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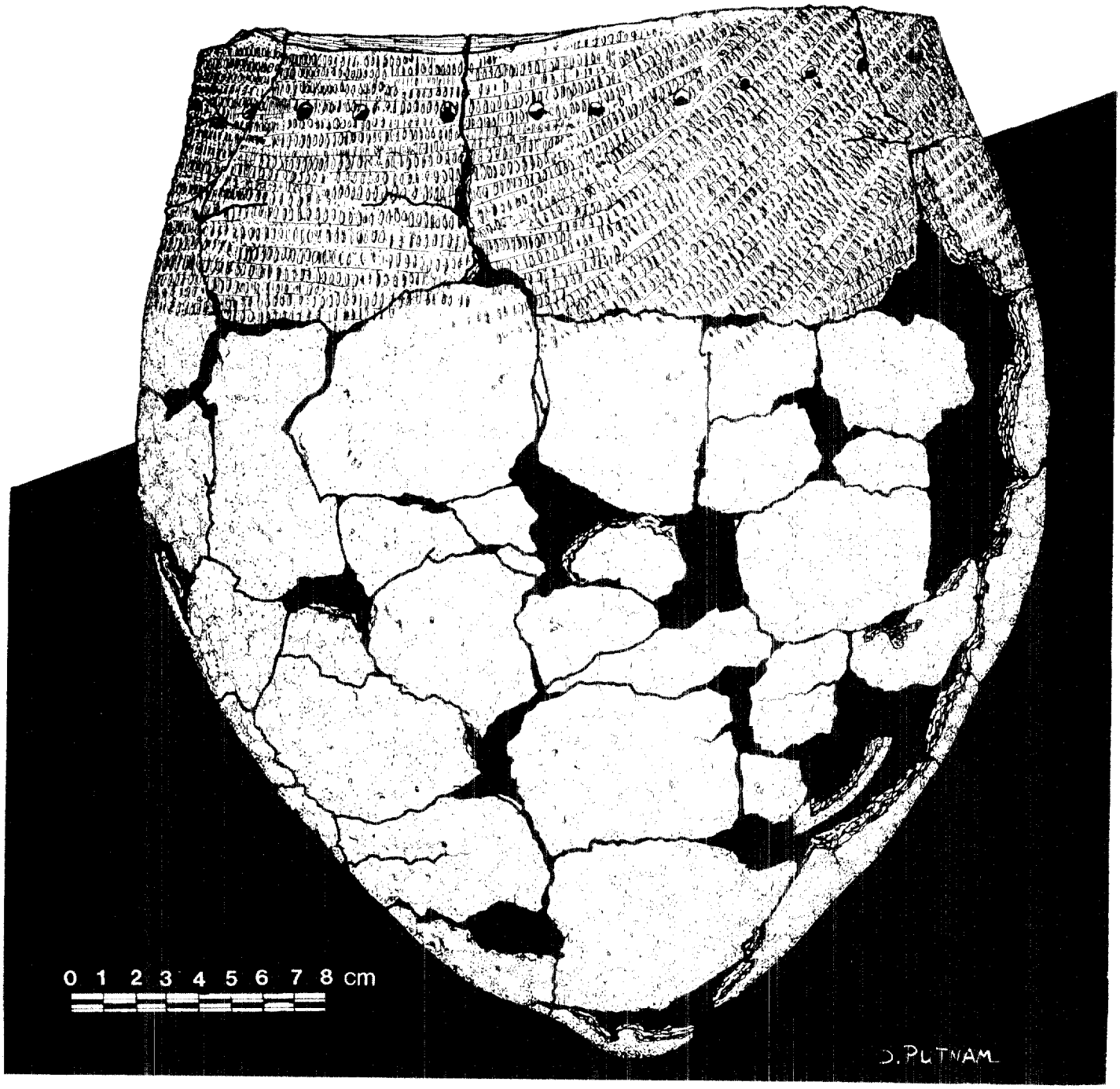

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THE MAINE ARCHAEOLOGICAL SOCIETY BULLETIN

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LETTER FROM THE PRESIDENT

1986 marks the 31st year of existence for the Maine Archaeological Society, Incorporated. We can be proud of the contributions our members have made in preserving Maine's rich archaeological record. We can also be proud of the role the Society has played in fostering the cooperative spirit that exists between the amateur and professional in Maine. This cannot be said in many states.

While we can take solid satisfaction in our Society's achievements, we cannot become complacent given the challenges, both natural and man-made, that threaten Maine's archaeological resources. The future will test our ingenuity and determination.

Our main goal remains the preservation of our archaeological resources wherever and whenever possible. We must maintain our cooperative and forth-coming relations with all. We can make no lasting contributions if we lose sight of these two important efforts. There are too many examples, even in Maine, of thoughtless individuals pillaging irreplacceable archaeological sites for the misguided purpose of enlarging a personal collection, or sale to the highest bidder. We cannot tolerate this kind of profiteering vandalism.

We must also continue the important work of public education with high quality meetings and our excellent Bulletin. For many, our meetings and Bulletin are the only connection with Maine archaeology and we must continue to meet the high standards set by our predecessors. They, and future generations, depend on us to do these things and do them well. I have every confidence that we are up to the work.

Best wishes for 1986

David S. Cook

AN ABORIGINAL CERAMIC VESSEL FROM ANDROSCOGGIN LAKE, ANDROSCOGGIN COUNTY, MAINE

by
James B. Petersen
and
Ron Newcomb

UNIVERSITY OF MAINE AT FARMINGTON

INTRODUCTION

In October, 1983, Mr. Ron Newcomb and his son, Dana, recovered a fragmentary, but largely complete aboriginal ceramic vessel from near the outlet of Androscoggin Lake in the Town of Leeds, Androscoggin County, Maine. This vessel remained uncleaned and unrestored until the autumn of 1985 when Ron Newcomb enrolled in an archaeology course taught by Petersen at the University of Maine at Farmington. Newcomb subsequently loaned the bulk of the then still unrestored shreds and fragments from the vessel to Petersen for detailed technological and stylistic analysis as an important supplement to the latter's ongoing study of aboriginal ceramic and fiber industries from Maine (Petersen n.d.; Petersen and Hamilton 1984; Petersen et al. 1984). Following attribution of the vessel to the late Middle Woodland (Ceramic period, ca. A.D. 650 to A.D. 1050 and assurance that much of the original vessel was present, Newcomb decided to attempt its restoration. The present paper contains background information, an account of the restoration by Newcomb and a relatively complete description of the vessel by Petersen and Newcomb (see Fig. 1 and journal cover illustration). Although this vessel will be included in a corpus of more than 900 vessels from Maine to be described by Petersen (n.d.), a rather lengthy description is included to provide a general format for other such analyses. It should be further noted that such finds are relatively rare in Maine (e.g., Feher 1972; Petersen n.d.; Smith 1926) and elsewhere in northeastern North America (e.g., Davis 1974; Howes 1960a; Levesque 1962; McIntosh 1908; Petersen and Burt 1985; Willoughby 1909, 1935).

BACKGROUND

The Newcombs recovered the vessel described here from near the outlet of Androscoggin Lake during the excavation of several small test pits at a previously known archaeological site. This site has been since designated the Newcomb site, or ME 36-5 in the Maine site survey files maintained by the Maine Historic Preservation Commission. The ceramic remains, including about 100 sherds and fragments, lay in a tight concentration about 45-50 cm below modern ground surface in sandy sediment. This spot is some 15-20 m from the current lake shore and generally near the lake's outlet, the Dead River. Several dozen other sherds, attributable to a second much less complete vessel, were recovered in association with a hearth feature and calcined faunal remains and lithic debitage in the same general area, but distinct from the more complete vessel. Little else will be mentioned about the setting of the site, or its cultural content pending continued investigation there.

VESSEL RECONSTRUCTION

An initial reconstruction of the ceramic vessel was attempted by Newcomb. This reconstruction was not entirely successful, however, since complete closure of several restored sections was not possible due to the inherent difficulty of maintaining the proper vessel curvature while assembling and glueing the sherds one at a time. This first reconstruction took about 60 hours.

A second attempt using a different technique proved more successful. This involved first making a vertical cross section template of the interior vessel

Fig. 1. Aboriginal Ceramic Vessel from ME 36-5. Vessel is 29 cm and 32 cm in maximum diameter and height, respectively.

cavity using information derived from the initial reconstruction. The template permitted the subsequent construction of a form upon which the vessel could be rebuilt. Two plywood sections were modeled after the template and notched to allow their intersection perpendicular to one another. This set of interlocking sections, made complete with break away cuts, then provided a foundation over which rigid styrofoam pieces were applied. Further shaping of the form was achieved with the addition of insulalting styrofoam applied from an aerosol container. Once cured, the foam was easily shaped with a knife following the contour of the interlocking plywood foundation.

Before the second reconstruction was attempted, it was necessary to disassemble most of the sherds to correct the improper curvature of the first reconstruction. A commercial hot air "gun" was used to carefully heat the glued seams and remove each sherd individually. Then the second reconstruction commenced, starting with the vessel in an inverted position, that is with the lip surface around the rim placed upon a flat surface. Rim sections were refitted around the form, with the addition of modeling clay to the form so that all pieces could be refitted prior to the application of any glue. Likewise, modeling clay was used to "shim" several rim sections to account for irregularities in the lip surface.

Individual sherds were temporarily held in place during this reconstruction through the use of fine nails and washers which could be carefully pushed into the foam and clay form. Once all the sherds had been assembled over the form, each was carefully reglued to the others using a relatively quick setting (five minute) epoxy. Three vertical seams were left unglued so that the form could be easily extricated and once this was achieved, the vessel sections were finally glued using a slow setting epoxy. Several long rubber bands were used to support the vessel while the slower setting glue cured. An additional 55 hours were expended in the second reconstruction, for a total of 115 hours.

ANALYTICAL PROCEDURES

The Newcomb ceramic vessel was analyzed using methods meant to maximize attribute variability as employed in other northeastern ceramic analyses (e.g. Dincauze 1975; Hamilton and Yesner 1985; Kenyon 1982; Petersen 1980, various). Definition of ceramic attributes can be found in several of these previous studies and discussion of perishable fiber attributes can be found in several of these and other studies (e.g., Adovasio 1977; Doyle et al. 1982; Hurley 1979; Petersen and Power 1983). Color determinations were made with Munsell Soil Color Charts and a binocular microscope (10-25X) was utilized in the examination of temper, paste and perishable fiber attributes.

DESCRIPTION

CONSTRUCTION AND FORM

Temper

Grit temper is quite apparent in all sherds and fragments of this vessel, including predominant feldspar as well as quartz and muscovite mica. The source of these materials was apparently "rotten" granite, which is a typical source of temper for most area and temporal periods in New England prehistory. The largest observable fragment of grit is about 8.60 mm in maximum size, but most are about 1.0-2.0 mm in size and thus classifiable as medium sized (cf. Petersen 1980). The total percentage of grit seems to be about 30 to 40% of the paste.

Texture

The paste is fine bodied and was moderately to well consolidated during manufacture. Some of the grit temper fragments are extrusive, having produced fine star-shaped fractures during the course of drying and firing. Blocky angular fractures are most typical of the broken edges and thus permitted Ron Newcomb's reconstruction. However, some platey fractures or spalling are also present,

particularly on the interior surface, which apparently reflect a relatively low firing temperature and incomplete fusion of the clay particles.

Method of Manufacture

The mode of manufacture was clearly coiling on the basis of many obvious coil fractures. A simple U-shaped cross section was evident in some cases, indicating that the coils were simply stacked one atop another. Coil diameter was variable due to differential compaction during manufacture, but ranged from 8.70 to 11.80 mm in thickness and 11.60 to 12.80 mm in height. Subtle surface irregularities on the interior seemingly indicate that the potter supported the interior with her (his?) hand during manufacture.

Surface Finish

The interior, lip and exterior surfaces were given like treatment during the process of surface finishing, which was undertaken to better consolidate the individual clay coils and to drive excess water from the vessel. All surfaces were smoothed, with evidence of fine striations present on both the exterior and particularly the interior, documenting that a soft yielding tool (e.g., a leather pad) had been applied to the surfaces while the vessel was leather hard.

Form

Overall vessel form is cylindrical with a slightly incurvate rim in comparison with the maximum diameter, which lies just above the midpoint on the vertical axis of the vessel. The base is clearly conoidal and the body is slightly to moderately globular depending upon the angle from which the vessel is viewed. This vessel appears rather elongate, with a width/height ratio of about 0.88, which puts it at the tall end of the range of cooking vessel forms as known from a recent ethnographic survey (Henrickson and McDonald 1983:631). This form is analogous to other quite rare examples of extant northeastern aboriginal ceramic vessels, or reconstructions thereof (see, in particular, Clermont and Chapdelaine 1982: Figs 12 & 15; McIntosh 1908: Plate 4; Petersen and Power 1985: Figs 3 & 4; Smith 1926: Figs 7-13; Willoughby 1935: Fig 109).

The incurvate to slightly incurvate rim has an irregular lip which is best classified as rounded. In places, the lip appears thickened as the result of firm application of the decoration tool. It should be noted that the rim proper would be classified as slightly excurvate if the neck and body portions were not present, as is most often the case in the study of fragmentary northeastern aboriginal ceramic vessels.

Color

Color attributes were apparently affected by conditions of firing and usage and to a lesser degree, conditions of preservation. Much of the exterior surface is best characterized as brown in color, Munsell 7.5YR5/4, but ranges to dark gray, Munsell 7.5YR4/0 and even black, Munsell 7.5YR2/0, where firing clouds and carbon are present, respectively. The exterior carbon deposits are largely confined to uppermost, decorated portion of the vessel. The interior surface is generally dark gray, Munsell 10YR4/1, ranging to black, 10YR2/0, where heavy carbon deposits are present. These are likely burned food residue, giving evidence of use of the vessel as a cooking pot. A sharply graded core, as seen in cross section of various sherds, is dark gray 10YR4/1, which, in conjunction with other attributes, indicates that the vessel was fired in a reduced environment (that is, oxygen poor) and quickly cooled after firing (Rye 1981: 115-116).

Metric Data

Lip thickness:	10.80 to 14.35 mm
1 cm below lip thickness	10.20 to 11.10 mm
Neck thickness:	10.30 to 13.35 mm
Body thickness:	8.65 to 13.30 mm
Basal thickness:	13.30 to 13.65 mm
Oral diameter:	22.5 cm

Maximum diameter:	29 cm
Vessel height:	32 cm
Vessel capacity:	7.6 liters (2.0 gallons)

DECORATION

Decoration Tool

Two distinctive tools were used in the decoration of the Newcomb vessel: a cord-wrapped "stick" (cws) implement and an irregular ovalish to circular punctate stamp. The first of these, the cws tool, was reconstructed with the use of modeling clay to produce a positive cast of the original implement. Careful analysis of this cast revealed that fine diameter, 1.30 to 1.40 mm, cordage, composed of two Z spun plys with a final S twist, had been S wrapped around a foundation of unknown size and type. The cord-wrapped "stick" designation has been used as a semantic convention, however, because of the obviously rigid nature of the foundation as seen in the individual tool impressions. The cws tool was at least 50.0 mm in total length and may have been as long as 70.0 mm. The cws tool form has important temporal significance in the span of northeastern aboriginal prehistory, a matter which will be discussed at greater length below.

The punctate tool likewise can be related to a category of decoration tools generally labeled as "circular" punctate implements. The present specimen is atypically irregular, varying from ovalish to round in shape. As based on a clay reconstruction, the tool was clearly manufactured from an irregular shaped and incompletely worked fragment of wood; this latter assessment is based on the clear evidence of wood grain in the positive clay cast of the tool. The punctate tool is about 5.80 mm in maximum dimension.

Technique of Application

A series of approximately linear impressions (or elements) was applied to the ceramic vessel with a form of simple vertical stamping. That is, individual elements in the decoration zone were applied with a straight on stamping motion, or roughly perpendicular to the vessel surface. As many as 180 cws elements and 20 punctate elements were thus produced on the exterior vessel surface alone.

Motif

The predominant form of decoration is cws impression, with numerous discrete and occasionally overlapping cws elements covering the lip and upper 1/4 of the exterior surface. No decoration of any sort is present on the interior surface. Cws elements are present with a left oblique transverse orientation across the lip. On the exterior surface one broad zone of cws elements extends from about 4.0 mm to 71.0(-81.0) mm below the lip. This zone is composed of about 18 parallel horizontal cws elements around most of the vessel circumference along with a restricted portion of right oblique cws elements (see Fig. 1 and journal cover illustration). A secondary form of decoration, punctations, overlies the cws elements in a single horizontal line at 16.4 to 22.6 mm below the lip around the exterior circumference. The punctations are as deep as 8.70 mm and are spaced from about 18.0 to 25.0 mm apart.

REPAIR

Four "repair" holes are evident on the body of the vessel. Each hole is conical and steeply tapered from the exterior surface towards the interior, with a maximum outer diameter of 9.5 mm and an inner diameter of 3.25 to 4.0 mm. These were quite obviously produced (drilled?) after the vessel had been fired on the basis of the irregular margins of each hole and the spalling on the interior where each penetrated that surface. The presence of such repair holes indicates that the vessel had been damaged, presumably cracked, and then apparently reinforced with some sort of lashing through the holes. Here we see an effort to extend its use-life, or what might be called "curation" in that someone was not willing to simply discard it after it developed

one or more cracks. It seems likely that it was ultimately abanoned at Androscoggin Lake only after it could no longer be repaired.

EXTERNAL CORRELATIONS

As noted elsewhere (Petersen and Burt 1985:6-8), the relationships of a single ceramic vessel are difficult to assess with much certainty. However, these bear some consideration, especially since such complete vessels are quite rare in local Maine and broader regional contexts.

In terms of a newly developed, but largely unpublished aboriginal ceramic chronological sequence for Maine, the present vessel seems easily attributable to ceramic subperiod 4, ca. A.D. 650 to A.D. 1050, on the basis of the full set of observed attributes (Petersen n.d.; Petersen et al 1984). This subperiod equates with what some might call the late Middle Ceramic period here in Maine and the Maritimes (cf. Sanger 1974, 1979), or the late to terminal Middle Woodland period elsewhere in the broad Northeast (e.g., Petersen and Power 1983, 1985; Ritchie 1965; Ritchie and Funk 1973). The justification for such an assignment follows.

Detailed comparison of the Newcomb vessel shows broad similarities with other cws and punctate decorated ceramics all across the Great Lakes-St. Lawrence River drainage in the period from ca. A.D. 600 to A.D. 1200, or thereabouts (e.g., Fitting 1978). More specifically, the particular combination of attributes, including the use of relatively coarse cws, "circular" punctate and the cylindrical conoidal vessel form, shows more precise correspondence with the early to middle portion of this temperal range with dates as cited above. Although numerous examples of generally similar ceramics have been recovered in Maine (e.g., Bourque 1971; Bourque and Cox 1981; Dunn 1960; Feher 1976; Hamilton and Yesner 1985; Howes 1960b; Rice 1976; Sanger et al. 1980; Smith 1926; Varney 1971; Will 1979; Willoughby 1909, 1935) and in the broader Northeast (e.g., Childs 1984; Clermont and Chapdelaine 1982; Davis 1978; Deal 1985a, 1985b; Kenyon 1982; Leudtke 1985; Petersen et al. 1985; Ritchie 1969; Smith and Wintemberg 1929), few of these are from well understood, dated and fully described contexts. Among the few better understood contexts, cws and punctate decoration are often found in conjunction with shell ("organic") temper (e.g., Allen 1981; Cox 1983; Hamilton and Yesner 1985; Leudtke 1985; Ritchie 1969) and as such are in most cases younger than grit tempered specimens, including the Newcomb vessel discussed here. This matter has been further confused by the occasional failure of ceramic analysts to successfully differentiate cws from temporally older drag stamped pseudo scallop shell and dentate decoration (e.g., Wright 1967: 115; and possibly Davis 1978; Foulkes 1980, for example). In the latter case, recognition of this problem would enable dismissal of a series of dates on putative cws decoration from the Maritimes which seem anomolously early by 400 to 500 years. This matter remains to be solved with future researcher cooperation and consultation, however.

More secure associations for the combination of cws and punctate decoration with grit temper include several in Maine and adjoining areas. Bourque's research on the central Maine coast established the presence of both grit and shell temper with cws and punctate decoration in "Grindle" ware between ca. A.D. 860 and A.D. 1200, with the well founded suspicion that grit temper may have largely preceded the use of shell temper (Bourque 1971: 201-202). A similar combination of attributes can be observed in ceramics from the Fernald Point site where they were dated between A.D. 845 ± 70 and A.D. 1310 ± 120 (Sanger et al. 1980: 56-58). A single date of A.D. 1235 ± 110 from the Goddard site (Bourque and Cox 1981) seems to well fix the more recent end of the suspected temporal range for such ceramics, whereas a date of A.D. 640 ± 90 from the Great Moshier Island A site seems to place the older end of the range (Hamilton and Yesner 1985). A variety of other examples from Maine and the Maritimes (e.g., Allen 1981;

Byers 1979:Table 1; Foulkes 1980, see Table 11) also corroborate this temporal range from about A.D. 600 to A.D. 1200. It should be emphasized, however, that it is difficult if not impossible to ascertain in all cases when and where grit temper occurred with both cws and punctate decoration in dated contexts due to the preliminary nature of most publications.

One final context deserves mention in this discussion in that it produced ceramics virtually identical to the Newcomb vessel. The Winooski site in western Vermont produced numerous comparable examples (some with punctation) in Cultural Level I dated to A.D. 850 ± 135, A.D. 900 ± 125 and A.D. 1065 ± 130. Fewer examples (nearly all with punctations) were dated in Cultural Level II to A.D. 655 ± 150, A.D. 725 ± 135 and A.D. 750 ± 130 at Winooski (Petersen and Power 1983, 1985).

In sum, it seems apparent that the Newcomb ceramic vessel is attributable to a period of manufacture sometime between about 1300 to 750 years ago, or ca. A.D. 650 to A.D. 1200. We have offered a brief outline of what are considerably more complicated reasons for suspecting manufacture towards the earlier end of that range, ca. A.D. 650 to A.D. 1050. The Newcomb vessel is significant for a variety of reasons, not the least of which is the fact that it provides a rare example of an essentially complete aboriginal vessel form. It further demonstrates the well-controlled nature of aboriginal ceramic manufacture, the relatively complicated nature of the stylistic motif (with over two hundred elements), and some degree of curation in the presence of repair holes. Although little mentioned here, the presence of S twist cordage (cws) decoration on this and another more fragmentary vessel from the Newcomb site again provide substantiation of a notable distinction in fiber perishable industries between "interior" and "coastal" sites in Maine over much the span of the Ceramic (Woodland) period. This is a pattern of technological and social differentiation, previously recognized by the senior author and other colleagues (e.g., Doyle et al. 1982; Petersen and Hamilton 1984; Petersen et al. 1984), which awaits further attention, description and interpretation.

REFERENCES CITED

Advasio, James M.
1977 Basketry Technology. Aldine Manuals on Archaeology. Chicago.

Allen, Patricia M.
1981 The Oxbow Site: Chronology and Prehistory in Northeastern New Brunswick. New Brunswick Manuscripts in Archaeology Series 2, No. 1. New Brunswick Historical Resources Administration, Frederickton.

Bourque, Bruce J.
1971 Prehistory of the Central Maine Coast. Unpublished PhD. Dissertation. Department of Anthropology, Harvard University.

Bourque, Bruce J. and Steven L. Cox
1981 Maine State Museum Investigation of the Goddard Site, 1979. Man in the Northeast 22:3-27

Byers, Douglas S.
1979 The Nevin Shellheap: Burials and Observations. Papers of the R.S. Peabody Foundation for Archaeology 9. Phillips Academy, Andover.

Childs, S. Terry
1984 Prehistoric Ceramic Remains. In: Chapters in the Archaeology of Cape Co, I. Vol.2, edited by F.P. McManamon, pp. 195-275. Division of Cultural Resources, North Atlantic Regional Office, National Park Service, Boston.

Clermont, Norman et Claude Chapdelaine
1982 Point-du-Buisson 4: Quarante Siècles d'Archives Oubliées. Recherches Amerindiennes au Quebec, Montreal.

Cox, Steven L.
1983 Blue Hill Bay Survey. Maine Archaeological Society Bulletin 23 (2):21-30.

Davis, Stephen A.
1974 A Complete Indian Vessel from Nova Scotia. Maine Archaeological Society Bulletin 14 (2):4-6.

Davis, Stephen A.
1978 Teacher's Cove: A Prehistoric Site on Passamaquoddy Bay. New Brunswick Archaeology Series 1. Historical Resources Administration, Fredericton.

Deal, Michael
1985a Final Report on the 1983/1984 Excavations at the Mud Lake Stream Site (BkDw5), Southwestern New Brunswick. Manuscripts in Archaeology 15. New Brunswick Historical and Cultural Resources, Fredericton.

Deal, Michael
1985b Diggity (BjDul7): A Ceramic Period Site on Spednic Lake, New Brunswick. Unpublished Report. Archaeology Branch, Dept. of Historical and Cultural Resources, Fredericton.

Dincauze, Dena F.
1975 Ceramic Sherds from the Charles River Basin. Bulletin of the Archaeological Society of Connecticut 39:5-17.

Doyle, Richard A., Nathan D. Hamilton and James B. Petersen
1982 Early Woodland Ceramics and Associated Perishable Industries from Southwestern Maine. Maine Archaeological Society Bulletin 22 (2) :4-21.

Dunn, Gerald C.
1960 The Eel Bridge Site and Its Relationship to the Sebasticook River Route. Bulletin of the Massachusetts Archaeological Society 21 (3+4) :33-38.

Feher, Steve
1972 An Iroquois-Mohawk Type Pot from Maine. Maine Archaeological Society Bulletin 12 (2) :4-6.

Feher, Steve
1976 Some Big Lake Pottery. Maine Archaeological Society Bulletin 16 (2) :7-10.

Fitting, James E.
1978 Regional Cultural Development, 300 B.C. to A.D. 1000. In: Handbook of North American Indians, Vol. 15, Northeast, edited by B.G. Trigger, pp. 44-57. Smithsonian Institution, Washington.

Foulkes, Ellen V.
1980 Fulton Island: A stratified Site in the Saint John River Valley of New Brunswick. Unpublished M.A. Thesis. Department of Anthropology, Trent University.

Hamilton, Nathan D. and David R. Yesner
1985 Early, Middle and Late Woodland Ceramic Assemblages from Great Diamond Island, Casco Bay, Maine. In: Ceramic Analysis in the Northeast: Contributions to Methodology and Culture History, edited by J.B. Petersen. Occasional Publications in Northeastern Anthropology 9 (2) :39-72.

Henrickson, Elizabeth F. and Mary M. A. McDonald
1983 Ceramic Form and Function: An Ethnographic Search and an Archaeological Application. American Anthropologist 85(3):630-643.

Howes, William J.
1960a Iroquoian-Mohawk Pottery of the Champlain Valley Area, Northern Vermont. Bulletin of the Massachusetts Archaeological Society (21 (3+4) :56-60.

Howes, William J.
1960b Maine Coast Pottery, Bulletin of the Massachusetts Archaeological Society 21 (3+4) :54-56.

Hurley, William M.
1979 Prehistoric Cordage: Identification of Impressions on Pottery. Taraxacum, Chicago.

Kenyon, Victoria B.
1982 Middle Woodland Pottery of the Central Merrimack Valley in N.H. New Hampshire Archaeologist 23:103-118.

Levesque, Rene
1962 Les Richesses Archeologiques du Quebec. La Societe D'Archeologie de Sherbrooke, Sherbrooke.

Luedtke, Barbara E.
1985 Regional Variation in Massachusetts Ceramics. Paper presented at the 50th annual meeting of the Society for American Archaeology, Denver.

McIntosh, William
1908 Aboriginal Pottery of New Brunswick. Bulletin of the Natural History Society 6 (2) :110-120.

Petersen, James B.
1980 The Middle Woodland Ceramics of the Winooski Site, A.D. 1-1000. Vermont Archaeological Society New Series, Monograph 1. Burlington.

Petersen, James B.
n.d. Aboriginal Ceramic and Perishable Fiber Industries from Maine: An Investigation of Technology and Social Interaction in the Ceramic Period. In preparation.

Petersen, James B. and Richard L. Burt
1985 An Aboriginal Ceramic Vessel from Chilmark, Dukes County, Massachusetts. Bulletin of the Massachusetts Archaeological Society 46 (1) :1-10.

Petersen, James B. and Nathan D. Hamilton
1984 Early Woodland Ceramic and Perishable Fiber Industries from the Northeast: A Summary and Interpretation. Annals of Carnegie Museum 53 (14) :413-446.

Petersen, James B. and Nathan D. Hamilton (with Laureen LaBar and Mark Hedden)
1984 Perishable Fiber Industries from Northern New England: "Ethnicity" and Technological Traditions during the Woodland (Ceramic) Period. Paper presented at the 49th annual meeting of the Society for American Archaeology, Portland.

Petersen, James B. and Marjory W. Power
1983 The Winooski Site and the Middle Woodland Period in the Northeast. Report submitted to Interagency Archaeological Services, National Park Service, Philadelphia. Department of Anthropology, University of Vermont, Burlington.

Petersen, James B. and Marjory W. Power
1985 Three Middle Woodland Ceramic Assemblages from the Winooski Site. In: Ceramic Analysis in the Northeast: Contributions to Methodology and Culture History, edited by J.B. Petersen. Occasional Publications in Northeastern Anthropology 9 (2) : 109-159.

Petersen, James B., Jack A. Wolford, Nathan D. Hamilton, Laureen LaBar and Michael Heckenberger
1985a Archaeological Investigations in the Shelburne Pond Locality, Chittenden County, Vermont. Annals of Carnegie Museum 54 (2) :23-75.

Rice, Marshall
1976 Deer Isle Ceramics, Maine Archaeological Society Bulletin 16 (2) :11-13.

Ritchie, William A.
1965 The Archaeology of New York State. Natural History Press, New York.

Ritchie, William A.
1969 The Archaeology of Martha's Vineyard. Natural History Press, New York.

Ritchie, William A. and Robert E. Funk
1973 Aboriginal Settlement Patterns in the Northeast. New York State Museum and Science Service Memoir 20. Albany.

Rye, Owen S.
1981 Pottery Technology: Principles and Reconstruction. Taraxacum, Washington.

Sanger, David
1974 Recent Meetings on Maine-Maritimes Archaeology: A Synthesis. Man in the Northeast 7:128-129.

Sanger, David
1979 The Ceramic Period in Maine. In: Discovering Maine's Archaeological Heritage, Maine Historic Preservation Commission, Augusta.

Sanger, David, B. Johnson, J. McCormick and M. Sorg
1980 Archaeological Salvage and Test Excavations, Fernald Point, Acadia National Park, Maine. Report submitted to the National Park Service, Denver Service Center, Denver. Department of Anthropology, University of Maine, Orono.

Smith, Harlan I. and W. J. Wintemberg
1929 Some Shell-heaps in Nova Scotia. National Museum of Canada Bulletin 47. Ottawa.

Smith, Walter B.
1926 Archaic Pottery of the Penobscot River. In: Indian Remains of the Penobscot Valley and Their Significance. University of Maine Studies, Second Series 7:19-29. University Press, Orono.

Varney, Lloyd H.
1971 A Blue Hill Bay Coastal Midden Site. Maine Archaeological Society Bulletin 11 (1) :14-32.

Will, Richard
1979 Prehistoric Pottery from Two Maine Sites. Maine Archaeological Society Bulletin 19 (2) :31-41.

Willoughby, Charles C.
1909 Pottery of the New England Indians. In: Putnam Anniversary Volume, Anthropological Essays Presented to Frederic Ward Putnam, pp. 83-101. G.E. Steichert & Co., New York.

Willoughby, Charles C.
1935 Antiquities of the New England Indians. Peabody Museum of American Archaeology and Ethnology, Harvard University, Cambridge.

Wright, James V.
1967 The Laurel Tradition and the Middle Woodland Period. National Museums of Canada Bulletin 217. Ottawa.

THE FORT HILL SITE: A STUDY IN FRONTIER EVOLUTION IN SOUTHERN MAINE

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ABSTRACT

The "second settlement" of Maine took place during the mid-eighteenth century after the French and Indians had nearly obliterated the first attempt. For a brief period (circa 1744-1760) the frontier passed through Gorham where settlement and defense were confined to a blockhouse and palisaded fortress on the height of land now known as Fort Hill.

Despite local historical interest and the promise of yeilding information about the evolution of the Northern New England frontier, no scholarly investigation of the Fort Hill site had been initiated before 1973. However, in the summer of that year, mutual academic interests and a practical exercise in a summer field course led to a joint geographical/archaeological venture. Initial goals involved ascertaining the location, function and interrelationships among structural features as well as relating the site to the evolution of the surrounding cultural landscape. The possibility of eventually creating a form of on-site interpretation for the public was also considered.

ACKNOWLEDGEMENTS

Although the author is indebted to the many students and volunteers who participated in the Fort Hill project, particular thanks are due co-initiator, Howard Sargent, of Franklin Pierce College for his inspiration, organization and tutelage in matters archaeological. William Longacre and Leslie Eastman provided valuable assistance in the bone analysis. Thanks are also extended to Dr. Nathan Hamilton, of the University of Southern Maine, who participated in excavation and analysis at the outset and more recently contributed to the editing and graphics, while providing the necessary encouragement to bring this paper to press.

INTRODUCTION

Location and Setting:

The Fort Hill Site (ME-256-3.8) is located at the crest of Gorham, Maine's nighest hill, at an elevation of 97.5 m (320 ft) above msl. It is about 1.5 miles north of the town center and 10 miles west of Portland as the crow flies. It can be found on the Gorham, Maine, 7.5 minute USGS topographic quadrangle at UTM zone 19 coordinates E 0382800 x N 4839200 (Fig. 1).

The site presents a panoramic westward view of the White Mountains of Maine and New Hampshire (Fig. 2). On a clear day Mt. Washington, the highest in the East, and other peaks can be identified. If the view eastward was not obscured by tree growth, much of the coastal plain would be visible and possibly a glimpse of the ocean off Black Point, Scarboro, would appear as it does from buildings on a nearby hill. Also, Anderson Hill in Windham, less than 2 miles distant and the site of another fort in a cordon of forts, would be in range of direct signal communication.

A low stone wall, corresponding to the original town division of 30 acre lots, bounds the south side of the fort lot. A substantial portion of the fort site area was purchased by the town of Gorham in the 1970's, from Norman Martin, a local dairyman, for use as a public park (Fig. 3). Its scenic and historic character attracts many visitors and picnickers.

The lot has been cleared and farmed for hay for as long as residents remember. A 1936 Gorham Bi-Centennial photograph (cf. Johnson 1936: frontispiece) shows the land cleared much as it is today. The adjacent lot, to the south, contains the first town burial ground and the apparent site of the first meeting house (see Fig. 5). Outside of the burial ground,

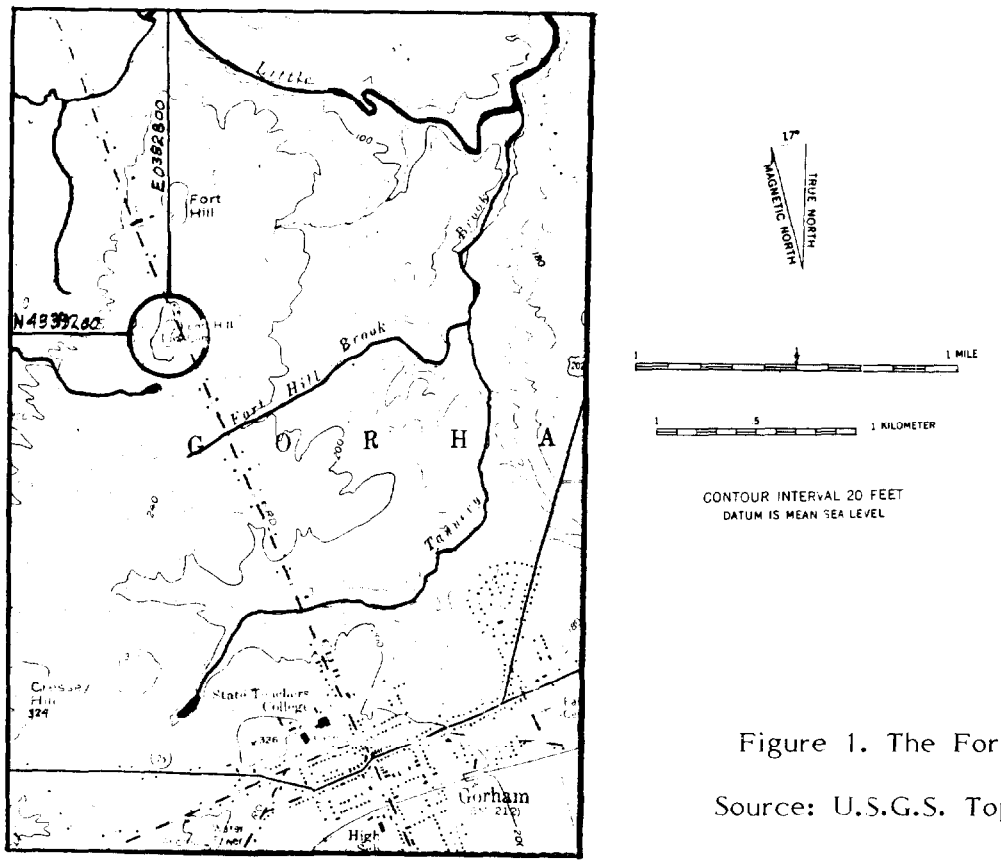


Figure 1. The Fort Hill Site.

Source: U.S.G.S. Topographic Map

the lot is dense with second-growth mixed forest of mostly hardwood less than 50 years old. A European import, the honey locust, is found in large numbers in the woods there.

HISTORICAL BACKGROUND

Town History:

Not infrequently does the distant event have local impact. Thus, a succession of 17th century European wars was reflected in New England as a bitter and bloody struggle between the predominantly English settlers and the French supported native inhabitants that for a time (in the 1690's) nearly wiped out the English roots from Northern New England. But after the Treaty of Utrecht in 1713 that temporarily ended Euporean conflict, wary English settlers slowly returned to the territories they had yielded. This so called "second settlement" differed substantially from that of New England a century earlier, since it was settled by Americans, including many war veterans whose identity with the "old sod" had been eroded considerably by time and environment. Naivete about environmental matters was displaced by hard earned trial and error experience, and the native Indians, when not overtly hostile, were at best deeply distrusted. Religious values were subordinated to secular concerns, primarily economic ones, and only a vestigal trace of the compact nucleated village ideal of the Puritan was evident in the settlement plans. Mutual defense would become the reason for clustering in the first two decades, rather than religious motives.

The town of Gorham came into being largely as the result of some political expedients. Until the time that sufficient numbers settled in Maine, the Crown would consider the province vulnerable to the French and in jeopardy of Indian attack. Furthermore, the fledgling port of Portland (then called Falmouth) would continue to struggle until it acquired a hinterland and Massachusetts, the mother colony, had incurred a debt with its Indian fighters. Since money was dear and land

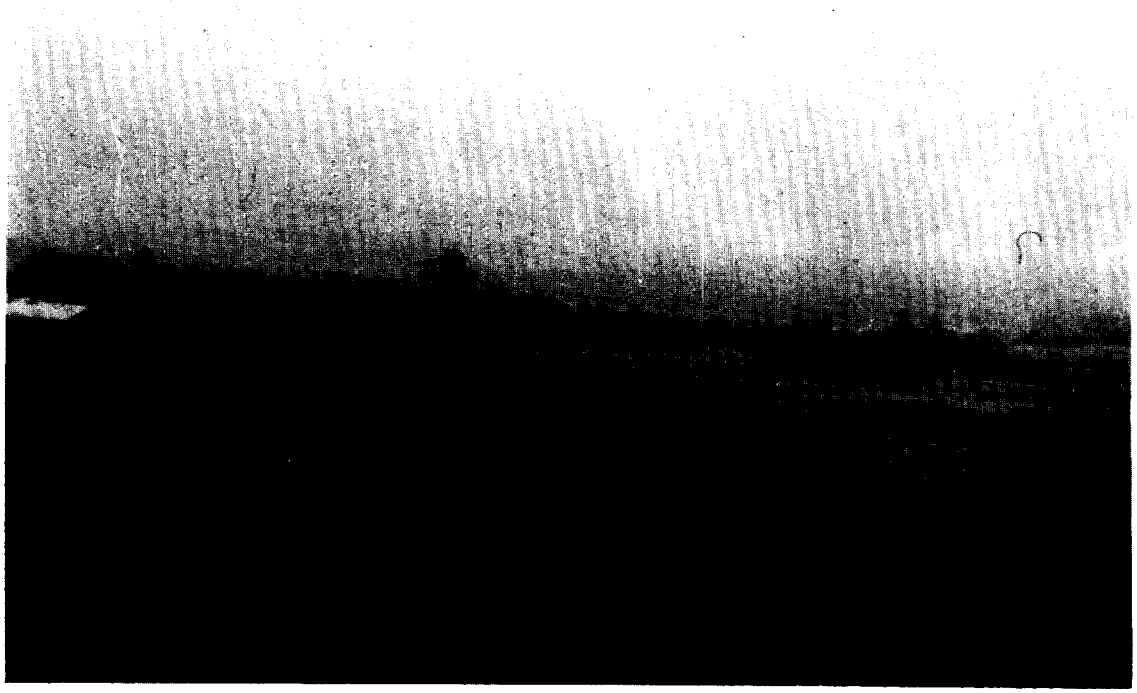


Figure 2. The view from Fort Hill looking west. On a clear day the White Mountains of New Hampshire are visible.

Figure 3. Excavated area is to the upper left of photo, about 150 feet (45 m) from the commerative marker.

available, what more convenient way to reward the veterans of Rhode Island swamp fights than a substantial grant of land on the Northern frontier, where they would play a continuing role in keeping the King's land secure.

The resumption of war in Europe in the 1740's triggered raids by the French and Indians in New England. Governor Shirley, intent on defending Massachusetts' northern interests, commissioned a cordon of forts to be established at what was then the frontier of settlement. The line of forts extended from Northwestern Massachusetts, two miles south of the border (cf. COE 1977) eastward through the Merrimack area and then diagonally across a forty mile stretch of southern Maine, inland from Portland and generally parallel with the trend of the coast.

Gorham was then called Narragansett #7, as it was granted ostensibly to veterans of the Rhode Island wars. Only a diminutive creek, fittingly called the Little River, provided a tenuous connection with Portland. An Indian camp was located just above the head of small boat navigation, and the settlers took to constructing a mill (in 1743) just a few feet downstream at the rapids. The mill was promptly burned by the Indians along with a crude meeting house on the hill, encouraging settlers to hastily erect a fort on the adjacent heights, since called Fort Hill. This was one of the line of forts that formed the defensive perimeter around the immediate coastal area. It could be considered part of an 18th century "Dew (defensive early warning) line" (Fig. 4).

The early settlement plan was linear, running along an Indian trail passing the mill site, uphill to the fort and thence down the south slope where the more favorable exposure encouraged farmsteading.

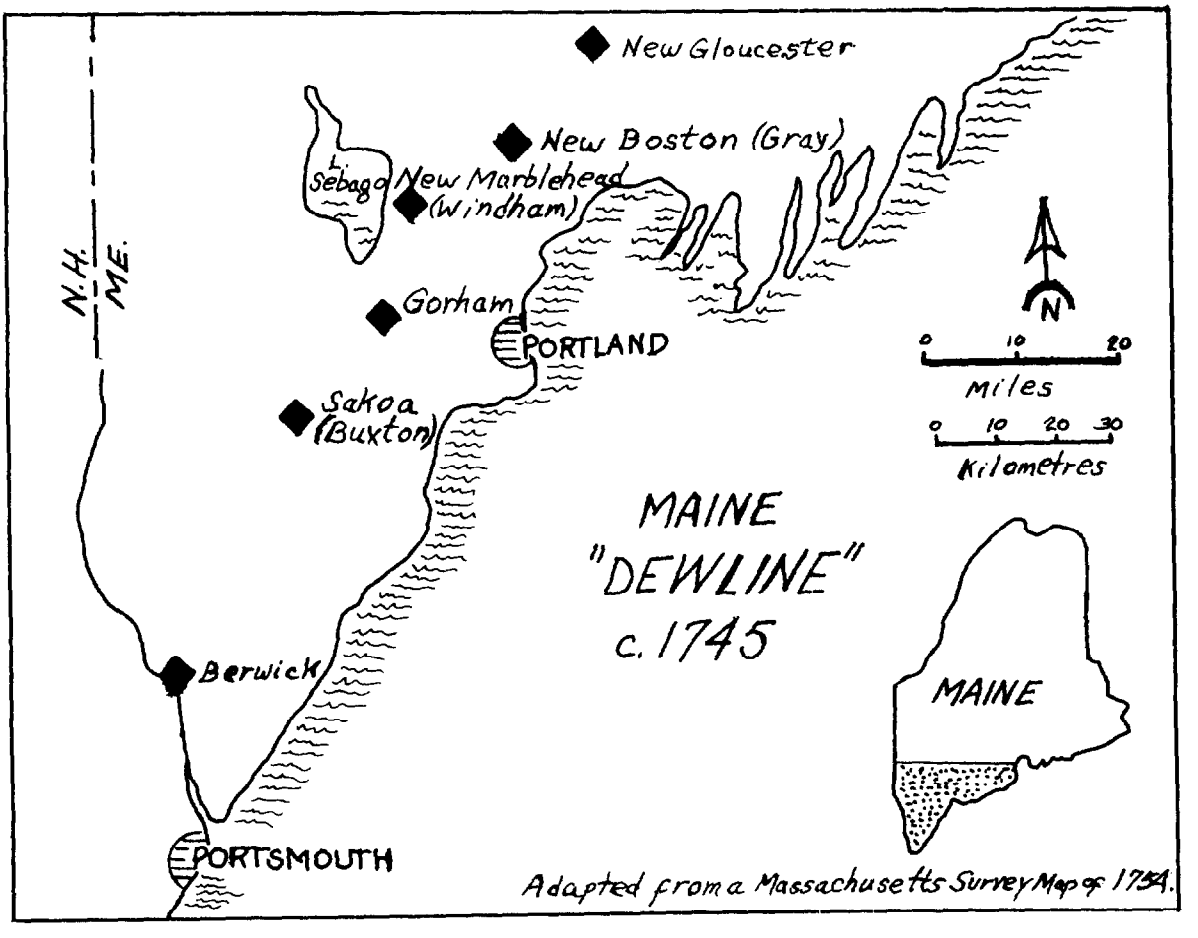


Figure 4. The Maine Cordon of Forts.

The normal proprietor's rights included a 30 acre parcel fronting on the main axis, plus an additional lot of 70 acres well to the north or west, and 100 acres well to the south. Allocation was largely by the drawing of lots, and some common land was provided in deference to the open land tradition. The plat map (Fig. 5) is derived from the prototype town plan (McClellan 1903: 82), with the probable cabin locations of nine of the twelve original families added. The original plots are still visible on a recent air photograph (Fig. 6). The outbreak of war, accompanied by burning of buildings, forced nearly the entire town population into the fort complex. There, ten families and a garrison of eleven Massachusetts soldiers (a total estimated at 60 persons) lived for several years, largely cut off

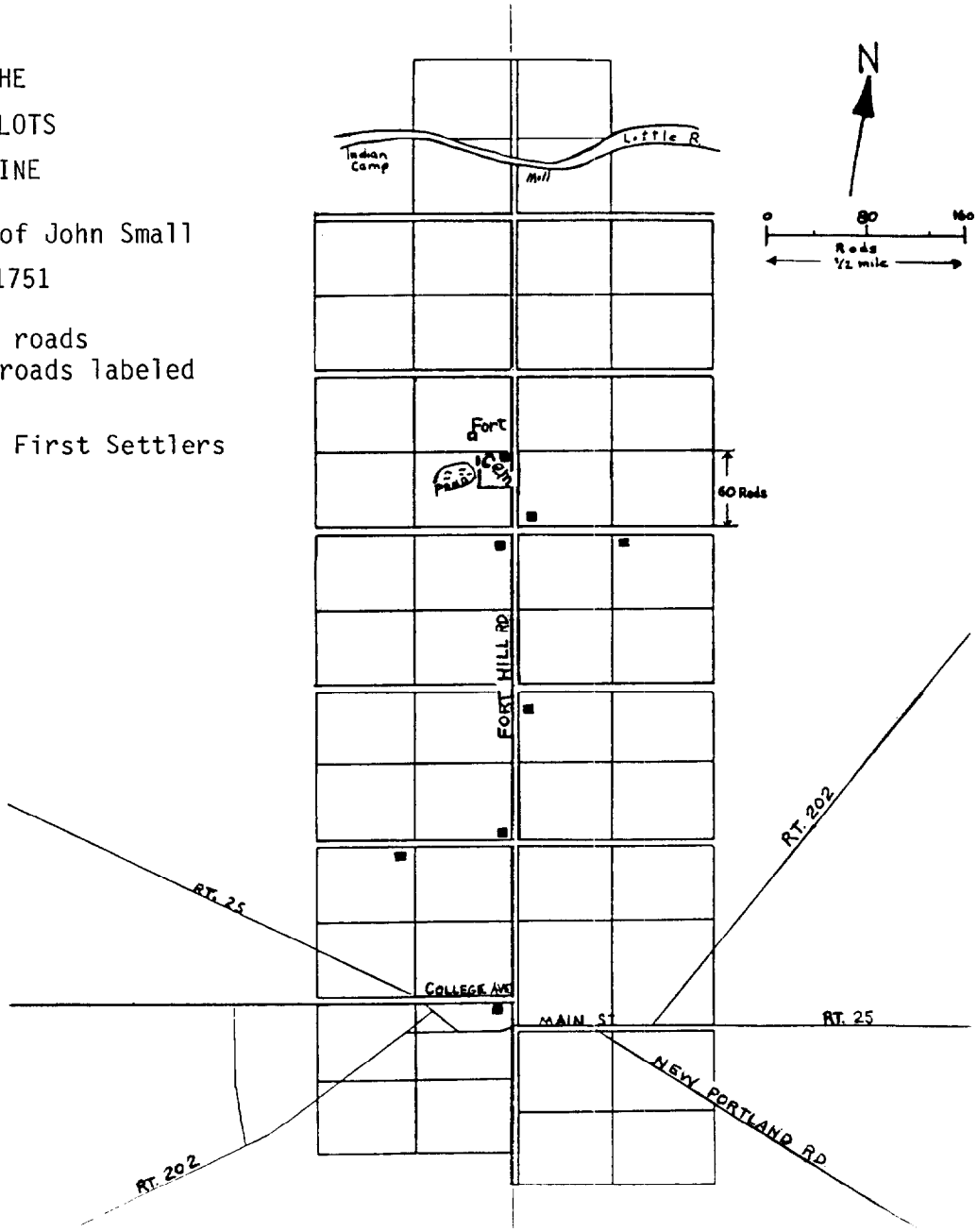
Figure 5.

PLAN OF THE
THIRTY ACRE LOTS
GORHAM, MAINE

From Original of John Small
dated 1751

—— Original roads
Present roads labeled

■ Homes of First Settlers



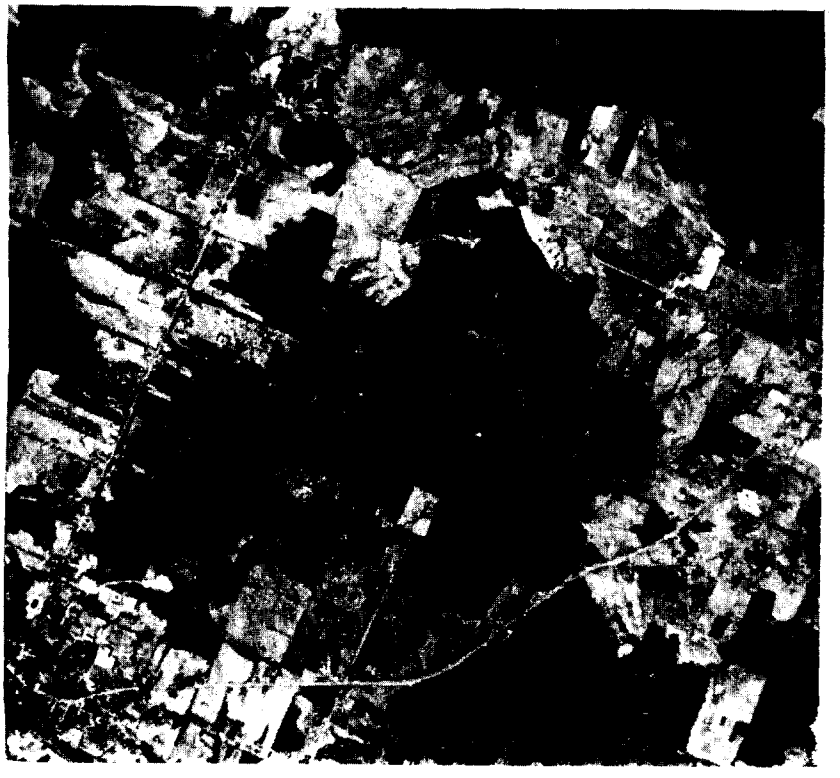


Figure 6. Aerial view of the Fort Hill site. The original 30 acre lots are still apparent. The photo covers about 2 miles from top to bottom.

from outside contact. One family moved on, Another chose to stay in its cabin and was massacred.

The ordeal of Indian raids, isolation and hardship came to an end with the fall of Quebec in 1760. With the coming of peace the frontier rapidly passed over, and Northern New England filled with English subjects who settled the alluvial soils of interfluves that they now perceived as desirable. Thus the densely forested, fertile and flat lands west of Gorham attracted settlers away from Fort Hill to first harvest timber and then to plant the cleared land.

The influx of new settlers made the land safer by virtue of numbers and increased commercial opportunities, a self-perpetuating process. With resultant improvements in transportation, "botton" goods were made available and the wholesale market expanded. Portland had acquired a hinterland, while the need and desire for subsistence living rapidly waned in Gorham and surrounding towns. On and around Fort Hill the level of commercial activity grew as favorable environmental and situational factors led to Gorham becoming the stockyard of the greater Portland area. In the process the fort's military function was rendered obsolete, and even its conversion into a meeting house was short-lived as new transport links caused a shift in the town center. This paper deals with the passing frontier and the economic and cultural changes that resulted, as revealed in the historic, environmental, and archaeological record.

Historical References to Fort Construction:

During the period of 18th century resettlement the "inexpensive, efficient, quickly constructed, and lightly manned... log stockade with blockhouse...replaced the costly stone forts of the earlier Indian wars" (Bradley 1981:13). Unfortunately, contemporary descriptions or sketches of the Gorham Fort are absent except for oblique references in the proprietors' records. Historical accounts based on interpretations of the sparse documentary evidence often conflict, and the "reliable

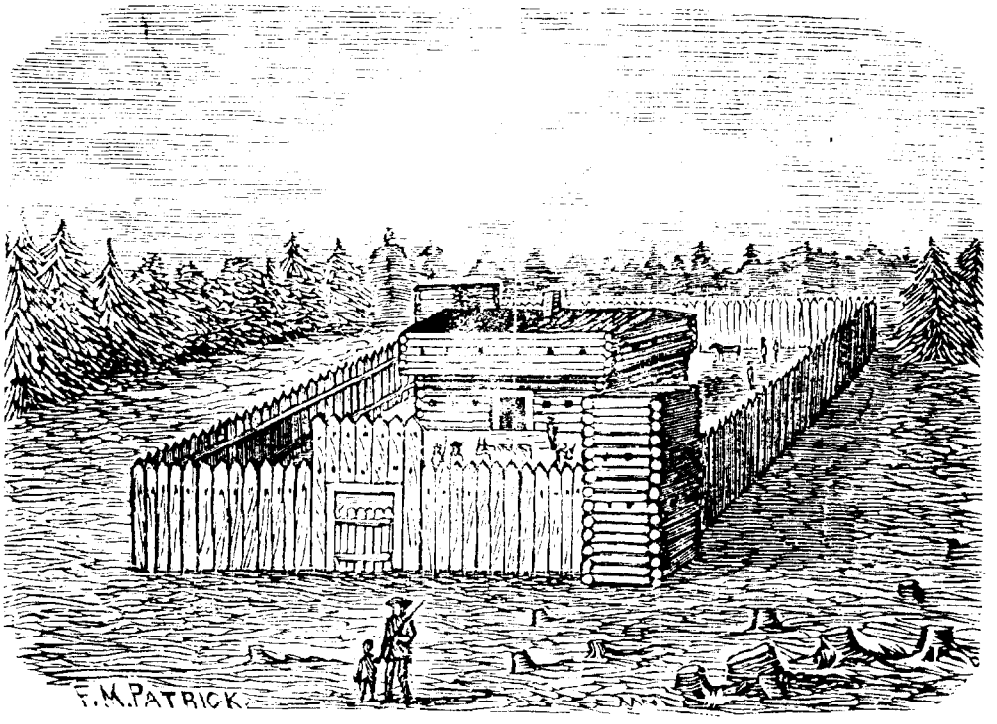
traditions" they invoke are mostly traceable to a romantic novel about Gorham's early years entitled Good Old Times (Kellogg 1877).

A sketch (Fig. 7) and descriptin in the most authoritative account depicts the fort as "an oblong square about 50 feet long...constructed of hewn timber... surrounded by a palisade of heavy timber, set [three feet] in the ground and about 12 feet high, [with] watchtowers (or flankers) at the diagonal corners," on each of which was mounted a "Sixpound swivel cannon" in the mode of the times (McClellan 1903:44-46). Historians further state that the blockhouse had the characteristic second-story overhang and was built of 12 inch squared timbers dovetailed at the ends. These features are reflected in Fort Halifax, a smaller 1754 Maine counterpart that still survives.

The Gorham fort, as well as sister forts in the area, received a £100 appropriation from the Massachusetts government to finance construction, and its use as a home, fort, and church was typical (Table 1). It is tempting, then, to view the forts of the Maine cordon as a standard military design, perhaps based on the then current version of an army training manual. This would have significant archaeological implications.

However, caution is advised since plans, accounts and archaeology suggest that the government, anxious to get the area settled, allowed builders to respond to demands of the site and incorporate their own ideosyncratic ideas.

For example, town records indicate the southeast flanker, at Fort Hill served as a meeting house and place of worship during the war years (see McClellan, 1903:46). This suggests a practice coming into vogue, as seen later at Fort Halifax, that eliminates the need for a central blockhouse (Fig. 8) This would expedite construction as well. The neighboring fort in Buxton took only 20 days to complete (Marshall 1874:47).



FORT, BUILT ON FORT HILL, 1745

Figure 7. An illustrator's rendition of the fort, sketched for McLellan's History of Gorham, 1903.

Table 1. 18th Century Maine Frontier Forts.

Location	Date	Appropriation	Blockhouse/Structures	Stockade (Palisade)	Source
Berwick	1690-1750	£100	Blockhouse	Palisade	Dunnack, H.E.
Falmouth (New Kasco)	1700-1716?			Palisades square (4) corner flankers	Bradley, R.L.
Brunswick (George Fort)	1715-1737	£500/£688 expended	50' Square stone fort	(4) corner bastions	Wheeler, G.A.
Westbrook Stroudwater Sacarappa	1733- ? Repaired 1754		"armed house"	Palisade	Rowe, E.R. McLellan, H.D.
Buxton (Narraganset #1) Salmon Falls	c. 1743- ?		Blockhouse 30'x25'x9' stud		Marshall, J.M.
Pleasant Pt.	1754- ?		Blockhouse 40'x40'	Palisade with (2) flankers	Dunnack, H.E.
Gorham (Narraganset #7)	c. 1744- ?	£100	Blockhouse 50'x50"	Palisade (2) diagonal flankers w/6 lb. swivel guns	McLellan, H.D.
Windham (New Marblehead)	1744- ?	£100	Blockhouse (2) stories 50'x50'	Palisade about 80'x80' (2) diagonal watchboxes with swivel guns	Smith, T.L. Baker, E.W. Dole, F.H.
Gray (New Boston)	1750- ?		Blockhouse 50'x25'	Palisade 100'x75'	Dunnack, H.E.
New Gloucester	1754-1788?		Blockhouse	(2) Swivel guns	Haskell, T.H.
Dresden Ft. Frankfort	1752- ?		Quarters and Storehouse	200'square with diagonal blockhouses	Bradley, R.L.
Augusta Ft. Western	1754- ?		Quarters and Storehouse Two story blockhouses, 20' square	Palisade 160'x62' (2) Blockhouses served as diagonal palisade flankers	North, J.W.
Winslow Ft. Halifax	1755- ?		Two story blockhouses, 20' square	(2) Blockhouses served as diagonal palisade flankers	Fisher, C.E.

Storehouses, barracks, huts, wells, outbuildings, etc. must have been present also, as most of the civilian population was confined there "closely shut up for four years... they remained in the fort seven years" (McClellan 1903:45). The last mention of repairs to the fort appeared in the proprietary records of 1757, and "citizens resolves" of 1773 state "Many of our watchboxes are still in being, the timber of our fort is still to be seen." (Johnson 1936:26). It was apparently still visible in 1836 at the 100th anniversary clebration when..."a body of citizens... visited the site of the old fort, the foundation timbers of which were still to be seen."

RESEARCH PLANS AND PROCEDURES

Research Goals and Plans:

The Fort Hill study began as a routine field survey experience for a USM class in Historical Geography, the objective being to determine the precise location of the fort from morphological, vegetative and other surficial indicators of old culture. After a literature search and consultation with the local historical society failed to confirm a precise location, a single two foot square test pit was excavated. It yielded eighteenth century materials and evidence that the area had been extensively plowed for agriculture. Thus, given the lack of precise knowledge about

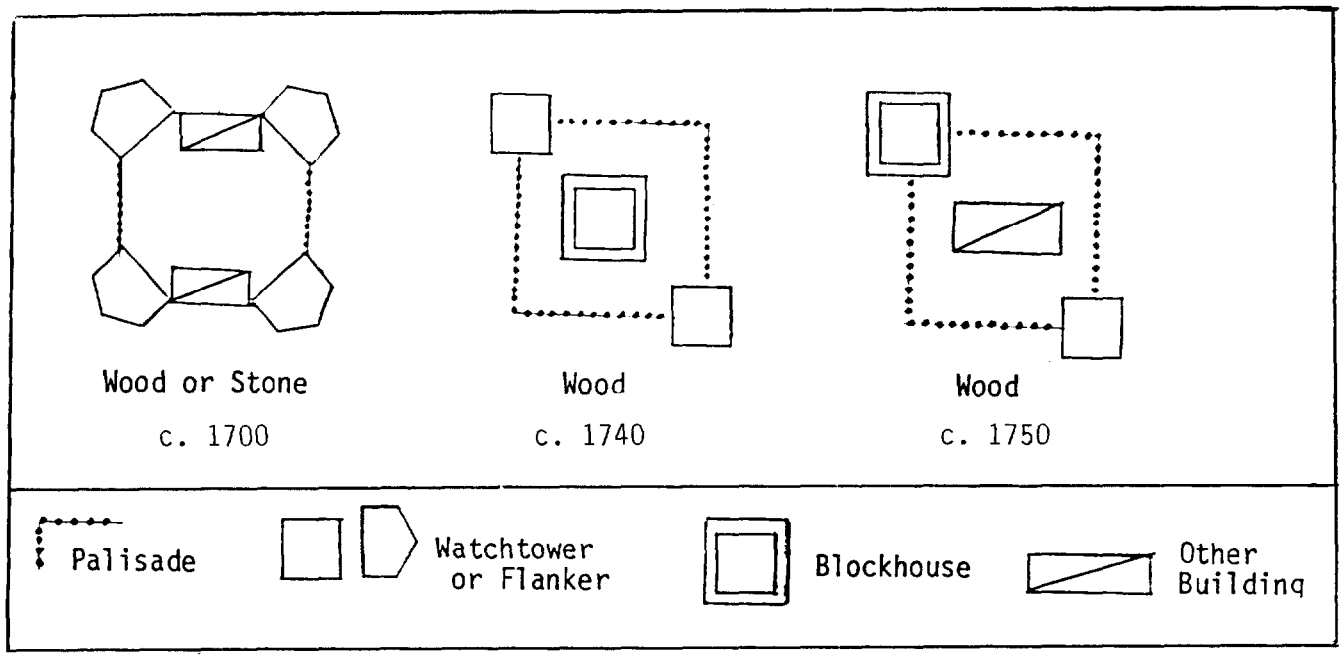


Figure 8. Frontier expediency led to design changes in forts during the 18th century.

the fort or its location and the presumed unstratified nature of much of the site, a plan was devised in which the initial goals were to find the fort and ascertain its structural characteristics. Standard field procedures were employed, with modifications to suit the problem, and a search methodology was developed that could later integrate into the archaeology.

Procedures:

A datum was established by driving a spike into the base of a large tree along the southerly border of lot #2 in the original plat, 60m(196.9 ft) west of the pavement edge of Route 114. It was expected that the archaeology would be confined to the northeast quadrant of northing and easting base lines extended from the datum, so that coordinate values would be positive.

The basic excavation unit would measure one square meter in horizontal dimension and be identified by the southwest corner coordinates. Although metric prevailed, consideration was given to using a 40 inch compromise "metre" that would combine the virtues of near comparability to an international standard with the logic of English measure, a system consistent with the archaeological period and adaptable to the 10 foot blocks frequently used in Anglo-historical archaeology.

After base lines and reference points were laid out by transit and a base map prepared, the initial transect was established 9 meters north of the easting base line. As the search and test procedure led to the uncovering of archaeological features, archaeological excavation commenced in an area 7 x 7 metres overall, divided by 1 metre balks into quadrants, each forming a 3 x 3 metre block (the surrogate for the 10 foot unit). In practice, however, the archaeology dictated the extension of the southerly excavation units by one metre, making them 3 x 4 metre blocks (Fig. 9).

Excavation proceeded by hand troweling after the turf was stripped. All excavated soil was sifted through $\frac{1}{4}$ inch screens and, in the case of a midden unit, washed through window screen and flotation used to recover seeds and small organic remains. Excavated earth was placed near the property lines and clean sand used for backfill.

The excavation progressed by arbitrary 10 cm increments that were in most cases

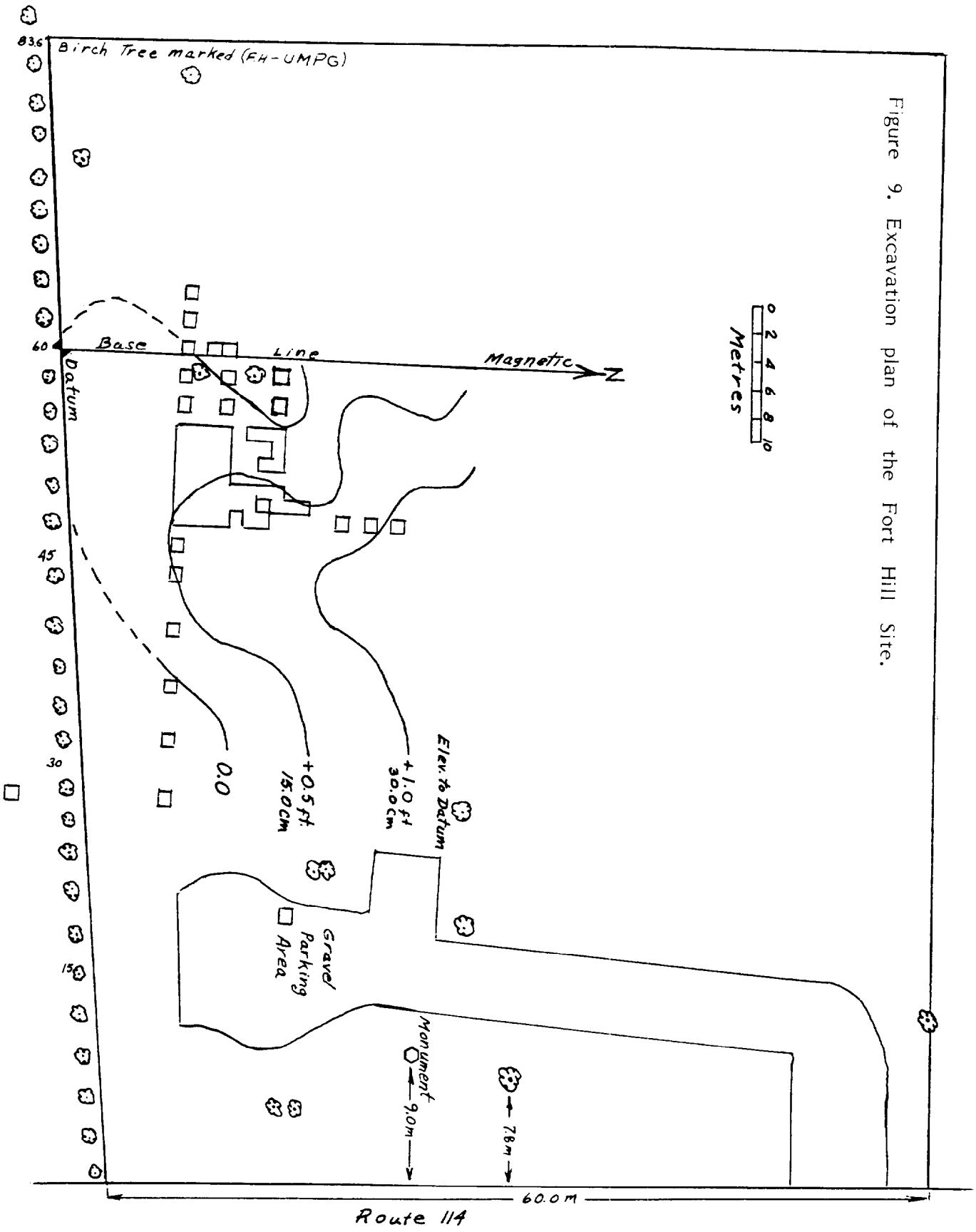


Figure 9. Excavation plan of the Fort Hill Site.

combined into a plow zone level (Stratum 1) which averaged 40 cm in depth. When features were encountered below the plow zone, excavation was by stratigraphic level. Since only two intact features were encountered, the archaeology was divided into the following 4 classes:

Stratum I, Plow zone.---------- 67 units

Stratum II. Hearth----------11 units

Stratum II. Hearth Construction- 9 units

Stratum II. Midden ----------1 unit

(Each unit measures one square meter in horizontal dimension)

Artifacts were processed in the usual manner and recorded by provenience i.e. horizontal control and stratigraphic level. Soil samples were identified by provenience and keyed to stratigraphic profiles. All artifacts, including ceramics, were numbered by provenience, with the exception of brick, window glass, and nails which were identified only when of exceptional size or qualities. Small or fragile materials that could not be numbered were placed in labeled polyethelene bags. Most materials were weighed, a procedure that proved necessary for brick (that often crumbled) and useful in bone and window glass analysis.

A special numbering system was employed at the Fort Hill site, so that each artifact would bear an identification of the provenience. For example, F8.4.H.5 translates as:

F = Fort Hill
8.4 = Northing 8 metres from base line and 4 metres east
H = Hearth level
5 = Artifact number for that unit

Units not falling in the northeast quadrant formed by the baselines were designated by an underline, hence F3.4 would read 3 units south and 4 west of the baselines. At the suggestion of the State Historical Archaeologist, Robert Bradley, the State site number Me 256-3.8 was added to important artifacts.

A separate inventory card was prepared for each provenience unit. It included type and number of artifacts, as well as information on combined weights, size, related and matched pieces. Diagnostic types were sketched and described on the back and special features of the unit plotted on the horizontal plane and in profile.

Preservation of ceramic materials involved only washing and a clear water rinse, but metals presented the usual problems. Several alternative procedures were carried out:

1. Buttons, coins and other non-ferrous materials that yielded detail for analysis and appeared stable received no special treatment other than washing.
2. Most nails were only cleaned, but a few were placed in a blue (reducing) charcoal flame. This stabalized them but at the expense of changing the character of the metal. Thus, others were treated with the remaining iron objects.
3. Cast and wrought iron objects, after preliminary mechanical cleaning with picks, wee subjected to electrolysis and heat drying before coating with paraffin wax.

By agreement, all artifacts are considered the property of the Town of Gorham and are curated and displayed at the Museum of the University of Southern Maine, Gorham Campus.

METHOD

Background:

Fort Hill offered an opportunity to develop specialized research methods when it became evident that a single component site with a long history of plowing was involved. The result was a methodology more geographic than chronological, since the time frame of occupation was narrow and the stratigraphy much disturbed. The following postulates provide a theoretical basis for the four-phase methodology.

First, a high degree of correspondence between the surface (in this case plow zone) and the undersurface is assumed. The validity of this thesis has been tested by archaeologists, including Redman and Watson (1970). Although Schiffer and Rathje (1973:172-73) introduce natural process variables such as accretion and erosion, the open, level character of the Fort Hill site tends to mitigate this problem.

A second postulate is based on the gravity model of action and interaction (see Haggett 1980:445). Simply stated, the amount and kind of artifacts generated at nodes and along paths is proportional to the extent and nature of activities and flows that took place there. This is similar to South's (1977:41) "Law of behavioral by-product regularity." Not only does this postulate apply to the reconstruction of a site's physical character but it also carries with it behavioral implications. It is of note, that geographic theories of distribution based on observations of contemporary processes when applied to artifact distributions, sealed and frozen in time, still attest to the dynamics of past periods.

Another basic premise of this study holds that plowing would alter distributional patterns to a far lesser extent than it disturbs vertical relationships. This is in agreement with a study by Roper (1976) and an area of interest and study at Fort Hill.

Step Search:

The "step search" locator technique is gravity model based. It is assumed that artifacts should increase in number as their source is approached. This inverse frequency/distance relationship, known to geographers as distance decay, was adapted to the Fort Hill study primarily as a tool for locating features.

Accordingly, a linear traverse of one metre squares was laid out and every other unit excavated. Key variables such as artifact count, sherd size, and artifact ratios were monitored as the search developed in the direction of increasing frequency. Should the count decline for two successive units, the excavators would "back up" to the high unit and proceed at right angles in the same manner. Again the "two unit" rule applied, for, if the count declined, the search would continue in the opposite direction. Thus the search progressed until the count could no longer be advanced, as the theoretical source of materials had been reached, Soil, artifacts, and often structural features confirmed the location (Fig. 10). Modification of the step search procedure, such as focusing on a particular artifact class, may lead to the discovery of specific features.

Pattern Analysis:

At normally complex archaeological sites there may be several material sources associated with separate structures or features of different types. This would require additional traverses at locations indicated by the evolving patterns of distribution that the archaeology reveals.

Several refinements of the step search are possible, including following artifact class ratios or monitoring the frequency count for particular groups or classes of artifacts such as those suggested by South (1977:95). Thus the "trail" of bone fragments could lead to midden deposits or hearth areas as it did in the Fort Hill case.

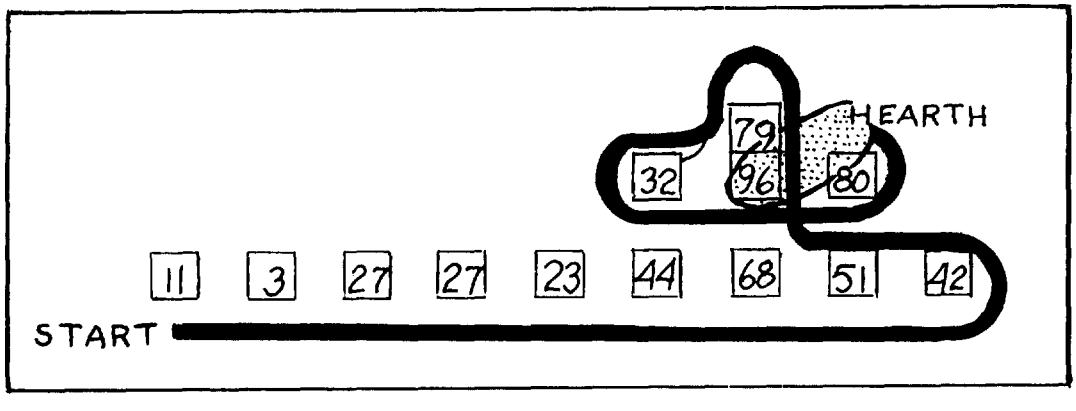


Figure 10. A simplified plan of the initial step search path showing the artifact count (less brick and bone).

Figure 11. The step search traverse.

However, as archaeology proceeds beyond the search stage more graphic procedures proved fruitful.

As archaeological blocks were opened up the distributional pattern of several classes of artifacts was revealed. When mapped on the metric grid, clear relationships could be seen between artifact type patterns and specific archaeological features that in turn served to identify, separate and delimit the features. Artifact clusters and patterns contributed to site "focus," a term Deetz (1977:94) defines as "the degree to which a site can be read" irrespective of the presence or absence of structural remains.

Distributions of window glass, nails, bone, and brick were mapped independently by the following simple contour technique.

1. The artifact count of a particular class was plotted on the master grid.
2. A frequency histogram often proved useful in establishing density class intervals.
3. Distributional contours were extrapolated at class limits.
4. The density classes were progressively shaded.

Figure 40 shows this technique in simplified form. The artifact distribution maps were then photographed onto color-coded transparencies. When viewed in overlay fashion, upon a map of known features, significant correlations were immediately apparent.

For example, most of the brick at Fort Hill was clustered around the hearth, suggesting that the fireplace and chimney represented the principal use of brick. Nail patterns tended to be more linear and may turn out to be in conformity with walls and other structural elements. It would follow, then, that secondary refuse areas, both adjacent and peripheral, could be traced by concentrations of their respective materials (South 1977:47-48) and pathways, catchment areas, and the like identified by material content and distributional pattern (Wilk & Schiffer 1977). Furthermore, each discovery magnifies the power of the graphic plot by logical extension given the following assumptions:

1. Humans adopt strategies to minimize effort.
2. Artifact distributions reflect the patterns of behavior or norms for a particular culture (South 1978:122 and Heldman (1983:72).

To illustrate further assume that:

1. Water was largely consumed in the central hearth area of the eighteenth century British Colonial house.
2. Archaeology has revealed:
   a. the hearth area
   b. an adjacent midden defined by South (1978:47) as a trash deposit immediately outside an exterior door.

Thus, the model (Fig. 12) indicates the

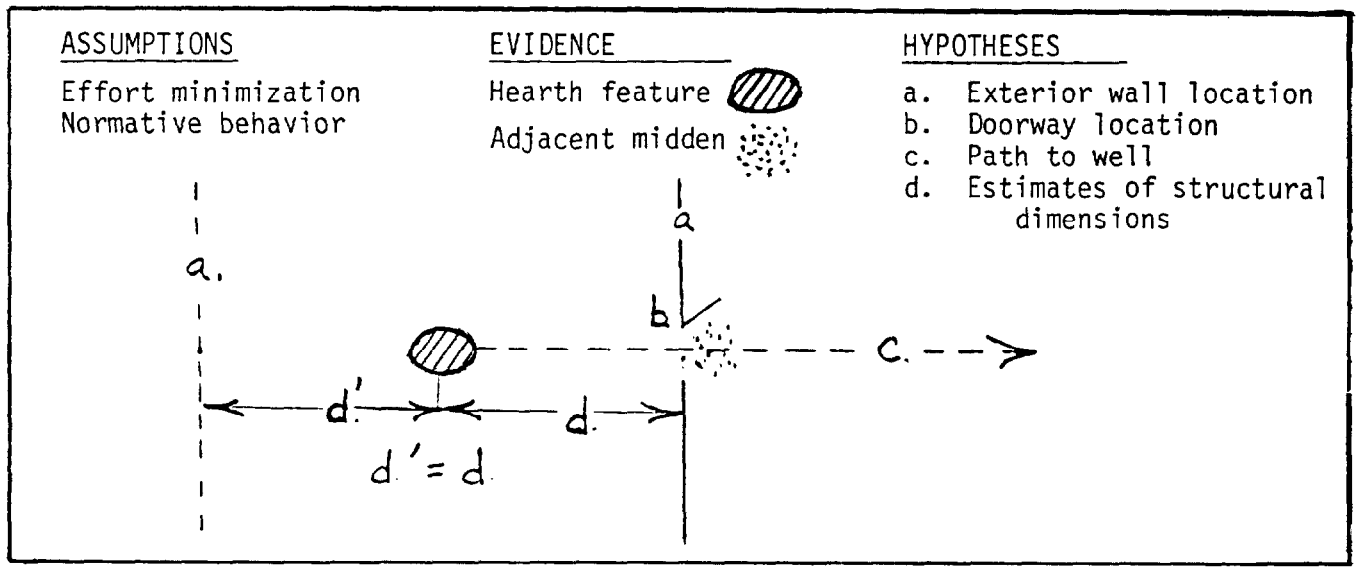


Figure 12. A model of structural probabilities derived from logical extension of evidence. (Caption w/in figure box).

types of hypothesis that can be derived from this information.

By extending this logic and incorporating artifact patterns, the probable physical arrangement and dimensions of a site can be reconstructed even when few or no in-situ features remain.

Plow Displacement:

A steel plow will penetrate to a depth of 20 to 25 cm (8 to 10 in) and, in turning the soil over, completely disrupt the stratigraphy. This has encouraged archaeologists working under time and financial constraints to adopt a strategy similar to the one used at Colonial Williamsburg in which the plow zone layer was stripped by a grader to expose the cultural surface below (Hume 1975:75-76). The object was to make visible, structural features such as post molds and foundations at the expense of the overburden. But, at shallow sites such as Fort Hill, most of the cultural remains would be lost, including their pattern of distribution. In order to better assess the displacement effect of plowing, models and measures of plowspread and plowsort were derived at Fort Hill.

Plowspread can be defined as the lateral displacement of artifacts due to plowing. It is empirically evident in distribution maps that show the spread of materials in relation to the probable sources. A more quantitative approach to this problem involved the measure of distance separation between matching sherds (Tab. 2). This was supplemented by radial line plots in which the largest sherd was connected to the other matching pieces (Fig. 13).

It was also noted early in the study that brick sherds became not only fewer in number with distance from their principal source, the hearth, but also smaller and closer to the surface of the plow zone. Conversely, objects with a high specific gravity, such as nails, appeared to work their way downward with successive plowing. It was theorized that this form of "plowsort" would be reflected in cones of artifact distribution as seen in model form (Fig. 14). Although only two excavation units were tested, there was the expected increase in the ratio of ceramics to nails in the upper plow zone levels of the unit more distant from the source.

Site/Surrounds:

Since any site must interact with environment, its significance must be assessed within the context of its surrounds. Given that the undisturbed or "natural" environment offers a full range of human alternatives, then the "cultural" landscape

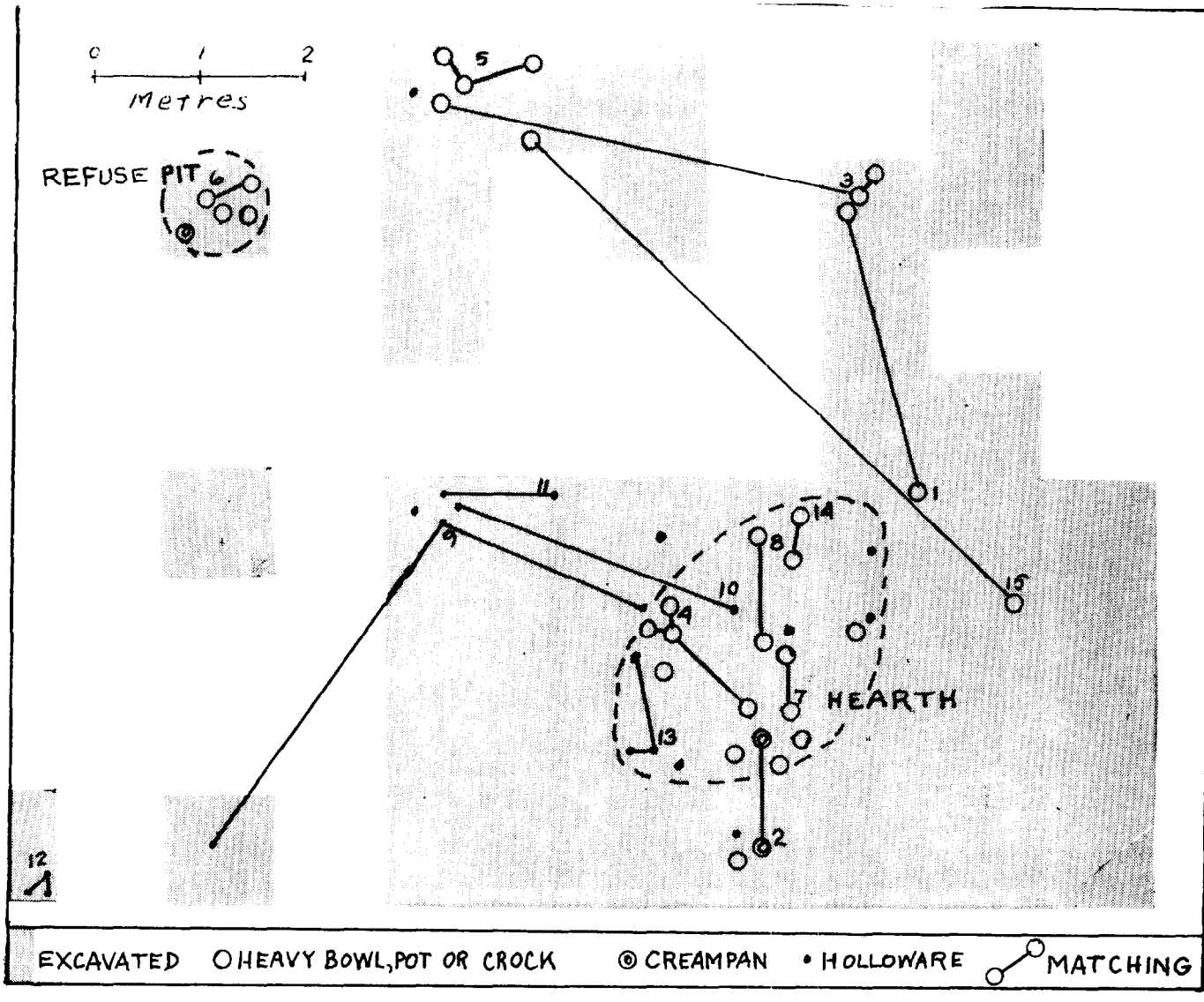


Figure 13. Ceramic distribution by type (Numbers identify vessels in Table 2).

Table 2. Plowspread of Matching Ceramic Sherds.

Vessel I.D. Number	Vessel Description	Number of Pieces	Displacement in Metres Total	Average
1	Crock Ty 1	2	3	1.5
2	Creampan Ty 1	2	2	1.0
3	Crock Ty 2	3	4	1.33
4	Pot Ty 3	4	1	0.25
5	Crock Ty 4	3	1	0.33
6	Bowl Ty 5	2	0	0.0
7	Crock Ty 10	2	1	0.5
8	Bowl Burned Glaze	2	1	0.5
9	Teacup	3	6	2.0
10	Cup - Brown Slip	2	3	1.5
11	Small bowl - Staffordshire type	2	1	0.5
12	Small bowl - Staffordshire type	3	0	0.0
13	Mug - Rhenish Type Stoneware	3	1	0.33
14	Crock - Ty 7	2	0	0.0
15	Crock Ty 1	2	7	3.5
TOTALS		37	31	0.83

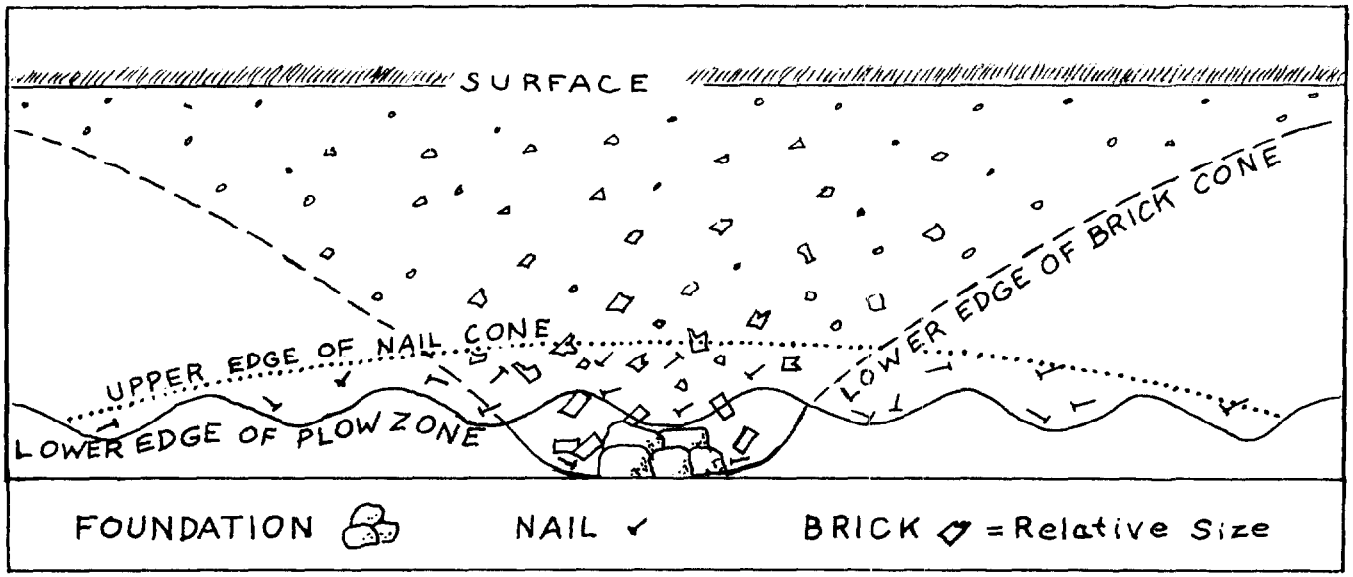


Figure 14. Cones of distribution.

represents the actual choices of people.

The Fort Hill settlement was established on the leading edge of a frontier that changed the land as it passed over. As a component part of that changing landscape, Fort Hill serves as a representative sample of frontier society in transition. On the other hand, relic traces of the past, such as burial grounds, stone walls, and forest growth that are found in the larger area, contribute to the understanding of the site. the case of barn structures in Gorham serves to illustrate.

Barns are functional things, long-lived and less subject to decorative change, for reasons of fashion, than are houses. The locations of these structures reveal areas of fertile soil and point out patterns of rural settlement. The barn type expresses both the cultural tradition from which they were inspired and the use for which they were intended (Kniffen 1965). In this study, the functional aspects of barns provided the most insights.

The barn at Gorham bearing the earliest documented date (1781) is small and low-studded (Fig. 15) with but four cattle "tie-ups." This would appear indicative of a subsistence era. By contrast, barns of the early 1800's are considerably larger, at least of two-story height and with steep roofs, (Fig. 16). This allowed large lofts to store hay and provided for the stabling on many animals at ground level which is consistent with the community's change from subsistence farming to commercial stock raising. A concommitant change was the abandonment of settlement at the fort site and its subsequent use as a hayfield. Thus, the study of barns and other community relics can serve to corroborate the research on the more specific archaeological site.

FINDINGS

Site Surface:

The Fort Hill site is a level, grass-covered f eld with two locust trees of about six inches in diameter close by major archaeological features. There is a difference in elevation of only slightly more than 1 metre in 100 metres. Surface morphology included a low mound, not more than 20 cm (8 in) in height, that proved to be a vintage manure pile. A rampart-like effect, occuring where the ground slopes down from the west end of the level area, is caused by bedrock formations close to the surface. Crop marks do not appear on aerial photos such as Fig. 6 (USDA 1:20,000 B&W 1964), and distinctive vegetative patterns are absent, save for some vestigial apple trees along the property line.

The native soil is in the Paxton group,

Figure 15. A low profile 18th century barn on Flaggy Meadow Road in Gorham (c. 1780).

Figure 16. A later "high-studded" barn (c. 1820) also on Flaggy Meadow Road in Gorham.

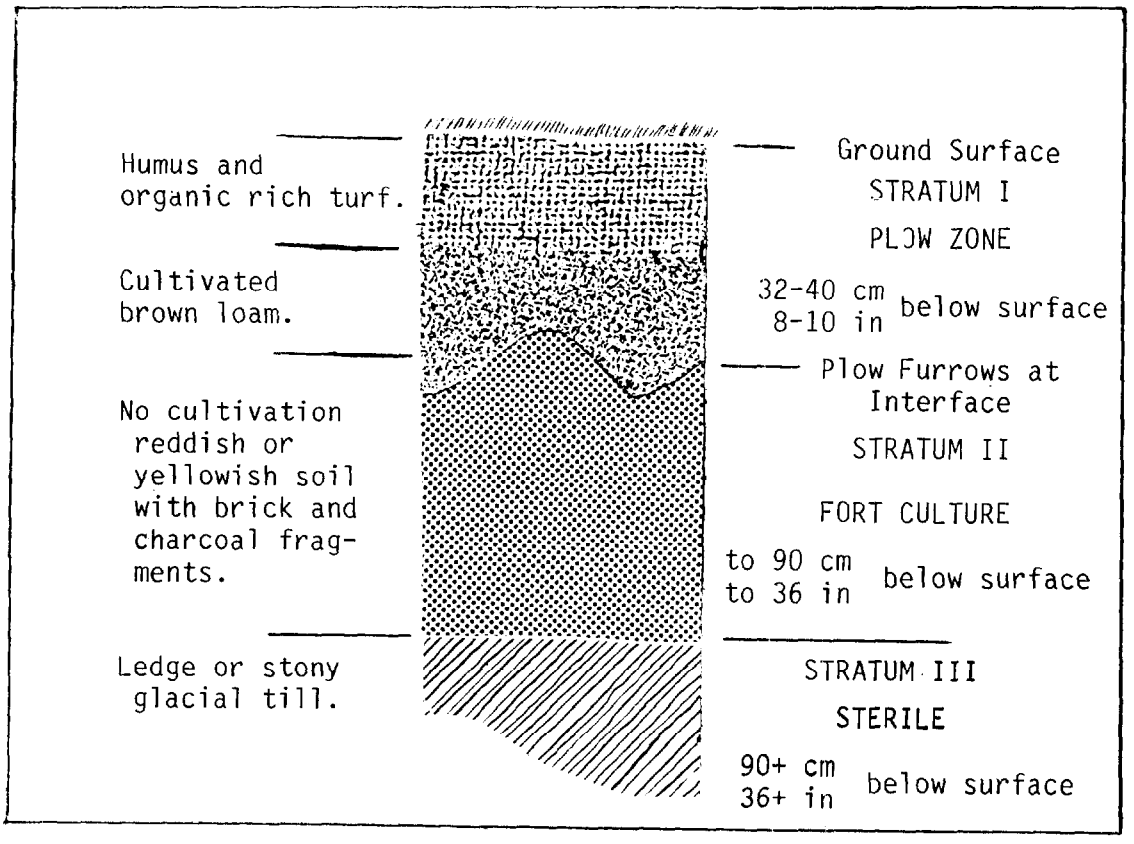


Figure 17. Generalized stratigraphic profile of the Fort Hill site.

described as a soil "found in very firm stony glacial till..on uplands....These soils range in color and texture from a dark brown, stony loam at the surface, through a yellow-brown, sandy loam subsoil, to a very firm olive-gray fragipan (hardpan) at a depth of about 50 cm (20 in). The upper horizons are well drained, but the subsoil is so compact as to restrict water flow and plant root penetration. These soils are suitable to row crops, hay, pasture, orchard and woodland" (USDA 1974:24-25).

Stratigraphy:

Cultural strata began with a plow level averaging 32 to 40 cm (8 to 10 in) deep, designated Stratum I or PZ (plow zone). Stratum II was applied to cultural soils below the reach of the plow and above the sterile subsoil. Profiles of units on the east-west axis sometimes show triangular facets, believed to be plow furrows, at contact with the lower horizon. All soils in Stratum II were feature related and extended to a maximum depth of 90 cm (36 in), where a hardpan surface and ledge was encountered (Fig. 17).

There was no evidence of traumatic events (such as an ash layer resulting from a burned structure), although flecks of charcoal, brick fragments, and artifacts mostly from the 18th century were present in both cultural levels. Outside of cultural materials, there was little to distinguish the plow zone from the upper layer of soil in neighboring fields. Soils associated with features were darker, often with a reddish cast when moist, and had a relatively high organic content. A distinct ash lens was found in portions of the hearth. Soil samples were obtained at various levels and keyed to the master plan (Fig. 20). It is significant to note that while only 18th century materials appear in Stratum II, a small amount of later materials are found with them in Stratum I, the plow zone. The most recent materials, including round nails and crown caps, are distributed close to the surface.

Features:

Original objectives included confirming the location of the site and deriving the size and shape of features in the fort complex through the analysis of artifact distributions in the plowed soil. The step-search, however, led directly to a massive rock structure designated Feature 1, the "hearth," and, later, a small bone-filled pit was discovered and labled Feature 2, the "midden."

Feature 1, the "hearth," though greatly disturbed, contained a number of rectangular field stones arranged in rows that form a right angle (see Figs. 18 thru 22). An adjacent concentration of field stones mixed with earth, brick, bone ash, and artifacts, occupied an area of about 4 square metres (44 2 ft) and extended to a depth of 90 cm (36 in). The entire complex of stone spanned an area about 6 m long by 3 m wide (19 ft x 9.5 ft). This compares in size with a description of a contemporary fireplace in a dwelling on Fort Hill.

"A fireplace is an enormous thing--like a great cave; you might stand under the mantle bar, and when it opened its mouth, it swallowed half a cord of wood... the chimney was thirteen feet square; the foundation was laid with great rocks, of which the jambs of the fireplace were also made" (Kellogg 1877:146).

The greatest concentration of brick came from this feature, including about 3 cartons of brick ranging from half to whole size. Several bricks were calcimined white on one surface. They are presumed to have been interior facing, while the rest made up the bulk of the chimney. the large rock concentration is associated with the brick and could have been the chimney base, although much of it appears to be hearth demolition. None of the bricks or stones were mortared, but a deposit of clay and ash was encountered in this feature at a depth of about 40 cm (17 in). The clay may have served as a caulking, and it is likely that the bricks were baked here, as well. The adjacent soils are reddened at this level, as if a brick clamp was erected and fired here.

The closely fitted stones that form a right-angle corner are overlain in part by an ash lens and appear to be the floor of the hearth. A difference in elevation of 17 cm (7 in) between the surface of the intersecting rows, however, confounds the interpretation. Other articulated rows of stones may be the remains of paving or foundation walls of the structure, but they have not yet been found to extend beyond the feature area described (Figs. 20 & 22).

It is worth noting that the huge amounts of wood consumed by hearths of this size would have significant ecological effects. As Whittlesley (1929) has theorized, this would contribute to clearing of the land for farming and thus replace one way of life by another.

The midden feature is locate 8 m (27ft) northwest of the hearth center. It is roughly circular, 18 cm (7 in) in diameter and extends to a depth of about 40 cm (16 in). The densest accumulation of bone found at the site (120 fragments) occurred in the 25 cm (10 in) of this feature below the plow zone together with ceramics, 18 common pins, a two-tined fork, a brass buckle fragment, plus shot, strips, sprue and a button of lead.

ARTIFACTS

General:

A total of 3457 artifacts, of which 682 (19.7%) are bone, were recovered in the 67 square meters excavated through April 1, 1983. Nearly all the artifacts appear to be of 18th century origin,while those of later vintage are present only in unstratified levels. Only 19 objects of modern manufacture were found, all in the plow zone.. They are not included in the artifact total (Tab. 8). Also excluded from the artifact count are the ubiquitous traces of charcoal and brick, in the first case, concentrations were noted, while brick was recorded by weight per unit and distributions were plotted for the site.

Sherd counts are employed for all artifacts for analysis purposes and to permit comparisons with other sites. However, the following limitations should be kept in mind:

1. Bone from the site is badly deter-

Figure 18. An early stage of excavation at the hearth area.

Figure 19. Completed excavation of the hearth showing articulated stones and a portion of the hearth floor in the top center left.

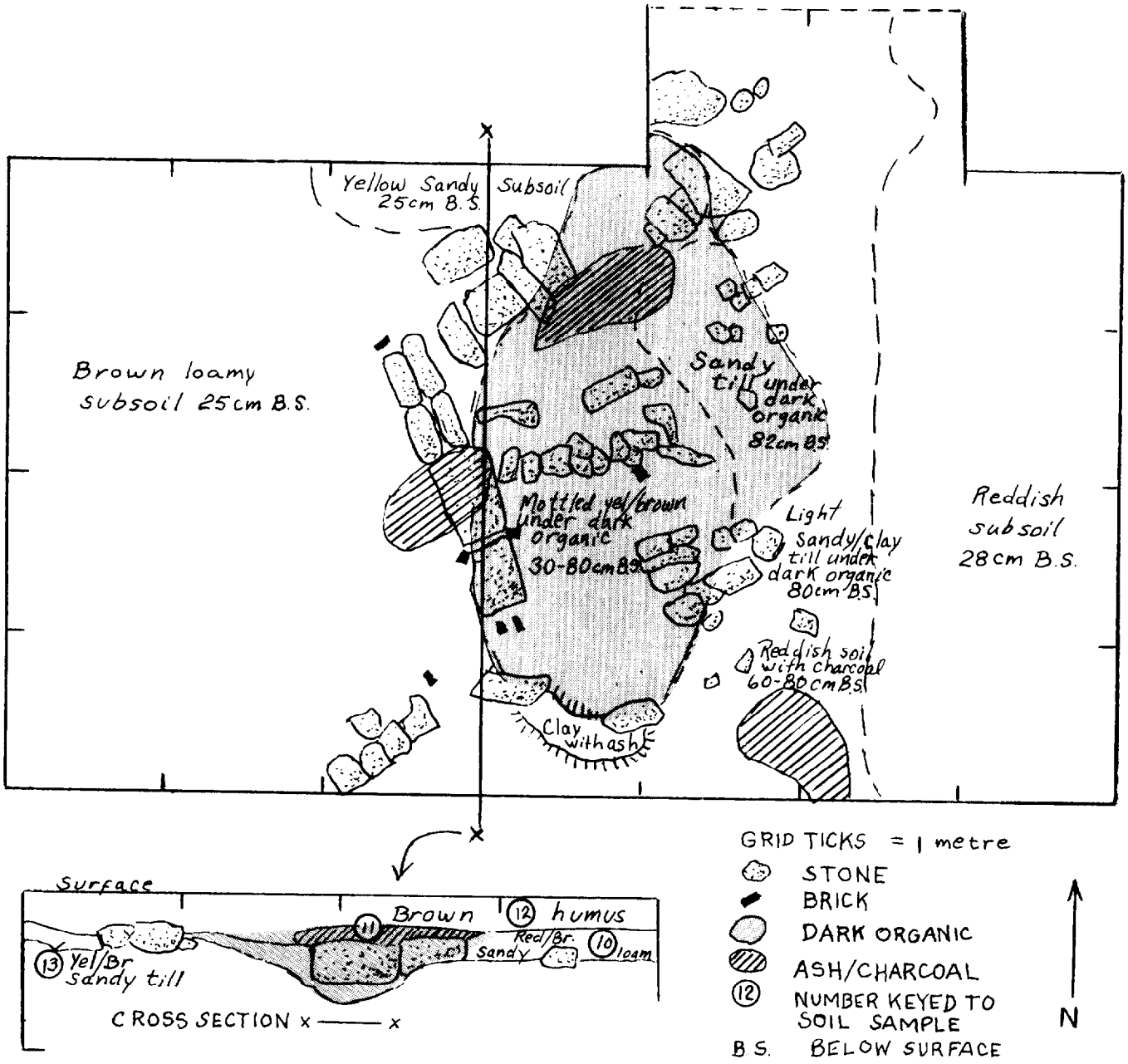


FIgure 20. The hearth feature and associated soils. Detail from the master plan.

iorated so counts are subject to variance. Bone was also recorded by weight per unit.

2. Nails, because of their rusted and and fragmented nature, were counted according to the number of nailheads recovered rather than individual fragments.
3. Sherds in the plow zone were fragmented by the plow, thus tend to be smaller in size and not proportional in number to those found in the features below.

Vessel counts were also attempted but the preponderance of small fragments of look-alike coarse earthware complicated efforts. However, matching and related pieces were recorded by unit and site data as noted in the ceramics section.

Figure 21. A power company line truck, with "cherry picker", provided an ideal camera platform.

Figure 22. An overhead shot of the site shows the hearth feature. North is to the top and the marked measure is 1 metre.

Brick:

Brick fragments turn up in the plow zone over the entire site, but a previously noted a concentration including several whole brick and large fragments occurs in proximity to the hearth feature. These water struck (formed in a mold) bricks are twisted, distorted and so crudely fired as to cause them to range from pink soft to hard black. They average $8\frac{1}{2}$ x 4 x 2 inches in size although a few range to $\frac{1}{2}$ inch larger in breadth and height. the 2,4,8 geometric progression is interesting for its symmetry and is clearly consistent with English measure, suggesting some standard rule of thumb. This compares with other bricks from nearby structures attributed to the McClellan family, the elder of which was present during the fort construction (Tab. 3).

A clay bank of Tommy's (Tannery) Brook is said to be the source of material for the latter two structures and may also have the fort. The bricks from these sites are all larger than modern bricks, but slightly smaller than the 18th century average as reported in Hume (1976:81). The decrease in size over time appears to be in keeping with 18th century trends and would allow room for mortar so that even measure spacing would result.

The total weight of brick recovered from all units (126,594.2 gm) included whole bricks and fragments down to 0.6 cm (0.25 in) in diameter. At the approximate dry weight of 1800 gm (4.0 lb est.) per brick, enough material was recovered to constitute over 70 bricks. It is significant that 90% of the brick was recovered from hearth strata below the reach of the plow and nearly all of the remainder from the plow zone units directly above or adjacent to the hearth area.

Ceramics:

Ceramics, in the form of 1384 sherds, comprised nearly half of the total number of non-bone artifacts recovered (Figs. 23 and 24). Not surprisingly, coarse, heavy leadglazed (or unglazed) earthenware accounted for nearly 90% of the sherd count and 96% of the total by weight. Only about 1.5 sherds per 100 were of delftware, and the same was true for stoneware. The few, very small sherds of refined earthenware, mostly creamware and pearlware, turned up entirely in the plow zone, and transfer printed ware was conspicuously absent (Tab. 4).

An attempt to tabulate sherds by vessel type was complicated by the plain, crude nature of coarse earthenware and the severe fragmentation caused by plowing. Nevertheless, distinctions were made on the basis of ware type, paste, glaze color, vessel characteristics (type, form and size), and other attributes such as graving or impressed decoration (Tab. 5).

No doubt the count considerably underestimates the number of vessels, particularly in the coarse earthenware category. The food preparation and storage vessels of large size are typical of the period, as are the dairy type. The latter testifies to the importance of milk products

TABLE 3. BRICK SAMPLES

SITE (Date)	SIZE IN INCHES	SOURCE
Fort Hill (1744)	$8\frac{1}{2}$ x 4-$4\frac{1}{4}$ x 2-$2\frac{1}{4}$	Archaeological excavation
McClellan House (1773)	$7\frac{7}{8}$-8 x $3\frac{3}{4}$ x $2\frac{1}{4}$	Existing structure, Fort Hill Rd.
Eunice McClellan House (1779)	$7\frac{1}{4}$ x $3\frac{3}{4}$ x $2\frac{1}{8}$	Gorham Historical Society (Baxter House)

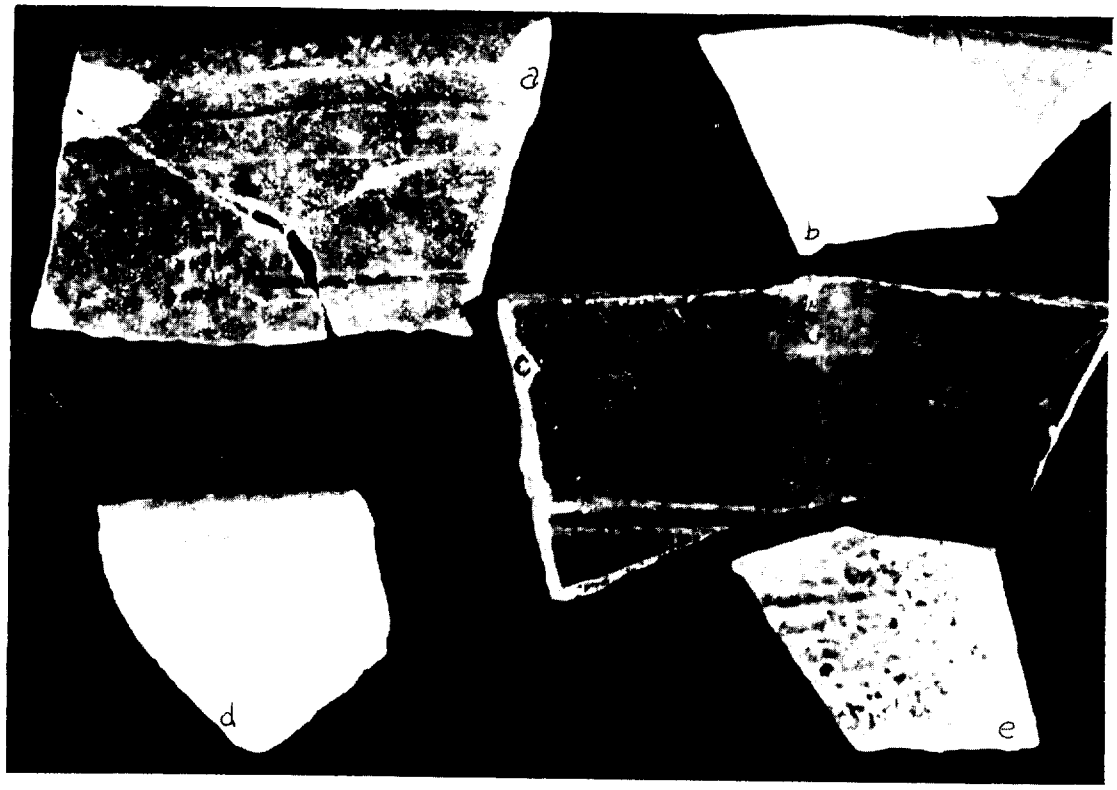


Figure 23. Redware crock and cream pan sherds. Mostly plain brown leadglaze but some with yellow slip. Shown approximately full size.

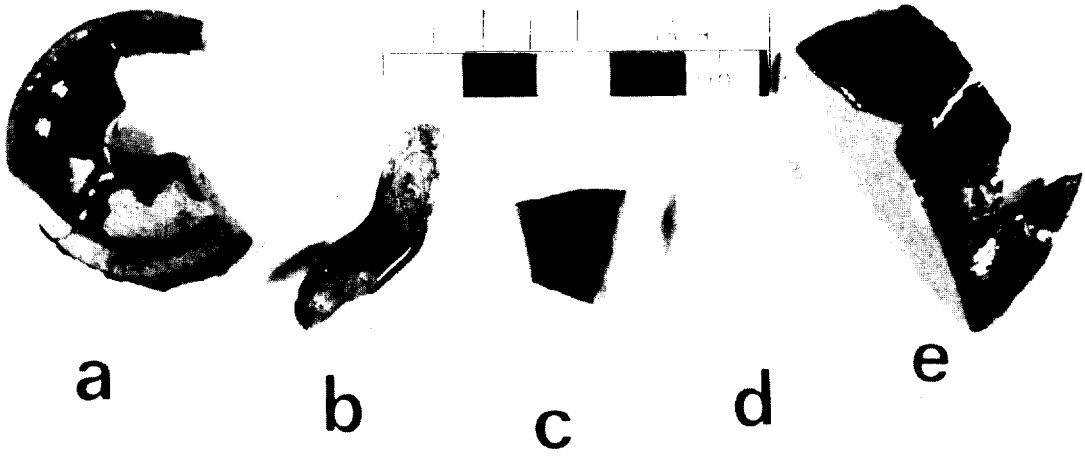


Figure 24. Tea ware fragments included a. lid b. crabstock cup handle c. Jackfield holloware d. delftware saucer e. Jackfield cup.

Table 4

Ceramic Ware by Percent

	No. of Sherds	percent		Wt.in grams	percent	
Unglazed Redware	402	29.0	89.5	860.3	25.9	95.8
Glazed Redware	838	60.5		2323.3	69.9	
Delftware	22	1.6		34.8	1.0	
Stoneware	20	1.5		34.5	1.0	
Refined Earthenware	52	3.8		24.5	0.7	
Unclassified Ceramic	50	3.6		46.2	1.4	
TOTALS	1384	100.0		3323.6	99.9	

as the "white meat" of the times.

Cups and small bowls are difficult to tell apart when in fragments, yet there seem to be several pieces of fine teaware present. This suggests the tea ceremony attributed to British military officers (South 1977:230), and there was at least one officer present at the Fort Hill site.

The small number of plates associated with the earlier ceramic types supports the thesis of communal living, as do the large bowls and other heavy foodwares. Even the Staffordshire type slipware plates appear to be serving platters rather than dishes (Fig. 26).

The coarse earthenware, though plain and of typical form, was not entirely devoid of character. Rim types showed considerable variety (Fig. 27), and a distinctive broad yellow band (white slip) appeared on some of the brown leadglazed vessels (Fig. 22b,d). It is possible that some of these coarse wares were locally manufactured, for such low value, high bulk, breakable vessels would bear a disproportionately higher transport cost

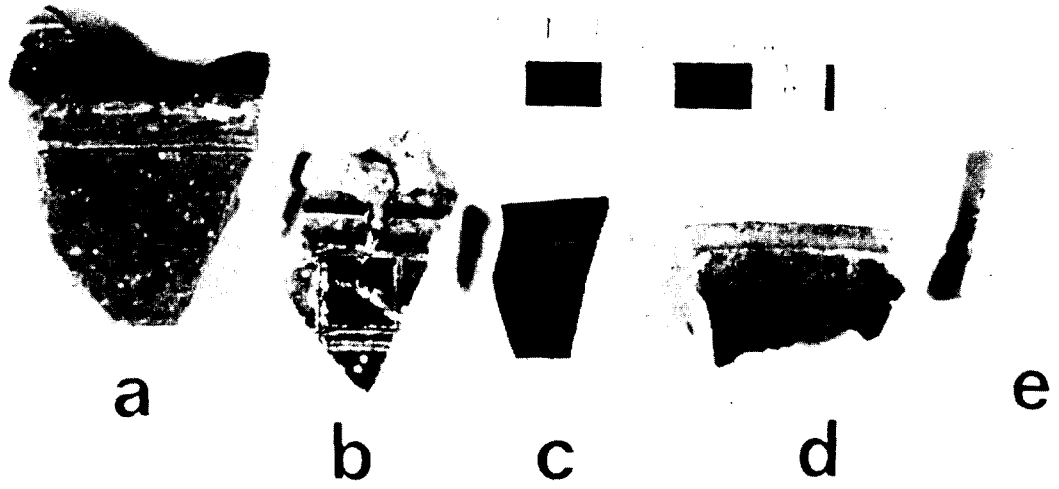


Figure 25. Stoneware fregments were present but sparse a. blue on gray mug b. blue/gray incised Rhenish type mug c. and d. brown glazed e. English salt glaze.

Table 5

Ceramic Vessel Count

	CROCKS	POTS	CREAM PANS	BOWLS	CUPS	MUGS	PLATES	OTHER	TOTAL
Coarse earthenware over ¼" thick	8	1	3	5					17
Other coarse earthenware					2			1	3
Staffordshire type slipware				1	3		2		6
Jackfield type					1	1			2
Delftware							1		1
Fine white salt-glaze stoneware					1				1
Rhenish type stoneware						2			2
Brown stoneware					2				2
Creamware					1				1
Pearlware					1		4		5
TOTAL	8	1	3	6	11	3	7	1	40

in relation to their value than more finely crafted wares. Indeed, two large unglazed fragments of a storage crock found at the hearth base show marks of turning on the inside but have an outer surface as if formed inside another vessel. Such crudely attempted redware manufacture may have occurred on site.

Bottles and Glassware:

Bottle glass was infrequently encountered. Dark green spirit bottle fragments predominated, including two round bottle bases, one measuring about 13 cm (5.0in) in diameter and heavily patinated. Portions of a pale green flat-sided bottle and a small blue glass pharmaceutical vial base were also found. All bases with the center present bore pontil marks.

Other examples of glass included a hand-blown dish or candle holder base with an impressed rib design on the baluster portion (Fig. 28c). Additional patterned sherds included several of clear glass, bearing a dimpled pattern, as well as ribbed specimens in green and clear glass. One of the most unusual pieces was what appeared to be a window glass fragment ground to an arrow-like shape (Fig. 28a). A large fragment of a black glass trade bead was also recovered.

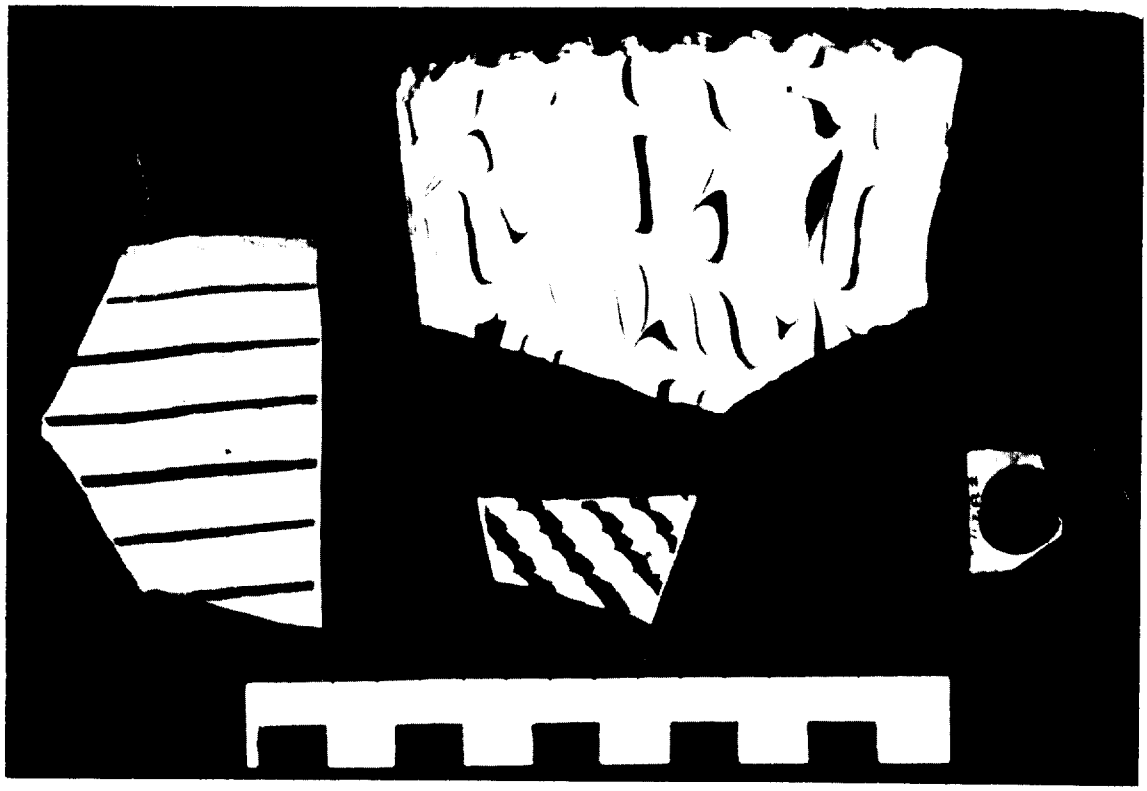


Figure 26. Combed and dotted slip fragments of Staffordshire type included the heavy "piecrust" plate fragment at top center.

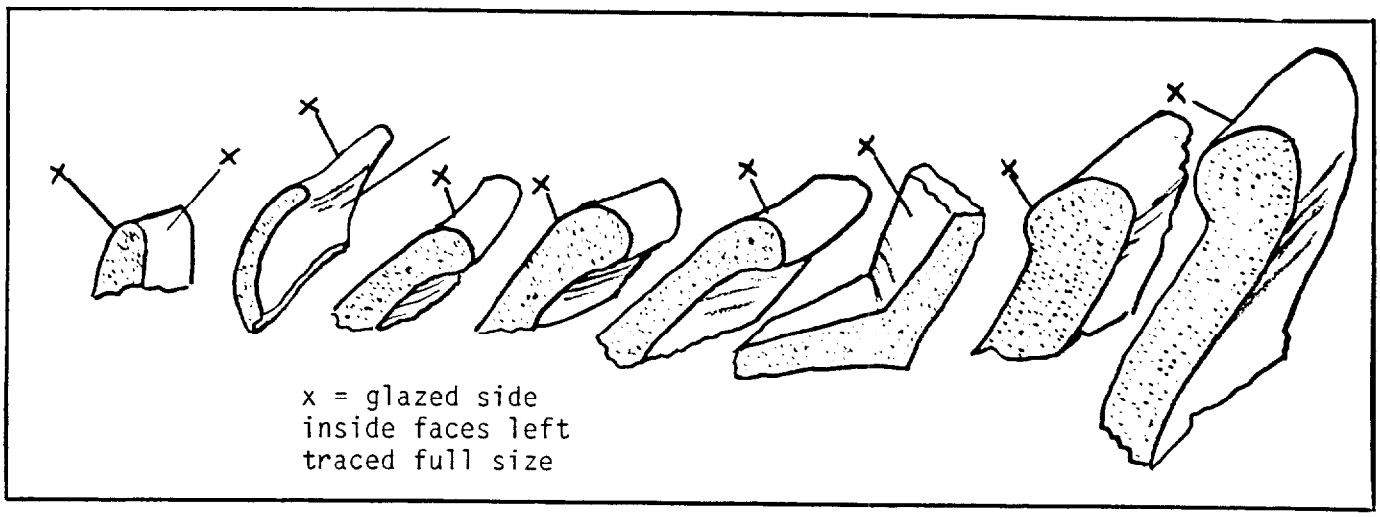


Figure 27. Rimsherd sections.

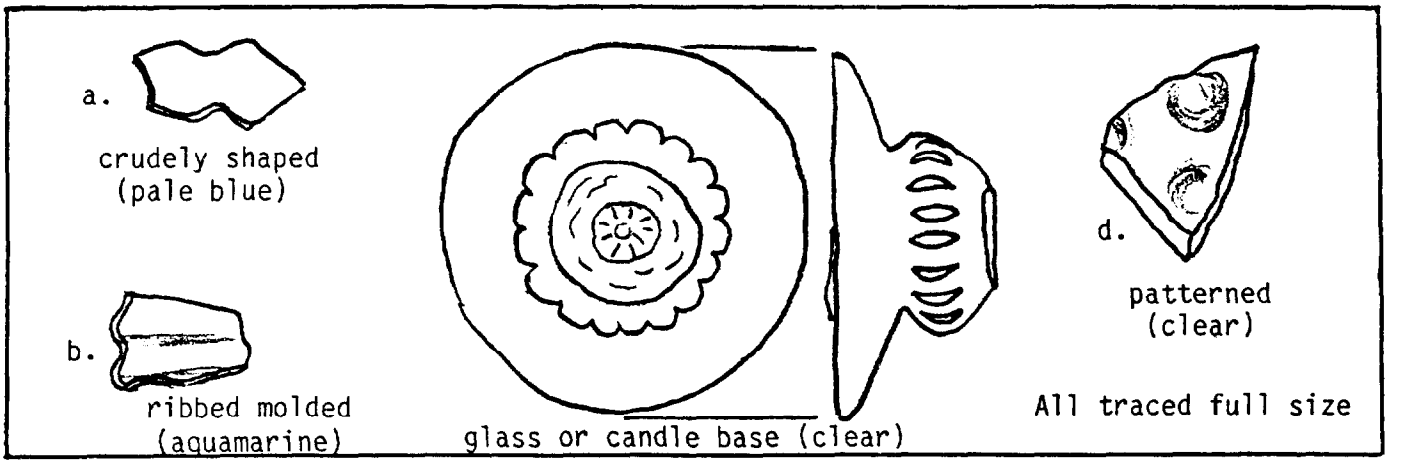


Figure 28. Fort Hill glass.

Tableware and Kitchenware:

Although Deetz (1977: 122-23) suggests that forks did not become popular until the mid-eighteenth century, two were found in the hearth strata at Fort Hill site. Both bear two tines and have a square tang for placement into a drilled handle. While one has a plain shank, the other is balustroid in shape. The only other tableware recovered is the center section of a pewter spoon, flaring to a spatulate handle end, and a fragment of what appears to be a square-cornered pewter container (Fig. 29f,g,d).

Kitchenware is represented largely in the form of cast iron kettle sherds and a fragment of a rolled-rim tinware container. Even more problematical is what appears to be a section of a heavy iron handle, the shaft of which is flattened near the end and terminates in a curl (Fig. 37c).

Bone:

"Captain Phinney gave Watson a cow and a pig, Hugh (McClellan) gave his half-a-dozen hens and a turkey. Mr. Bryant sent him half a sheep and Daniel Moshier a bushell of wheat flour and a leg of bacon" (Kellogg 1877:147). This reference to domestic animals in Kellogg's Good Old Times is supposedly taken from the written record of the fort period. Among the 1162.1 gr (2.5 lb) of faunal materials recovered from Fort Hill (Fig. 30), the following species or types could be identified (Tab.6).

Turkey, both wild and domestic, and hens were conspicuously absent, as these dooryard scavengers are closely associated with pioneer communities. Given our small sample and the deteriorated condition of the bones due to the acid soils, this may not be significant. Eggshells were found in the lower hearth strata, but were identified as those of wild rather than domestic birds, as were the avian bones. Local legend includes accounts of pigeon hunting by early settlers. Also, mention of repayments by the Indians in the form of "A brace of wild pigeons," deer and salmon appear in Celebration (1866:70). Surprisingly, however, deer bone could not be verified in the remains.

The fragmented and deteriorated nature of the bones ruled against detailed quantitative analysis, but some general observations follow.

Most of the cow and pig long bones lacked epiphyses, indicating the presence of immature animals. Conversely, a massive jaw of an old sow pig showed severe trauma (as if pierced by a bullet) that had healed over, causing a distorted and enlarged area (Fig. 30c). Indeed, pig remains seem to predominate in the sample, but this is not unusual since these creatures thrive on garbage and are adept at foraging the woods for mast. Furthermore, whereas the meat to fodder ratio for a cow is 1 to 20, it is 1 to 5 for a pig.

Evidence of food preparation includes bones, burned and calcined from cooking, and knife marks across long bones. Additionally, split vertebrae of pig and

Figure 29. Representative kitchen artifacts illustrated as a. spirit bottle bases b. case bottle fragment c. base of stemmed glassware d. pewter container fragment e. kettle sherd f. two-tined forks g. pewter spoon handle.

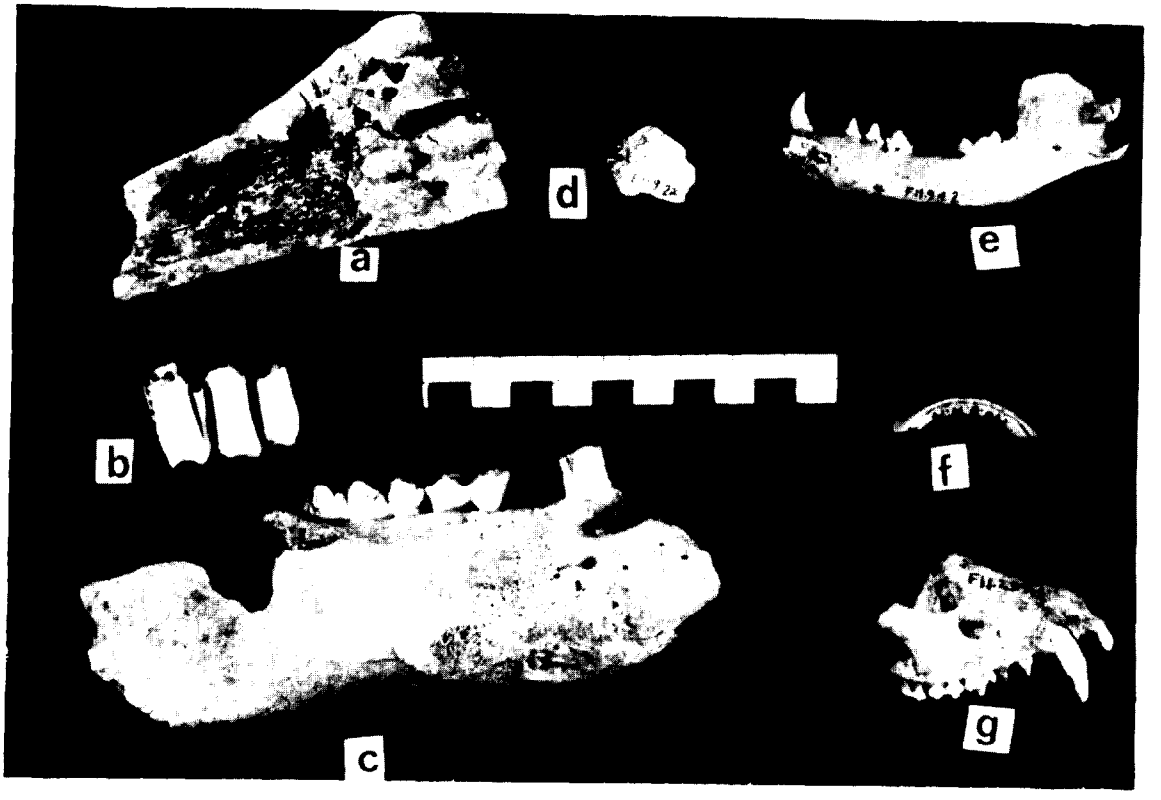


Figure 30. Bone fragments in the hearth and midden areas: a. sheep/goat metapodial b. sheep/goat tooth c. mandible of sow showing bone growth over trauma d. bone with butchering marks e. mandible of carnivore f. beaver incisor g. maxilla of raccoon.

Table 6. Animal and Bird Remains.

DOMESTIC	WILD
Pig (Sus Scrofa)	Quahog (Antica Islandica)
Cattle (Bos Indicus)	Henclam (Spisula)
Sheep or goat (Ovis or Capra)	American oyster (Crassostrea Virginica)
Horse (Equus caballus)	Small avian as songbird
Dog (Canis familiaris)	Quail, partridge or pigeon
	Raccoon (Procyon lotor)
	Woodchuck (Marmota monax)
	Various species of freshwater fish
	Beaver (Castor Canadensis)

sheep testify to rib cuts, and several bones appear to have been split to extract marrow.

Window Glass:

Fragments of thin crown type window glass were found primarily in the plow zone units, with concentrations on and around the north portion of the hearth area. Of the 608 sherds, 595 were from the plow zone. They were generally of small size, with an average weight of about 0.5 gm.

Nails and Spikes:

Although nearly all of the 351 nails found at Fort Hill were hand wrought, they were far from mundane in character. All pennyweight sizes from 2d to 10d (ranging from 1 to 3 inches in length) were present. Any over 3 inches long were classified as spikes. Several types were present in addition to the common rosehead, including spatula points (to prevent wood from splitting), sprig and headless nails for finish work (the head could be recessed with a nail set), and nails clinched at a right angle about 2 inches down the shank to prevent their working loose (used for floorboards, doors and the like) (Figs. 31 and 32).

Fragments of rusted nails presented a problem in counting, since one shank may produce several pieces. It was, thus, the policy to count only nail heads, as this is the most durable part of the nail and each nail has only one. In most cases, the size of the nail could still be estimated from the size of the head or the diameter of the shank.

Although most nails were badly deteriorated, the hearth area proved serendipitous. Because used lumber sometimes served as fuel, it contributed to the presence of several nails, many of which looked newly forged. Apparently, the blue flame at the base of the fire acts as a reducing agent to preserve the iron. The nails showed considerable difference in the care and style in which they were forged, making it unlikely that they were the product of a single blacksmith. The fact that only one wrought iron spike was found may reflect the use of trunnels of tree nails to peg together mortise and tenon framing.

Clay Tobacco Pipes:

Three marked pieces of kaolin clay tobacco pipes were recovered. One bore the relief initials of William Nichols, a British pipemaker (1730--71) and the second an incuse R.T. believed to be that of Robert Tippet's apprentice (1713-20) also of Bristol (Oswald 1975:156-158). The letters or symbols on the spur of the third fragment could not be deciphered. The bowl to stem angle (40°-45°) as seen on some larger fragments would be appropriate for the 18th century. A total of 88 stems were measured, 75% of which were of 5/64 diameter. The Binford (1962)

Figure 31. Various sorts of nails were recovered. Some found in the hearth feature were remarkably well preserved.

Figure 32. A full range of nail sizes were found at the Fort Hill site.

pipestem diameter dating formula yielded a 1749 mean occupation date. Although samples were small, there seemed to be no significant difference in results between individual features or the sample as a whole (Tab. 7). This evidence supports the single component site thesis.

Arms:

A honey colored, finely crafted blade type gunflint and a gray spall type gunflint were recovered in the plow zone. Stone (1974:247-263), in his discussion of Michilimackinac gunflints, indicates that though the spall flints were in use from the 1600's until the American Revolution the blade type did not become a common trade item until 1740. Both types would be consistent with the 18mm (0.75 in) diameter musket balls that were found at Fort Hill, one of which was considerbly chewed. Apparently "biting the bullet" was for real in those times as a similarly chewed ball was reported at the Fort Stanwix excavation (Hanson and Hsu 1975:79). Shot, a musket ball, lead strip and sprue, found in close association in the midden, provide further evidence that lead casting was carried out at the site.

Table 7.

Clay tobacco pipestem dated by the Binford Formula
(1932 - Avg. Diam. of stem hole x 38.3 = computed mean date of occupation).

	Area	# pcs	Dia. 64ths"		Product	Avg. Dia.	Computed Date
STRATUM I	Plow Zone	18	x 4	=	72		
		50	x 5	=	250		
		1	x 6	=	6		
	Total	69			328 ÷ 69	= 4.75	= 1750
STRATUM II	Hearth	1	x 4	=	4		
	Feature 1	13	x 5	=	65		
	Total	14			69 ÷ 14	= 4.93	= 1743
	Midden	2	x 4	=	8		
	Feature 2	3	x 5	=	15		
	Total	5			23 ÷ 5	= 4.60	
TOTAL	All Samples	21	x 4	=	84		
		66	x 5	=	330		
		1	x 6	=	6		
	Total	88			420 ÷ 88	= 4.77	= 1749

Clothing Items:

A portion of a brass bucke and a two pronged buckle tine were found, but a tinplated cast lead badge attracted more attention. At first glance this could be taken for a Crackerjack toy, but closer inspection showed prongs on the back that could be bent over to affix it to fabric. The center of the badge was unmarked, possibly awaiting the inscription of a unit designation. Perhaps they were distributed to the Massachusetts Militia in this form to be engraved upon assignment (see Fig. 33b).

Also, a small cache of 18 brass solder-headed straight pins was uncovered in the midden unit. All but one were 26mm (1.0) long, the other larger by half again. They may have been affixed to a piece of discarded fabric (Fig. 34).

Buttons:

Buttons turned up on a regular though infrequent basis. Most were cast lead, including the eye, and could have been molded on site. Several fit so well into an early brass button mold (in the University Museum collection) that it closed snugly over them. Recently cast pieces from the same mold appear almost identical to those from Fort Hill (Fig. 33d,e). Other varieties included one piece cast brass with doubled eye cast brass with eye in place and brass with soldered eye (Types 31, 8 & 9 in Hume 1976:90). Since three buttons of the latter style were of the same diameter, it is possible that coins were milled down to form the button body. A large button (2.6cm) of an alloy such as tombac was carefully milled, had an iron eye soldered to it and the front polished and plated with tin and silver. One of the two-piece buttons had a cast bronze back with a stamped brass basket-weave design almost identical to one excavated at Fort Michilimackinac (see Pl.30m, Stone 1974:56) and (Fig. 34). Most buttons were plain style and could have been uniforms, although no specific military designations appeared on them. Sleeve links included a square cast brass piece with beveled corners and a geometric design and an attractive octagonal linked pair in silver with an incised floral pattern similar to a design on one found at Fort Michilimackinac (see Pl. 36t, Stone 1974:70) and (Fig. 35).

Personal Items:

It is either through remarkable prescience or sheer coincidence that a crew member unearthed an iron key in the vicinity of the hearth just after remarking that a mug on the mantel would be a good place for keeping the same. The iron key is three inches long with a balustrade shaft. Discovered in the plow zone, it cannot be stratigraphically related to the fort period.

Two well-worn 1723 Hibernia half-pennies were found nearby. The obverse shows the head of King George I and the reverse a seated female figure with a harp. Originally struck for use in Ireland, they were as unpopular there as the English rule and many were shipped to the American colonies (Yeoman 1983:21). Fort Hill specimens may have served as pocket pieces, as there was little need for currency. The hearth also yielded a fragment of ivory comb with all teeth missing. This was the only Fort Hill artifact found that clearly related to grooming (Fig. 36).

Tools:

One would expect axes, picks, shovel blades and other heavy tools to be essential in the clearing and building on the frontier. However, these tools were nearly absent in the Fort Hill archaeology. This could result from the excavation taking place in the vicinity of the hearth rather than at out-buildings, but it may also reflect the value attributed such utilitarian items, to the extent that they stayed in the owner's possession after the fort was abandoned.

1) Among the finds, a heavy mattock blade with the socket end missing, could have been discarded in the field when it broke.
2) A small iron wedge of the type used to split rock, although the foundation appears to be of field-stone rather than split (yet some stones are carefully selected for squareness).

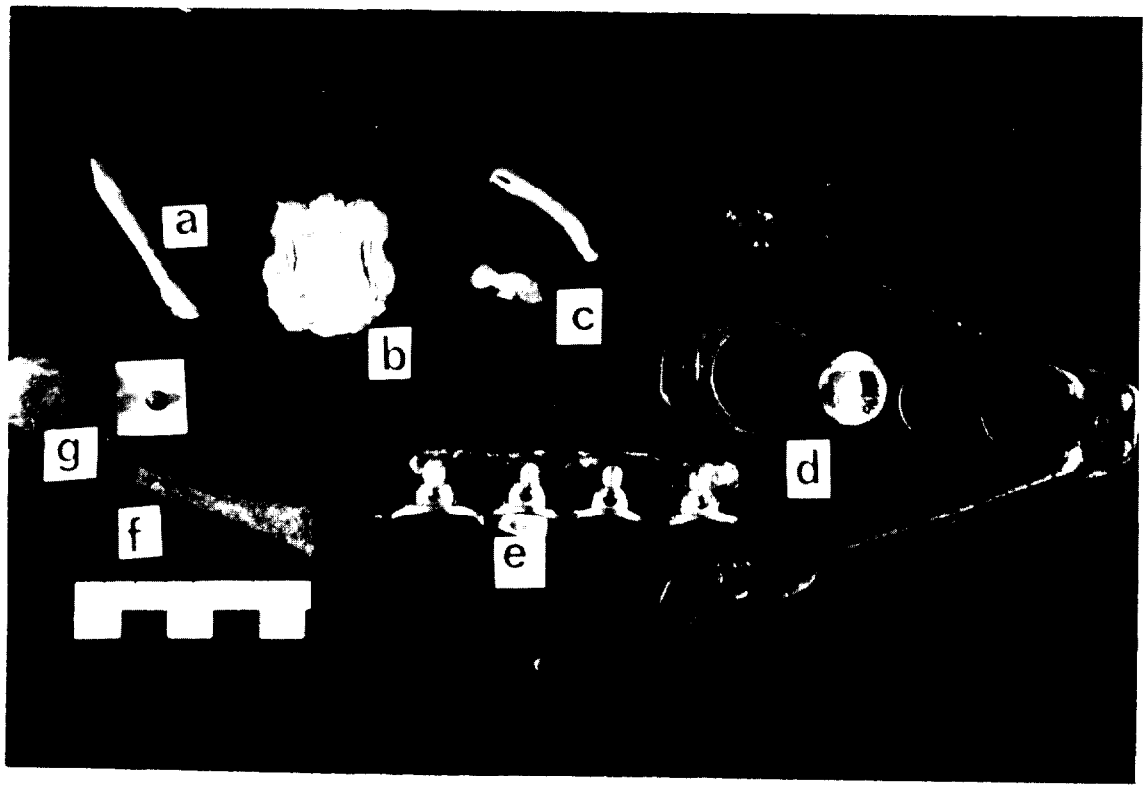


Figure 33. Evidence of casting at Fort Hill can be seen in a. a lead pencil b. tinned cast lead badge c. lead sprue d. a Fort Hill lead button fit snugly into a contemporary button mold e. button cast from the mold f. a pewter spoon handle g. musket ball.

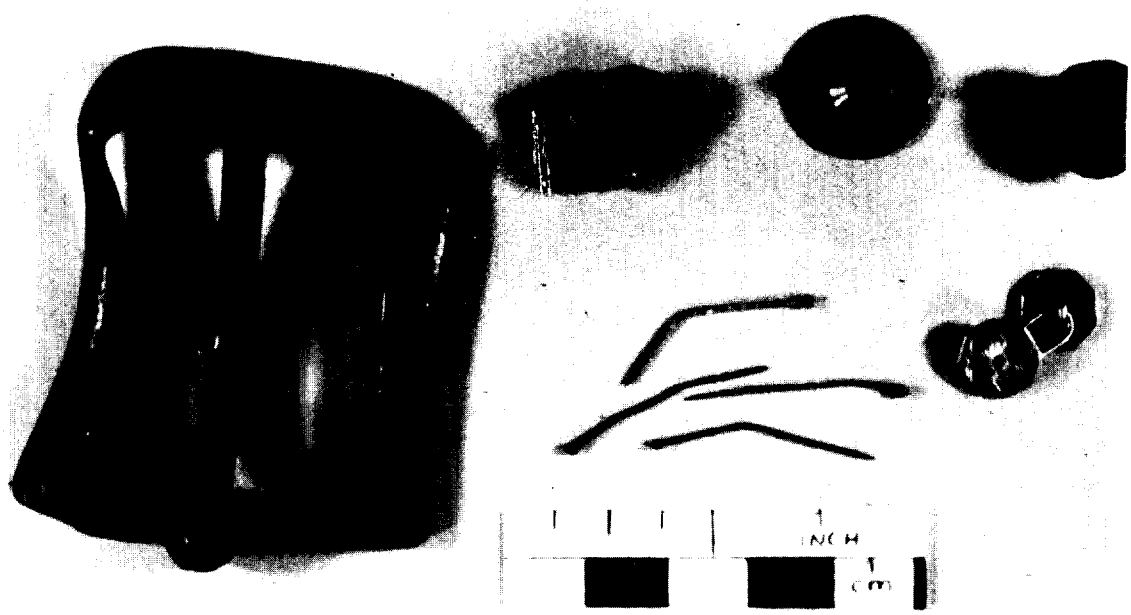


Figure 34. Buttons, buckles, and pins are clothing related items. The brass buckle was tinned, the brass pins had heads of lead and buttons were lead cast, turned brass, engraved or of stamped design.

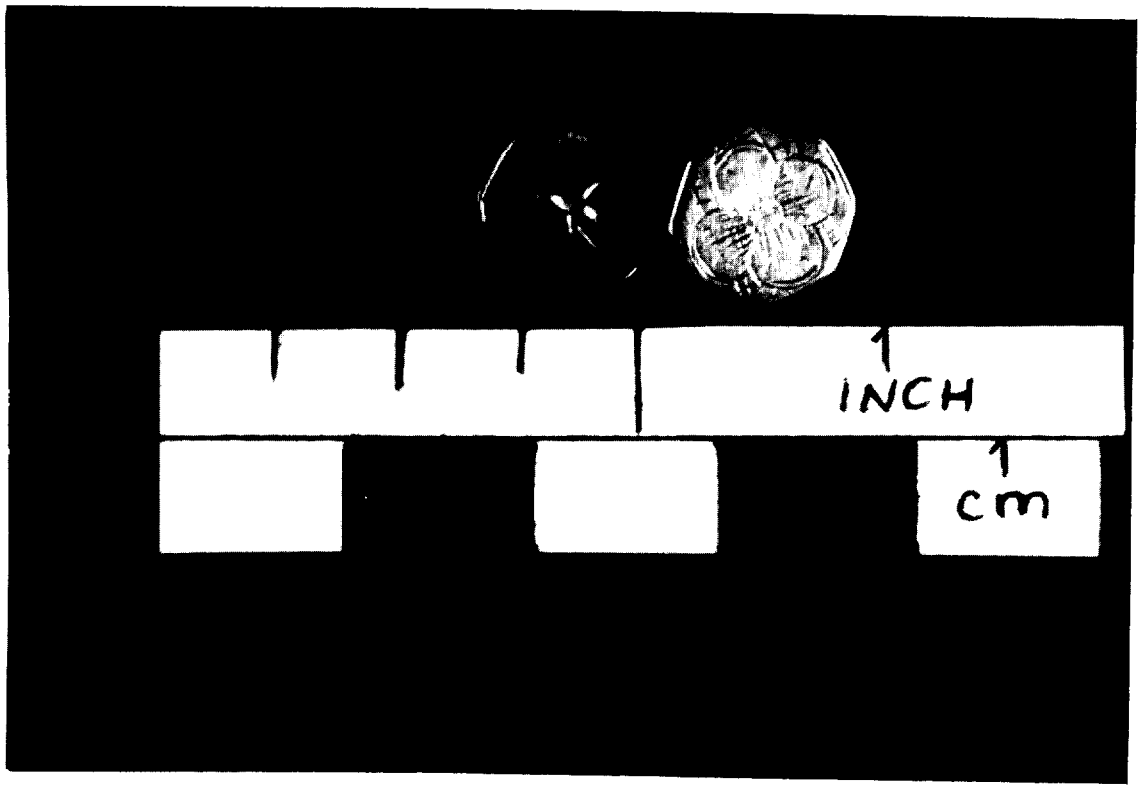


Figure 35. Detail of a silver cufflink with engraved floral design.

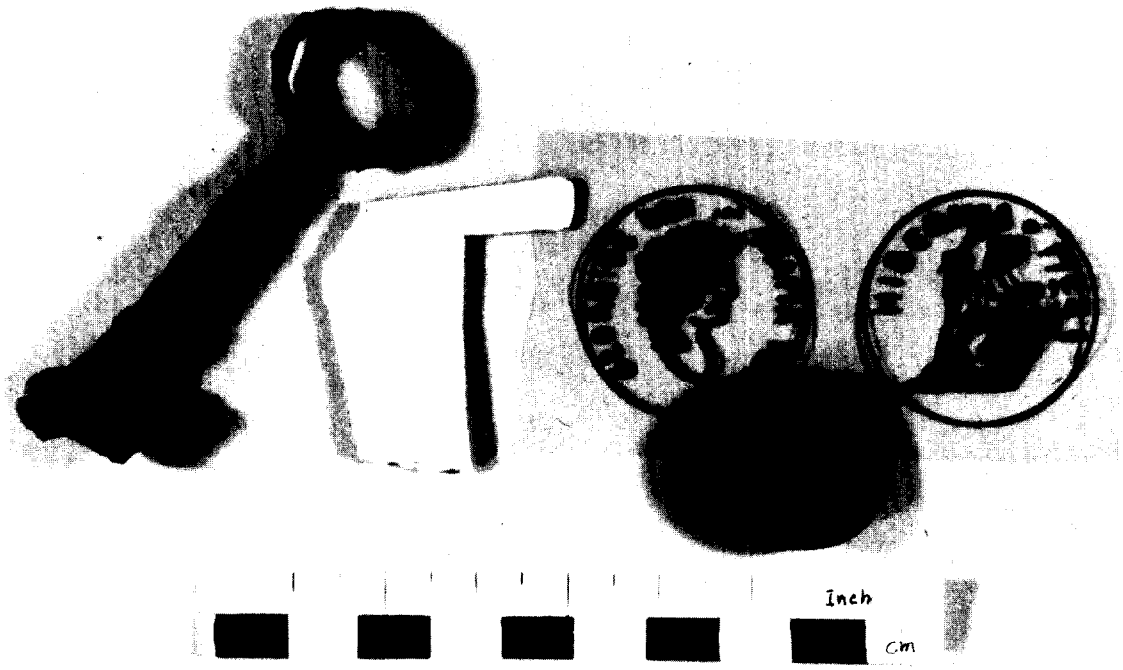


Figure 36. Personal items included an iron key, ivory comb and Hibernia half-penny.

3) A 10 inch triangular file that closely resembles the modern day equivalent. It is preserved to the extent that the cross hatched grooves are clearly visible. Upon close inspection a slight uneveness in groove spacing reveals its hand made, rather than machine made, origin. It would have been useful to tool sharpening and cleaning sprue and mold marks from cast objects (Fig. 37).

Botanical:

One of the most dramatic finds, a 50 mm (2.0 in) portion of a carbonized corn ear was not even recognizable at first. Only when the caked mud was removed did four paired rows, characteristic of Indian corn, appear. It closely resembles carbonized Anasazi corn (circa 1,000 A.D.) in the U.S.M. Museum, although the 12 mm (0.5 in) core is slightly smaller (Fig. 38). This represents one of the few links with Native American culture revealed at Fort Hill and may be the same variety of "Indian Corn" referred to by Greenleaf (1829:207) that was still being harvested by Maine farmers as late as the early 19th century.

ANALYSIS

Overview:

At the outset it was postulated that the Fort Hill site was limited in both size and duration. The archaeology confirms these conditions by revealing the single component nature of the site and aspects of a passing frontier. It is perhaps ironic that as the town of Gorham achieved a degree of prosperity during and after the Revolution, the Fort Hill settlement rapidly declined, caused by changing priorities in land use and settlement shifts in the surrounds.

Portland's (Falmouth's) growth became the prime mover, for as its population expanded so did its need for an agricultural hinterland. Gorham's rich bottom lands fulfilled much of this need and the Ossippee Trail, an Indian route from the White Mountains to Casco Bay, was converted into a main thoroughfare (now Route 25) leaving Fort Hill 2.4 km (1.5 mi) removed from the activity center. Furthermore, as the trouble with French and Indians was resolved the Fort became superfluous. Inhabitants favored the fertile bottom lands of Gorham over the stony slopes of Fort Hill and the population shifted accordingly. So did the town's center of gravity shift to the Ossippee Trail (Rt. 25) and Fort Hill Road (Rt. 114) crossroads while taverns, commercial establishments and the meeting house soon followed suit. The town's basic settlement pattern and road network was then established and has persisted to the present. Fort Hill was in effect stranded and converted to hayfields to help meet the need for fodder as the area became oriented towards commercial stock raising. Only in recent times has development recurred on Fort Hill due to the present-day decline in agriculture and the new situational relationships brought about by the advent of the automobile. Fort Hill's panoramic views and early heritage have made it a most prestigious place to live.

Chronology:

The historic record provides a firm 1744 date for the construction of the fort in Gorham that began a period when the inhabitants suffered greatly for want of food, clothing and comfortable houses, while danger from the Indians was constant and pressing (Celebration 1886:14). The end date is less clear but important as it marks the change from a subsistence to commercial economy with attendant changes in land use. Most likely, the fort structure fell subject to use as a meeting house, partial dismantling, and eventual decay when its original purpose was rendered obsolete by the fall of Quebec.

The undisturbed "midden" underrode the plow zone and provided an opportunity for establishing a terminus post quem that would offer the earliest possible date for plowing. Unfortunately, the bone, crock sherds and cast lead objects recovered, though indicative of the 18th century, can not be dated with precision.

The "hearth" feature, although below the plow reach, show signs of backfilling which could have occurred during or subsequent to plowing the site. The mixed and disturbed nature of fill and plowed

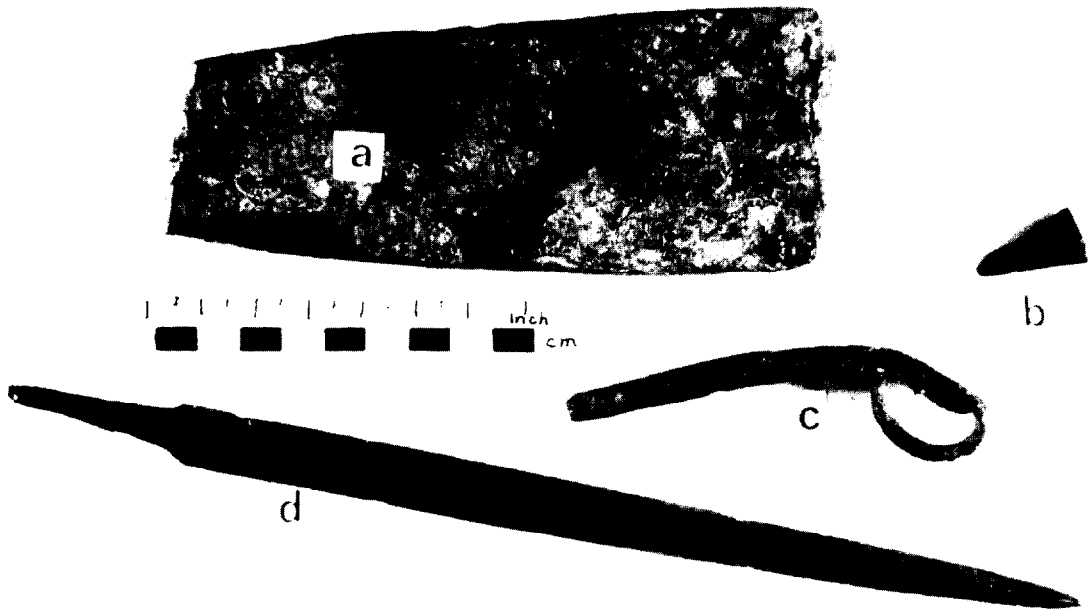


Figure 37. Few tools were found. Shown are a. a broken matlock blade b. stone-wedge c. wrought iron handle to unknown piece d. triangular file

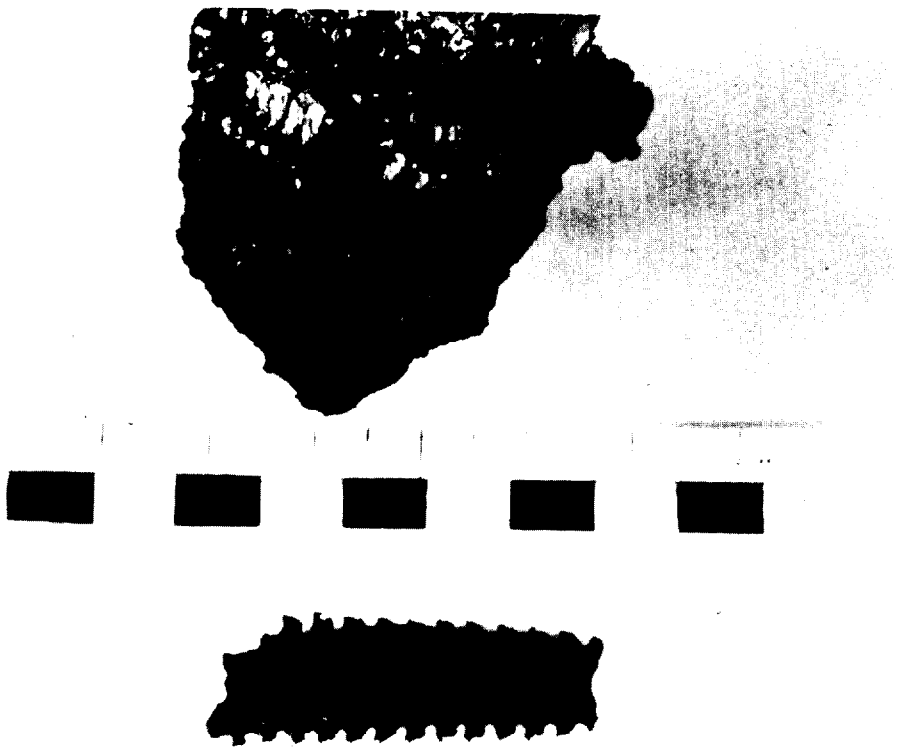


Figure 38. Fort Hill carbonized corn (lower) compares closely to Anasazi carbonized corn (upper) of c. 900 A.D.

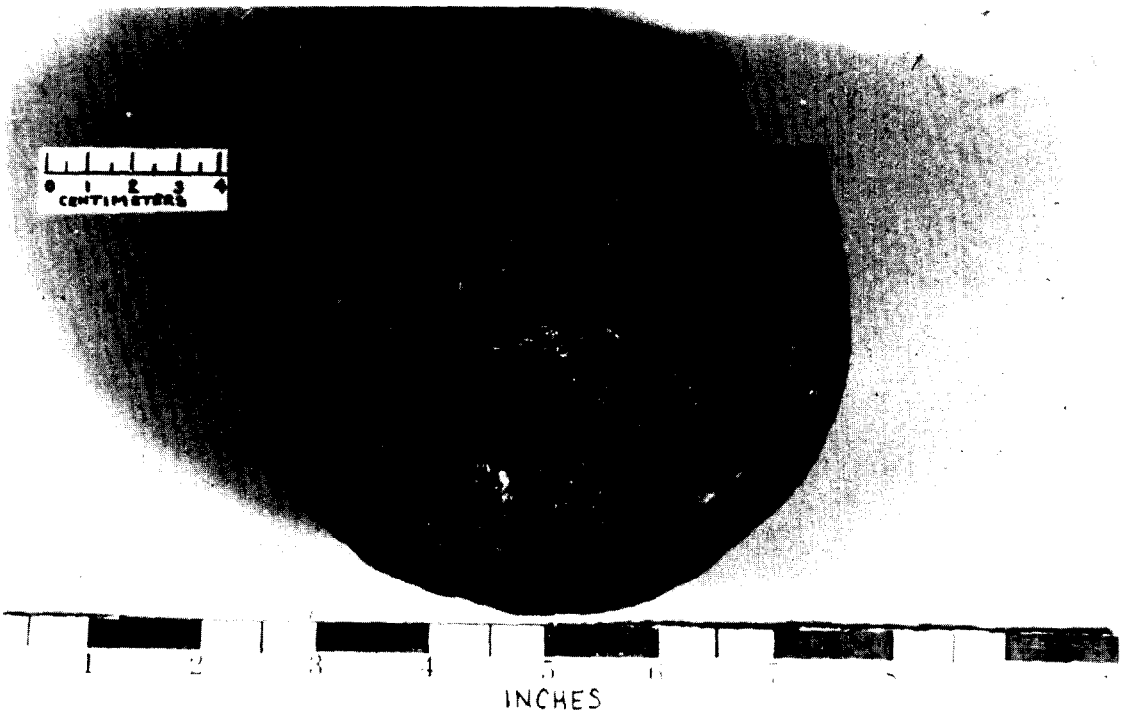


Figure 39. A problematical piece that could be the poll of an Amerind axe.

soil makes archaeological separation between the two levels difficult. Nevertheless, as previously noted, the hearth feature, unlike the plow zone, contains only 18th century materials including two well-worn 1723 Hibernia halfpennies.

As expected, coarse, heavy earthenware, appropriate for communal living, dominated the ceramic recoveries. The chronologically more useful marker types made up too small a sample to apply South's (1977) mean ceramic date formula but their presence, or absence, proved revealing.

Most frequent among the marker types about 80 sherds) is yellow lead glazed combed slip of Staffordshire type with a 1733 median date of manufacture. Present in much smaller amounts was blue/gray Westerwald type stoneware (1738) and a few examples of brown salt-glazed stoneware mug sherds (1733), "Jackfield" ware (1760) and barely a half-dozen tiny sherds of blue on white delftware (1720). All of the above were found in the hearth feature as well as the plow zone. It is important to note that the 50 or so chip-sized fragments of refined earthenware, probably including creamware, pearlware and hard white, were all contained in the plow zone. Among them, four different hand painted chips were recovered but transfer printed ware was conspicuous by its total absence. The paucity of delftware (popular in the late 1600's), the great abundance of combed slip along with blue/gray and brown stoneware (typical in mid-18th century), and the absence of creamware (beginning 1760's) in features, tends to confirm the historic dates of occupation.

This is further confirmed by clay pipe artifacts of typical period shape, style and maker. Also, the pipe stem hole diameter formula yielded a 1749 mean occupation date for all levels, combined with a range from only 1744 to 1750 among the four stratigraphic classes (including the plow zone) despite the small sample sizes. This is significant when combined with the blade type gun flint (post 1740) and other artifacts common in the 18th century with the nearly

complete absence of later materials. It not only confirms the historic beginning date of settlement but also indicates that the fort complex represented the only settlement at this site and a brief one at that. The transition to farmland, a commercial agricultural system and dispersal of settlement was largely accomplished before the beginning of the 19th century.

Comparisons:

Both intrasite and intersite comparisons have contributed to the understanding of the site and its relations to the region. In the first case the site was analyzed by stratum and feature primarily to determine structural and functional aspects of the fort complex. The midden, hearth and hearth construction are stratigraphic features while the plow zone provided a more general trend surface. The distribution of artifacts in strata and features appears in Table 8 according to the definitions and classification system of South (1977:210-211).

The "midden" derived its label by virtue of its 59% bone content (by count) plus an additional 15% kitchen related materials (ceramics and bottle glass). The fact that only one bone sherd out of 120 was recovered in the unit's plow zone, along with several pieces of window glass, suggests that the midden was in a dug pit, and the overlying window glass was largely introduced by breakage after the abandonment of the fort. Two small sherds of window glass in the midden may be intrusive as they represent only about 1/20 of the average site ratio.

The ceramic ratio for the hearth area is less than that for the site as a whole, probably due to the increase in other materials, with bone in particular making up half of the volume by weight. This also offset the expected increase in nails that would result from burning old lumber. A continuous ash lens just above the fire base, firecracked rock, reddened soil and painted brick from the hearth, as well as a concentration of chimney brick, testify to the hearth feature. If bone is eliminated, the artifact ratios are similar to the plow zone averages, with the exception of a considerable increase in kaolin pipe sherds, indicating the hearth is a good place to clean and break a pipe as well as discard the pieces.

The hearth construction trench was difficult to separate from the overlying hearth area due to rubble filling at demolition, plow disturbance, and mixing due to small materials filtering through the firebase. It was generally sparse in materials per volume excavated with the exception of brick (possibly wasters used in construction) and nails, which were twice the frequency of the site as a whole.

The plow zone's 67 one-metre units provided the most representative sample of the site with ceramics making up half of the artifact total and appearing ten times more frequently than bottle glass. Window glass and nails contributed another third and, together with clay pipe, the above made up 90% of the plow zone content. Most of the remainder was bone. Only 24 obviously modern artifacts had to be excluded from tabulation. No materials clearly relating to the 19th century or later were found in stratified units.

It is worth noting that the principal construction materials, window glass and nails, differed substantially in their ratios between the plow zone and stratified units as seen below:

The predominance of glass in the plow zone and nails in the lower units may support an historical account that the fort was built "of logs without windows," McClellan (1903:170). It is also possible that the glass was introduced in fill after abandonment but more likely results from breakage after abandonment, as previously noted. If this were the case and the blockhouse kept closed, then glass would have shattered inward. Although data is not complete, there appears to be a rectangular concentration of glass occurring on the site that may reflect the outlines of the blockhouse (see Fig. 40).

Data and methodology for intersite comparisons has been borrowed from South (1977), with additional information from Heldman (1983), and is summarized along with Fort Hill data in Table 9. South identifies a Carolina (or domestic) site

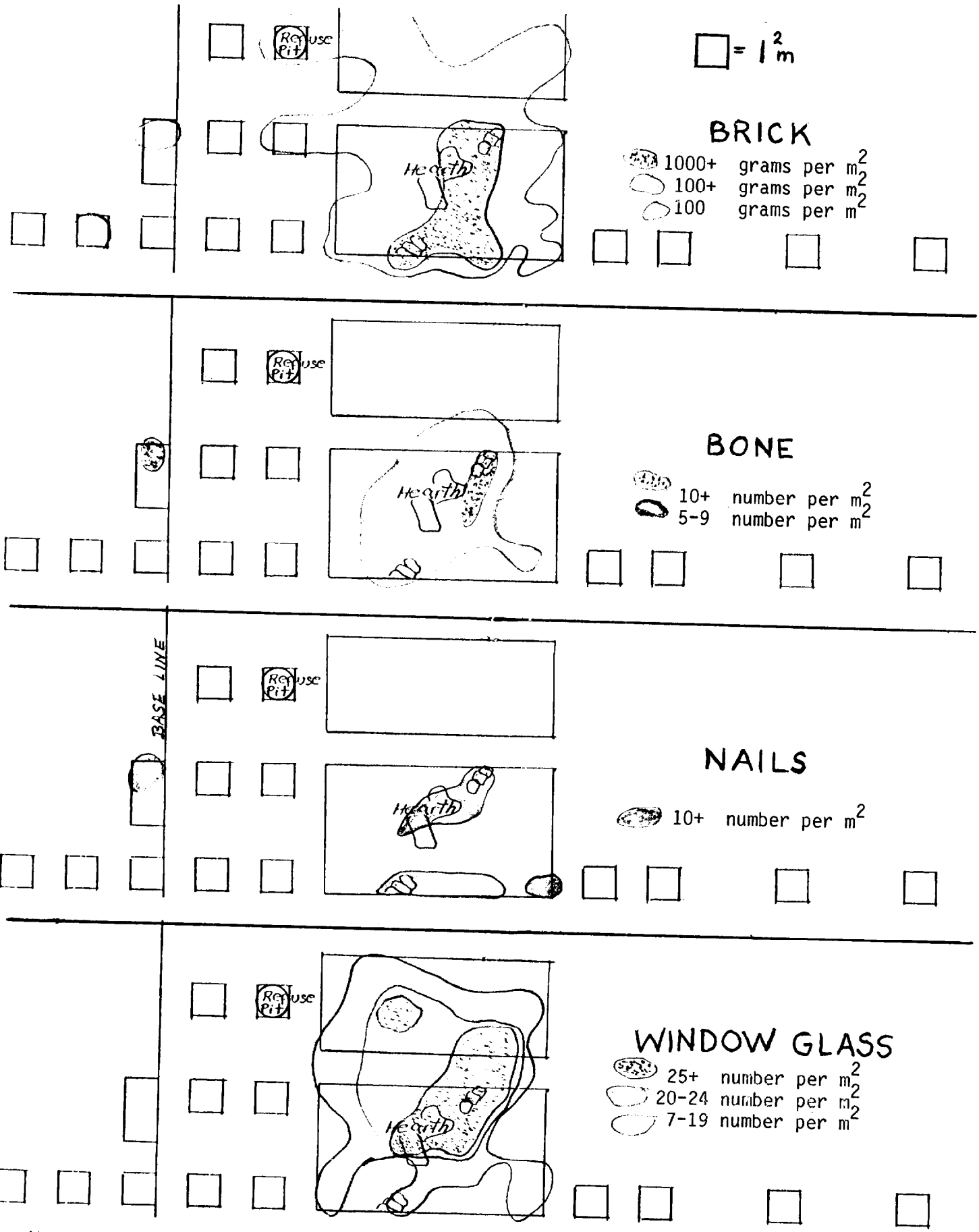


Figure 40. Artifact distribution in relation to features.

Table 8. Fort Hill intrasite comparisons

Artifact Summary Thru April 1983 (Brick not included)

ARTIFACT CLASS	PLOW ZONE f	PLOW ZONE %	PLOW ZONE %less bone	MIDDEN f	MIDDEN %	MIDDEN %less bone	HEARTH f	HEARTH %	HEARTH %less bone	HEARTH CONSTR. f	HEARTH CONSTR. %	HEARTH CONSTR. %less bone	TOTAL f	TOTAL %	TOTAL %less bone
KITCHEN	1331	51.7	56.7	30	14.7	35.7	170	29.6	57.2	24	22.9	51.1	1555	45.0	56.0
Ceramic	1193	46.4	50.8	24	11.8	28.6	144	25.0	48.5	23	21.9	48.9	1384	40.0	49.9
BONE	226	8.8		120	58.8		278	48.3		58	55.2		682	19.7	
ARCHITECTURE	856	33.3	36.5	17	8.3	20.2	76	13.2	25.6	16	15.2	34.0	965	27.9	34.8
Glass	595	23.1	25.4	2	1.0	2.4	6	1.0	2.0	5	4.8	10.6	608	17.6	21.9
Nails	257	10.0	11.0	15	7.4	17.9	68	11.8	22.9	11	10.5	23.4	351	10.1	12.6
FURNITURE	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
ARMS	7	0.3	0.3	5	2.5	6.0	0	0.0	0.0	0	0.0	0.0	12	0.3	0.4
CLOTHING	20	0.8	0.9	20	9.8	23.8	1	0.2	0.3	1	1.0	2.1	42	1.2	1.5
PERSONAL	3	0.1	0.1	1	0.5	1.2	2	0.3	0.7	0	0.0	0.0	6	0.2	0.2
TOBACCO	120	4.7	5.1	10	4.9	11.9	39	6.8	13.1	4	3.8	8.5	173	5.0	6.2
ACTIVITY	10	0.4	0.4	1	0.5	1.2	9	1.6	3.0	2	1.9	4.3	22	0.6	0.8
ARTIFACT	2347			84			297			47			2775		
BONE	226			120			278			58			682		
TOTAL	2573	100.1	100.0	204	100.0	100.0	575	100.0	99.9	105	100.0	100.0	3457	99.9	99.9

Table 9.

Fort Hill intersite comparisons with selected North American sites.

	Artifact Group Percentages:							
	Kitchen	Architecture	Furniture	Arms	Clothing	Personal	Pipes	Activities
Carolina Pattern	63.10	25.50	0.20	0.50	3.00	0.20	5.80	1.70
Frontier Pattern	27.60	52.00	0.20	5.40	1.70	0.20	9.10	3.70
Fur Trade Pattern	4.64	6.79	0.05	4.54	65.50	8.22	6.12	4.14
Hepburn-Reonalds House (S7) Brunswick Town	45.20	48.30	0.20	0.10	0.30	0.10	4.60	1.20
French Farm Lake Farm (20EM57)	41.88	41.72	0.00	0.70	1.57	0.17	4.36	9.60
Michilimackinac Rue de la Babillarde 1770s	11.42	4.29	0.28	17.75	36.26	1.04	5.38	10.86
Michilimackinac Rue de la Babillarde 1760s	9.12	13.39	1.07	16.17	45.23	0.64	1.71	12.68
Michilimackinac Rue de la Babillarde 1730s-1761	12.60	9.40	0.00	10.20	44.88	0.79	0.00	22.05
Fort Hill, Gorham, Me.	56.0	34.8	0.0	0.4	1.5	0.3	6.2	0.8

Data other than Fort Hill from Heldman, 1983.

pattern that has a high kitchen artifact ratio (ceramic and bottle glass) to architecture group (nails and window glass). This contrasts with his version of a frontier pattern that is characterized by an inversed kitchen group to architecture group ratio. The Fort Hill site is of interest since it fits his data chronologically and served both frontier and domestic functions. As expected, artifact group ratios at Fort Hill fall in the lower range of the domestic pattern yet show the influence of the frontier.

Other artifact classes also appear consistent with Fort Hill's mixed status. Furniture-related items are entirely absent suggesting the use of crude stuff and/or the removal of same. This also supports the abandonment thesis, rather than burning, as the latter would result in some hardware remaining in-situ.

Arms are sparse (and could relate to fowling pieces as well as a military presence) even though a detachment of ten soldiers and an officer stayed there. Sprue, shot and a gunflint turned up in the midden but were hardly present elsewhere, notwithstanding that the fort saw little or no action during the war years. Enough teaware was uncovered, however, to make a case for the tea ceremony associated with British military sites (Roth 1961).

Clothing items were also sparse in contrast to the high percentages found in habitation sites at Fort Michilimackinac. All 18 pins recovered came from the midden unit and buttons turned up on an average of one for every four units excavated. Their distribution was scattered, reflecting the incidental nature of their loss. Other personal and activity group items were insignificant in numbers, as small things of value are saved.

Pattern and Structure:

Whereas a few years ago local historians had only a vague notion of the Gorham Fort location, the recent archaeology has provided confirming evidence of the former structure. The excavation of 67 metric units has disclosed artifact patterns and two features, which in turn, allow for more accurate predictions of the content of new units and may lead to future discoveries.

As discussed in the methodology section, the distribution of key artifact types (brick, bone, glass and nails) has been plotted independently on the site plan (Fig. 40) in relation to features. A discussion of each artifact type and its probable relations to structure follows. It should be noted, however, that the artifact patterns are derived from plow zone strata only and do not include heavy concentrations of materials found in features.

As previously noted, the brick is closely associated with the hearth area and extends to the south. Outlying concentrations may or may not be significant considering that one stray whole brick (approximately 1800 gms) would be the equal of the total fragments found in some of the denser units.

Bone is also tied to the hearth area with an additional concentration of fragmented bone just to the west of the base line that could represent an adjacent midden or small hearth. It is of interest to note that the refuse pit feature was not reflected in the plow zone horizon, indicating the use of a dug pit.

The nail pattern, like that of bone, corresponds with hearth areas, although a linear concentration appears at the southern margin of the excavation. This contrasts with that of window glass which shows no outlying concentrations and appears in a dense cluster in units around and to the north of the hearth.

At this point, attempts at reconstructing the fort arrangement would be conjectural, at best, but some hypotheses appear in the model below (Fig. 41).

It should also be kept in mind that sleeping and storage areas would have involved a second story if this were garrison-type construction. Hence, upper level artifacts would overlay and mix with those of the ground floor. Also, several outbuildings may be involved, the discovery of which would contribute

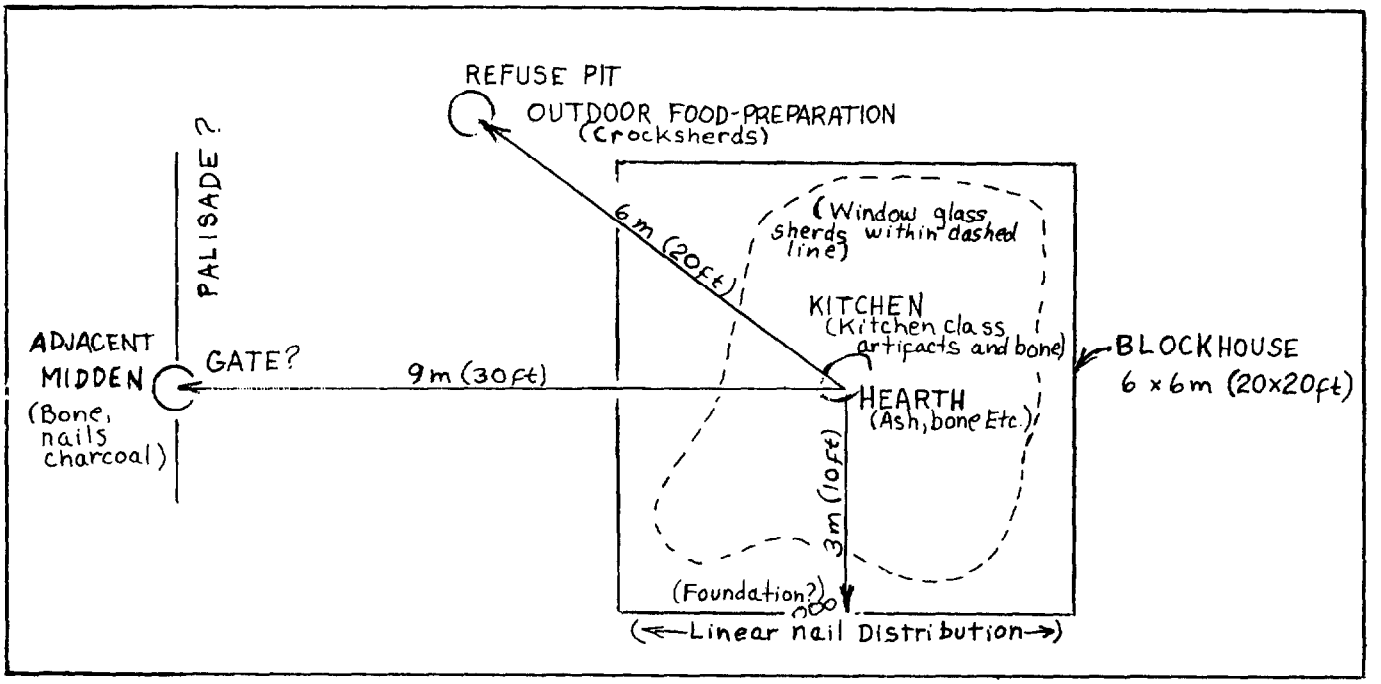


Figure 41. A thesis on fort structure and activity patterns.

greatly to the pattern. Crop marks that may reveal their location have been noted during recent field inspections.

The palisade is still the most significant missing feature in the archaeology to date. The well has not been located, either, although local legend suggests that water was hauled from a nearby brook. This is likely, since the site is on the height of land and underlain with ledge.

Even though evidence of the former structure is fragmentary, nomination to the Maine Register of Historic Places is recommended. Additionally, an inexpensive technique for public site interpretation could include gravel or sand backfilling along with landscaping to reveal site patterns.

Conclusion:

Sites disturbed by plowing and other activities need not be summarily dismissed from intensive field investigation. By analyzing patterns of artifact distribution, calibrating for the degree of disturbance and relating site features to the surroundings, considerable information may be obtained relative to the location, scale, time and nature of activities that took place on site and in the area. Such research can be considerably enhanced with a cross-disciplinary approach such as the melding of geographic and archaeological techniques.

In the Fort Hill case, a spotty and probably biased historical record offers little help in corroborating our findings. Yet, the demonstrated ability to predict patterns and associations based on limited sampling suggests that the methods employed have validity in reconstructing the functional organization of the site and its relationship with its surroundings.

BIBLIOGRAPHY

Anon
1886 Celebration of the 150th Anniversary of Gorham, Maine.
B. Thurston & Co., Printers, Portland.

Baker, Emerson W.
1981 "Test Excavations at the Province Fort Site (ME 483-1), Windham, Maine, 1979 and 1981."
Report to the Maine Historic Preservation Commission, Augusta.

Binford, Lewis R.
1962 "New Method of Calculating Dates from Kaolin Pipe Stem Samples,"
Southeastern Archaeological Conference News Letter.
Cambridge, Mass., Vol. 9, No. 1

Bradley, Robert L.
1978 Maine's First Buildings: The Architecture of Settlement, 1604-1700.
Maine Historic Preservation Commission, Augusta.

Bradley, Robert L.
1981 The Forts of Maine 1607-1945. An Archaeological and Historical Survey.
Maine Historic Preservation Commission, Augusta.

Camp, Helen B.
1975 Archaeological Excavations at Pemaquid, Maine, 1965-1974.
The Maine State Museum, Augusta.

Caywood, Louis R.
1955 Final Report Fort Vancouver Expeditions.
U.S. Dept. of Interior. National Park Service, San Francisco.

Clark, Charles E.
1970 The Eastern Frontier, The Settlement of Northern New England 1610-1763.
Alfred A. Knopf, New York.

Davey, Peter (ed.)
1979 The Archaeology of the Clay Tobacco Pipe II.
British Archaeological Reports, No. 60.

Davey, Peter (ed.)
1980 The Archaeology of the Clay Tobacco Pipe III.
British Archaeological Reports, No. 78.

Deetz, James
1977 In Small Things Forgotten.
Anchor Press/Doubleday, Garden City, New York.

Dole, Frederick H.
1935 A History of Windham, Maine.
Henry S. Cobb, Printer, Augusta.

Dunnack, Henry E.
1924 Maine Forts.
Charles E. Nash and Son, Augusta.

Fairbanks, Jonathan L. and Robert F. Trent
1982 New England Begins: The Seventeenth Century. Vol. 1, 2, and 3. Introduction, Migration and Settlements. Museum of Fine Arts, Boston.

Faulkner, Alaric
1982 "Pentagoet. A first look at Seventeenth Century Acadian Maine." Northeast Historical Archaeology, Vol. 10.

Fisher, Carleton E.
1972 History of Fort Halifax. The Courier-Gazette, Winthrop, Maine.

Forbes, Charles B.
1948 "Path of Settlement and the Distribution of Population in Maine." Economic Geography, Vol. 12.

Gibson, Susan G., editor
1980 A 17th Century Wampanoag Burial Ground in Warren, Rhode Island, Burr's Hill. The Haffenreffer Museum of Anthropology, Brown University.

Greenleaf, Moses
1829 A Survey of the State of Maine. Shirley and Hyde, Portland.

Haggett, Peter
1983 Geography, A Modern Synthesis. Harper and Row, New York.

Hanson, Lee and Dick Ping Hsu
1975 Casemates and Cannonballs. U.S. Dept. of the Interior National Park Service, Pub. in Archaeology No. 14, Washington, D.C.

Haskell, T. H.
1875 The New Gloucester Centennial. Hoyt, Fogg and Dunham Co., Portland.

Heldman, Donald P.
1983 Archaeological Excavations at French Farm Lake, 1981-1982. Mackinac Island State Park Commission, Mackinac Island, Michigan.

Hume, Ivor Noel
1976 Artifacts of Colonial America. Alfred A. Knopf, New York.

Hume, Ivor Noel
1974 Historical Archaeology. Alfred A. Knopf, New York.

Johnson, Walter H., Editor
1936 Bi-Centennial History of Gorham, Maine 1736-1936, General Committee of the Bi-Centennial, Westbrook.

Kellogg, Elijah
1877 Good Old Times.
Ticknor & Fields, Boston.

Kniffen, Fred
1965 "Folk Housing: Key to Diffusion."
Annals of the Association of American Geographers, 55, No. 4.

Marshall, J.M.
1874 A Report of the Celebration of the Centennial Anniversary of the Town of Buxton.
Dresser, McLellan & Co., Portland.

McClellan
1903 History of Gorham, Me.
Smith and Sale, Printers, Portland.

McManis, Douglas R.
1975 Colonial New England, An Historical Geography.
Oxford University Press, New York.

Moran, Geoffrey P.
1982 Archaeological Investigations at the Narbonne House.
National Park Service - U.S. Dept. of the Interior, Boston, MA.

North, James W.
1870 History of Augusta.
Clapp and North, Augusta.

Olsen, Stanley J.
1964 Mammal Remains from Archaeological Sites.
Peabody Museum, Cambridge, Massachusetts.

Olson, Sandra Gordon
1980 "Life At Fort Pownall"
Unpublished site report.

Oswald, Adrian
1975 Clay Pipes for the Archaeologist.
British Archaeological Reports, No. 14.

Quimby, Ian M.G.
1972 Ceramics in America.
University Press of Virginia.

Redman, Charles L. and Patty Jo Watson
1984 Archaeological Explanation, The Scientific Method in Archaeology.
Columbia University Press, New York.

Redman, Charles L. and Patty Jo Watson
1970 "Systematic Surface Collection."
American Antiquity, Vol. 35, No. 3.

Rockwell, Tim O.
1972-73 Belle Grove Excavations, Middletown, Va. 1972-73.
National Trust for Historic Preservation.

Roper, Donna C.
1976 "Lateral Displacement of Artifacts Due to Plowing."
American Antiquity, Vol. 41, No. 3.

Roth, Rodris
1961 Tea Drinking in 18th Century America: Its Etiquette and Equippage.
Contributions from the Museum of History and Technology, paper 14,
Smithsonian Institution, Washington, D.C.

Rowe, Ernest R.
1952 Highlights of Westbrook History.
Westbrook Women's Club, Westbrook, Maine.

Schiffer, Michael B. and William J. Rathje
1973 "Efficient Exploitation of the Archaeological Record: Penetrating Problems."
in Research and Theory in Current Archaeology, Charles L. Redman (ed.)
John Wiley & Sons, New York.

Schiffer, Michael B.
1981 Modern Material Culture.
Academic Press, New York.

Schmid, Elizabeth
1972 Atlas of Animal Bones.
Elsevier Publishing Co., New York.

Smith, Thomas L.
1873 History of the Town of Windham.
Hoyt and Fogg Co., Portland.

South, Stanley
1977 Method and Theory in Historical Archaeology.
Academic Press, N.Y.

Stone, Lyle M.
1974 Fort Michilimackinac 1715-1781.
Michigan State University, E. Lansing.

United States Department of Agriculture
1974 Soil Survey, Cumberland County, Maine.
U.S. Govt. Printing Office, Washington, D.C.

United States Geological Survey
1970 Gorham, Maine Topographic Quadrangle Map, 7.5' series.
Reston, Virginia.

Wheeler, George A.
1878 History of Brunswick, Topsham, and Harpswell, Maine.
Alfred Mudge & Son, Printers, Boston.

Whittlesey, Derwent
1929 "Sequent Occupance."
Annals of the Association of American Geographers, 19, No. 2.

Wilk, Richard and Michael B. Schiffer
1979 "The Archaeology of Vacant Lots in Tucson, Arizona."
American Antiquity, Vol. 44, No. 3.

Yeoman, R.S.
1983 A Guidebook of United States Coins.
Western Publishing Co., Racine, Wisconsin.

DESCRIPTION AND ANALYSIS OF GUNLOCKS FROM COLONIAL PEMAQUID

(Excerpt of a chapter prepared for a forthcoming volume on the archaeology of Colonial Pemaquid by Robert L. Bradley and Helen B. Camp)

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Archaeological excavations at Colonial Pemaquid have produced a modest collection of gun parts from various contexts, the most complete of which have been submitted to the author for identification and interpretation. All of these items have been fully cleaned and conserved either by the conservation laboratory of the Smithsonian Institution or the University of Maine Historical Archaeology Laboratory prior to analysis. While little of the original surface of the metal survives and no markings are legible, the specimens preserve faithfully their original contours, distinctive features, and approximate dimensions.

The sample consists of four partially complete gunlock mechanisms and an isolated gun cock. All of these pieces are from flint sparking mechanisms. The two larger locks and the cock represent muskets or fowling pieces, while the two smaller mechanisms come from pistols.

Musket Locks

Artifact 600

The earliest of the four gunlocks is a large, nearly complete *English dog lock* , sometimes called a *Jacobean lock* (Brown 1980:79) found on the upper floor rubble of a semi-circular tower at the north corner of fort William Henry (1692–1696). Parts represented, besides the lockplate itself, are the tumbler, mainspring, priming pan, frizzen, battery spring and bridle, and lower two thirds of the gun cock (Figure 1). Key parts that are missing include the horizontally acting sear, the dog catch, and the buffer block, but their locations are indicated by mounting holes or brackets on the lockplate.

This early lock has several interesting diagnostic attributes, but in order to appreciate them it is necessary first to understand the action of the mechanism and its evolution. The English lock evolved from another automatically igniting mechanism, the Dutch *snaphaunce*, or "pecking hen" shown in Figure 2 (Peterson 1962:77). Both mechanisms produced a spark by striking a gunflint, held in a the jaws of a hammer or *cock*, against a steel *battery*. The resulting shower of sparks fell into an open *pan* of gunpowder at the *breech* end of the barrel and ignited the charge.

These flint sparking mechanisms, although more complicated than the primitive matchlock, had the obvious advantages of being self-igniting, relatively weatherproof. Also, because they did not glow or smell before firing, they were less likely to give away one's position. They were, moreover, much simpler mechanisms than the contemporary wheel lock—by comparison a clockmaker's product. The snaphaunce and English locks shared the same simple, but primitive method for releasing the cock, which made them relatively inexpensive to produce and simple to repair (Figures 2 and 3). The key piece was a laterally acting *sear*, a lever which is activated by the trigger and releases the gun cock. One end of this lever passes through a rectangular hole in the side of the lockplate where it holds back the upturned tail of the cock (Glendenning 1951:107).

In both the snaphaunce and English locks, the gun cock is coupled to a gear-like *tumbler* on the inside of the mechanism by a short axle which passes through the lockplate. As the gun cock is manually drawn back into the "full cock" or "full bent" position, the tumbler compresses the mainspring, providing power to the action. When the full cock position is reached, the lug on the end of the sear protrudes through the side lockplate and engages the tail of the cock, holding it in place. When the trigger is pulled, the sear lug is withdrawn through the side of the lockplate until the cock is released. The cock then speeds towards the battery under the power of the mainspring. Striking the battery a glancing blow, it exposes the priming pan to a shower of sparks, ignites the charge, and finally comes to rest against an iron block or *buffer*. Naturally this action subjects the lug on the end of the sear to considerable shearing action. Very quickly it becomes worn round and prone to fire accidentally. Without additional safety features, this mechanism could have been as dangerous to its owner as to his prey.

The major difference between the English lock and the snaphaunce lies in the method for exposing of the priming charge in the pan. In order for the firearm to be portable, the charge in the priming pan had to be kept covered up until shortly before ignition. The problem arose in synchronizing the

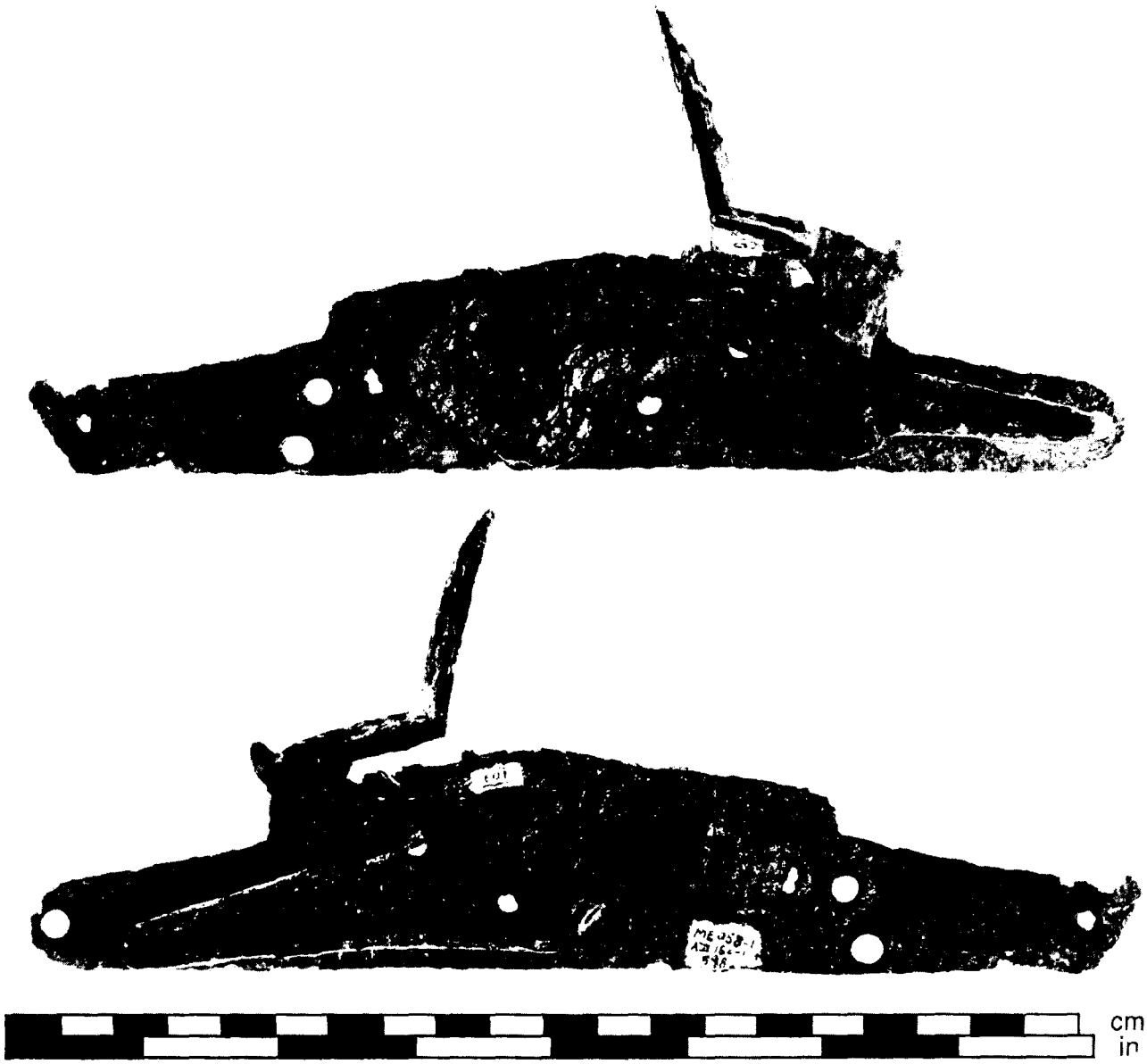

FIGURE 1. English dog lock found in the rubble of the tower of Fort William Henry, probably manufactured prior to 1650, artifact 600.

action of the firearm so that the charge would be exposed only at the very last instant. In the snaphaunce, this was accomplished either by sliding the pan cover forward manually just before firing or, in a more complex version, by a plunger which linked the pan cover to the tumbler (Peterson 1962:77). The principal innovation of the English lock was the combination of the pan cover and battery into a single piece, or *frizzen* (apparently a 19th century term), thus reducing the number of moving parts, and the number of motions required to load the weapon (Figure 3). When the cock struck the frizzen, the frizzen flew back, exposing the pan at just the proper instant.

This improvement in the reliability of the weapon, however, was accomplished at the expense of safety. The battery of a snaphaunce could be kept flipped forward when the gun was being loaded or carried. Thus even if the cock was released accidentally, the flint would have nothing

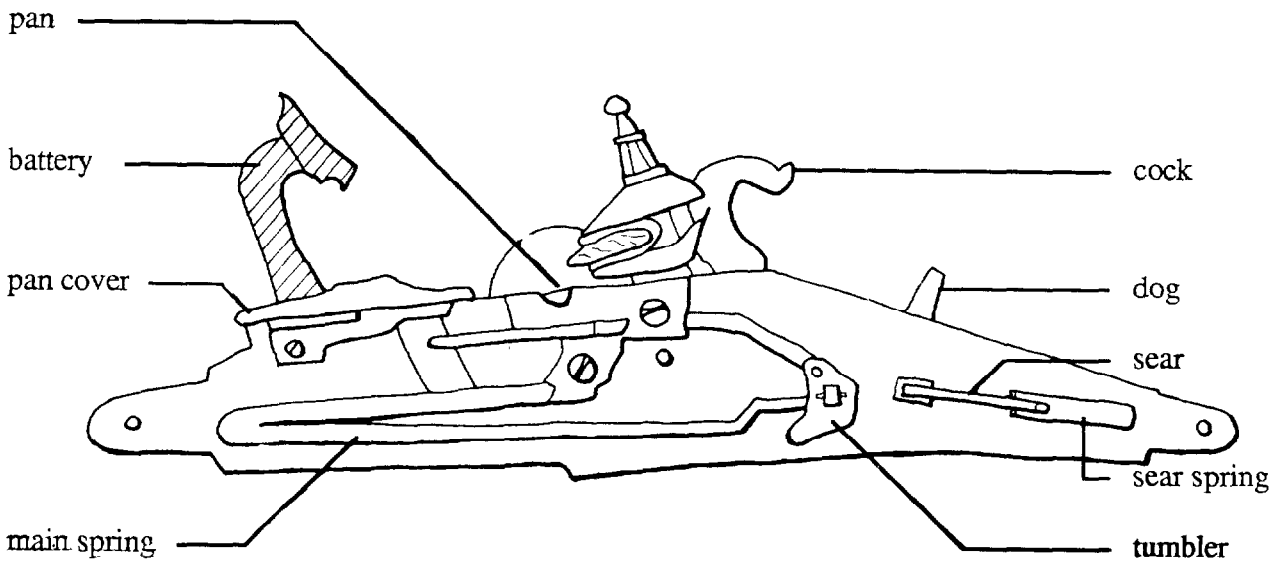

FIGURE 2. Snaphaunce firing mechanism, internal view. (after Brown 1980:70)

to strike. The frizzen of the English lock, however, was necessarily kept in the firing position in order to keep the priming charge covered. In order to load and carry such a mechanism, therefore, it was necessary to provide a secure "half cocked" position which would allow the pan to be opened, primed with powder, and reclosed. This was accomplished by adding a *dog* or catch to the outside of the mechanism to hook onto the tail of the cock and hold it safely in position—hence the name *dog lock* . Many versions of the lock were also provided with a internal half cock position. This was effected by a complicated ratcheting mechanism in which the sear first engaged the tumbler in mid position, and did not engage the cock directly until the latter was it was fully drawn back (Glendenning 1951:111). The dog, however, was often retained as a safety—to prevent the firearm from "going off half cocked." Without the dog, this mechanism is known simply as an *English lock.*

This particular specimen is a typical early form of dog lock. A ramp is incorporated in the tumbler, a feature which indicates that the weapon was provided with an internal half cock position. Although the external dog itself does not survive, there is a mounting hole for it in the lockplate and a small facet filed into the tail of the cock which the dog engaged. Thus the firearm was provided with a redundant safety system—a wise precaution considering the dubious mechanical reliability inherent in its design.

The English dog lock went through a number of evolutionary changes, during the 17th century, gradually taking on the characteristics of the true flintlock or *French lock* by the first decade of the 18th century (Peterson 1956:29–31). Towards the end of the century, the lockplate became curved, eventually taking on the "banana" profile of the true flintlock (Figure 4). By the middle of the 17th century, the horizontal sear was replaced by a vertical sear which engaged a notch on the tumbler directly, just as a pawl engages a rack in a ratchet mechanism. Consequently the tail of cock degenerated, and the safety dog now fit into into a simple notch in the cock body. Also the formerly square corners of pan became beveled or rounded.

In all of these characteristics, the Pemaquid lock shows the more conservative form. The laterally acting sear and the S-shaped cock whose tail it engaged are particularly primitive features. In the armorer's workshop at Fort Pentagoet in Castine, Maine, for example, the lateral sear was already being replaced by the vertical sear during the first period of French occupation, 1635–1654 (Faulkner 1986). Also notable is the long, straight, lower margin of the lockplate, a form dating to the first half of the 17th century and inherited from the snaphaunce. The ornamental finial on the back end is a typical early feature as well, although the shape of this particular specimen is unusual. When viewed from above, the priming pan is L-shaped with square edges, unlike later beveled or rounded forms. The frizzen is light and delicate, but has the curved striking surface typical of English and French design, and distinct from the contemporary Dutch form which was straight and massive (Blanchette 1980:68). Finally, the lock is so large that employs three mounting screws, located at the

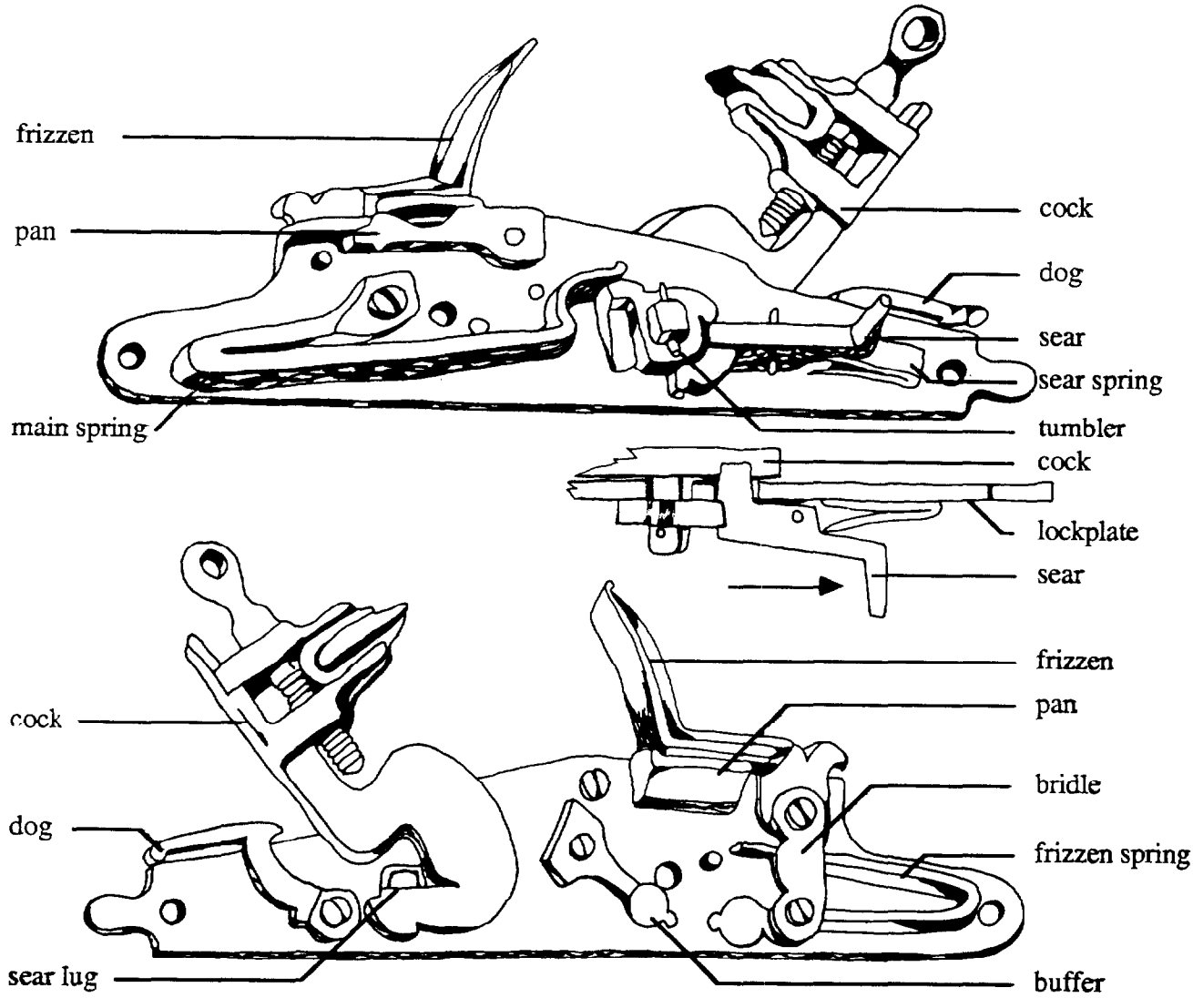

FIGURE 3. Early English dog lock mechanism showing horizontally acting sear. (after Peterson 1956: Plate 25)

ends and the center of the lockplate. By the second quarter of the 18th century, most musket locks had only two mounting screws, one at each end (Peterson 1956:35).

While the dog lock is thought to have been the dominant firing mechanism in the English colonies between 1625 and 1675 (Peterson 1965:31), the Pemaquid lock was probably made during the first half of this period. It is identical in all important respects to two specimens in an English collection reputed to date prior to 1640 (Glendenning 1951:104–112). It is also very similar to an archaeological specimen from an early 17th century context in Yorktown, Virginia (Peterson 1956:Plate 27, 32). While the Pemaquid lock may have been made somewhat later than the Yorktown example, it is of a form which was rapidly replaced during the 17th century as firearms technology developed, and it is unlikely to have been fabricated after c. 1650. Even the dog locks used in the English Civil War (1642–1646) were generally of more advanced forms.

The Pemaquid specimen is virtually identical to a Jacobean lock presently in the hands of the Massachusetts Historical Society. The latter was used by one of Benjamin Church's Indians to kill the Wampanoag chief King Philip in 1676 (Peterson 1956:32, Brown 1980:131). One implication is that by this date, well used, obsolescent firearms were being supplied to the Indians. Thus the discovery of this specimen at Fort William Henry in a context as late as 1696 seems unusual, and it is unlikely that this forty-five to seventy year old piece was typical of the equipment used by the garrison.

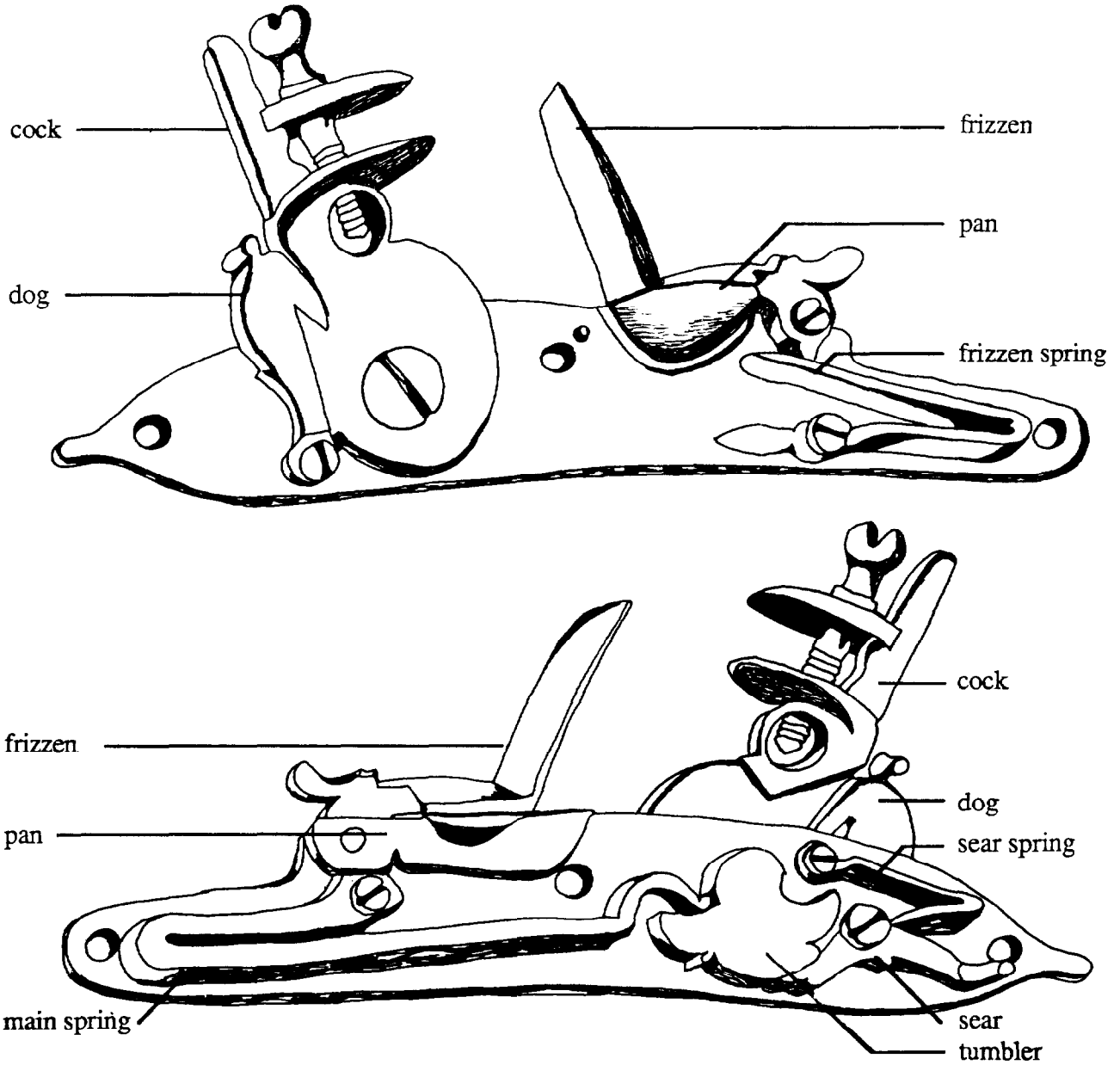

FIGURE 4. Late dog lock with a vertically acting sear. (after Peterson 1956: Plate 26).

Nevertheless, the mechanism had seen extensive use over a long lifetime. The priming pan, for example, had nearly burned through, and was due for repair by the time it was discarded.

What appear to have been "obsolete" firearms, moreover, sometimes remained in service for extraordinarily long periods. One claim has been made for the retention of this same form of early dog lock even up to the American Revolution. Two specimens appeared in refuse excavated at the Geddy Workshop in Williamsburg, Virginia, evidence that some early muskets were kept and not refurbished with true flintlocks until as late as 1776 (Noel Hume 1970:19, Figure 10). In an era when lock parts had to be individually fitted, repairing an ancient dog lock was hardly more difficult than maintaining a more modern flintlock.

Finally, the condition of the lock may indicate the context of its demise. First, the jaws of the cock have been forcibly broken off. The break shows considerable plastic deformation, and was accomplished by prying the neck outward. The gun cock fractured at its narrowest and weakest point, a rather common occurrence judging from the remains of firearms found at 18th century Fort Michilimackinac in Michigan (Hamilton 1980: Figure 73). The form of the fracture, however, shows clearly that it was not broken in normal use, but rather by a violent act—probably sabotage. Also, the central mounting bolt has been driven

through the lockplate, and protrudes through the outside, as if the stock had been struck deliberately with a heavy hammer on the left hand side. When head of the bent gun cock was broken off, the remainder flew forward under the power of the mainspring, bending and nearly shearing off the protruding mounting screw.

Artifact 885

The second musket or fowling piece lock was found in association with the Officers' Quarters at Fort Frederick, built in the rubble of Fort William Henry and actively garrisoned between 1729 and c. 1734. This is a true *flintlock*, and is typical of weapons in use at the end of the 17th century and later (Figure 5). Besides the lockplate, the parts recovered include the sear spring, the priming pan and the frizzen. The mechanism was a typical flintlock in most respects, and clearly employed a vertically acting sear, as there is no rectangular hole in the side of the plate. The rounded priming pan is

FIGURE 5. Flintlock from the Officers' Quarters at Fort Frederick, probably manufactured between 1690 and 1720, artifact 885.

a relatively late characteristic while the arc of the lockplate is characteristic of the period 1690–1740 (Figure 6).

This general form of flintlock changed very little from the late 17th century through the middle of the 18th century. Superficially, the specimen is very much like those from later contexts such as the English occupation at Fort Michilimackinac, Michigan from 1761 to 1781 (Hamilton 1976: Figures 17–18). The Pemaquid lockplate, however exhibits two subtle characteristics which are decidedly more primitive, indicating that this was an earlier variety. These clues are both evident in the pattern of screw holes. This plate, like its bulky antecedents, was mounted with three bolts rather than two. Yet it also lacks the screw hole necessary to mount a tumbler bridle, a bracket which served to stabilize the action of the cock and tumbler. This feature was introduced at the end of the 17th century. By 1717 it had become standard on French military firearms, and shortly thereafter it was adopted by English gunsmiths (Bouchard 1978:12–14). Publications showing the earlier three bolt, bridleless design are rare, but do exist. The Pemaquid specimen is essentially identical to the lock of a long barrelled fowler in the collection of Harold Peterson (1956:45, Plate 52), dated by him between 1688 and 1700. A very similar lock, fitted to a blunderbuss, bears the markings of one "Crips," a London gunsmith active c. 1685–1715 (Brown 1980:142).

While it is possible for this gunlock to have been in use during the operation of Fort Frederick, its date of manufacture is certainly more compatible with Fort William Henry, 1692–1696. The association with Fort Frederick, therefore, may be the result of secondary deposition.

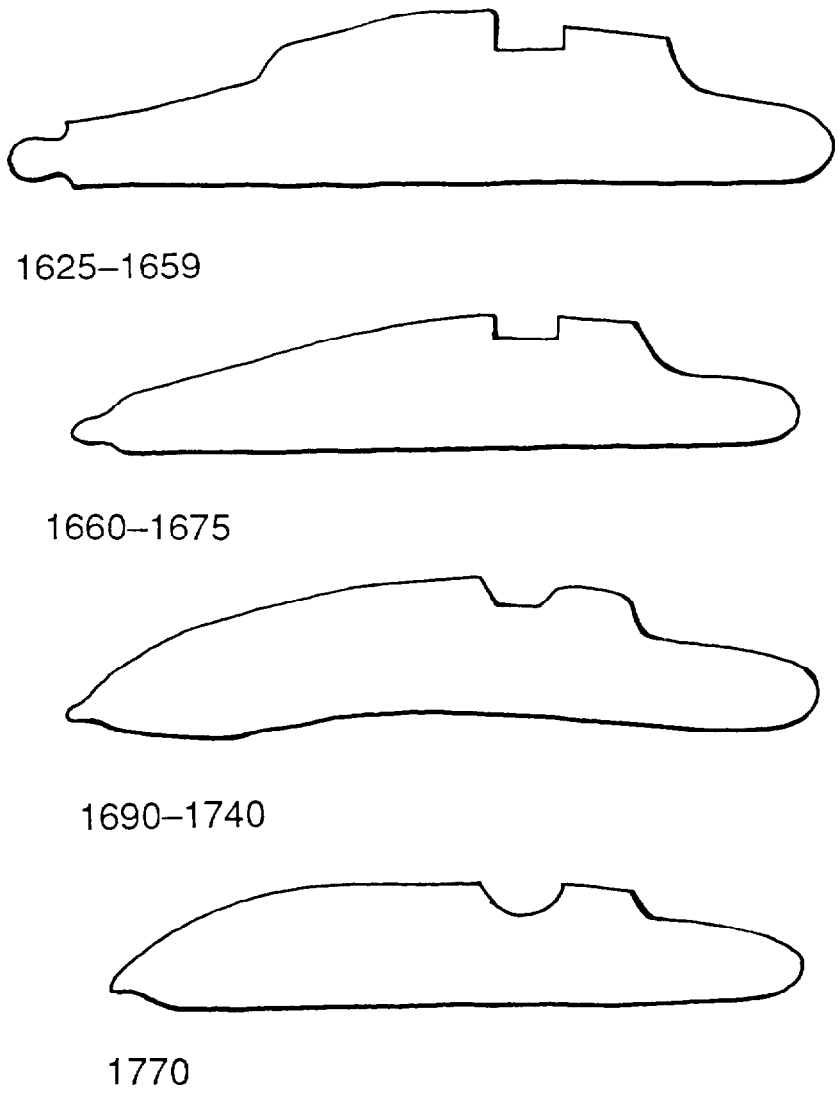

FIGURE 6. Evolution of English lockplate forms, 1625-1770. (after Peterson 1956: Plate 38)

Pistol Locks

Artifact SR–2

Of the all the locks from Pemaquid, this is the most complete, missing only the mainspring (Figure 7). It was found in the village area of Pemaquid in Structure 2, tentatively identified on the basis of tobacco pipe remains and other domestic artifacts as the John Earthy Tavern, in operation from 1650 to c. 1676. This pistol lock, however, is of much later manufacture, and must represent fill dumped into the cellar hole of the tavern.

This item is a completely developed flintlock mechanism probably of English manufacture, but faithful to the French prototype. While grossly similar pistol locks were made as early as 1680 (Brown 1980:151), the presence of a tumbler bridle indicates that the mechanism is probably a later product of the 18th century. The Pemaquid specimen is very close mechanically and stylistically to a lock illustrated in the 1770 edition of Denis Diderot's *Encyclopedia of Sciences, Arts, and Crafts*, (Brown 1980:205) redrawn in Figure 8. Note in particular that the ornate tumbler bridles are virtually identical. The only significant distinction lies in the design of the cock's comb which is simpler and surely cheaper to make (c.f. Benson 1980: Figure 59).

Artifact S2

The second pistol specimen, also from the John Earthy tavern, is missing the sear, the tumbler, and the cock (Figure 9). It is a particularly interesting mechanism because of the unusual frizzen spring arrangement. In this piece the frizzen spring is located on the interior, piggybacked on top of the main spring. It presses on a cam which is connected to the frizzen by an axle passing through the lockplate. This novel design gives the exterior of the lockplate a relatively clean, uncluttered, "modern" appearance.

Other characteristics of the lock have somewhat contradictory implications. The pan and frizzen are rounded and therefore relatively advanced. The straight lower margin of the lockplate, however, is an early trait, like that of the dog lock. Furthermore, although nose of the sear is broken, the rest of the sear and its spring were intact, and clearly operated horizontally. In this case, unlike the dog lock and snaphaunce, the sear did not pass through the lockplate, but engaged the tumbler directly. Unlike the usual pawl and ratchet arrangement, however, the cock was retained by a long arm which extended from the sear and hooked over the top of the tumbler.

This lock mechanism remains something of an enigma, its country of origin and period of manufacture yet to be determined. It is probably a transitional form of flintlock, an experiment designed to improve on the more traditional dog-lock mechanism. The enclosed frizzen spring and unique lateral sear design are innovative features—ideas which apparently never gained wide acceptance. While the piece might be a late 17th century product, it is unlikely to have been contemporary with the last use of Earthy's Tavern at the outbreak of King Philip's War in 1676.

Gun Cock

Artifact 884

A complete gun cock was recovered from the Officers' Quarters at Fort William Henry where it was deposited c. 1696. It retains in its jaws a blonde, spall type gunflint, damaged on one side, but still usable (Figure 10). This artifact, with its recurved neck and gracile *comb*, is a variety "gooseneck," a type characteristic of the French flintlock. Although goosenecks changed little from c. 1660 to c. 1820 they can be dated according to a simple typology devised by Jack Benson (1980) based on the products of known gunsmiths.

Three attributes place this gooseneck early in the evolutionary sequence. The upper jaw of the vise, or *cap*, is of a broad, teardrop shape, and tapers towards the back, a characteristic of cocks made prior to 1750 (Figure 11). After the first quarter of the 18th century, vise jaws became more symmetrical ellipses, or tapered towards the front. The cock also retains a simple method for aligning the jaws, a design previously employed on wheel locks and snaphaunces. A notch in the upper vise jaw or cap fits around the narrow shaft of the comb, which is square in cross-section. A later, alternative design, reverses this relationship; the comb is broad and slotted while the cap is tanged at the back and fits into the comb. While both versions were used in English firearms up through the early 19th century, the grooved comb design appears to have become the more popular of the two in the 18th century. A final early characteristic is rounded section of the cock body at the tumbler hole. This is flat on the inner face and convex and slightly asymmetrical on the exterior, a characteristic of 17th and early 18th century goosenecks. By the middle of the 18th century gooseneck cocks were made flat on both surfaces, usually with chamfered or beveled

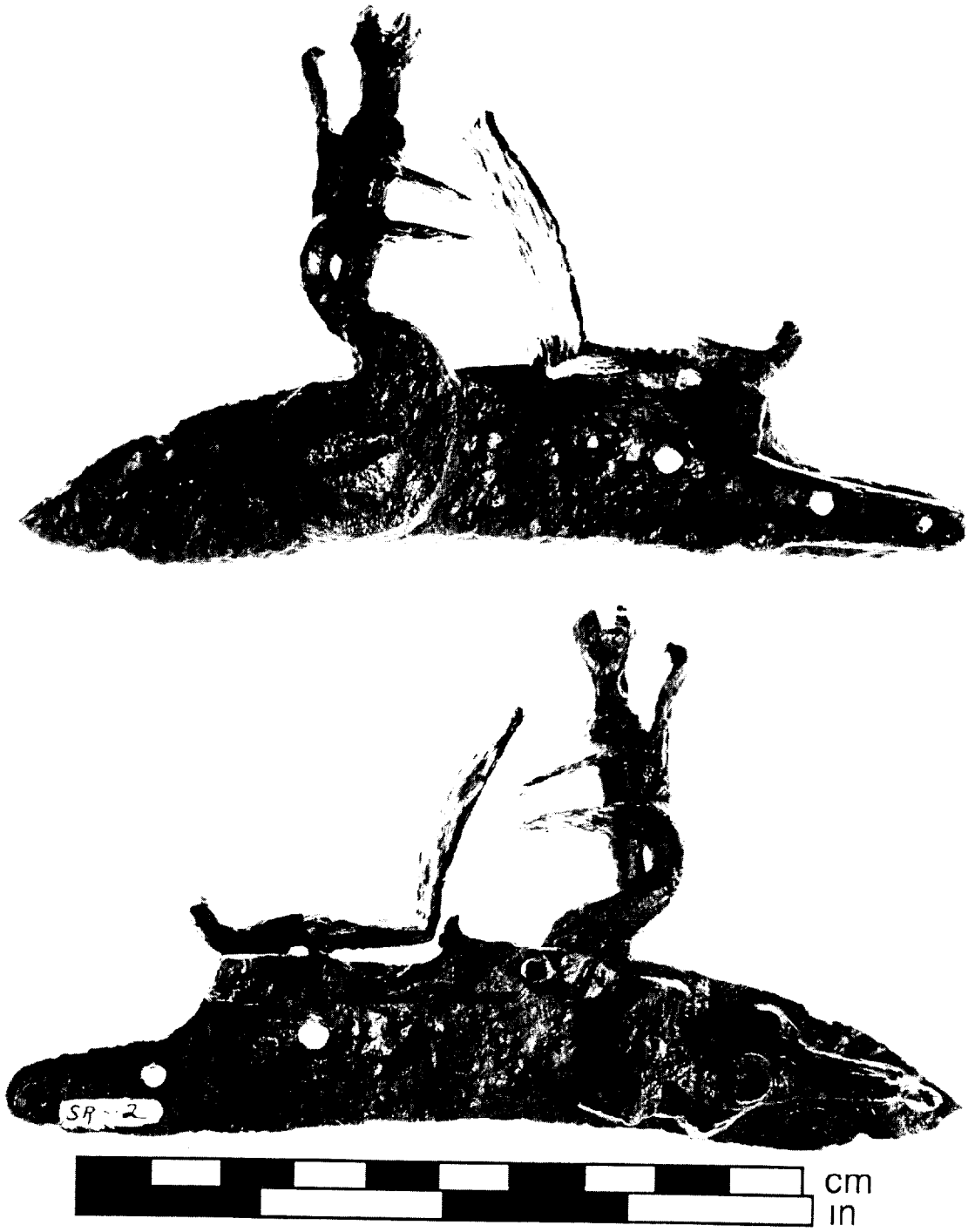

FIGURE 7. A mid 18th century flintlock pistol mechanism recovered from fill within Structure 2, the John Earthy Tavern, c. 1650-1676, artifact SR-2.

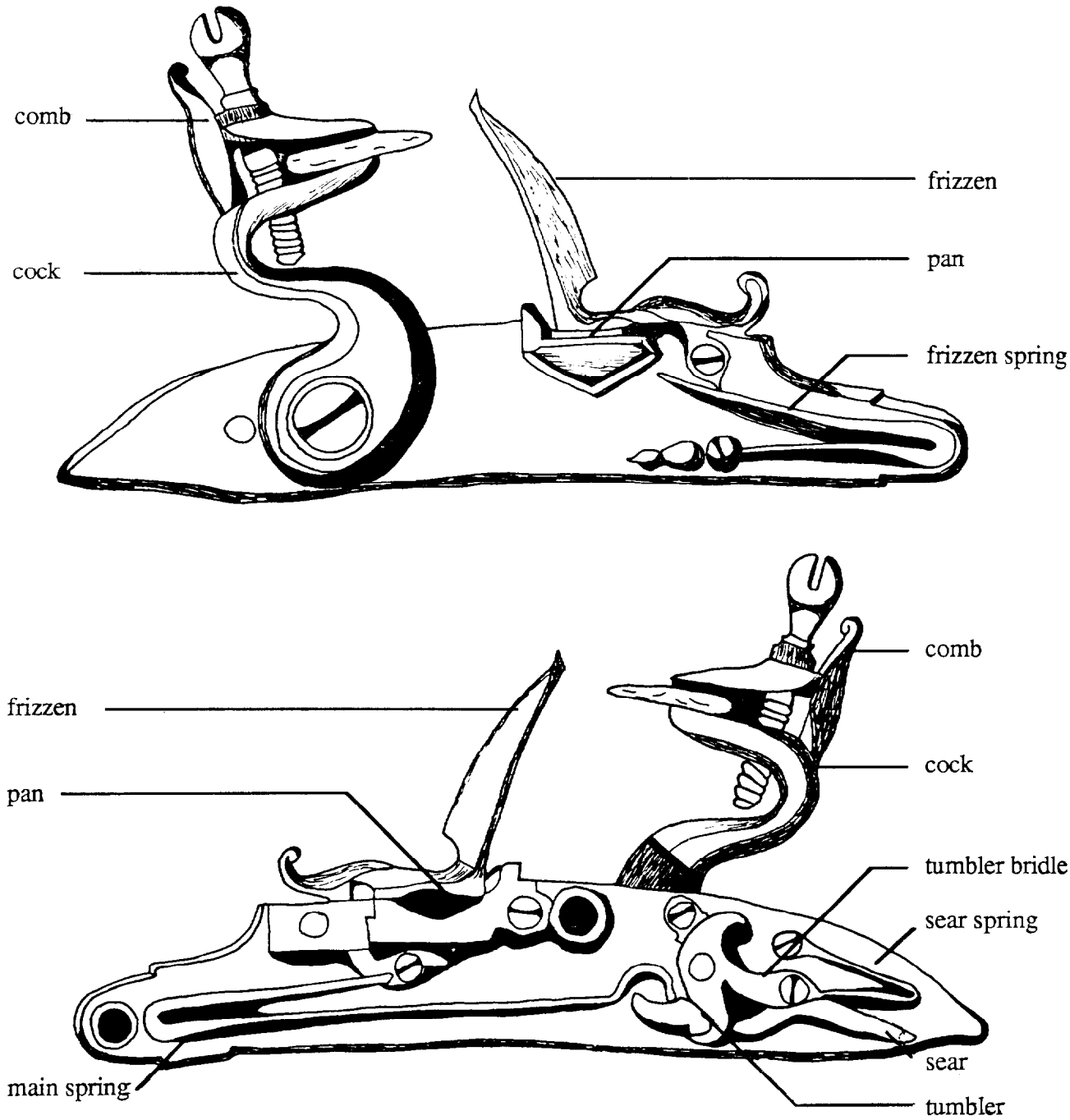

FIGURE 8. Typical French flintlock mechanism, redrawn from Denis Diderot's *L'encyclopedie, ou Dictionnaire Raisonné des Sciences, des Arts et des Metiers*, 1770 edition.

edges on the outside face, resulting in a sub-rectangular or trapezoidal section.

In body section, the Pemaquid cock resembles a lock by "Brook" made c. 1680, while the comb and cap arrangement matches a pistol made by "Clarkson" c. 1710 (Benson 1980:98, Figure 58, top). Thus it is likely that this piece was made at the end of the 17th century. It is not unusual, however, to find such early goosenecks in mid or late 18th century contexts. A complete British gun cock from Fort Stanwix in Rome, New York (1758–1781) is very similar in outline and section to the Pemaquid specimen, although it incorporates the grooved comb design (Hanson and Hsu 1975: Figure 43i). Michilimackinac (1715–1781) has produced similar gun cocks (Hamilton 1976: Figure 2c, Figure 22s).

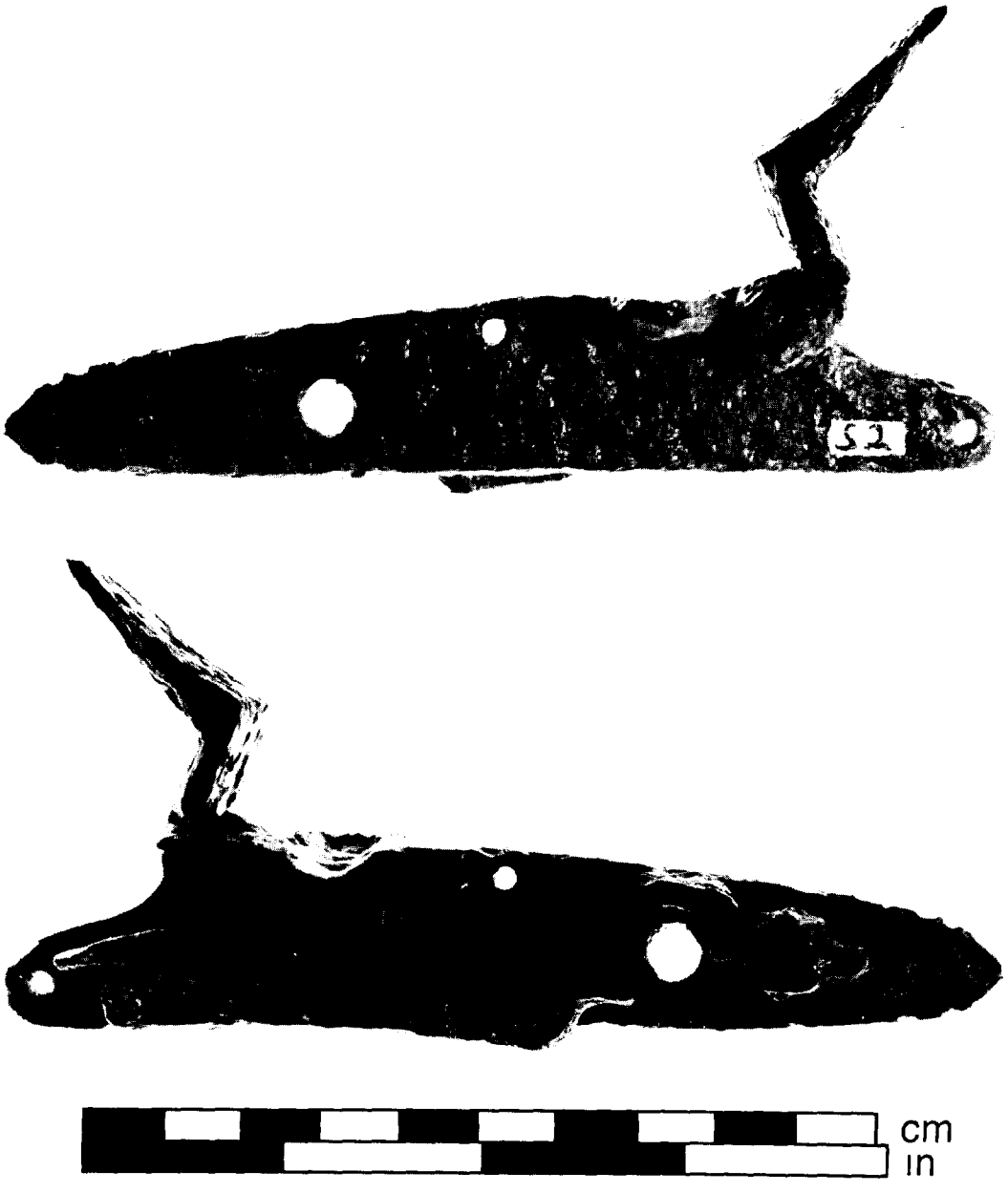

FIGURE 9. Flintlock pistol mechanism of unknown date and origin, recovered from fill within Structure 2, the John Earthy Tavern, c. 1650-1676, artifact S2. This unusual action has an internal frizzen spring and a horizontally acting sear which hooks over the tumbler.

Conclusions

As there is no evidence to the contrary, all of the specimens are assumed to be of British manufacture, except for S2, which has not been unidentified. These pieces all represent flintlocks or their immediate antecedents, yet they exhibit distinct mechanical and stylistic attributes which indicate wide variation in manufacturing date, ranging from the early 17th century through the middle of the 18th century.

Two of the four lockplates examined were probably in service up to the time of their demise and deposition in the site. The dog lock, no. 600, was clearly sabotaged while it was still usable, and the flintlock pistol, SR–2, was virtually intact except for a mainspring when it was discarded. The remaining two locks were missing several major parts, but it is not clear whether this was due to differential preservation, selective recovery, sabotage, or scavenging of parts for repair of other firearms.

FIGURE 10. Complete, undamaged "gooseneck" gun cock from the fill of the Officers' Quarters at Fort Frederick, artifact 884. Though found separately, this cock is compatible and contemporary with the lockplate shown in Figure 5, artifact 885, and originally the two may have constituted a single mechanism.

The gun cock, no. 885, and the large lockplate, no. 884, are stylistically and mechanically compatible, and are of similar manufacturing date. Although they were discovered separately, it is possible that they represent a single weapon, ancient yet serviceable, discarded at the destruction of Fort William Henry in 1696. According to this interpretation, the lockplate must have been redeposited supsequently in the later fill of Fort Frederick.

Finally, cannibalized gun mechanisms, especially stripped lockplates, are common by-products of firearms maintenance, and are to be expected on such frontier sites (c.f. Faulkner 1985; Light and Unglik 1984:29–31; Hamilton 1980: 116–119). However, there appears be no consistent pattern or concentration of evidence for firearms repair in the Pemaquid collections. This suggests that the relevant workshop areas and trash heaps of the various smiths and armorers who must have operated at Pemaquid during its several occupations have yet to be identified.

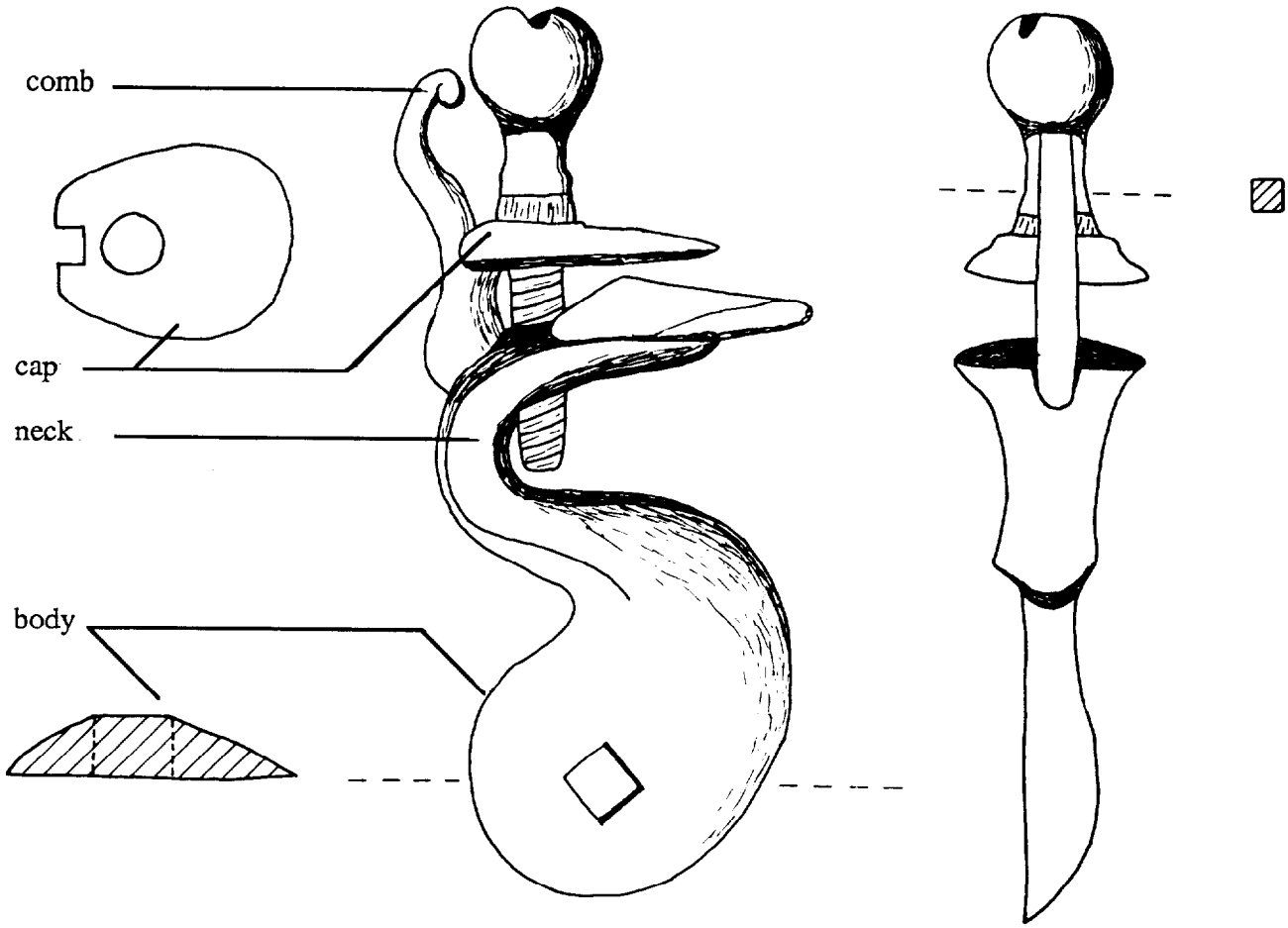

FIGURE 11. Salient features of the Pemaquid gooseneck, artifact 884. The teardrop shaped, grooved cap, the square section of the comb, and the convex section of the body all suggest that this is an early gooseneck form, possibly made in the late 17th century or early 18th century.

REFERENCES

Benson, Jack J.
1980 Style Changes in Goose-Necked Cocks. In T.M.Hamilton, *Colonial Frontier Guns*, The Fur Press, Chadron, Nebraska.

Blanchette, Jean François
1980 Firearms, In *Burr's Hill: A 17th Century Wampanoag Burial Ground in Warren, Rhode Island*, Susan G. Gibson, Ed.

Bouchard, Russel
1978 *Les Fusils de Post de Traite Pontchartrain: 1690–1760*. Section des Études Amérindiennes de l'Univertité du Québec à Chicoutimi, Chicoutimi.

Brown, M. L.
1980 *Firearms in Colonial America*. Smithsonian Institution Press, Washington.

Faulkner, Alaric
1986 Maintenance and Fabrication at Fort Pentagoet 1635–1654: Products of an Acadian Armorer's Workshop. *Historical Archaeology*, in press.

Glendenning, Ian
1951 *British Pistols and Guns 1640–1840*. Cassell & Co., London.

Hamilton, T.M.
1980 *Colonial Frontier Guns*. The Fur Press, Chadron, Nebraska.
1976 *Firearms on the Frontier: Guns at Fort Michilimackinac 1715–1781*. Reports on Mackinac History and Archaeology Number 5, Mackinac Island State Park Commission, Williamston, Michigan.

Hanson, Lee and Dick Ping Hsu
1975 Casemates and Cannonballs: Archeological Investigations at Fort Stanwix, Rome, New York. *Publications in Archeology 14*, National Park Service, Washington.

Light, John D. and Henry Unglik
1984 *A Frontier Fur Trade Blacksmith Shop 1796–1812*. Studies in Archaeology, Architecture and History. Parks Canada, Ottawa.

Noel Hume, Ivor
1970 *James Geddy and Sons, Colonial Craftsmen*. Colonial Williamsburg Archaeological Series No. 5, Williamsburg.

Peterson, Harold L.
1956 *Arms and Armor in Colonial America 1526–1783*. The Stackpole Company, Harrisburg, Pennsylvania.
1962 *The Treasury of the Gun*. Golden Press, New York.

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