 19th-century English tool catalogs (cf. Smith 1975). While no one has looked at a large enough sample of English tool forms of this period to definitively assign them to regional manufacturers, further archaeological research in that area may permit us to determine the areas in England from which these tools came. That in turn may assist us in analyzing the transfer of woodworking traditions to the Chesapeake. The few tools with legible makers'

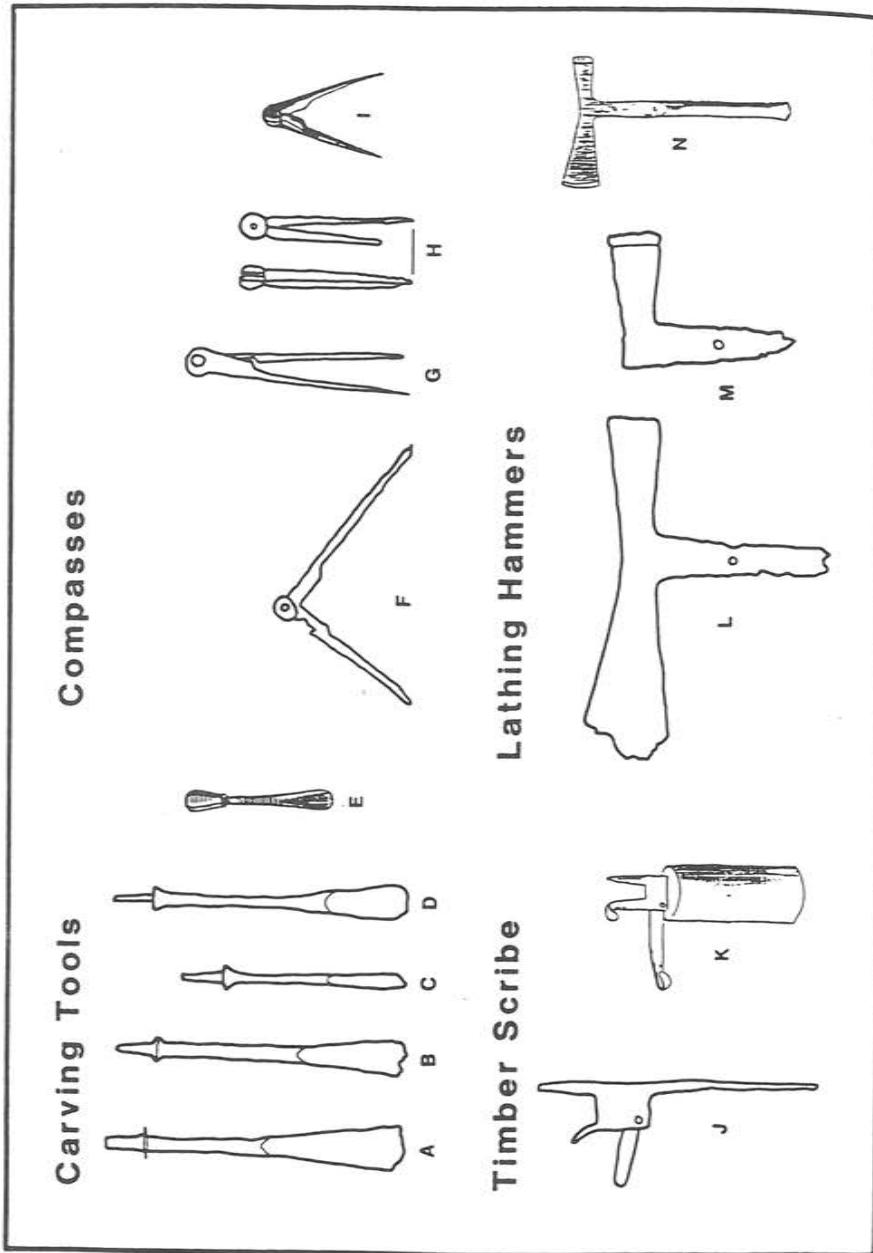


FIGURE 9. Carving Tools, Compasses, Timber Scribes, and Lathing Hammers

#### CAPTION FOR FIGURE 9

CARVING TOOLS OR BENCH GOUGES: A. Martin's Hundred (2129B) 1620-40. B. Martin's Hundred (3011E) ca. 1620. C. Martin's Hundred (4115E #145) ca. 1620. D. Martin's Hundred (4065 #1) ca. 1620. (All 1/4 scale.) E. Illustration from Moxon (1989) (not to scale).

COMPASSES: F. Martin's Hundred (3135A) ca. 1620. G. Martin's Hundred (4115A #125) ca. 1620. H. Martin's Hundred (3011H) ca. 1620. (All 1/4 scale.) i. Illustration from Moxon (1989) (not to scale).

TIMBER SCRIBE: J. Pettus Site (KM116) mid-to-late 17th century (1/4 scale). K. Illustration by the author (not to scale).

LATHING HAMMERS: L. Causey's Care (CC178/50B) pre-1665. M. Kingsmill Tenement (KM353C) early-to-mid 17th century. (Both 1/4 scale.) N. Illustration by the author (not to scale).

marks have the potential to reveal even more specific information about tool origins.

We cannot assume that all imported tools originated in England, however. Some excavated pieces have characteristics that we normally associate with Continental tools, such as the tang configuration and nose decoration of the Jordan's Point saw, the ornate detailing of the Flowerdew rivetting hammer, the round heads of small saw sets, and the curved ears of some of the axes. We need to look at these pieces more closely. They could reflect Virginia's early trade with the Dutch or, if they came to Virginia from England, they might give us some clues about 17th-century English tool manufacturing and tool trade in general.

Joseph Moxon copied illustrations for his plate of joinery tools from a French architectural book (Felibien 1676). As a result, most of the tools he portrayed are of Continental design. Moxon may have believed that this was justified on the grounds that at least some woodworking tools used in England during the 17th century were Continental types. Many tools, especially those made by specialist toolmakers, such as blades, probably were imported into England from the Continent during the late 16th and early 17th centuries. Saw blades and hammers found on the Thames foreshore in London share characteristics with the Continental-like tools excavated here, and they are either Continental or strongly influenced by Continental forms.

By at least the mid-17th century, however, the English tool industry began to blossom, and imported tools and Continentally-inspired designs gave way to the patterns that we now think of as British. There is a possibility, for example, that hexagonal socket chisels were originally a Continental design. They were later made in England, certainly in Birmingham and possibly in London, but although they are common on early Virginia archaeological sites, they disappear by about the mid-18th century and are replaced by standard English round-socket chisels. That may be the result of the transfer of the edge tool industry from London and Birmingham to Sheffield. By noting such variations and changes in tool design we can begin to develop typologies of tools that allow us to better ascertain both European and colonial patterns of commerce. Such typologies also can help us date sites.

Archaeologically recovered tools also reveal information about tool manufacturing technologies and tool quality. Visual examination confirms, for example, that most edge tools were made of iron with steel cutting edges welded to them. More scientific metallurgical analysis of tools, a task Colonial Williamsburg is beginning in conjunction with a 1994 exhibit of 18th-century woodworking tools, will reveal the quality of the materials used to make them

and how well those materials were handled in the manufacturing process. We should, for example, be able to determine whether the saws used by Virginians were the cheaper all-iron types or the more expensive steel ones mentioned by Moxon (1989:95-96). That finding may in turn reveal the sophistication of Virginia tool purchasers.

Even a cursory examination indicates that some tools were either of poor quality or were severely misused. A number of recovered axes are broken through the eye, and many hexagonal socket chisels excavated from both 17th and 18th-century sites survive only as dismembered blades (Figure 7I and J) or sockets. Such evidence allows us to make some informed guesses about how well tools performed their intended functions. On the other hand, evidence of tool misuse may lead us to question whether or not their users knew how to use them. Or possibly, in a pinch, they gave a shrug and used an ax as a hammer, or struck it like a wedge, or used a chisel as a pry bar, hoping futilely for the best.

Archaeological tools show us, through damage or wear patterns, how pieces were used. They can also show how pieces were repaired and, upon occasion, how they were modified. As severe mushrooming of the sockets of chisels reveals, many colonists did not bother to fit them with wooden handles (Figure 7L-N). Mushroomed wedges indicate heavy use or that they were struck with an iron hammer or ax rather than the prescribed wooden mallet. The mortise chisel from Flowerdew (Figure 7Q) appears to have been reforged to make it wider, possibly to convert it to a paring chisel. If we find a specialized tool modified to make a more common one (or the opposite) or a tool remade into a different size, it suggests either that the required tool was not available or that an owner's tool needs were changing.

The use of tools as trade items and the Native Americans' persistent attempts to acquire them have much to tell us about the transfer of European technology to native inhabitants. We need to look carefully at the specific tools we find on post-Contact Native American sites to see exactly what aspects of European technology were adopted and adapted. We also need to begin looking at tools, especially homemade tools, found on slave sites to see if there are African influences.

Finally, there are some interesting bits of trivia. Froes must have been one of the more common tools in early Virginia, yet we unearth very few of them. While that might be because we are not looking in the right places, their rare survival may result from their being made totally of iron. When they broke, just about any local smith could easily repair them or make something else from them. Lathing hammers are relatively common finds on early Virginia sites. We

find some in 17th-century contexts (Figure 9L and M) and even more dating from the 18th-century. While their intended purpose was to cut to length and nail lathe for plaster, they are a handy general-purpose hammer and hatchet. Does their widespread presence indicate a comparable use of plaster, or is it more likely that these tools were the kitchen hammers of their day, ready for everything from splitting kindling by the hearth to pounding back together anything that happened to be loose?

Ultimately we need to do a lot more digging. We require a much larger sample of tools to test our first hypotheses. We need to look diligently for workshop sites that might contain more specialized tools used in the colony. Efforts to determine changes in tool forms and use over time necessitate that we investigate a much broader range of sites. Tools, albeit humble artifacts, made life in the early Chesapeake possible. Only through archaeology will we be able to determine exactly what those tools were and how 17th-century colonists used them.

#### NOTE

<sup>1</sup>This quotation is from Captain John Smith (Barbour 1986:225).

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Tools are illustrated courtesy of the following institutions: Martin's Hundred and Mathews Manor — Colonial Williamsburg Foundation; Chesopean site, Kingsmill Tenement, Pettus site, Drummond site, and The Maine — Virginia Department of Historic Resources (VDHR) and Jamestown-Yorktown Foundation; Jordan's Point — VDHR and Virginia Commonwealth University Archaeological Research Center; Causey's Care and Boldrup Well — VDHR; St. Mary's City — Historic St. Mary's City; Flowerdew Hundred — Flowerdew Hundred Foundation; Basse's Choice and Harbor View Fort — Virginia Company Foundation; Pasbehay site — James River Institute for Archaeology; Jamestown — National Park Service, Colonial National Historical Park, Jamestown Museum Collection; King's Reach — Maryland Historical Trust/Jefferson Patterson Park and Museum.

## APPENDIX

### Tools Listed in "The Cost of Furnishing the Margaret" July-September 1619

This list is compiled from an accounting made for investors outfitting the Margaret, a ship bound for Virginia to settle Berkeley's Hundred (Kingsbury 1933:178-179). It appears that many of the tools were purchased to prepare the ship itself and make clothing and equipment for the party of 35 men. Some, if not most, of the tools probably sailed with the ship for use in Virginia and possibly as Indian trade goods. If that is the case, the document provides a unique insight into the variety and quantity of tools imported into Virginia during the early years of colonization.

To Richard Godfry for his tooles brought downe wth him  
200 of needles  
Six pound of glue  
Carvinge tooles for Rich Godfry  
2 dozen of hatchets  
4 rings for bittles [reinforcement rings for the heads of large wooden mallets]  
7 wedges  
3 hammers and round rings for chesils and other tooles [reinforcement rings for wooden handles for chisels permitting them to be struck with a hammer or mallet without splitting]  
3 dozen di of rings more  
2 crowes and one pickaxe [a croze is a tool for cutting grooves in barrels to receive the heads]  
3 squaringe axes [broad axes for hewing]  
4 chesils  
3 Adises [adzes] and a spokeshave  
17 borriers [borers: augers] and a drawing knife  
2 handsawes  
14 planinge irons and a hammer  
one payr of spiners [pincers?]  
2 Cawkinge irons [caulking irons] and 5 formers [heavy chisels]  
4 hatchets  
6 hatchets  
2 long sawes [pit saws?] 2 tenant saws [tenon saws: large back saws] & one file  
8 iron wedges waighinge 46 li [pounds]

2 squires [squares]  
Carpenters lynes [chalk lines]  
6 compasses [dividers]  
1 dozen of files  
one dozen of nalle [awl] blades  
4 whetstones  
2 payr of taylors sheares  
one dozen of wimble bits [drill bits]  
one longe thirt sawe [thwart saw: a cross-cut saw?]  
[nails of various types]  
12 chesils and 3 gouges  
2 drawinge knives and 2 knives to make trenchers  
3 hatchets  
3 axes  
one handsawe  
2 turning irons [turning tools?] one round spokeshave and one taper bit  
a Coops [cooper's] hatchet and an axe, one borrier and an Adis  
2 files and 2 plaininge irons  
a spokeshave and 2 bench hooke  
a cleaving saxe [a large, knife-like tool for riving]  
3 small files 6 taylors thimbles and 1 li of wyer  
2 pickaxes  
2 sledges  
2 bill hooke  
2 tillers for sawes [iron brackets for pit saw handles] and six truels [trowels?]  
2 gimlets  
one payr of compasses  
2 payr of plyers  
one markinge punch [a letter or symbol punch for marking iron]  
4 coold chisels  
5 irons for scrues [dies for threading metal screws]  
one longe pasture bit [?]  
one small vice  
21 li of chalke  
halfe a pound of black lead  
3 axes  
one lave iron for the Couper [?]  
one great playne iron [for a cooper's jointer?] one spokeshave and one tap bit  
a hook bill

2 fromwards [froes]  
2 sawes  
a Coops [cooper's] knife  
one holdfast  
12 plaine irons  
one payr of pinsers  
a rubbinge skin [a fish skin for smoothing wood?] ]  
4 skins for aprons  
9 piercer bits [drill bits]  
8 planinge irons  
one piercer stocke [a "brace" for use with piercer bits]  
2 rabbet plaines  
12 skins for aprons  
for bags to put nayles in  
2 melting ladles  
a compas, sawe, 2 chesils & a gouge  
small tooles for the Cooper  
a payr of scrues of his [Ferdinando Yate] wch he lent for the vse [use? vise?] about the ship at Tatcombe  
30 spades  
2 felling axes  
one hatchet  
2 li of wyer  
a Carpenters hammer  
2 small howes [howels used by coopers to shape the surface of barrels into which the croze groove was cut]  
six awles  
To William Peirse for a longe howe & axe helved [handled]  
To Humfry Plant for a longe sawe. vs [with?] tiller wrest compasses squire line & reele  
8 felling axes (besides 2 payd for by Richard Partridge) there [made in the forest of Deane]  
Payd the det for lodginge and dyet to Eliz Hibbert of Gatcomb who detayned a rug & 2 axes  
Payd Willm Clement for the releife of his wife in his absence and for redemption of his tooles that were pawned  
Payd to Thomas Coopy upon an agreemt made at Stoke 7 September, a Smyth Carpenter & Turner  
To Humphry Plant Carpenter & Sawyer for his 3 years wages beforehand to pay

his dets  
To Richard Godfry of London Joyner upon a Composicon with him made  
Payd for 4 squaringe axes bought in Wotton by Walter Coopy

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