ARCHAEOLOGICAL INVESTIGATIONS

AT

CROAKER LANDING

44JC70 and 44JC71

1988

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The VDHL personnel who participated in the field research included William P. Boyer, Jr. as principal investigator, Wayne E. Clark as field supervisor, and Mary Ellen N. Hodges, Celia Reed, and Keith Egloff as excavators. Mary Ellen N. Hodges processed the artifacts and assisted Keith T. Egloff in preparing the drawings of the maps and features. Cathy Fauerbach, photographer, prepared the plates.

The principal author, Keith T. Egloff, compiled the report and authored all sections except those dealing with the faunal remains from 44JC70. The complex and informative analysis of faunal remains is contained in three studies written by Mary Ellen N. Hodges and Leslie D. McFaden of the Division of Historic Landmarks, and Jay F. Custer and Keith R. Doms of the Center for Archaeological Research, Department of Anthropology, University of Delaware.

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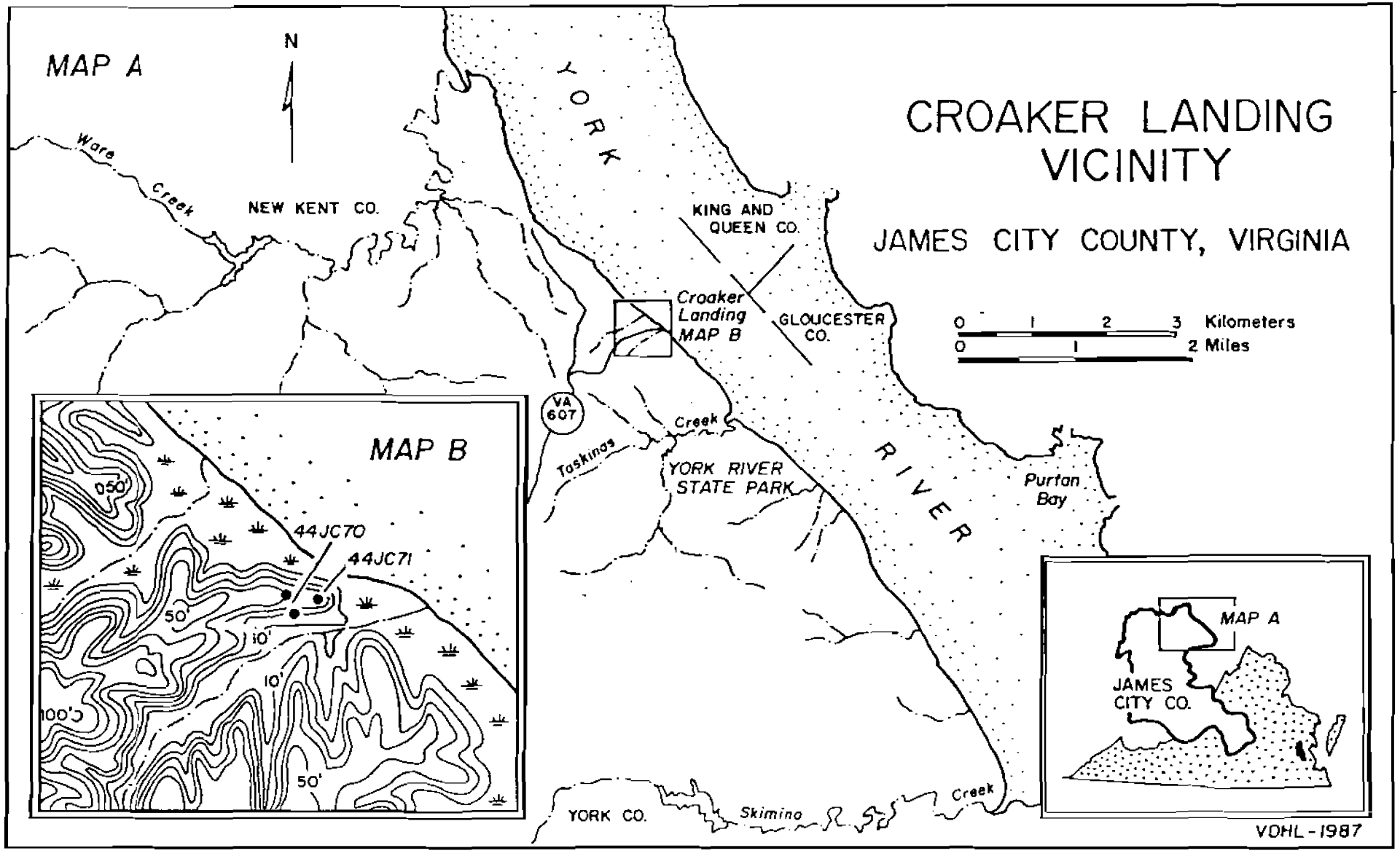
INTRODUCTION

Croaker Landing, located in James City County along the south bank of the York River 10 miles north of Yorktown, is a small boat landing and parking area where the local watermen and boating enthusiasts gain access to the York River (Figure 1). While the Virginia Division of Parks and Recreation were expanding the facilities at Croaker Landing, that were acquired as part of the York River State Park, land clearing activities along the river bluff revealed a wide variety of Woodland ceramics and associated oyster shell scattered on the surface of the ground. Archaeological investigations were considered appropriate prior to further land clearing activities and facility construction.

A reconnaissance survey, performed by the Virginia Division of Historic Landmarks at Croaker Landing on 24 January 1978, located cultural debris on the tops of two 30' high knolls and at the base of one of the knolls. These three clusters of cultural debris were assigned two official state site numbers, 44JC70 and 44JC71. Because the clusters are located near each other and revealed similar cultural remains, they may be considered components of the same site.

The knolls form a point of land overlooking an extensive area of tidal flats along the York River. Broad, sweeping marshes extend to both the north and south of the point of land. This small campsite is located just down river from the freshwater-saltwater transition zone of the York River.

The survey led to test excavations by the Division of all three clusters of cultural material. Test squares at one knoll top component, 44JC70, revealed limited cultural material and no


CROAKER LANDING VICINITY
JAMES CITY COUNTY, VIRGINIA
MAP A
N
Ware Creek
NEW KENT CO.
YORK
KING AND QUEEN CO.
Croaker Landing MAP B
GLOUCESTER CO.
0 1 2 3 Kilometers
0 1 2 Miles
VA 607
Taskinas Creek
YORK RIVER STATE PARK
RIVER
Purtan Bay
MAP B
050'
44JC70
44JC71
50'
10'
10'
100'
50'
MAP A
JAMES CITY CO.
YORK CO.
Skimino Creek
VOHL-1987

stratigraphy or cultural features. No further work was conducted there. Only at the knoll top component, 44JC70, revealed limited cultural material and no stratigraphy or cultural features. No further work was conducted there. Only at the knoll top designated 44JC71 did investigations uncover a large amount of ceramics associated with a well preserved oyster shell feature. This feature was entirely excavated.

Test investigations at the base of the first knoll, 44JC70, revealed a well preserved deeply stratified midden deposit. Since such deposits are extremely rare in the coastal plain of Virginia, intensive archaeological excavations were conducted by the Division from 26 January to 21 March 1978. The stratified midden revealed slices of prehistory through 2500 years of time from approximately 1000 B.C. to A.D. 1500. The midden and associated pit features provided a sequence of projectile point types and ceramic wares that corroborated existing sequences for the Coastal Plain of Virginia. Furthermore, one previously undefined ceramic ware, Croaker Landing, and one projectile point type, Potts Side-Notched, were defined. The unusual wide variety of well preserved stratified shellfish remains, including oysters, soft shell clams, mussels, periwinkles, and angel wings, provided an excellent opportunity to examine subsistence activities at one small campsite and to see how these activities may have changed in response to a fluctuating freshwater-saltwater transition environment.

The reconnaissance survey in the Spring of 1978 was extended along the south side of the York River, seeking other areas of high artifact density. Surprisingly, only three light scatters of prehistoric material were discovered. The major reasons for this

light habitation in the region are: the intensively dissected and rugged nature of the terrain, low soil fertility, lack of available cobble lithic material along the shoreline, relatively small and restricted marshes, and only one small creek flowing into the York River.

One is left with the impression that the Croaker Landing Site is locally unique. The site exhibits an unusually dense occupation in an area that culturally was rather isolated. Furthermore, due to the rare coincidence of the accretion of colluvial soils at the base of the knoll and Native American habitation, a deeply stratified midden was created resulting in the excellent preservation of cultural remains.

EXCAVATION AT 44JC70

Introduction

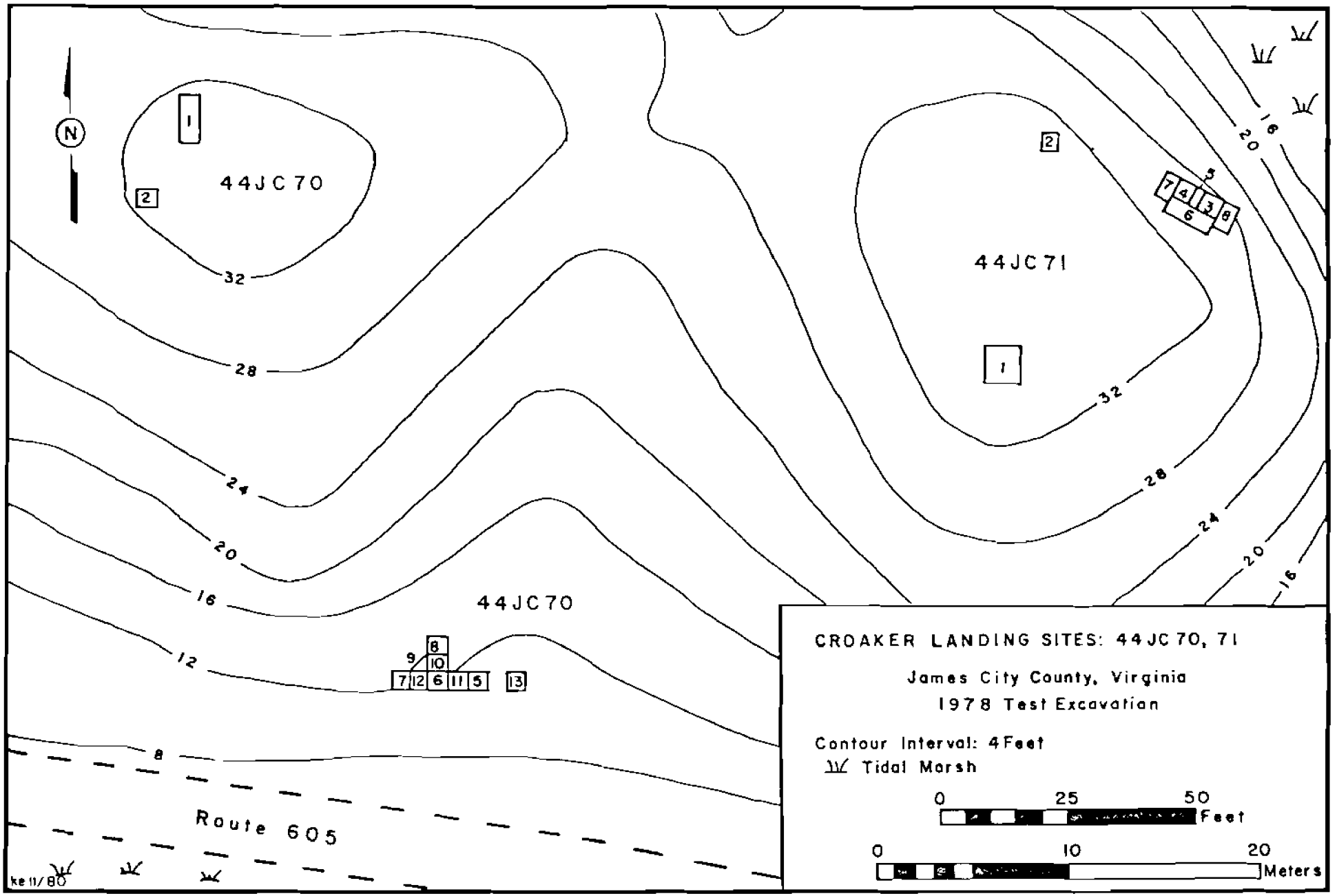
The highest part of the site, designated 44JC70, is situated on a knoll along a point of land which is bounded on the east by the York River and on the north and south by expanses of marsh vegetation. From this portion of 44JC70 a collection of surface artifacts was made, and two squares were excavated, recovering limited amounts of cultural material (Figure 2).

At the south base of the knoll a stratified midden was unexpectedly discovered and assigned the same site number. This lower portion of the site was truncated by Route 605 which was constructed by removing soil from the southern edge of the point of land and filling in the adjacent marsh. The excavation of nine squares there revealed abundant cultural material from the Early through the Late Woodland periods.

Test Units

Two squares were excavated where a thin scatter of surface artifacts, approximately 17 meters in diameter, occurred on top of the nine meters high knoll. Square 1, one meter by two meters, was excavated in three arbitrary levels to a depth of 20 cm., as was Square 2, which was one meter on a side. The few recovered artifacts offer little insight into the cultural history of the York River area. The Mockley Ware, represented by 13 net-impressed sherds, was evenly mixed with eight Popes Creek net-impressed sherds. No further work was recommended for this portion of the site. (Figure 2).

At the bottom of the hill a "T" shaped trench (Squares 5-13) was excavated to reveal the cross section of a small shell midden approximately 12 meters east to west by five meters north to south


N
44JC70
44JC71
44JC70
Route 605
32
28
24
20
16
12
8
CROAKER LANDING SITES: 44JC70, 71
James City County, Virginia
1978 Test Excavation
Contour Interval: 4 Feet
Tidal Marsh
0 25 50 Feet
0 10 20 Meters
ke 11/80

by one and one-half meters deep. All of the squares were one meter by one meter except for Square 9 which was half of a square. The data recovered from this trench provides the basis for the following statements on stratigraphy, features, projectile points, ceramics and faunal analysis.

Stratigraphy

The complex stratigraphy of the site is illustrated in the two east to west profiles each five meters and in the two north to south profiles each three meters (Figures 3, 4, 5). A dark brown to black sandy humus, 8 cm. deep, is designated as Stratum 1. The shellfish recovered from the stratum are composed mainly of oyster.

Of the 30 sherds uncovered from the stratum 67 percent are shell-tempered (Table 1). Nine of those sherds are either simple-stamped or fabric-impressed and represent the Roanoke and Townsend wares, the latest ceramics found at the site. One small triangular quartzite point (9A) came from the humus.

Below this a tan sandy soil, 8-18 cm. in thickness, represents Stratum 2. The shellfish uncovered from this stratum consist mainly of oyster. The number of simple-stamped and fabric-impressed sherds are declining in frequency while the net and cord-marked shell-tempered ware, representing the next oldest ceramic , Mockley, is increasing. One large triangular point (8B2) and one clay pipe stem (7B) are the other diagnostic artifacts recovered from the stratum.

Stratum 3, a light yellow sandy soil 7-25 cm. thick, contained decreasing amounts of oyster shell and increasing amounts of soft shell clam. Of the 21 sherds from Stratum 3, 67 percent are sand-tempered net-impressed, representing the forth oldest

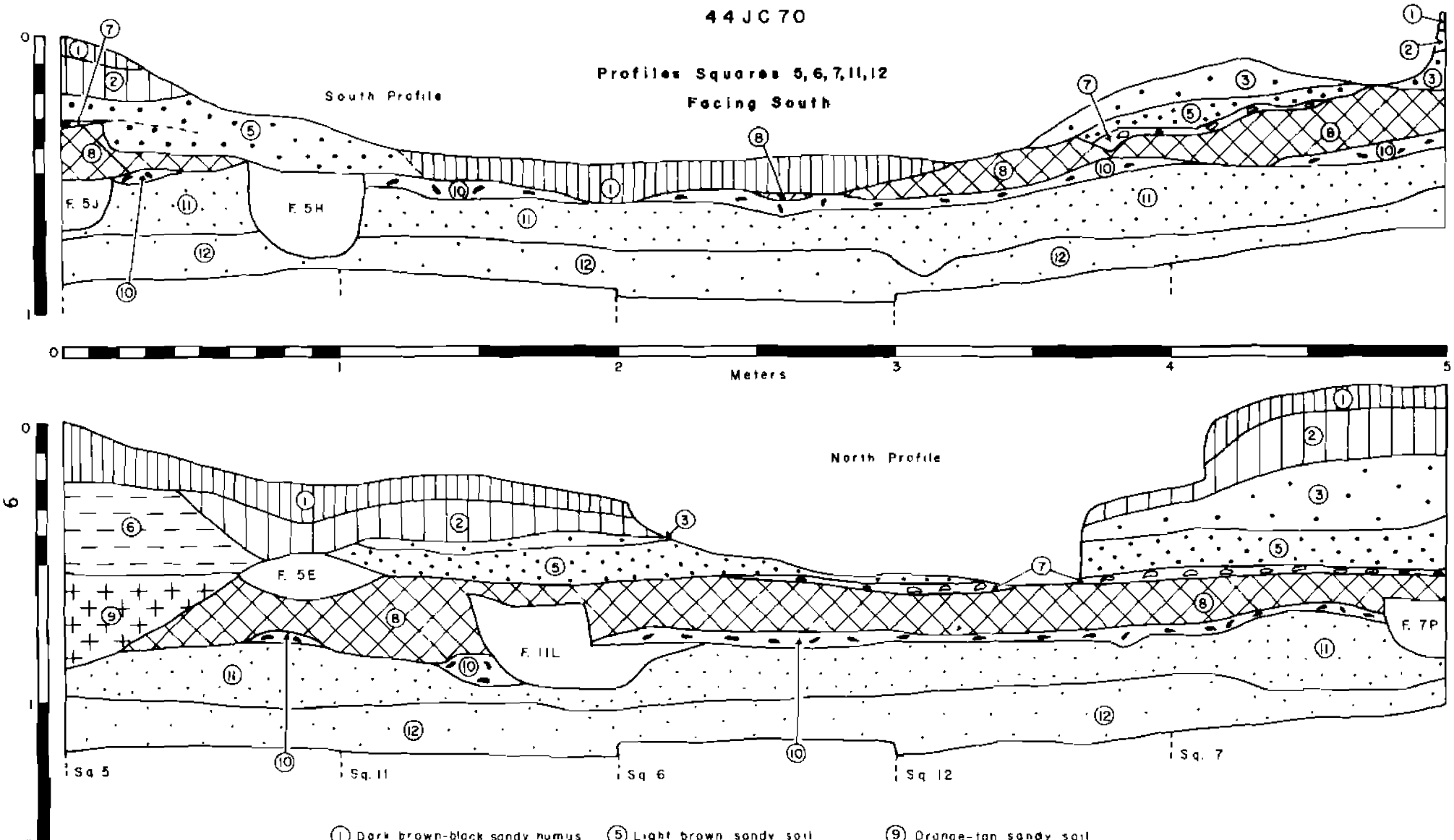
Figure 3. Excavated 'T' shaped trench into shell midden, 44JC70, facing north.

CROAKER LANDING

44 JC 70

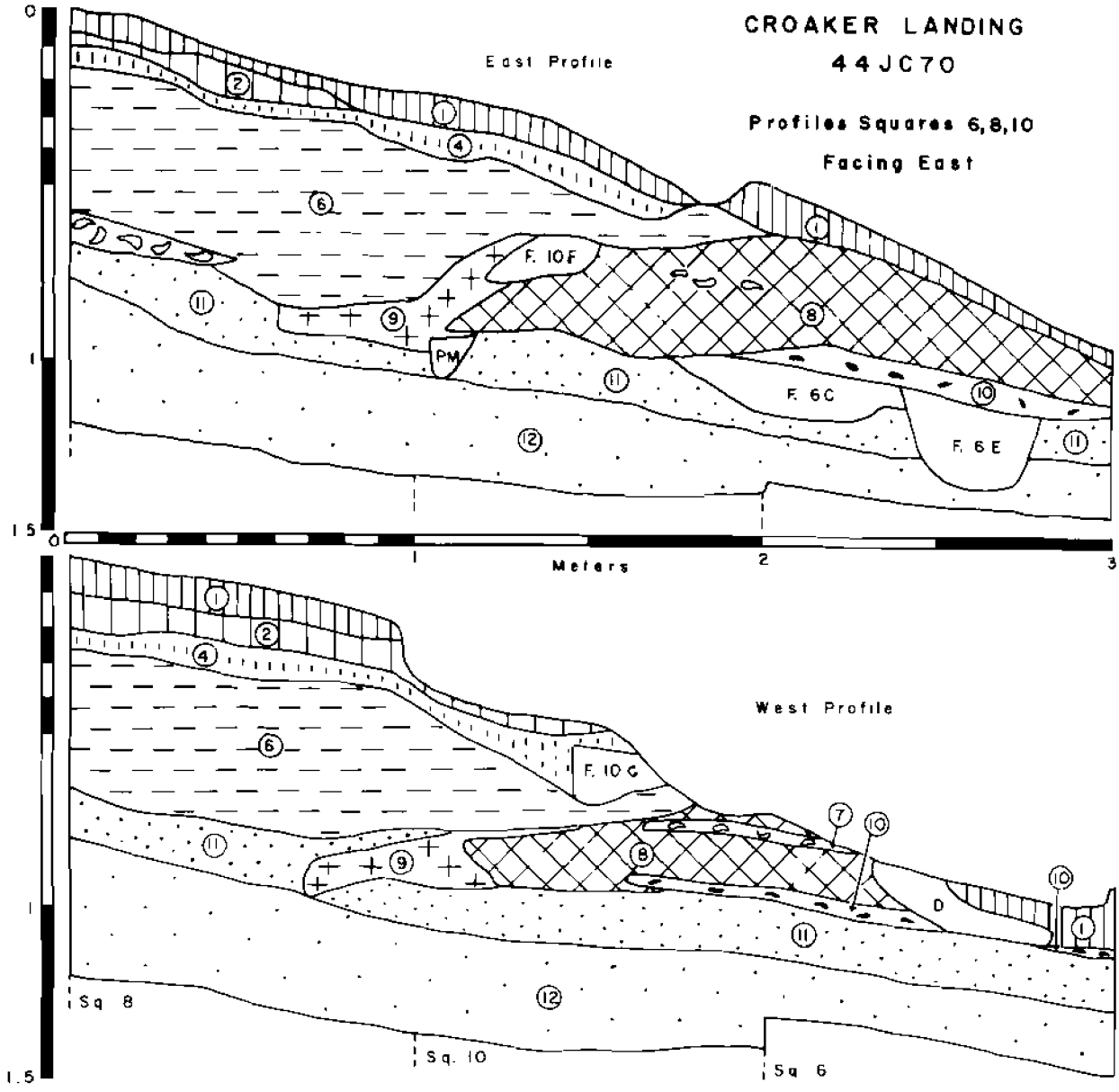
Profiles Squares 5, 6, 7, 11, 12

Facing South



1. Dark brown-black sandy humus
2. Tan sandy soil
3. Light yellow sandy soil
4. Yellow sandy soil
5. Light brown sandy soil
6. Light orange sandy soil
7. Dark brown sandy soil, oyster shell
8. Black sandy soil
9. Orange-tan sandy soil
10. Dark brown sandy soil, oyster & mussel shell
11. Light tan sandy sterile subsoil
12. Light yellow sandy sterile subsoil

F-Feature



(1) Dark brown-black sandy humus
(2) Tan sandy soil
(3) Light yellow sandy soil
(4) Yellow sandy soil
(5) Light brown sandy soil
(6) Light orange sandy soil
(7) Dark brown sandy soil, oyster shell
(8) Black sandy soil
(9) Orange-tan sandy soil
(10) Dark brown sandy soil, oyster & mussel shell
(11) Light tan sandy sterile subsoil
(12) Light yellow sandy sterile subsoil

PM- Post mold D - Disturbance F - Feature

ceramic ware, at the site Popes Creek. A bone awl tip (7C2) is the only other notable artifact from the stratum.

Stratum 4, a yellow sandy soil 4-10 cm. in thickness, occurred only in Squares 8 and 10. The shellfish recovered from the stratum include mainly oyster, with less soft shell clam, mussel, and periwinkle. The 11 sherds, the only artifacts excavated from the stratum, are nearly an equal quantity of shell and sand-tempered net-impressed ceramics.

A light brown sandy soil, 5-16 cm. thick and most clearly visible in Square 7, is Stratum 5. Of the great amount of shellfish removed from the stratum the majority are oyster. Thirty-three of the 46 sherds excavated from the stratum are sand-tempered net-impressed. Of those, 5 exhibit interior scoring, a diagnostic attribute of the Popes Creek Ware.

A light orange sandy soil, found only in Squares 5, 8, and 10, is Stratum 6. The stratum, ca. 50 cm. thick, contained a few small pockets of predominately oyster shell. The 72 sherds from the stratum are evenly divided between shell-tempered and sand-tempered, and are overwhelmingly net-impressed (97 percent). Two ceramic attributes occurred first in this stratum: interior scoring on two shell-tempered sherds, and two sherds with a combination of shell and sand-temper. Also, the first sand-tempered cord-marked sherd came from this stratum, as well as two small particle-tempered net-impressed sherds. Five Woodland projectile points, representing a range of types, came from the stratum. They include a fragment of a large triangular point (8D), one Potts Side-Notched variety (10B6), two Potts Corner-Notched variety (5A1, 8B5), and one small point (13A) with a diminutive

stem similar to the Will's Cove point type (Bottom 1979:48). The points are made from either quartz or quartzite.

Stratum 7 is composed of a dark brown sandy soil, ca. 5 cm. thick, with numerous burnt oyster shells within the upper half of the stratum. The paste and surface treatment of the 30 sherds from Stratum 7 are similar in kind and proportion to the sherds from Stratum 6. One Potts Corner-Notched variety (7E1) and one Potts Side-Notched variety (7E1) came from the stratum.

A dark brown to black compact sandy soil, 10-28 cm. thick, comprises Stratum 8. The great amount of shellfish recovered from the stratum contains less oyster shell than previous strata and more periwinkle, mussel, and soft shell clam. Of the 29 sherds removed from the stratum, 67 percent are sand-tempered and 33 percent are shell-tempered.

An orange tan sandy soil, 14-20 cm. in thickness and found only in Squares 5, 8, and 13, comprises Stratum 9. A few small oyster shell pockets occurred in the stratum. Four different tempering agents are found in the paste of the 75 sherds recovered from the stratum. Three of the tempers -- shell (44 percent), sand (17 percent) and small particle (8 percent) -- occurred in previous strata. The fourth tempering agent, a yellowish clay (30 percent), represents Croaker Landing Ware, the earliest ceramic found at the site. Two fragments of steatite vessels (8F) and one long, narrow quartzite knife (10H) came from this stratum.

Stratum 10, a dark brown sandy soil 2-7 cm. thick, is interpreted as being the lowest cultural level at the site, although due to the complex stratigraphy, Stratum 9 could actually be earlier than Stratum 10. The largest amount of mussel and angel wing shellfish found at the site came from stratum 10. Even

though the level is extremely rich in shellfish and is dark brown from organic stain, only four sand-tempered net-impressed sherds came from the stratum.

Stratum 11 is light tan sandy sterile soil, 13-27 cm. in thickness and underlying both Strata 9 and 10. Only a few shell fragments occurred, presumably intrusive from Stratum 10. This stratum graded into Stratum 12, a light yellow sandy sterile soil 7-30 cm. thick, located at the base of the excavation.

The complex stratigraphy at the site is difficult to interpret culturally due to two geological factors. The first is the high probability of secondary deposition of soil and artifacts in many of the strata. Since the site is located at the base of two adjoining knolls, one logical source for soil and artifacts is from the hill top. The steep gradient of certain strata and the presence of only two pit features in Strata 1, 2, 3, 4, and 5 suggests that they were not surfaces upon which people lived, but rather were the result of colluvial deposition. Thus, the mixing of ceramic wares in various strata could, in part, be explained by the secondary deposition of colluvium and artifacts. Conversely, the horizontal nature, the heavy concentration of various shellfish remains, the dark brown to black organic stain, and the five pits associated with Strata 7, 8, and 10 suggest that they were occupational surfaces created from the primary deposition of cultural debris.

The second geological factor that confuses the cultural interpretation of the site is the stratigraphic break between the three squares (5, 8, and 13) located furthest upslope and the rest of the squares at the base of the hill. As a result Strata 4, 6, and 9 do not clearly overlap with Strata 5, 7, 8, and 10. Only an

informed conjecture can be presented as to their temporal relationship.

Features

The most common features other than small clusters of oyster shell, are irregular-shaped and bowl-shaped pits. Of the nine pit features, four originated from Stratum 8. Three of those (5H, 7P, 11L) were well defined by their soil discoloration and ranged in size from 15-60 cm. deep by 28-80 cm. wide, while the fourth, Feature 10F, was irregular shaped. Feature 12G originated from the interface between Strata 7 and 8 (Figure 6). One bowl-shaped feature (6E) originated from Stratum 10 and was 28 cm. deep and 40 cm. wide. Although the function of the pit features is uncertain, they do indicate that Strata 8 and 10 were surfaces upon which people lived, rather than colluvial deposits. Three other excavated features and the strata from which they originated are: 10c, an irregular pit 10 cm. deep from Stratum 4; 5D, a small pocket of mussel shell 10 cm. deep in Stratum 5; and 8G, an irregular pit 20 cm. deep from Stratum 11. The only artifacts associated with the nine features are 24 sherds, included in the ceramic study presented in Table 1.

Projectile Points

Ten projectile points from the Woodland Period, representing six types, were excavated in stratified context. One small equilateral triangular point (9A), associated with Roanoke and Townsend ceramics, was excavated from the humus of Square 9 (Figure 7). The estimated size of the quartz point, 23 mm. wide by 27 mm. long, would place the type in the Late Woodland period

A larger quartzite triangular point base (8B2), associated with Mockley ceramics, was recovered from Stratum 2 (Figure 7).

Figure 6. Profile of feature pit, 12G, originating from Stratum 8 at 44JC70. The pit is .62 meter wide by .35 meter deep.

Figure 7. Projectile points from 44JC70. Top row: equilateral triangular (9A). Middle row: isosceles triangular (8B2, 8D). Bottom row: Potts Side-Notched (10B6), Potts Corner-Notched (7C1, 8B5), and small stemmed (13A). Long narrow bifacial knife (10H). Artifacts are made from either quartz or quartzite.

The base of the broken point is 27 mm. wide and its length is undetermined. A fragment of a still larger quartz point (8D), in shape similar to the base of an isosceles triangle with nearly parallel sides, was removed from Stratum 6 (Figure 7). The associated ceramics in the level were Mockley and Popes Creek.

The third style of projectile point, represented by two specimens (5A1, 8B5) uncovered from Stratum 6 and one (7E1) from Stratum 7, is the Potts Corner-Notched variety (Figure 7). The corner-notched point is triangular in outline and has a slightly concave base. The size of the point ranges from 20-22 mm. wide by 27-38 mm. long. The type was first described in 1953 at the Potts Site on the Chickahominy River where it mainly occurred at a depth of 15-22 inches and was associated with early sand-tempered pottery (McCary 1953). A similar 'pointed ear' variety was found at the Doerschuk Site in North Carolina. There they were included in the Yadkin large triangular type (Coe 1964:45).

Two small triangular, slightly side-notched points (7E1, 10B6) were removed from Strata 6 and 7 (Figure 7). Similar in size, general shape, and distribution to the Potts Corner-Notched variety, these points are defined herein as the Potts Side-Notched variety. These varieties of the Potts points appear to date from the middle of the Middle Woodland period.

The fifth style of projectile point, excavated from Stratum 6, was a small triangular blade (13A) with a broad, short stem. Its size is 23 mm. wide by 33mm. long. Although the point was found with both Mockley and Popes Creek ceramics at the Croaker Landing Site, its style suggests a slightly earlier association. The point resembles material retrieved by Bottoms (1979:48) from

the Will's Cove Site (44SK55), a shell midden along the Nansemond River in the City of Suffolk.

The last point type is a long, narrow quartzite biface (93 mm. by 28mm.) with a broken base. The point, which may have functioned as a knife to open oysters, was found in Stratum 9 in a level containing two Mockley net-impressed sherds.

Ceramics

Croaker Landing Ware

The ware is defined on the basis of 20 body sherds and three rim sherds representing two vessels. The two component types are Croaker Landing Plain and Croaker Landing Cord-Marked.

Fifty percent of the paste is composed of subangular clay particles 2-7 mm. in diameter. Occasional rounded stone particles, 2-4 mm. in diameter, occur in the paste as natural inclusions. An analysis by the Soil Conservation Service, using a diffractometer and comparing the matrix of the paste and the clay inclusions, resulted in no visible difference in composition (Seglin 1979). Under a stereomicroscope (7X-30X) the beige inclusions in the reddish matrix appeared in many instances to be softer and more sandy. The inclusions are not crushed sherds as is suggested by various authors. The analysis emphasized the coarseness of clays in the Coastal Plain. This not only means a wide range of naturally occurring sand and small particles in the clay, but also uneven weathering that causes gradation change in texture and composition, as well as differential iron oxidation. The chemist at the Williamsburg Pottery confirmed these findings by stating that clays from the peninsula area, if not thoroughly ground and mixed, will yield color and textural variations similar to those seen in the sherds from Croaker Landing (Seglin 1979).

The question arises as to whether the clay inclusions were intentionally added as a tempering agent to the paste, or whether they were the result of incomplete clay preparation prior to vessel shaping. In order for the paste to exhibit a uniform composition, a coarse clay would have to be ground. If the coarse clay was incompletely ground or puddled, the resulting paste would exhibit textually diverse inclusions. However, since other examples of the earliest ceramics from the coastal plain contain intentionally crushed soapstone and schist, the inference is that the crushed clay also was intentionally added.

The interior surfaces of the Croaker Landing vessels are clayey smooth and, due to the large clay inclusions, are rather uneven. The smoothing or 'floating' procedure covered the majority of the inclusions with clay, leaving a few visible on the interior surface of the sherds.

The exterior surfaces are either plain or cord-marked. The plain surfaces exhibit a lumpy appearance due to the uneven smoothing over the large clay inclusions. The cord impressions are too faint to make any discussion of their appearance practical.

The body wall, with a straight and vertical rim, ranges from 7-9 mm. in thickness. A circular lug, 20 mm. in diameter and projecting 10 mm. out from the body wall, is centered 50 mm. below the rim. The rim is slightly everted (Figure 8).

Decoration included as series of six small and faint circular punctations (2 mm. in diameter) along the top surface of the rim. A vertical series of 9 faint punctations of the same size were applied at right angles to the rim on the exterior of the same

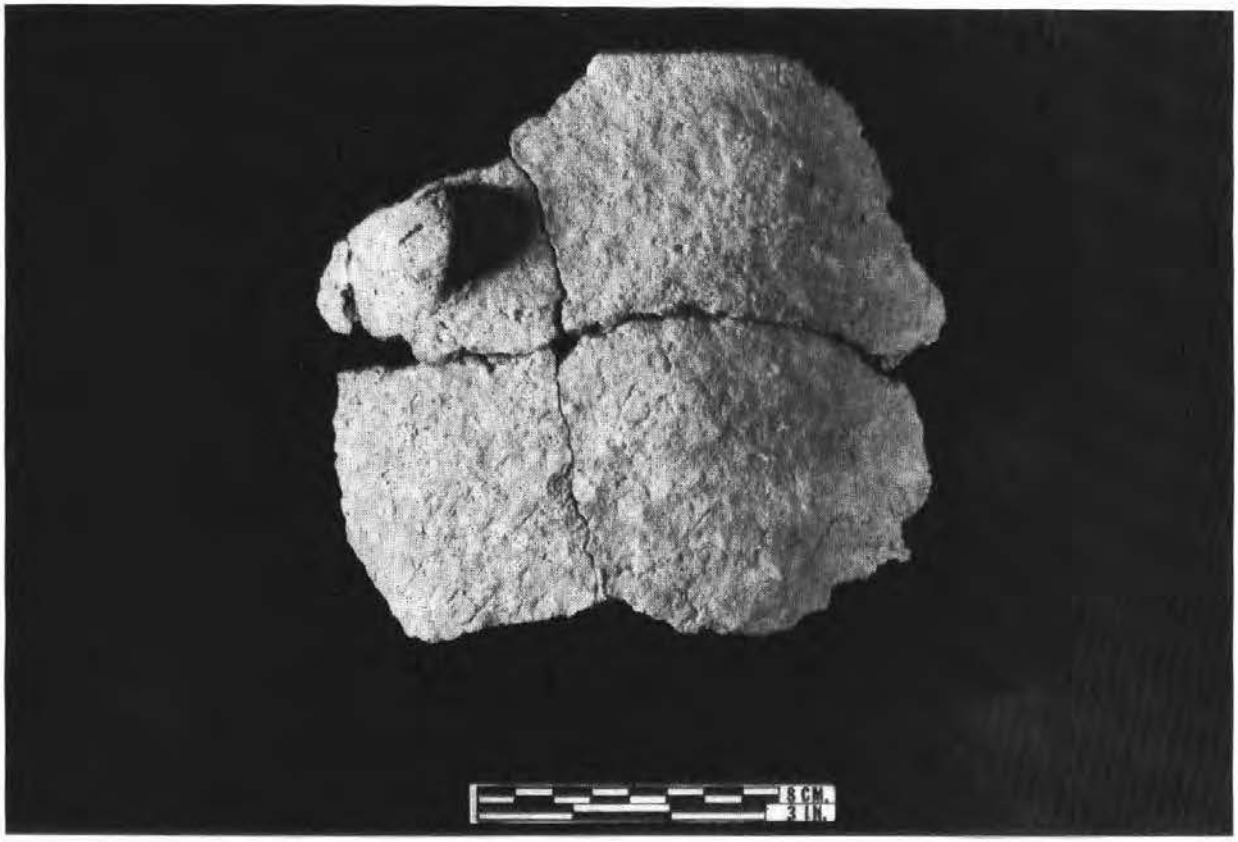


Figure 8. Croaker Landing Plan vessel fragment with circular lug handle from 44JC70.

Figure 9. Small Particle-Tempered net and cord-impressed ceramics from 44JC70.

plain surface vessel. At the Croaker Landing Site the ware was uncovered stratigraphically in the next to lowest cultural stratum and predates all other ceramics from the site (Table 1).

Excavated from the lowest stratum at the Potts Site, the ware was first referred to in 1955 as a plain surface 'clay-sherd-tempered' ceramic (Evans 1955). Remains of a 'sherd-tempered' vessel with cord-wrapped dowel-impressed surface, lug handles, and conical base was reported by Painter (1970) from the escarpment along the western margin of the Dismal Swamp. He called the ware Cypress Swamp Knobbed. Another flat bottom vessel with lug handles and a temper of 'beige colored crushed sherds' was found along the James River above the fall line at the Monacan Farm Site (Winfrees 1972:65).

Round and rectanguloid flat bases, lug handles, and plain surfaces have been found by McCary (1976:4) on clay-tempered vessels at the Moysenec Site along the Chickahominy River. McCary noted that the light tan clay temper was "probably slightly fired or baked in the sun and subsequently crushed" before being added to the paste. Furthermore a few sherds from the Edgehill Site along the Chickahominy River exhibit both clay and soapstone particles, a composite temper also noted by Painter (1970) in sherds from the Dismal Swamp area.

In addition to the literature search the principal author reviewed McCary's personal collection of clay-tempered sherds from the Moysenec, Potts, and Walker Dam sites along the Chickahominy, from the Pamunkey Indian Reservation, and from the Brinkley Farm on the western escarpment of the Dismal Swamp. The flat basal sherds (8 to 9 mm. in thickness) appeared in all cases to be from oval vessels. The body walls are from 7 to 10 mm. thick below the

CROAKER LANDING SITE
44JC70

Tempers / Strata	Shell						Shell Sand	Sand				Small Particle		Clay		Total
	S	F	P	N	NI	C	N	N	NI	C	CI	N	C	P	C	
1	3	6		8		3		9	1							30
2	1	5	3	17		9	1						1			37
3				4		3		14								21
4				4		1		6								11
5			2	3		3		33	5							46
6		1	1	28	2	1	2	22	12		1	2				72
7			1	11	1			8	6	1		2				30
8				6		4		17		2						29
9				24	8	1		10		2	1	6		16	7	75
10							2	2								4
11																0
12												1				1
	4	12	7	106	10	25	5	121	24	5	2	11	1	16	7	355

S Simple Stamped
F Fabric Impressed
P Plain Surface

N Net Impressed
C Cord Impressed
I Interior Scoring

rim, and from 8 to 11 mm. thick elsewhere. Lugs are either oval or round and are located ca. 35 mm. below the top of the rim. The oval lugs are 35 to 50 mm. long by 15 mm. wide, while the round lugs are 20 mm. across. Three possible basal sherds exhibit impressions: 1) a net with knots 10 mm. apart, 2) an open twined fabric, made from a coarse cord, forming spaces that at 15 mm. long by 5 mm. wide, and 3) linear impressions reminiscent of wood or cane splints (McCary personal communication 1981).

While clay-tempered ceramics are more common in the south Coastal Plain of Virginia the soapstone-tempered Marcey Creek Ware with identical vessel attributes is more prevalent towards the interior along the James and Potomac river basins. Since their distribution is contiguous with some overlapping and their vessel attributes are identical except for temper, the Marcey Creek and Croaker Landing Wares must be, in part, contemporaneous. The Marcey Creek Ware is considered the earliest ceramic in the Coastal Plain, and it has been placed temporally from 1200-800 B.C. (Artusy 1976:2).

Appearing slightly later in time, the Coulbourn Cord-and Net-Impressed types from southern Delaware exhibit inclusions of 'fired clay or crushed ceramic sherds' in the paste of conical shaped vessels. The series has been dated to 375 B.C. at the Wolfe Neck Site (Artusy 1976).

In the Coastal Plain of North Carolina from Cape Hatteras south to Cape Fear, the Carteret Series (Loftfield 1976:154) and the Hanover Series (South 1976) exhibit sherd clay temper on cord and fabric-marked conical vessels. These series are much later in time, tentatively dated to the Middle Woodland period, and are not culturally related to the Croaker Landing Ware.

In conclusion, vessels found along the Coastal Plain of Virginia with flat or conical bases, plain or cord-marked surfaces, lug handles and clay inclusions in the paste, may be dated to the beginning stage of the Early Woodland period. At one site along the James River the phenomenon extended inland to the Piedmont province. However, it appears that ceramic series with sherd temper, conical bases, and net-, cord-, and fabric-impressed surfaces, occurred later in Delaware and North Carolina during the Middle Woodland period. They are culturally unrelated to the earlier Croaker Landing Ware.

Small Particle-Temper Ware

The ware is described on the basis of ten body sherds, one basal fragment, and one rim sherd. The temper, representing 20 percent of the paste, is composed of small subangular to angular particles (1-3 mm.) of predominantly quartz with an occasional particle up to 5 mm. in diameter. The temper may be natural quartz inclusions in the clay, the larger of which were crushed by grinding during the preparation of the clay.

The surface treatment is either net- or cord-marked. The net is of a small mesh with ca. five knots per 2 cm. The cord impressions are of a twisted material, 1 mm. in diameter (Figure 9).

The basal sherd (13B) is of a flat bottomed vessel, 10.3 cm. in diameter at the base. The bottom and sides of the vessel exhibit faint net impressions of a small mesh. The profile of the sherd is illustrated in Figure 13.

The stratigraphic context of the sherds at the Croaker Landing Site would place the ceramics at the end of the Early Woodland period and the beginning of the Middle Woodland period.

A somewhat similar 'grit-tempered' cord-marked ware, excavated at various locations in the lower Potomac River Basin, is temporally placed at about 750 B.C. (McNett 1975:10). However, the paste of these sherds more strongly resembles Varina Ware, a ceramic recently defined by Mouer (1986:145-148) for the interior Coastal Plain of the James River area. Varina Ware has been radiocarbon dated to A.D. 230-480.

Popes Creek Ware

The ware, discussed on the basis of 252 sherds, has a less sandy paste and thinner body than the type description presented by Stephenson (1963:92-96) at the Accokeek Site. However, from the existing similarities one could consider the sherds found at Croaker Landing to be a southern variant of the Popes Creek Ware. The component types are net-impressed (97 percent), overwhelmingly the dominant surface treatment, and cord-marked (3 percent). Net impressions range from a fine mesh, five knots per 25 mm., to a large mesh with knots spaced 15 mm. apart. One sherd, which at first glance appears to be cord-marked, upon closer inspection is net-impressed and has knots spaced 25 mm. apart. Interior scoring, a diagnostic attribute of the ware, is not a dominant characteristic at the site, occurring on just 26 sherds. The ware at Croaker Landing does not exhibit a tempering agent other than the sand and occasional small particles which would occur naturally in the coarse clays of the Coastal Plain (Figure 10).

McNett (1975:11), based on his work in the lower Potomac River Basin, places the ware in the Middle Woodland period at 500-100 B.C., although it may have persisted until slightly later in time.

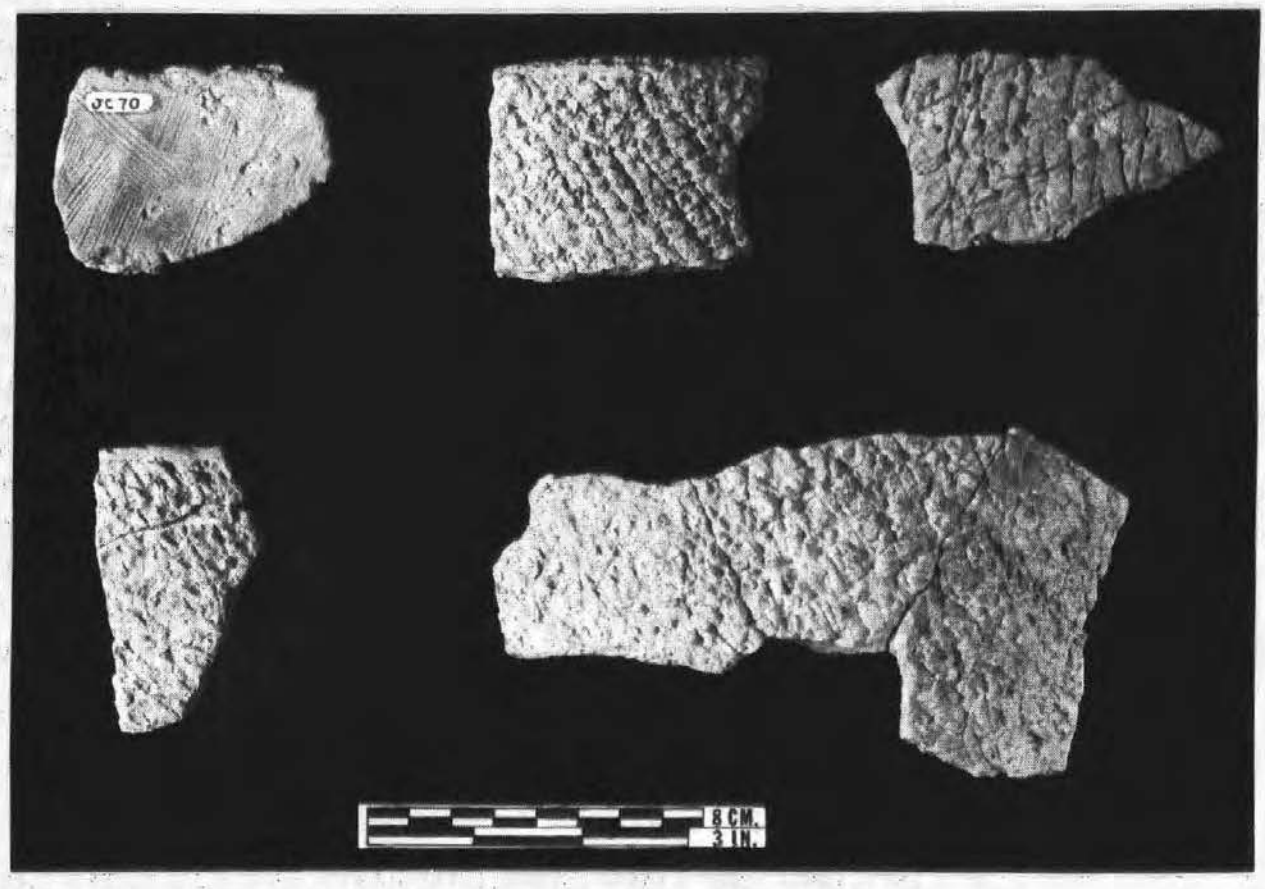


Figure 10. Popes Creek net impressed sherds from 44JC70 with interior scoring.

Figure 11. Mockley net impressed sherds from 44JC70.

Shell-Sand Tempered Ware

This ware, represented by just five sherds at 44JC70, occurs in greater amounts on top of the hill at 44JC71. The paste does not exhibit the typical soft, clayey feel that is characteristic of the shell-tempered Mockley Ware, but rather a sandy texture as a result of a moderate amount of sand and occasional small particles (up to 2 mm.) incorporated into the paste. The paste qualities may represent a transitional ceramic type from Popes Creek to Mockley, but more likely reflect local variation in the clay source used by the people to make Mockley vessels.

Mockley Ware

The ware is discussed on the basis of 148 sherds (Figure 11). The pottery resembles the ware defined by Stephenson (1963:103-109) at the Accokeek Site. Despite its widespread distribution from Delaware to Virginia, the ware remains amazingly homogeneous in surface finish and temper across the entire circum-Chesapeake Bay region. The dominant component of the shell-tempered ware at the Croaker Landing Site is the net-impressed type (78 percent), followed by cord-marked (17 percent), and plain surface sherds (5 percent). Interior scoring, closely resembling the scoring on Popes Creek sherds, occurs on ten sherds (7 percent). The earliest date for the Mockley Ware, A.D. 200, came from Delaware (Griffith and Artusy 1977). In Virginia, Mockley Ware has been dated from A.D. 460-875 at the Maycocks Point Site on the James River (Barka and McCary 1977, Opperman 1980). Radiocarbon dates for Mockley Ware came recently from charred wood recovered from three pit features at 44VB7. The dates are A.D. 260-60 (Beta-12119), A.D. 460-90 (Beta-12120), and A.D. 410-60 (Beta 12121).

Townsend Ware

Only 12 sherds of this ware were found at the site (Figure 12). The shell-tempered sherds, with fine twined fabric impressions, ar occasionally decorated below the rim with incisions. The sherds are identical, even in some decorative motifs, to the pottery defined by Blaker (1963:14) and Stephenson (1963:109). In Virginia, the ware has been dated to A.D. 945 at Governor's Land on the James River (Outlaw 1978:112) and to A.D. 1590 at the DeShazo Site on the Rappahannock River (MacCord 1965:98).

Roanoke Ware

Only four sherds of this ware were uncovered at the site, all from Strata 1 and 2 (Figure 12). The exterior surface of the shell-tempered ware was either maleated with a thong-wrapped paddle or scraped resulting in overlapping linear impression. Further examples were noted in the Coastal Plain from surface collections from the Virginia Beach area, in excavated contexts from Carter's Grove (44JC118) and Flowerdew Hundred Site (44PG41) along the James River, and the Newington Site (44KQ6) along the Mattaponi River.

The ware was first defined by Blaker (1952:257) as the Roanoke Simple Stamped Series. The ware, named after Roanoke Island in the estuarine Coastal Plain of North Carolina, was found by Harrington (1948:251) near the bottom of the ditch around the original Fort Raleigh. The ware is probably contemporaneous, in part, with the English settlement at the fort. Similar sherds were excavated from a pit containing mixed Colonial and Indian artifacts at what is thought to have been the site of the colonial

trading post at Kecoughton, now in the City of Hampton, Virginia (Blaker 1952:257). Evans (1955:47) also described Roanoke Simple Stamped type as a component of his Chickahominy Series.

Unlike the Townsend Ware with its incised, corded, and punctated decorations, the Roanoke Ware displays little exterior decoration except occasional lip-notching made with the thong-wrapped paddle. The simple-stamped ware is not as widespread as the Townsend Ware. It is not found in Maryland, Delaware, in the Potomac River Basin, or in the Northern Neck of Virginia (Stephen Potter, personal communication).

Simple-stamped vessels, although tempered with crushed quartz, were defined in the Roanoke Rapids Basin as the Gaston Series (Coe 1964:119). Similar ceramics from the interior Coastal Plain and fall line transition zone, tempered with small particles, were found near Petersburg (Egloff 1980) and at Flowerdew Hundred (Charles Hodges, personal communication) in Late Woodland contexts. Thus simple stamping was an innovation in surface treatment that probably entered Coastal Plain Virginia from North Carolina during the end of the Late Woodland period.

Flat-Bottomed Vessels

Two vessel fragments with flat bases were recovered from Croaker Landing. One fragment (13B), from Stratum 9, is a small particle-tempered sherd with knotted-net impressions. The vessel is 10.8 cm. in diameter at the base. The other fragment (6B), shell-tempered and net-impressed, was found in Stratum 8. The bottom of the vessel is approximately 8 cm. in diameter (Figure 13). Another example of a flat-bottomed shell-tempered sherd is from a shell midden (44PM13) along the Elizabeth River in the City of Portsmouth. The bottom of the vessel, surface finish

Figure 12. Roanoke Simple-Stamped sherd on left with Townsend Fabric-Impressed sherd on right. Both are from 44JC70.

Figure 13. Flat-bottomed vessel fragments from 44JC70. The upper example is shell-tempered while the lower example is small particle-tempered.

undetermined, is approximately 10 cm. in diameter. At the Currituck Site, North Carolina, sand or shell-tempered vessels with flat bases were associated with charred wood and bone dated to 810-660 B.C. (Painter 1978).

Painter (personal communication) identified the earliest ceramics from the estuarine Coastal Plain of Virginia and North Carolina as Water Lilly Plain Ware. The plain surface ovaloid vessels are shell-tempered with flat bottoms and lug handles. The ware is comparable to Marcey Creek and probably dates to ca. 1200 B.C. The latest occurrence of flat-bottomed ceramics is from the pit feature at 44VB7 dated to A.D. 260-60. The ware, similar to Mockley, is cord- or net-impressed and shell-tempered with rounded flat bottoms that have protruding edges similar to a foot ring. Thus far, the threads of evidence suggest that shell-tempered ceramics in Coastal Plain Virginia began in the Early Woodland period, and that flat-bottomed vessels were produced as late as A.D. 260.

Vessels with flat bases are a widespread phenomenon in the Middle-Atlantic Coastal Plain. They occur from the Currituck Site, on Currituck Sound in North Carolina, to Long Island, New York. The vessels in nearly every instance of archaeological context are temporally placed in the Early Woodland period.

Flat bottoms, as vessel attributes, appear in a wide range of wares. The trait occurs on various sizes and shapes of vessels that exhibit different paste qualities and decoration. The trait was reported in the late 1940s by Manson (1948) and Slattery (1946) associated with soapstone-tempered vessels from sites along the Potomac River Valley. Later Evans' (1955:54) work in the

Virginia Coastal Plain documented flat bottoms on both 'clay-sherd' and soapstone-tempered wares. Recently, the work of Painter (1977) at the Currituck Site revealed flat-bottomed 'beaker shaped' vessels with 'sherd, sand, and shell temper.' They exhibit cord, fabric, and net impressions. For Delmarva Peninsula the flat-bottomed vessel phenomenon was discussed by Wise (1975:21). There, the Ware Plain Series, an Early Woodland period ware that occurs from Long Island to Maryland, exhibits pinch-pot construction, lug handles, and flat bottoms. The vessels are tempered with either crushed quartz, sand, or limestone. A closely related ware found in Delaware, Dames Quarter Black Stone-Tempered (with crushed hornblend as temper), exhibits smooth-, cord-,d and fabric-impressed surfaces, lug handles, the coiling technique of vessel manufacture, and flat bottoms.

The above examples of flat-bottomed vessels, with various methods of manufacture, temper, and surface treatment from Long Island to Currituck Sound, indicate that the characteristic is widespread through space and time. In fact, it would be unusual when excavating an Early Woodland Coastal Plain site not to uncover an example of a vessel with a flat base. By reviewing the published literature one may create a general scheme of the development of vessels with flat bases. The earliest of the flat bottomed vessels had plain surfaces, lug handles and a temper of schist, hornblend, shell, soapstone, or clay. Later, small particles of grit and sand became common paste ingredients. The initial method of manufacture was hand modeling and pinching. This method of manufacture in which the coils were bonded together by maleating them with instruments that left cord-, fabric-, or

net-surface impressions. The shapes of the earliest vessels were shallow ovaloid or rectanguloid bowls and resembled the earlier soapstone vessels. These shapes became less prevalent by 800 B.C. and were superceded by various sizes of straight-sided tall jars and bowls with small, rounded flat bottoms that have protruding edges similar to a foot ring. The evidence suggests that flat bottoms as a vessel attribute prevailed in the coastal Middle-Atlantic Region from 1200 B.C. to A.D. 260.

44JC70 FAUNAL REMAINS

Introduction Mary Ellen N. Hodges

In recent years, archaeological survey has provided increasingly refined information on the distribution of Woodland period sites in the Middle-Atlantic region. Much remains to be learned, however, concerning the function of specific site types and how they were integrated within the Native American subsistence and settlement systems. Excavation of the stratified midden at Croaker Landing, 44JC70, provided an opportunity to examine subsistence activities at one small campsite within the region and to investigate differences in the use of subsistence resources at this location through several successive periods of occupation. Included in the following three studies on the faunal remains at 44JC70 are data resulting from examination of the shellfish and bone recovered from three midden strata and six selected features dating from the Middle Woodland period.

In the first study, a series of measurements of the oyster shells from the site are analyzed for information on the environmental settings from which the shellfish were obtained, the season of procurement, and the number of collecting episodes represented within the deposits. Both oyster and other shellfish species are discussed in the second study which compares the relative contribution of different species within midden and feature deposits. The final study examines the vertebrate faunal remains from the site. This study also summarizes the subsistence data from 44JC70, comparing the findings to those obtained at several other Middle Woodland period sites within the Virginia Coastal Plain in order to determine the specific function of the Croaker Landing site.

The three strata examined in these studies, Strata 7, 8, and 10 (listed from youngest to oldest), are believed to be the only excavated refuse-bearing strata at the site representing primary deposits of occupational debris. Only those portions of Strata 7, 8, and 10 included within Squares 7, 10, 11, and 12 of the excavation grid were examined. It was extremely difficult to correlate levels in Squares 5 and 8 to the main midden deposit, and Square 6 was excavated before a controlled sampling strategy for the recovery of faunal remains was implemented. Data from all three strata is not provided for some of the squares because of the following circumstances: 1) The remains of Stratum 7 in Squares 7 and 12 were removed as one unit. The excavation was later subdivided for better control. 2) Stratum 10 in Square 10 was destroyed prior to excavation by water erosion during a thunderstorm; and 3) Stratum 7 did not extend into Square 11.

Of the six features examined in the following studies, four of the deposits can be correlated to the three occupational strata. These are Feature 12G (Stratum 7), Features 5H and 7P (Stratum 8), and Feature 6E (Stratum 10). Two other features, 10C (Stratum 4) and 8G (Stratum 11) were also examined.

Faunal remains were recovered from 44JC70 through dry and wet screening processes. While all excavated units of the midden were dry-screened through one-quarter inch mesh in the field, all the fill from small features and samples three or six gallons in size from larger features and from strata, were reserved and later water-screened through one-quarter and one-sixteenth inch mesh. All shell and bone fragments captured in both dry and wet-screening processes were retained. For the analyses of shellfish remains, however, only material captured in one-quarter

inch mesh was examined, and the data from dry and wet-screen samples were combined for each unit. Shellfish remains captured on the one-sixteenth mesh consisted primarily of fine shell powder or of fragments too small to be identified.

Analysis of bone from the site included material from the one-sixteenth mesh wet-screening process. All wet and dryscreened samples were combined in the analysis. Unfortunately, the size of the original wet-screen sample (either total feature, 3 gallons, or 6 gallons) was not factored into the analysis. Because of the extremely fragmentary condition of the one-sixteenth inch mesh samples, this problem in the analysis has likely skewed the figures for the number of unidentifiable elements in each unit. Since most identifiable specimens were collected in one-quarter inch screening processes, however, the reliability of the minimum number of individuals represented in each unit is not expected to be significantly affected.

Analysis of Oyster Shell

Jay F. Custer and Keith R. Doms

This short report describes the results of an analysis of oyster shell remains from the Croaker Landing site (44JC70). Three samples were analyzed using techniques described by Kent (n.d.) as applied by Doms and Custer (1983). The three samples were from separate strata (Square 7: Strata 7, 8, and 10). Results of a variety of analyses are described below.

A series of measurements of the oyster shell samples were made along with a series of measurements of acetate peels. The attributes of shells measured were height, length, and height/length ratio. Measurements taken from acetate peels included age, amount of growth since last winter growth check, and total growth over three previous years. The last two measurements were used to calculate an index (IG) of percentage of yearly growth prior to death (Figure 18). Frequency distributions for each variable are provided in Figures 14-18. The summary statistics of each sample's measurements are noted in Table 2.

Examination of Figures 14-18 show that the variables height, length, and height/length ratio are normally distributed although there is some skewing of the distributions. The age and growth index are <u>not</u> normally distributed. Only the age data for Stratum 7 comes close to approximating a normal distribution. These observations mean that the descriptive statistics presented in Table 1 are not necessarily amenable to further detailed statistical analysis.

Because the height/length ratios are normally distributed, the mean values can be analyzed in order to note the variety of oysters present and the environments from which they were

collected. The mean values for the height/length ratio all indicate that the populations were mud flat oysters living in intertidal mud flat settings. Examination of individual shells in the samples showed that there were occasionally a few long and narrow "coon" oysters present. However, both coon and mud flat oysters grow in the same general environmental setting. Weathering of the outer surfaces of the shells made it difficult to observe ribbing; however, all of the relatively unweathered shells had some development of ribbing. The presence of ribbing indicates that the shell was exposed to sunlight during some portion of the day during its growth period. Therefore, these shellfish probably came from a very shallow intertidal mud flat which was exposed to air, or was covered with less than 40 - 50 cm of water, at low tide. All three samples also showed a high incidence of attachment scars (Stratum 7 - 76 percent, Stratum 8 - 92 percent, Stratum 10 - 100 percent) indicating that the oysters were probably in fairly dense clusters.

The unimodal distribution of the shell size measurements shows that the shells collected were within a limited size range. However, a variety of ages is represented within the limited size range. Usually there is a close correlation between shell size and age based on the environmental settings, especially with regard to salinity and available nutrients, within samples of oysters from prehistoric sites in the Middle-Atlantic Region (Doms and Custer 1983; McNamara 1982). The absence of such a correlation within the Croaker Landing material may be related to the divergent growth indices. A wide variety of growth indices are present within each sample indicating that several collecting episodes took place in order to produce the accumulation of shells found in

each stratum. Thus, the divergent ages and constant sizes may indicate a series of collecting trips to various locations with different salinity settings.

Examination of parasite bores on shells was also undertaken in order to assess the salinity regimes of the oysters' environments. Some shells had no bores present while others had many large holes covering their outer surfaces. Presence/absence of bores and their size are related to the presence of various parasites which are sensitive to salinity. The variety of bore size and frequency indicates a range of environmental salinity from well over 20 ppt for more than half of the year to less than 10 ppt for less than one-fourth of the year (Kent n.d.:22). This wide range of salinity would also indicate that the oysters were collected from a variety of environments on several different collecting trips..

Analysis of acetate peels for "marker years" (Doms and Custer 1983:7) was inconclusive. No correlations among distinctive summer or winter growth patterns were apparent in any of the samples.

The oysters analyzed here seem to represent a variety of debris which probably accumulated over several years as indicated by the absence of clustered, or normally distributed, growth indices, and the absence of recognizable marker years. Although the environments from which they were collected were relatively constant, that is shallow intertidal mudflats with dense clusters of oysters, the locations of the collecting sites varied as indicated by the varied salinity measure and the absence of a correlation between age and size measurements.

In sum, the Croaker Landing shell provides an interesting contrast to shell samples analyzed from other Middle Atlantic Coastal sites. For example, further north in the Chesapeake Bay and in the Delaware Bay, analysis of small middens and single features (Custer 1983; Doms and Custer 1983; McNamara 1982) have shown very limited time spans and locations for oyster collection and deposition. The Croaker Landing data are different in that they show oyster collecting taking place at a variety of locations throughout the year at numerous locations. At present it is not clear whether these differences are due to different use of oyster resources in these regions or to differential sampling in the two areas. Up to now, the samples from northern areas of the Chesapeake and Delaware Bays have been primarily from small middens and features, while the Croaker Landing samples seem to be more generalized living debris. The Croaker Landing data, however, certainly suggest some interesting avenues for future research.

Table 2. Descriptive Statistics of Oyster Shell From 44JC70.

	Height	Length	H/L Ratio	Age	Growth Index
Stratum 7					
mean	62.83	43.31	1.47	6.37	.69
variance	346.63	124.37	.14	7.55	.25
std. dev.	18.62	11.15	.38	2.75	.50
n	94.00	92.00	90.00	82.00	44.00
Stratum 8					
mean	51.14	35.64	1.48	8.00	.84
variance	102.39	61.41	.11	7.54	.14
std. dev.	10.12	7.84	.33	2.75	.37
n	22.00	22.00	22.00	13.00	9.00
Stratum 10					
mean	49.86	29.11	1.80	6.50	.66
variance	213.44	79.59	.37	5.25	.18
std. dev.	14.61	8.92	.61	2.29	.43
n	35.00	35.00	35.00	26.00	16.00

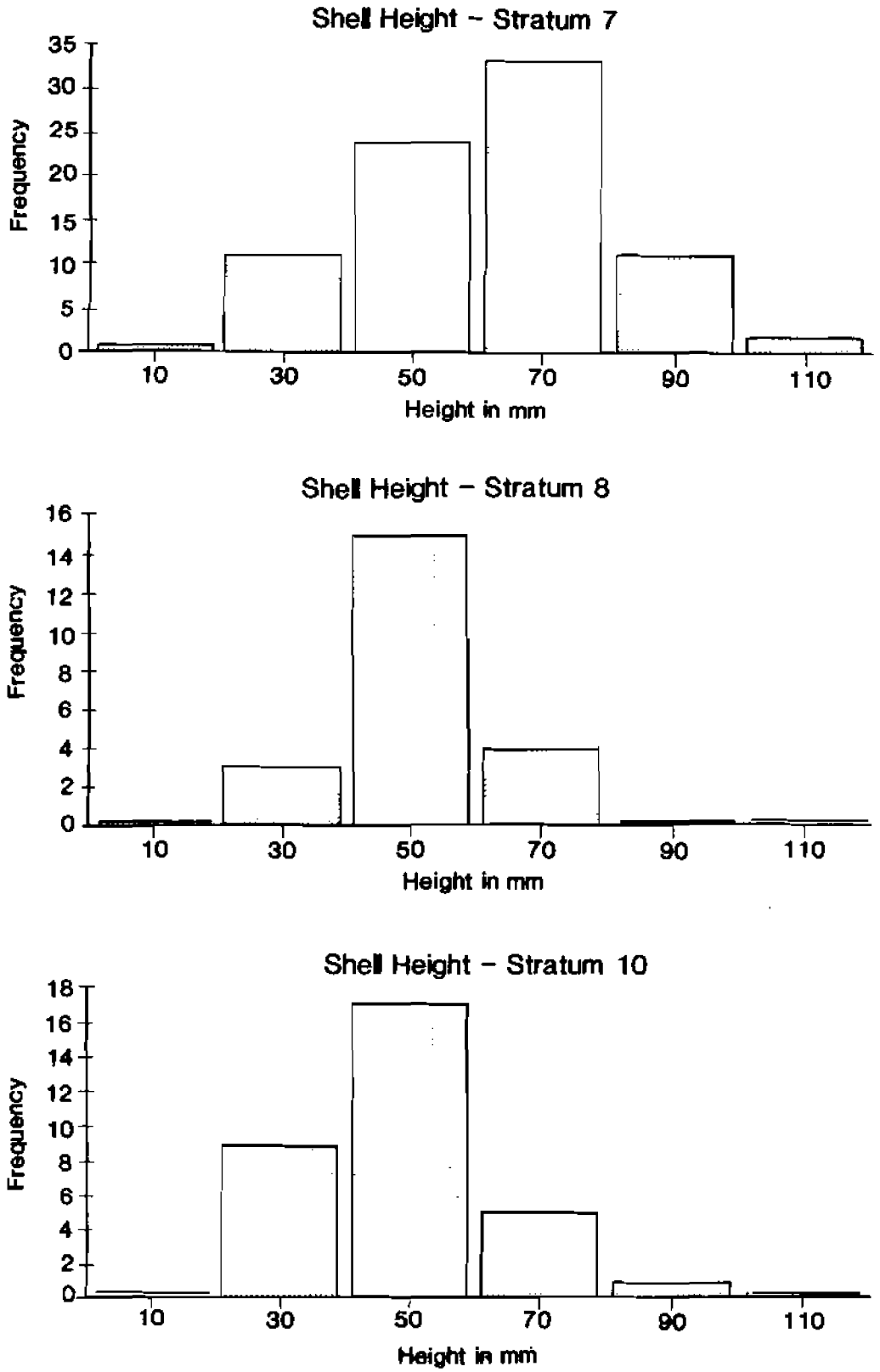
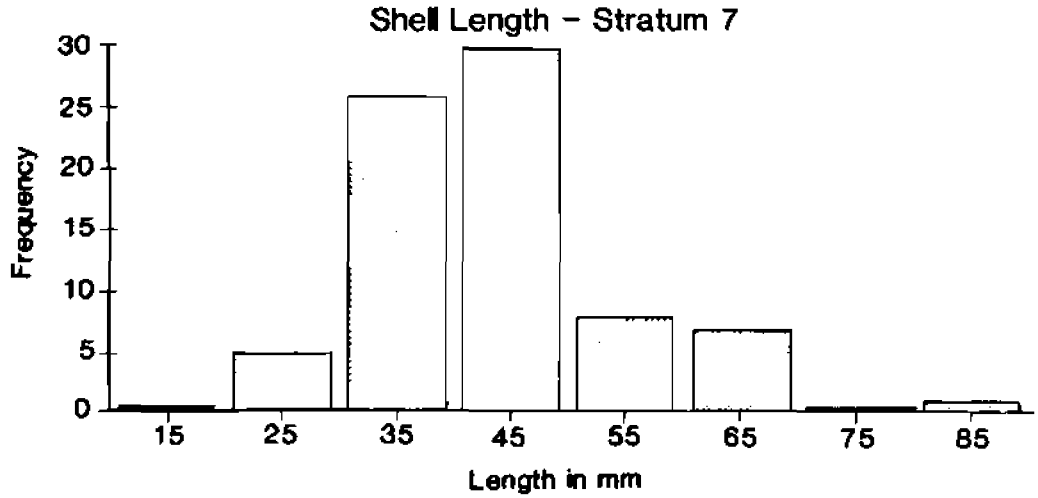
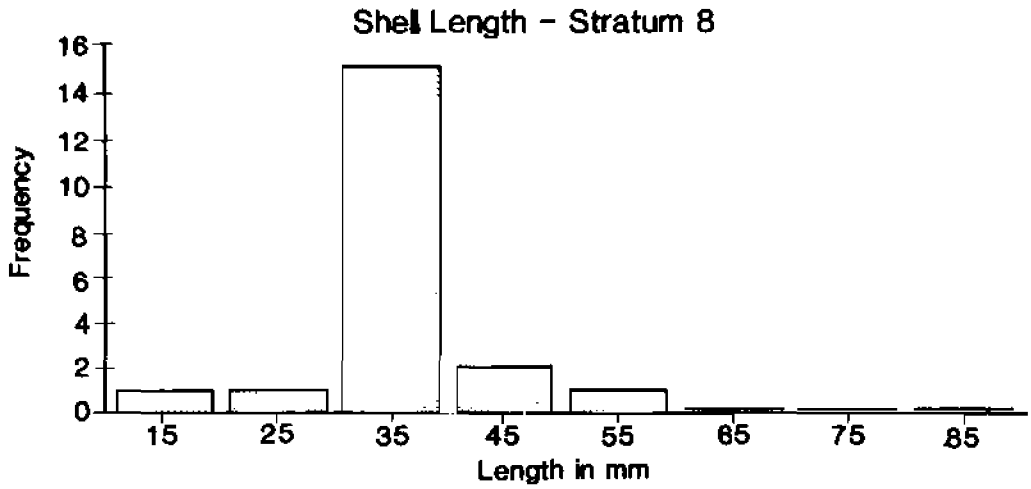


Figure 14: Oyster shell height from Strata 7, 8, and 10 at 44JC70





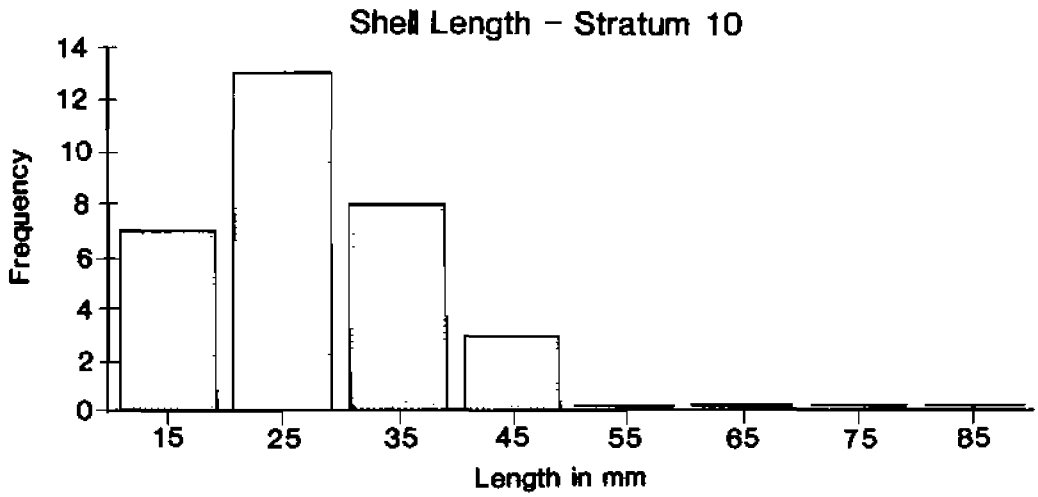
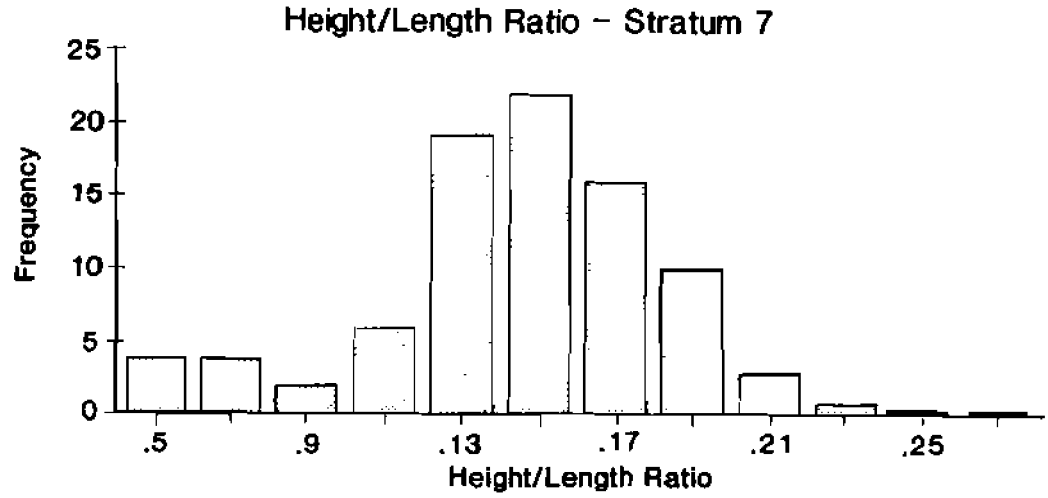
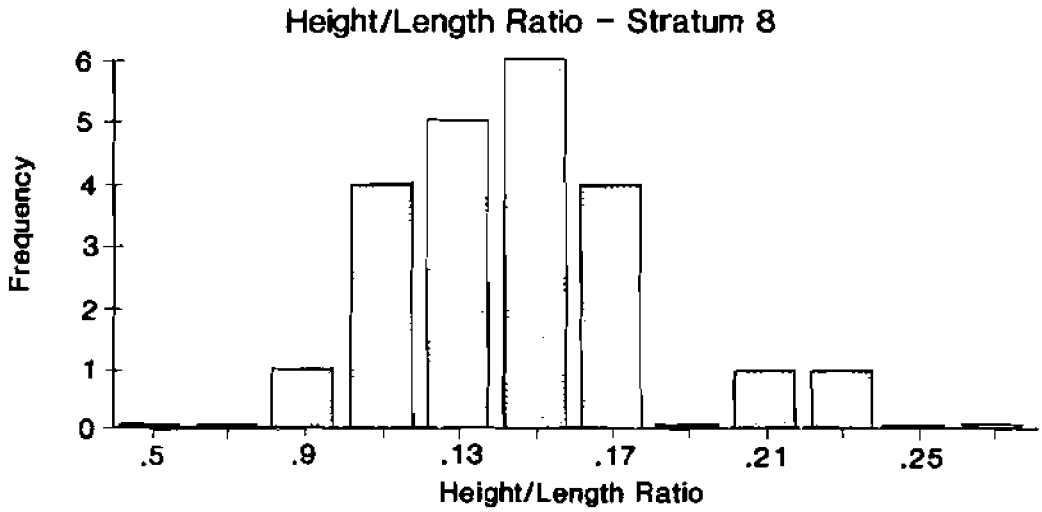


Figure 15: Oyster shell length from Strata 7, 8, and 10 at 44JC70





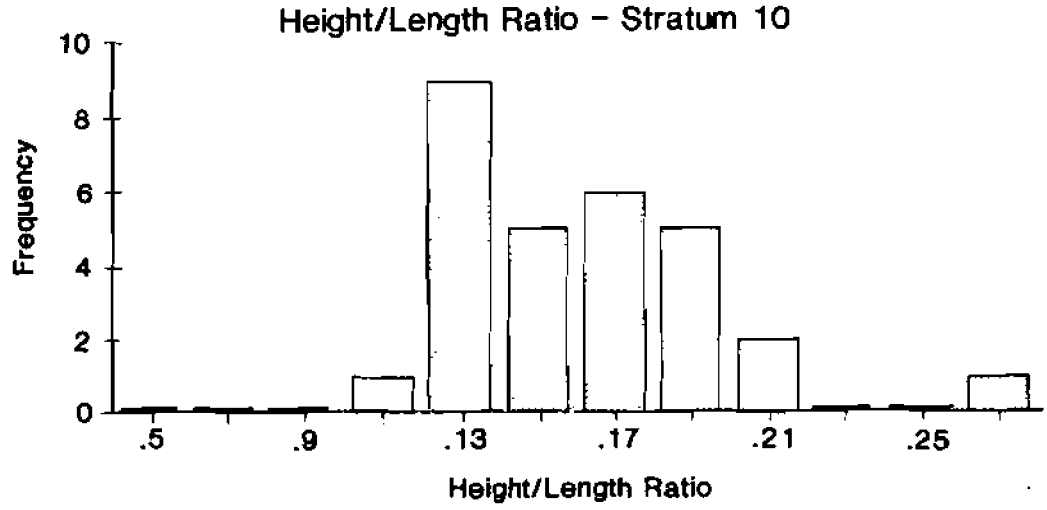
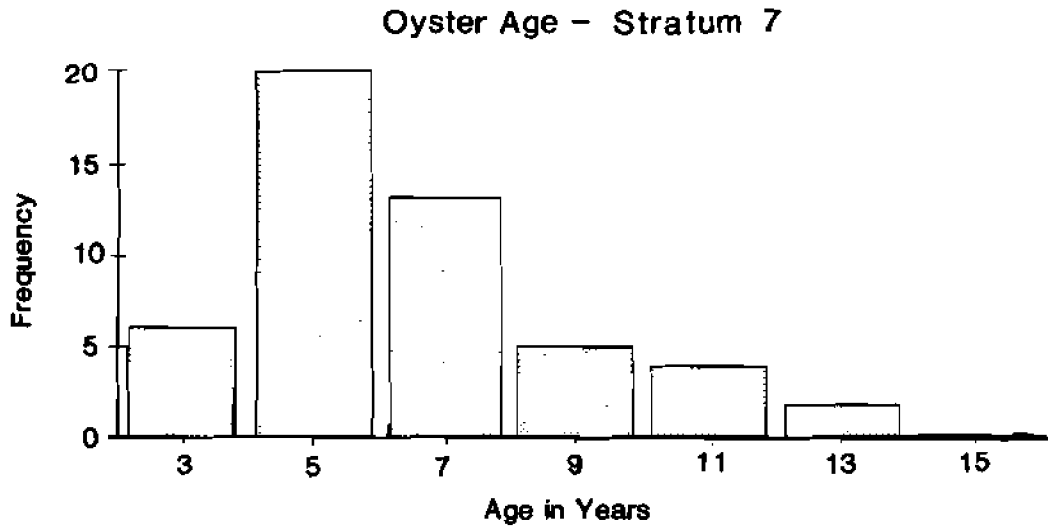
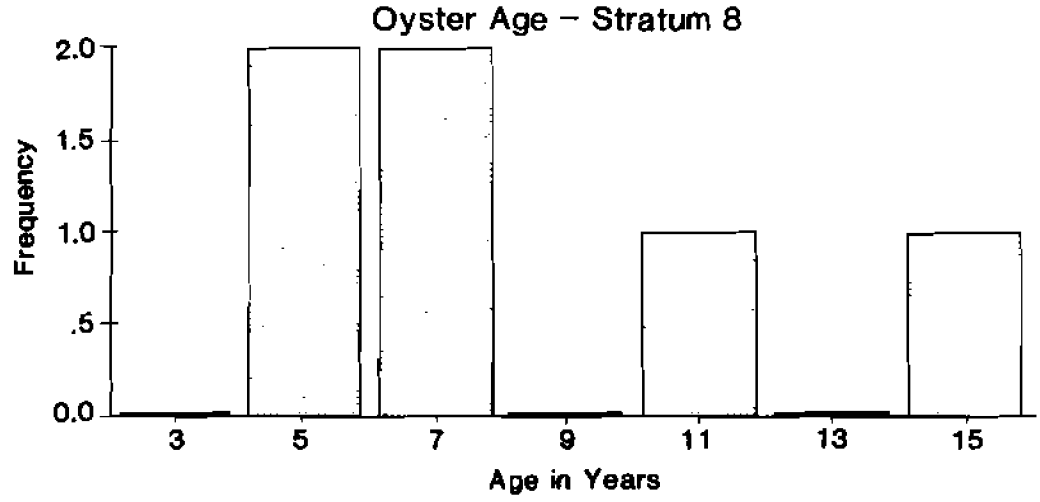


Figure 16: Oyster shell height/length ratio from Strata 7, 8, and 10 at 44JC70





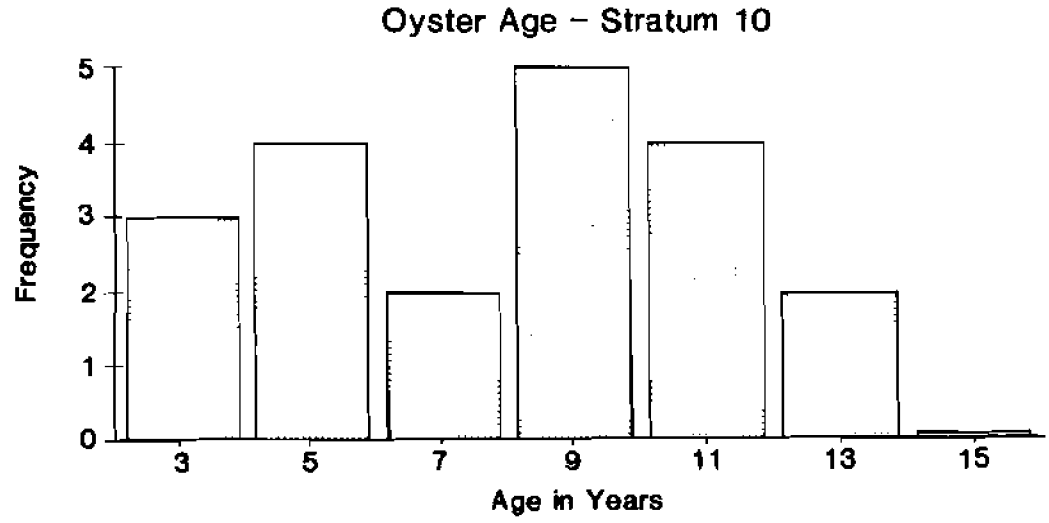
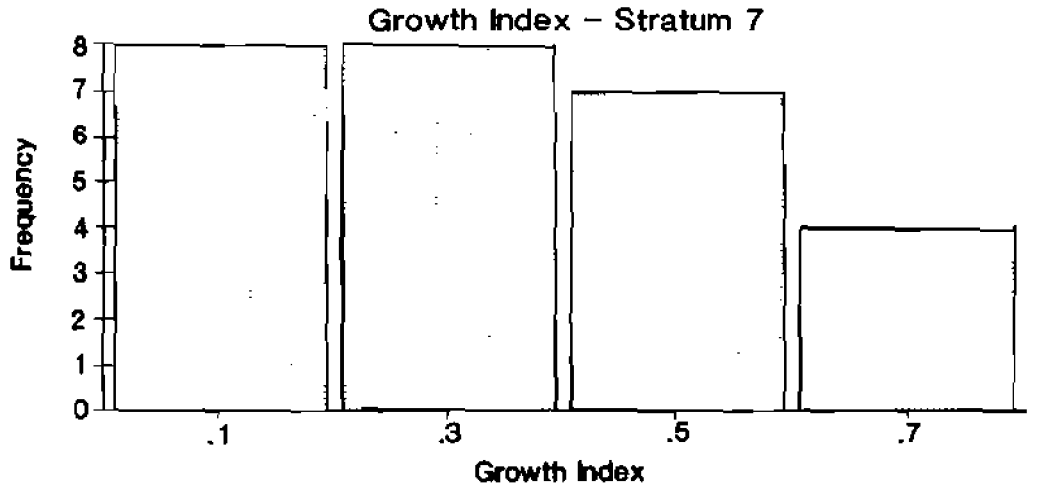
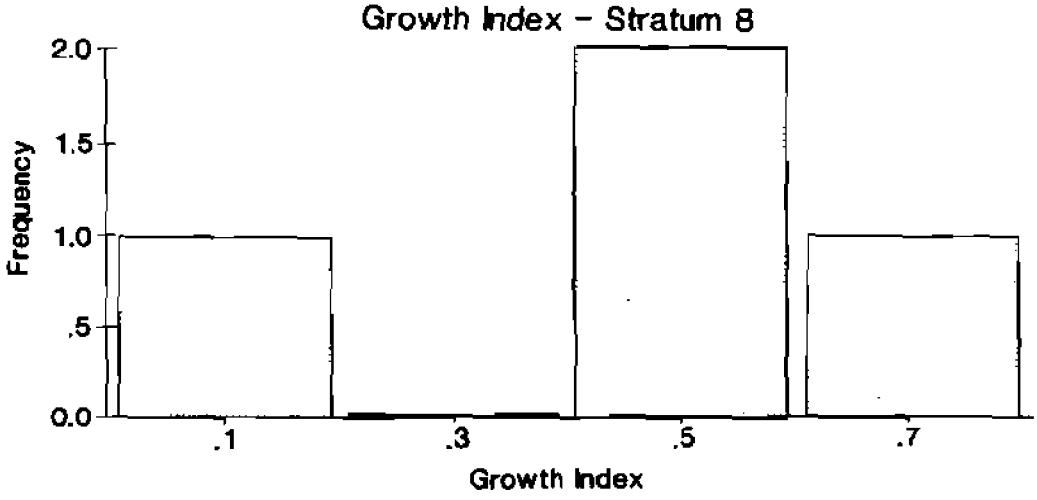
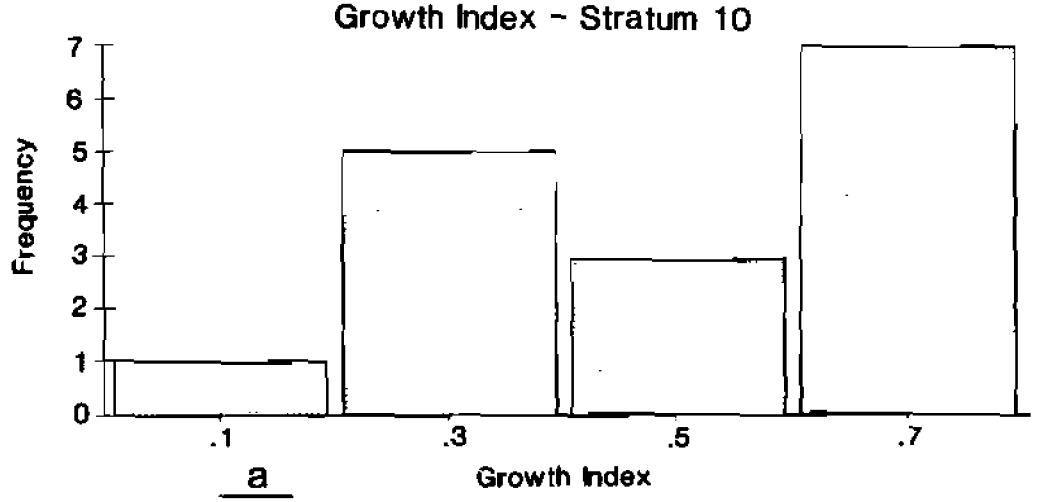


Figure: Figure: 17: Oyster shell age from Strata 7, 8, and 10 at 44JC70







Note: $1G = \frac{a}{b/3}$, where

a = growth since last winter growth check prior to death, and

b = growth over the previous three years.

Figure 18: Oyster shell growth index from Strata 7, 8, and 10 at 44JC70

Shellfish Remains

Mary Ellen N. Hodges

While the consumption of oysters played a significant role in the diet of Native American peoples who occupied the Croaker Landing site, numerous other shellfish species were utilized as well. For the following study, shellfish remains from three strata and six features at the site were sorted by species and quantified in order better to understand the variety of foods contributing to the diet and the relative importance of each during successive periods of occupation at the site. Although the results of the study may not define major changes in the subsistence pattern through time, the data do suggest certain ideas about the type of subsistence strategy practiced by native peoples during the Middle Woodland period.

Six species constituted the bulk of the shellfish remains in the midden and features at 44JC70. Included among these are the Virginia oyster (*Crassostrea virginica*); the ribbed mussel (*Geukensia demissa*), a bivalve which lives within the intertidal zone in brackish waters and is commonly found clustered on stones or peat near the high water mark; and the marsh periwinkle (*Littorina irrorata*), a small lunged gastropod which lives among brackish marsh plants in the intertidal zone. Less well represented by shell weight are the angel wing (*Cyrtopleura costata*), stout tagelus (*Tagelus plebeius*), and soft shell clam (*Mya arenaria*), all of which are burrowing species found either within the intertidal zone (soft shell clam) or near the low tide level and in deeper waters (angel wing and tagelus). For the purposes of this study, remains of soft shell clam and tagelus were combined. Although the hinges of the two species were easily

distinguished, accurate identification of fragmentary portions of the surrounding shell was considerably more difficult.

Several other mollusks common to the intertidal zone were also recovered from the midden, although, where noted within an excavation unit, these were represented by only one or two individuals each. These species include the northern quahog (Mercenaria mercenaria); an unidentified member of the Ark family (Arcidae); the channeled whelk (Busycon canaliculatum); and two small gastropods, the eastern melampus (Melampus bidentatus) and the eastern mud whelk (Ilynassa obsoleta). The Atlantic blue crab (Callinectes sapidus), an anthropod, was present as well.

For the purposes of this study, shell weight, rather than estimates of the minimum number of individuals (MNI), was used to compare the dietary contribution of species. Although it would have been more desirable to have used MNI's, the limited time available for the study and the condition of the shellfish remains influenced the decision to employ shell weight as the basis for comparison. In all strata and features studied, the remains of mussel, tagelus, soft shell clam, angel wing, and to a lesser extent, periwinkle were in an extremely fragmentary condition. Shells of the ribbed mussel, in particular, were badly weathered, a factor which it appears would have made any MNI estimates for the species dubious. For example, one mussel shell sample of approximately 500 grams (enough fragmentary shell to fill a six by six inch plastic ziplock bag) contained only nine recognizable shell valves, three left and six right. In contrast, the rather stable hinge portion of the angel wing shell appears to have survived in the 44JC70 midden in far greater numbers relative to fragments of its very fragile outer shell.

The use of shell weight rather than MNI's obviously limited the scope of this study, since shell weight cannot be used to estimate the relative contribution of different species within a single sample. Both shell weight and usable meat vary by species. Within a species, shell weight is not a reliable indicator of usable meat. Shell weight can be used to compare the contribution of one species in two or more units, however if the effects of leaching and other factors affecting the condition of the remains are consistent (Waselkov 1982:69-80).

The weight of the shell remains recovered from excavation units representing the three primary midden strata and the six features analyzed is listed in Tables 3 and 4. While it is impossible to estimate from shell weight the exact contribution of the six major species represented, each appears to have contributed significantly to the diet. Although by weight the three burrowing species, angel wing, soft shell clam, and stout tagelus, are less well represented within the assemblages than are the ribbed mussel and periwinkle, it should be noted that the former contribute comparable or even significantly greater amounts of meat per individual than the latter, more accessible, species. Usable meat (wet weight) for angel wing, soft shell clam, and stout tagelus has been estimated at 15.0, 7.0, and 6.4 grams respectively, while ribbed mussel and marsh periwinkle can be expected to provide approximately 7.9 and 2.4 grams each (Price et al. 1976:29). Medium select oysters yield 13-20 grams wet meat each Galstoff 1964:381; Watt and Merrill 1975:36.

Although the relative contribution of each of the six species varies widely among the excavation units analyzed, there is some similarity in the contributing of oyster within midden units

associated with the same stratum. Within Stratum 10, oyster comprises 30 to 48 percent of the shall remains. For units associated with Stratum 8, oyster varies as 40 to 70 percent of the shell debris. Oyster clearly dominates the most recent midden layer, Stratum 7, providing 94 to 95 percent of the shell remains.

This consistency is not repeated, however, when the shellfish debris from the four features associated with the midden strata are compared. All four features contained proportionately less oyster shell than the strata from which they originated. These findings are not particularly surprising, however, since differences might be expected in the formation of intrusive features versus extensive deposits.

Growth indexes calculated by Custer and Doms for oyster recovered from the midden strata at 44JC70 indicate that the shellfish were collected at various times throughout the year. The lack of recognizable marker years in growth suggests each midden stratum may represent several years of accumulation. While the growth indexes of oyster from the features were not examined, it might be expected that these deposits were accumulated more quickly than the midden strata and represent single relatively short occupation periods. If these features represent single collection episodes, then the shellfish composition of each might reflect the resource focus of merely one particular outing. In contrast, the midden deposits at 44JC70 might be expected to reflect broader patterns of shellfish exploitation through the life of the site.

Data on the shellfish remains from Feature 12G provide an example of how the composition of individual units within a deposit can differ in character from the deposits as a whole.

Feature 12G was disected for excavation, and, although the feature was found to contain at least three depositional layers, fill from the east side (excavated first) was removed as one unit. As shown in Table 5, the composition of each of three levels excavated in the west half of the feature differs considerably from the composition of the feature as a whole. The discrepancy seen between data obtained from each half of the feature serves further as evidence of the effect of sampling design on subsistence data.

In contrast to the instrusive feature, data obtained from the units of midden deposit analyzed from 44JC70 might be expected to be more representative of broader patterns of shellfish exploitation throughout the use of the site. The data from the midden strata (Table 3) appear to suggest that, while a wide variety of shellfish were utilized during all three major occupational periods at the site, oyster assumed a more dominant role within shellfish exploitation through time. While the range of subsistence resources used during the Middle Woodland period has been documented at several sites within the Virginia Coastal Plain, at only one site, (44WM119) White Oak Point in Westmoreland County, has research been particularly structured to examine changes in the use of both vertebrate and invertebrate species through time (Waselkov 1982). Comparison of 17 archaeological components dating from the Late Archaic through Historic periods at White Oak Point indicated that there was a drop between the Middle and Late Woodland periods in the variety of total faunal resources utilized. The data did not suggest, however, that changes in shellfish utilization occurred through time. Within each component, oyster contributed the largest proportion of usable meat of

any shellfish species. The only evidence for increasing specialization in oyster gathering through time comes from the one Late Archaic component analyzed, in which other shellfish species contributed a larger proportion of the total meat yield than during any later component at the site. An increase in the intensity of oyster use through time was suggested at the White Oak Point site by an increase in the proportion of oyster shell debris to soil matrix in Late Woodland Period components (Waselkov 1982:191-211).

When the oyster data from Croaker Landing are examined more closely, there are indications that suggestions of increased specialization in the use of the species through time are more apparent than real. Instead, the data suggest that differences in the composition of midden Strata 7, 8, and 10 may reflect human response to short-term changes or fluctuations in available resources in the vicinity of the site.

Tables 6 and 7 show the median and mean values for the height of left oyster valves from each stratum and feature analyzed at 44JC70. While the data from the strata show that these values increase through time from Stratum 10 through Stratum 7, additional data from the features would indicate that a more inclusive characterization of the site as a whole is that oyster shell height varies in relation to the importance of oyster within each sample. In other words, the greater the proportion of oyster shell within a sample, the larger the size of oysters within that sample. This relationship seems self evident, of course, since smaller oysters weigh less. It is important to note, however, that when smaller oysters were used, the difference in the total

contribution of oyster was not compensated for by collecting more individuals.

Assuming that the occupants of the Croaker Landing Site took advantage of the best oysters available to them, what are the factors that might explain differences in oyster size within the study samples? It seems unlikely that over-exploitation of oysters was responsible for periodic reductions in specimen size, since site settlement decisions could have compensated for a deficiency of this type. Instead, it is probable that the differences in oyster size among features and strata may relate to the specific environments from which the shellfish were collected and/or to the general environmental setting of Croaker Landing.

The geographical position of Croaker Landing within the saltwater/freshwater transition zone of the York River would suggest that conditions there were not optimal for healthy oyster growth, particularly among those populations located within the intertidal zone or at the mouths of tributaries to the river. At present, York River salinity at Croaker Landing ranges from approximately 15 ppt in autumn to a low of 10 ppt in spring (Hyer et al. 1971:14). Although salinity during the Middle Woodland is not expected to have differed considerably from modern conditions, salinity may have increased somewhat through time as a result of rising sea level. Oysters generally inhabit regions in which salinity varies between 5 ppt. to 30 ppt. In parts of estuaries where salinity is below 10 ppt, oysters can be harmed or destroyed by freshettes (Galstoff 1964:105). To cite an extreme example of this effect, in 1972 when Tropical Storm Agnes passed through Virginia, oyster setting was zero or very low in all of the state's estuaries (Haven 1978:283-384). Environmental events such

as storms and freezing conditions are especially severe on intertidal oyster populations. In addition to storm effect on salinity, water turbulence often dislodges intertidal oysters, washing them out to deep channels where they are often smothered by sediments (Galstoff 1964:403; Haven, personal communication). The data from Custer and Doms' study (this volume) on the age distribution of oysters from the Square 7 midden samples suggest that the oyster populations available to the inhabitants of Croaker Landing were subject to severe disruptions due to environmental events. Stratum 7, which yielded the highest values for oyster height, is the only stratum for which the age data come close to approximating a normal distribution.

In conclusion, what the differences in composition of the midden strata at Croaker Landing may reflect is not decreased specialization in shellfish exploitatin through time, but rather the practice of a flexible subsistence strategy (Joachim 1976:16-19). It might be expected that, among the available shellfish species, oysters were normally preferred because they yield a large amount of meat per individual and are easily gathered and processed. During periods of healthy oyster growth, other shellfish species were probably used primarily to provide variety to the diet. This strategy appears to have been open to modification, however, and allowed for more intensive use of lower yield, but usually equally accessible species, when the condition of local oyster populations was below normal. The practice of a flexible subsistence strategy effectively reduced the risk of depending heavily on oysters within this particular geographical setting.

Comparative data from elsewhere within the York River estuary and Virginia Coastal Plain are required, of course, to check the validity of this analysis and to define better the subsistence pattern of the Middle Woodland period. The pattern of shellfish exploitatin observed at the Croaker Landing Site is undoubtedly linked specifically to the particular function of the site, which appears to have been a small encampment used intermittently for relatively short periods. Whether the same type of pattern would be repeated at larger riverine-oriented base camps which may have existed in the area is unknown. The patterns observed at Croaker Landing appear, in part, to be related to the site's position within the estuarine saltwater/freshwater transition zone of the York River. Differences between 44JC70 and comparable small encampments in an interior setting and further up stream in freshwater environment and downriver should also be investigated.

TABLE 3. SHELLFISH IN STRATA 7, 8, AND 10 AT 44JC70.

STRATA	SQUARE	OYSTER		RIBBED MUSSEL		PERIWINKLE		ANGEL WING		CLAM**		OTHER***	
		WT.*	%	WT.	%	WT.	%	WT.	%	WT.	%	WT.	%
7	7	8695	94.8	105	1.1	358	3.9	0	0.0	4	0.0	7	0.1
	10	2694	93.7	56	1.9	117	4.1	2	0.1	6	0.2	1	0.0
	Total	11,389	94.6	161	1.3	475	3.9	2	0.0	10	0.1	8	0.0
8	7	1591	58.2	488	17.9	497	18.2	47	1.7	101	3.7	9	0.3
	10	2382	39.7	2561	42.7	872	14.5	77	1.3	100	1.7	7	0.1[1]
	11	3346	58.2	1506	26.2	720	12.5	25	0.4	141	2.5	9	0.1[2]
	12	6064	70.2	1293	15.0	968	11.2	45	0.5	228	2.6	38	0.4[3]
	Total	13,383	57.9	5848	25.3	3057	13.2	194	0.8	570	2.5	63	0.3
10	7	603	48.2	443	35.4	96	7.7	35	2.8	66	5.3	9	0.7
	11	831	30.0	1508	54.5	395	14.3	8	0.3	26	0.9	1	0.1
	12	691	35.3	919	46.9	289	14.8	55	2.8	4	0.2	2	0.1
	Total	2125	35.5	2870	48.0	780	13.0	98	1.6	96	1.6	12	0.2

* Weight in grams
** Includes soft shell clam and stout tagelus
*** Unless additionally noted, represents only barnacles (*Balanus sp.*) and land snails

1 Arcidae family, *Busycon canaliculatum*
2 *Melampus bidentatus*
3 *Busycon canaliculatum*, *Callinectes sapidus*

TABLE 4: SHELLFISH IN ANALYZED FEATURES at 44JC70.

STRATA	FEATURE	OYSTER		RIBBED MUSSEL		PERIWINKLE		ANGEL WING		CLAM**		OTHER***	
		WT.*	%	WT.	%	WT.	%	WT.	%	WT.	%	WT.	%
4	10C	812	93.9	43	5.0	8	0.9	--	--	2	0.2	0.3	0.0
7	12G	7070	57.3	4230	34.3	912	7.4	41	0.3	53	0.4	24	0.2
8	5H	62	12.2	339	66.6	97	19.1	9	1.8	1	0.2	1	0.2
8	7P	191	33.2	316	54.9	67	11.6	1	0.2	--	--	1	0.2
10	6E	9	6.9	172	93.0	4	2.2	--	--	--	--	--	--
11	8G	330	95.4	4	1.2	11	3.2	--	--	--	--	1	0.3[1]

* Weight in grams
** Includes soft shell clam and stout tagelus
*** Unless additionally noted, includes only barnacles and land snails

[1] *Ilynassa obsoleta*

TABLE 5. SHELLFISH IN FEATURE 12G at 44JC70.

SAMPLE UNIT	OYSTER		RIBBED MUSSEL		PERIWINKLE		ANGEL WING		CLAM**		OTHER***	
	WT.*	%	WT.	%	WT.	%	WT.	%	WT.	%	WT.	%
West Half:												
Level 1	200	22.0	652	71.8	54	5.9	1	0.1	--	--	1	0.1
Level 2	1087	43.0	1266	50.1	163	6.4	8	0.3	4	0.2	1	0.0
Level 3	223	43.6	213	41.6	70	13.7	4	0.8	1	0.2	1	0.2
TOTAL	1510	38.2	2131	54.0	287	7.3	13	0.3	5	0.1	3	0.1
East Half	5560	66.3	2099	25.0	625	7.5	28	0.3	48	0.5	21	0.3[1]

* Weight in grams
** Includes soft shell clam and stout tagelus
*** Unless additionally noted, represents only barnacles (*Balanus sp.*) and land snails

[1] Arcidae family, *Busycon canaliculatum*, *Melampus bidentatus*

TABLE 6: HEIGHT (MM) OF OYSTER IN STRATA 7, 8, and 10 (LEFT VALVES ONLY) at 44JC70.

STRATA	SQUARE	# OF VALVES	RANGE	MEDIAN	MEAN	% OF OYSTER SHELL IN UNIT SHELL WEIGHT
7	7	94	16 - 114	63, 64	63	94.8
	10	19	40 - 98	58	62	93.7
8	7	22	36 - 75	49, 51	51	58.2
	10	71	30 - 68	46	48	39.7
	11	42	22 - 77	51, 52	50	58.2
	12	42	31 - 76	50, 51	51	70.2
10	7	35	24 - 93	49	50	48.2
	11	51	23 - 63	41	40	30.0
	12	35	25 - 57	40	40	35.3

TABLE 7. HEIGHT (MM) OF OYSTER IN FEATURES (LEFT VALVES ONLY) AT 44JC70.

STRATA	FEATURE	# VALVES	RANGE	MEDIAN	MEAN	% OF OYSTER SHELL IN UNIT SHELL WEIGHT
4	10C	25	37-85	50	54	93.9
7	12G	41	28-112	52	53	57.3
8	5H	3	25-51	35	36	12.2
8	7P	11	30-64	48	47	33.2
10	6E	NO MEASURABLE WHOLE OYSTER				
11	8G	5	43-60	55	50	95.4

Vertebrate Faunal Remains

Leslie D. McFadden and Mary Ellen N. Hodges

Although the Croaker Landing Site is distinctive because of the shell midden accumulated there, excavation also recovered a sizable, although extremely fragmentary, collection of vertebrate faunal remains. To determine what role faunal resources other than shellfish played within subsistence activities during the Middle Woodland Period at the site, vertebrate remains from units of the three primary midden strata and from one feature, 12G (Stratum 7), were examined and identified to the lowest taxonomic level possible. This collection comprised a total of 7,263 specimens and included those remains recovered in both one-quarter inch dry and one-quarter and one-sixteenth inch wet-screening process.

The physical environment of 44JC70 has probably changed little, except for modern depletion of estuarine resources, Middle Woodland Period. The number of different microenvironments within the immediate vicinity of the Croaker Landing Site would have provided its inhabitants a wide variety of animal and plant foods from which to choose for subsistence. Located within the freshwater/saltwater transition zone of the York River, the site lies adjacent to expanses of brackish wetlands which line the river shoreline. Freshwater resources were also available near a small unnamed stream which flows just beyond the southern edge of the midden. A slightly larger stream enters the York only 305 meters upriver. The mouths of both streams probably have been truncated through time by erosion along the now abrupt southern shore of the York, and, although they are not filled with sediments, they may have been more embayed during previous periods

when the site was occupied. Taskinas Creek, a more extensive drainage with a more embayed mouth, lies one mile downriver from Croaker Landing. Subsistence resources of full hardwood and mixed mesophytic hardwood forest communities would have been available to the site inhabitants along nearby interior ridges and ravines.

Eight vertebrate faunal species were identified among the remains analyzed from the Croaker Landing Site. These include white-tailed deer (Odocoileus virginianus), raccoon (Procyon lotor), opossum (Oidelphis marsupialis), groundhog (Marmota Monax), Eastern cottontail rabbit (Sylvilagus Floridanus), and grey squirrel (Sciurus carolinensis). Of the fish bone recovered, catfish (Ictalurus sp.). was the only type which could be identified with certainty. Also present were the remains of unidentified turtle and snake species. No avian remains were identified in the assemblages.

A little over one-half of the faunal materials from the sample units remained unidentified (Table 8). Similar to the shellfish remains at the site, the majority of bone recovered was extremely fragmentary. While the recovery of a large proportion of very small remains is expected when wet-screening through one-sixteenth inch mesh is practiced, the poor condition of the remains from Croaker Landing suggested that the bones here may have been particularly subject to breakage and crushing by the weight and movement of the shellfish debris being added to the midden, as well as by other activities associated with use of the surface of the site through subsequent occupations.

By specimen quantity approximately 40 percent of the bones from the three midden strata and the feature were turtle remains (Table 8). Deer bone and unidentified bone originating from large

mammals, probably deer, comprise the second largest category represented, contributing approximately 7 percent of the remains. Although fish, raccoon, opossum, and other small mammals each accounted for less than 1 percent of the total sample, fish remains were in greater number than the total sum of elements from each of the small mammalian species.

Looking at the three midden strata individually (Tables 9, 10, and 11), the range of species within the assemblages for Strata 7 and 8 are generally quite similar. A variety of small mammals are represented in each, the major difference between the two assemblages being that Stratum 7 holds a larger percentage of unidentified large mammal and deer bone, and Stratum 8 holds a larger percentage of turtle bone. The assemblage from Feature 12G (Table 12) is also generally similar to those of Strata 7 and 8. In contrast to these deposits, the assemblage from Stratum 10 is less diverse, with only turtle, fish, and unidentified large mammal bones represented among the identifiable elements.

Perhaps the most surprising feature of the faunal remains from Croaker Landing is the large quantity of turtle shell included. Despite their large numbers, however, the fragmented condition of the turtle bones precluded any positive identification of species. The few internal bones recovered (approximately 2 percent of the specimens) were too small and/or worn for identification. Turtle shells had separated not only into the several bony plates which make up the carapace and plastron, but the individual plates had broken as well. Although several factors may have contributed to the condition of the bones, it is interesting to note that an early colonial recipe for turtle soup calls for one to "Break both Shells to Pieces and put them into a

Pot" (Bullock 1966:85). Whether this method of preparation was practiced by Native Americans in Virginia is unknown.

Although the exact species represented by the turtle bones could not be determined, examination of the specimens did show that 98 percent of the shell fragments were from smoothed-shelled species. Considering the environmental setting of the site, these could include the snapping turtle (Cheldra serpentina), the mud turtle (Kinosternon subrubrum), or the bog turtle (Clemys muhlenbergii), all aquatic species tolerant of brackish water and preferring habitats with soft, muddy bottoms and abundant aquatic vegetation. Smoothed-shell fragments could also represent freshwater species such as the painted turtle (Chrysemys picta) and the red-bellied turtle (Chrysemys rebriventris), or the box turtle (Terrapine carolina), a land species. It is likely that the turtles represented by the ridged shell fragments in the collection are either the diamondback terrapin (Malaclemys terrapin), considered a delicacy by many people (Nichols 1977:102), or the river cooter (Chrysemys sp.). Both inhabit rivers or marshes characterized by brackish water (Ernst and Barbour 1972).

Because a simple count of specimens may not accurately reflect the dietary contribution of individual species within an assemblage, estimates were made of the minimum number of individuals (MNI) per species represented within each deposit analyzed from Croaker Landing. These counts were then used with figures for average meat yields (White 1953; Guilday 1971) to estimate the relative contribution of each species to the diet. The number of fish represented was determined by the number of mandibles within an assemblage. Turtles were counted by using

scapulae. The rough figure of (.45 kilogram) of meat was used to estimate the dietary contribution of the unidentified fish and turtle species. Remains of snake were omitted from the analysis, as it was considered that they may not represent subsistence residue. Although remains of groundhog were included, these too might be considered to have originated within the midden through natural means unrelated to man's use of the site. Tables 9, 10, 11, and 12 show the results of these calculations for the midden strata and feature. Table 13 shows revised figures for the deposits when the contribution of oyster, the only shellfish for which MNIs were estimated, is considered. Each oyster was considered to have yielded 13 grams of wet meat.

As seen in Table 13, the four faunal assemblages analyzed from the Croaker Landing Site are generally quite consistent in the relative meat contribution of species. It should be noted, however, that, in most cases, only one individual per species was identified in each sample. This small sample size could easily skew the results. Thus, given the generally consistent range of species represented in the four deposits, it follows that the relative dietary contributions of species between each deposit would be the same. Deer provided 70-94 percent of usable meat within the three midden strata and Feature 12G. Within the assemblages from Strata 7 and 8 and Feature 12G, a variety of small mammals supplemented the diet, contributing individually from as low as one percent up to almost 13 percent of the meat. Collectively, small mammals contributed 15-21 percent of usable meat. The major difference between the deposits is the lack of small mammals within Stratum 10. This fact should probably not be construed as the reflection of a stronger marine focus, however,

since the dietary contribution of oyster within Stratum 10 is consistent with its role within the other three deposits analyzed. None of the deposits, in fact, show a particularly strong estuarine focus, although oyster, fish, and turtle (some land species may be included) did provide a larger proportion of usable meat within Stratum 8 than within either the feature or other midden deposits. Oysters contributed only 0.9-3.6 percent of usable meat within the assemblage. Even if other shellfish had been included, it is unlikely that the total contribution of shellfish species would have exceeded or even matched the usable meat provided by all small mammals within the assemblages from Strata 7 and 8 and Feature 12G.

The Croaker Landing Site can be compared to several other Middle Woodland Period sites within the Virginia Coastal Plain for which faunal data are available. These include White Oak Point (44WM119) located near the mouth of Nomini Creek on the south shore of the Potomac River where two components dated ca. 400 B.C. - A.D. 300 were excavated (Waselkov 1982); Skiffes Creek (44NN7) located a little over one-and-one-half miles up Skiffes Creek from its confluence with the James River and containing two Middle Woodland period features; Feature 3 dating from the late Middle Woodland and Feature 1 deposited earlier (Barber 1983a, 19836); College Creek (44JC27) on the north shore of the James about three miles downriver from Jamestown where a mixed Middle/Late Woodland assemblage was obtained from the plowzone (Barber 1978); and Maycocks Point (44PG40) situated on the south shore of the James River about five miles downstream from Hopewell and where three excavated zones span the period ca. A.D. 300 - 900 (Barber 1981). The Middle Woodland components analyzed at White Oak Point and

Skiffes Creek appear to have represented seasonally occupied short-term encampments. Maycocks was a larger settlement with at least some of its inhabitants occupying the site year-round. Information on College Creek is less clear, although the faunal remains indicated it was occupied during both cold and warm weather months.

As shown in Table 14, the assemblages from Croaker Landing fit well within a general pattern in the use of vertebrate fauna seen elsewhere within the Virginia Coastal Plain. At each of the sites analyzed, mammals played by far the most important role within the diet, with deer contributing the overwhelming majority of meat derived from this class. The remains from Croaker Landing differed from most other sites, though, in that a narrower range of small mammals were used. Noticeably lacking at Croaker Landing are the remains of muskrat (found at College Landing, Skiffes Creek Feature 3, and Maycock's Point Zones 2 and 4) and beaver (College Landing and Skiffes Creek Feature 3). Also missing at Croaker Landing are the remains of the domestic dog (College Creek, Maycock's Point Zone 4, Skiffes Creek Features 1 and 3, and White Oak Point Component 1). Another important difference with the Croaker Landing remains is the complete lack of avian remains which were recovered in all other assemblages except White Oak Point Component 1. While every component from the other sites yielded evidence of turkey, both Maycock's Point Zone 2 and White Oak Point Component 2 also yielded duck, with evidence at the former site of Canadian goose as well. The final significant divergence between Croaker Landing and several of the other assemblages is a difference in the role of fish within the diet. In six of the other assemblages, fish provided over 10 percent of

usable meat. At Maycock's Point, Skiffes Creek Feature 1, and White Oak Point this large percentage is due to the procurement of sturgeon, an anadromous species estimated to yield 45 kilograms of meat per individual. Gar contributed 6.3 percent of usable meat at Skiffes Creek Feature 3. The pisces remains from College Creek were unidentified.

Shellfish, either salt or freshwater species depending on the locale, played a role in the subsistence at all of the sites listed in Table 14. The relative contribution of invertebrate and vertebrate faunal remains has been studied so far, however, at only White Oak Point where the results differed profoundly from those obtained at Croaker Landing. The meat contribution of mammals exceeded that of shellfish species within only three of seventeen components analyzed from the entire White Oak Point excavation--one each from the Late Archaic, Late Woodland, and Protohistoric/Early Historic periods. Within Middle Woodland period Components 1 and 2, shellfish provided, respectively, 62.7 and 64.2 percent and mammals 37.2 and 27.7 percent of usable meat. Oysters contributed 77.1 and 92.2 percent of the invertebrate share of the diet. These figures indicate a more specialized site function than those from Croaker Landing where oysters contributed only 0.9 - 3.6 percent of usable meat in the deposits analyzed.

The preceeding discussion and the results of the analyses of shellfish remains from Croaker Landing suggest that the site was a small, perhaps transient, encampment, occupied for periods of relatively short duration at various times throughout the year. The subsistence pattern fits generally with that seen at other Middle Woodland period sites within the Virginia Coastal Plain. Deer was the most important contributor of meat to the diet, while

small mammals and species from other vertebrate as well as invertebrate classes played supplementary roles. The function of the Croaker Landing Site appears to have been less specialized than several other sites for which comparative data are available. Lacking in the vertebrate faunal remains from 44JC70 is evidence of the use of certain mammalian and avian species which should have been available to the inhabitants in nearby riverine, marine, and estuarine environments. Fish played only a minor role within the diet. Even shellfish, which considerably enhanced the archaeological visibility of the site, contributed only a small share of the meat used by the inhabitants. In sum, while the location of the Croaker Landing Site would suggest that it was occupied specifically for the procurement of aquatic resources, the faunal remains recovered from the Middle Woodland Period components indicate a less specialized role within the prehistoric subsistence and settlement systems.

TABLE 8. DISTRIBUTION OF VERTEBRATE FAUNAL SPECIMENS BY STRATUM AND FEATURE AT 44JC70.

SPECIES	STRATA 7 n	STRATA 8 n	STRATA 10 n	FEATURE 12G n	TOTAL n	TOTAL %
Turtle	118	2139	391	294	2942	40.5
Fish	3	42	3	4	52	0.7
Deer	6	20	--	2	28	0.4
Raccoon	2	4	--	17	23	0.3
Opossum	1	1	--	--	2	--
Groundhog	1	1	--	--	2	--
E. Cottontail	--	1	--	--	1	--
Grey Squirrel	--	--	--	1	1	--
Snake	1	2	--	--	3	--
Unid. Large Mammal	70	388	21	15	494	6.8
Unidentified	222	2414	332	747	3715	51.1
TOTAL	424	5012	747	1080	7263	99.8

TABLE 9. VERTEBRATE FAUNAL REMAINS FROM STRATUM 7 (SQUARES 7 AND 10) AT 44JC70.

SPECIES	ELEMENTS	MNI	USABLE MEAT LBS.	%
Turtle	118	1	1.0	0.8
Fish	3	1	1.0	0.8
Deer	6	1	100.0	78.7
Raccoon	2	1	15.0	11.8
Opossum	1	1	5.0	3.9
Groundhog	1	1	5.0	3.9
Snake	1	NA	NA	NA
Unid. Large Mammal	70	NA	NA	NA
Unidentified	222	NA	NA	NA
TOTAL	424	6	127.0	99.9

TABLE 10. VERTEBRATE FAUNAL REMAINS FROM STRATUM 8 (SQUARES 7, 10, 11, and 12) AT 44JC70.

SPECIES	ELEMENTS	MNI	USABLE MEAT LBS.	%
Turtle*	2139	7	7.0	5.0
Fish**	42	4	4.0	2.9
Deer	20	1	100.0	72.7
Raccoon	4	1	15.0	10.9
Opossum	1	1	5.0	3.6
Groundhog	1	1	5.0	3.6
E. Cottontail	1	1	1.5	1.1
Unid. Large Mammal	388	NA	NA	NA
Unidentified	2414	NA	NA	NA
TOTAL	5012	16	137.5	99.8

* Includes ridged-shelled species
** Includes catfish

TABLE 11. VERTEBRATE FAUNAL REMAINS FROM STRATUM 10 (SQUARES 7, 11, AND 12) AT 44JC70.

SPECIES	ELEMENTS	MNI	USABLE MEAT	
			LBS.	%
Turtle*	391	2	2.0	1.9
Fish	3	1	1.0	1.0
Unid. Large Mammal **	21	1	100.0	97.1
Unidentified	332	NA	NA	NA
TOTAL	747	3	103.0	100.0

*Includes ridged-shelled species

** Assumed to be deer

TABLE 12. VERTEBRATE FAUNAL REMAINS FROM FEATURE 12G AT 44JC70.

SPECIES	ELEMENTS	MNI	USABLE MEAT	
			LBS.	%
Turtle	294	1	1.0	0.8
Fish	4	1	1.0	0.8
Deer	2	1	100.0	84.7
Raccoon	17	1	15.0	12.7
Grey Squirrel	1	1	1.0	0.8
Unid. Large Mammal	15	NA	NA	NA
Unidentified	747	NA	NA	NA
TOTAL	1080	5	118.0	99.8

TABLE 13. USABLE MEAT PROVIDED BY VERTEBRATE SPECIES AND OYSTERS AT 44JC70.

SPECIES	STRATA 7			STRATA 8			STRATA 10			FEATURE 126		
	MNI	LBS.	%	MNI	LBS.	%	MNI	LBS.	%	MNI	LBS.	%
Oyster	113	3.2	2.5	177	5.2	3.6	121	3.4	3.2	41	1.1	0.9
Turtle	1	1.0	0.8	7	7.0	4.9	2	2.0	1.9	1	1.0	0.8
Fish	1	1.0	0.8	4	4.0	2.8	1	1.0	0.9	1	1.0	0.8
Deer	1	100.0	76.8	1	100.0	70.1	1	100.0	94.0	1	100.0	84.0
Raccoon	1	15.0	11.5	1	15.0	10.5	--			1	15.0	12.6
Opossum	1	5.0	3.8	1	5.0	3.5	--			--		
Groundhog	1	5.0	3.8	1	5.0	3.5	--			--		
E. Cottontail	--			1	1.5	1.1	--			--		
Grey Squirrel	--			--			--			1	1.1	0.8
TOTAL		130.2	100.0		142.7	100.0		106.4	100.0		119.1	100.0

TABLE 14. PERCENTAGE OF MEAT CONTRIBUTED BY VERTEBRATE CLASSES AT FIVE MIDDLE WOODLAND PERIOD SITES WITHIN THE VIRGINIA COASTAL PLAIN

SITE/COMPONENT	MAMMALIAN TOTAL	MAMMALIAN (DEER)	AVES	REPTILIA	PISCES
College Creek	86.1	(77.2)	1.5	1.1	11.3
Skiffes Creek Feature 1	81.2	(76.7)	1.3	0.1	17.5
Skiffes Creek Feature 3	85.6	(64.2)	2.7	3.3	8.4
Maycock's Point Zone 2	85.7	(81.7)	2.6	0.9	10.9
Maycock's Point Zone 4	80.8	(79.4)	1.8	3.5	14.0
Maycock's Point Zone 5	86.1	(82.4)	1.4	1.2	11.4
White Oak Point Component 1	99.5	(87.6)	--	0.2	0.3
White Oak Point Component 2	77.2	(60.1)	0.6	1.7	20.5
Croaker Landing Strata 7	98.3	(78.7)	--	0.8	0.8
Croaker Landing Strata 8	91.9	(72.7)	--	5.0	2.9
Croaker Landing Strata 10	97.1	(97.1)	--	1.9	1.0
Feature 12G	98.2	(84.7)	--	0.8	0.8

EXCAVATION AT 44JC71

The site, 44JC71, is located on the last knoll along a ridge-like point of land overlooking the York River and its accompanying tidal flats (Figure 1). Directly south of the site, the development of a sand spit across the mouth of a small creek resulted in a high rate of siltation and the formation of a small three-acre marsh. Marshland also occurs directly north of the site along the York River. Part of the knoll upon which 44JC71 rests was removed in the past and spread over the sand spit to make the access road to the historic Croaker Landing.

The previous bulldozer land clearing for the parking facility removed all of the humus from the hilltop revealing an orange clay subsoil. Two small shell concentrations were noticed intruding into subsoil, and Squares 1 and 2 were placed to encompass them. Excavations encountered no cultural stratigraphy and few artifacts in either of the squares. What cultural information may have existed had undoubtedly been removed completely by the clearing activities (Figure 2).

However, a third concentration of oyster shell and artifacts was found at the north bluff edge of the knoll. This area was avoided by the heavy machinery due to its proximity to the steep drop to the marsh below. Here, the shallow stratigraphy revealed in Squares 3-8, contained cultural material associated with an oyster shell feature (Figure 2). The stratigraphy was composed of a grey brown sandy humus (Stratum 1) 15 cm. thick. Below that, a tan sand (Stratum 2) 7 cm. in thickness contained the oyster shell feature. Stratum 3, a culturally sterile yellow orange sandy soil 5 to 15 cm. thick, had occasional oyster shell intrusive from

Stratum 2. These strata laid on the sterile orange clay subsoil (Stratum 4) that forms the knoll (Figure 19).

The cultural material from Squares 3-8 associated with the shell feature consisted of bone, shell, and ceramics. A sizable sample of small bits of splintered animal bone, mainly deer, was cataloged but not analyzed. All but the most fragmentary pieces of shell were saved. The sample comprises 11.8 kilograms of oyster shell, representing at least 923 valves, and 19.8 grams of periwinkles represented 13 individuals. The oyster shells are unusually small with the majority less than 50 mm. in height. Same of the oyster shells in Stratum 2 are burnt. Others, particularly the smallest oyster shells still have both valves articulating, suggesting that they were not opened and consumed.

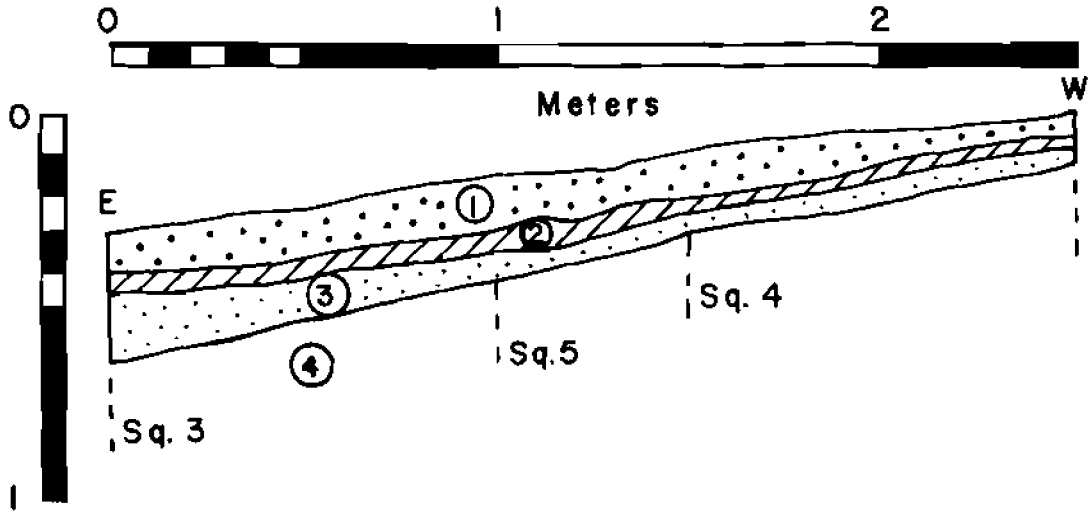
The majority of the ceramics lay on top of the oyster shell, as if on an occupation surface, with a few pieces scattered amongst the shell. The 185 sherds recovered and analyzed represent two wares (Figure 20). Three cord-marked small particle-temper sherds were uncovered. The rest of the sherds are extremely uniform and assigned to the shell-tempered Mockley Ware. The shell is leached out of the sherds leaving identifiable fine, flat holes in the paste. The paste does not exhibit the typical soft, clayey feel characteristic of the Mockley Ware but rather a sandy texture as a result of a moderate amount of sand incorporated into the paste. Also unusual are occasional rounded particles of stone up to 2 mm. in diameter widely scattered throughout the paste. These unusual paste qualities either represent a local variance in the clay source used by the people, or perhaps the paste indicates an earlier temporal period within the Mockley Ware.

CROAKER LANDING

44 J C 71

Profile Squares 3-5

Facing Southwest



1 Gray-brown sandy humus

2 Tan sand with oyster shell

3 Yellow-orange sandy soil

4 Orange clay subsoil

Figure 19. Profile of Squares 3-5 at 44JC71.

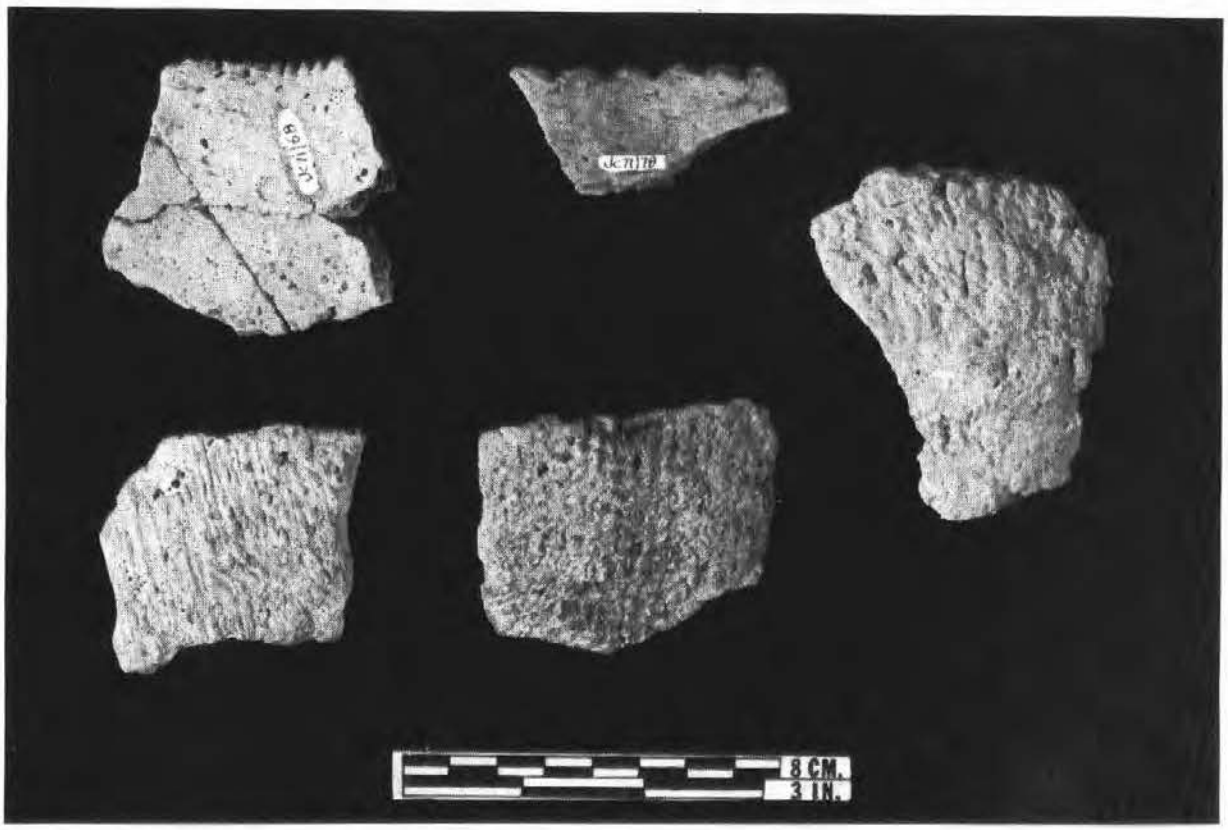


Figure 20. On left four Mockley cord and net-impressed sherds illustrating rim notching creating, in some cases, a scalloped effect. A small Particle-Temper cord-marked sherd on the right.

Of the 182 Mockley sherds analyzed, 159 (87 percent) are knotted-net-impressed and 23 (13 percent) are cord-marked. The average thickness of 50 net-impressed sherds is 7.3 mm. with a range of 5.7 to 9.5 mm. Twelve cord-marked sherds have an average thickness of 7.1 mm. with a range from 5.1 to 8.0 mm. The rim sherds exhibit the decoration of narrow (2 mm.) to wide (6.5mm.) notching achieved by applying a rounded tool to the interior lip of the rim. The wide notching created a unique scalloped effect along the interior lip of the rim.

In conclusion, 44JC71 is a small Middle Woodland knoll site overlooking the marshes and tidal flats of the York River. Although the people probably got most of their meat from deer and small mammals, they undoubtedly supplemented their diet with oysters. The vast majority (98 percent) of the sherds belong to the Mockley Ware and exhibit sand-shell-temper, paste qualities that probably represent local variation in the natural clay source.

RECONNAISSANCE SURVEY OF THE SOUTH BANK YORK RIVER

The high, well drained points of land overlooking the York River, its tidal flats, the adjacent brackish marshes, and freshwater creeks are thought to be ideal for prehistoric habitation. Therefore, after the completion of the excavation at Croaker Landing, a reconnaissance survey along the south side of the York River was conducted, seeking other areas of high artifact density. Surprisingly, only three light scatters of prehistoric material were discovered. This represented an investment of 140 man hours of survey time of a three-mile strip of land below Croaker Landing along the York River and in searching an area three-quarter of a mile inland along each of two creek drainages.

Volunteers from the Department of Anthropology, the College of William and Mary, and staff archaeologists from the Division of Historic Landmarks surveyed a 60 meters wide strip of forested land along the York River, Taskinas Creek, and an unnamed creek whose headwaters drain from the Christensons Corner area. The survey consisted of shovel test pits spaced 15 meters apart. The 30 centimeters in diameter holes were excavated through the topsoil, normally 30 centimeters deep, down to the surface of subsoil and the exposed soil was carefully searched for artifacts. Exposed land surfaces such as the York River shoreline and eroded headlands were surface inspected.

Thus, the small fingers of high land overlooking the York River and its creek tributaries were thoroughly investigated resulting in the recording of only three small prehistoric sites. These sites were found on the points of land just south of 44JC70 and 71 (Figure 1). Thirteen shovel test holes located 44JC73, uncovering only four quartz flakes and one fire-cracked rock.

44JC74, identified by three quartz flakes and one shell-tempered sherd, was discovered through the excavation of seven shovel test pits. Eleven holes uncovered two quartz flakes, two fire-cracked rocks, and one sand-tempered fabric-impressed sherd, thereby defining 44JC75.

Why was there such a surprisingly low site density in the area after the initial fruitful discoveries at Croaker Landing? An extensive reconnaissance survey along the York River in York County directly south of James City County may help to answer this question. The York County Survey noted that while site density was greatest in southern York County in the region of low topography (2 to 6 meters in elevation) adjacent to extensive estuarine environment, site density decreased in the northern end of the county in the region of greatly dissected, well drained uplands (15 meters in elevation). Furthermore, the York County Survey in 1979-80 found that site density increased in areas of large expanses of level land adjacent to the York River and confluent low order streams, as well as in conjunction with marshes and cobble outcroppings.

The leading reasons why the land along the York River near Croaker Landing was inhabited only lightly in prehistoric times are: 1) its intensively dissected and rugged nature which created only small flat areas low in natural soil fertility; 2) the lack of available cobble material along the shoreline; 3) relatively small and restricted marshes; and, 4) the occurrence of only one small low order stream, Taskinas Creek. Also, sea level rise and concomitant changes in river level have undoubtedly eroded the Archaic sites which may have been located on headlands overlooking the York River. We are left with the impression that the Croaker

Landing Site, 44JC70, is locally unique. It exhibits an unusually dense midden in an unexpected topographic position that resulted in an astonishingly well preserved site.

CONCLUSION

One component of the Croaker Landing Site is a unique deeply stratified midden with well-preserved cultural remains dating from 1000 B.C. to A.D. 1500. Such a site is extreme rare in the Coastal Plain of Virginia. The site cooroborates the associations that exist between known ceramic wares and projectile point types. Furthermore, one previously undefined ware and one projectile point type were defined. The well preserved and varied shellfish and vertibrate remains from the midden provided an excellent opportunity to study differences in the use of subsistence resources through successive periods of occupation during the Middle Woodland period. A reconnaissance survey of the south bank of the York River in the vicinity of Croaker Landing found very little cultural material, suggesting that this area was culturally isolated. Although a moderate amount of well preserved floral material was recovered from the one-sixteenth-inch mesh wet-screening process of soil from the strata and features at the site, these remains were not studied. However, they hold great research potential and an ethnobotanical study that complements existing shellfish and vertibrate studies is most desirable.

The projectile point sequence found at Croaker Landing cooroborates existing knowledge, progressing from Late Woodland small equilateral triangular points, to larger isosceles triangular points, to Middle Woodland Potts Corner-Notched points. A side-notched variant of the Potts point was defined. A small stemmed point and a long narrow bifacial knife may date to the Early Woodland period.

The strata verified the known ceramic sequence of Late Woodland Roanoke Simple-Stamped and Townsend Wares, to Middle

Woodland Mockley and Popes Creek wares. A sandy-paste variety of the shell-tempered Mockley Ware was recognized. Rim-notching, creating a scalloped decoration, was noted also on Mockley sherds. A Small Particle-Tempered Ware, probably similar to Varina Ware, was identified near the bottom of the excavation. At the bottom of the trench a clay-tempered pottery, newly defined as Croaker Landing Ware, probably represents the earliest ceramic in the Early Woodland period. The ware has two types: Croaker Landing Plain and Croaker Landing Cord-Marked.

The three studies of shellfish and vertebrate remains from the stratified midden are different, yet combine to portray an image of a diverse and flexible subsistence pattern near the freshwater-saltwater transition zone of the York River. This section is extremely significant since few detailed studies of shellfish remains from Native American sites in the Coastal Plain of Virginia existed prior to these studies. In a rapidly progressing field of study, the attempt was made to apply the newest method of shellfish analysis to the data. Thus, the shellfish data was reanalyzed a number of times and was among the reasons this report took ten years to complete.

The first shellfish study suggests that the oysters from the Croaker Landing Site seem to represent an unusual variety: growing in waters with various salinity, showing no correlation between age and size measurements, and being harvested throughout the year. The second study of all the varieties of shellfish suggests that within the saltwater-freshwater transition zone of the York River, oysters were normally the preferred species. However, during periods when their meat yield lessened, other lower yield shellfish, which were only occasionally gathered before, were now

more intensively harvested. The last study, the analysis of the entire shellfish and vertebrate assemblage, revealed a very significant aspect of the Native American's subsistence base. While the site is ideally located for exploitation of aquatic resources, the people still obtained over 90 percent of their meat yield from deer and small mammals. In general, the faunal studies illustrate the flexible subsistence strategy of Middle Woodland Native Americans when applied to a small intermittent encampment along the saltwater-freshwater transition of the York River.

The reconnaissance survey of the south bank of the York River in the vicinity of Croaker Landing suggests that the stratified shell midden is locally a rare, astonishingly well preserved site, located in an unexpected topographic position -- at the base of a knoll on a very small patch of flat ground barely elevated above a brackish marsh. The following are suggested reasons for the light inhabitation of the area: 1) the intensively dissected and rugged nature of the terrain which created only small flat areas low in soil fertility; 2) the lack of available cobble materials along the shoreline; 3) relatively small and restricted marshes; and 4) only one small stream nearby.

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