

THE BULLETIN

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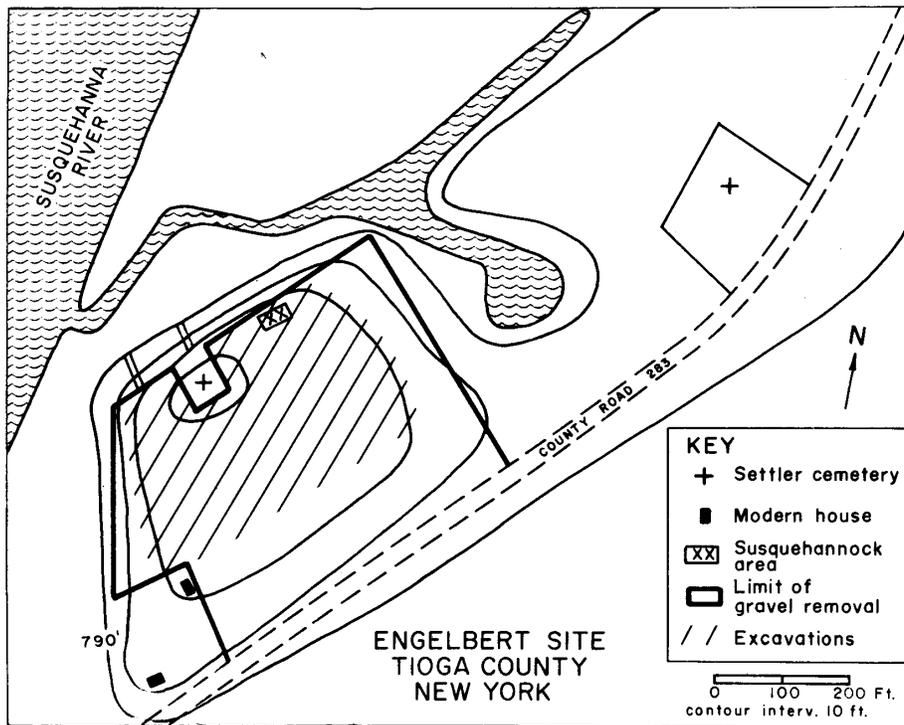
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A PROTO-HISTORIC SUSQUEHANNOCK CEMETERY
NEAR NICHOLS, TIOGA COUNTY, NEW YORK

Marilyn C. Stewart

Triple Cities Chapter

Introduction

This paper is, first and foremost, a site report describing a Susquehannock cemetery in south-central New York. The cemetery is compared to other Susquehannock burial sites and is placed temporally in the proto-historic period. Secondly, the paper presents the results of a ceramic analysis of the vessels from this site in which the vessels are described in terms of measured attributes and compared to other Susquehannock, Iroquoian, and Mississippian vessels. A third goal is to test Witthoft's (1959) hypothesis that the Susquehannocks migrated from the Upper Susquehanna Valley between 1550 and 1570 A.D. This hypothesis is found to remain the most economic explanation for the distribution of Susquehannock remains in northern Pennsylvania and southern New York.

The Susquehannocks

The Susquehannock Indians are one of the most fascinating but least known tribes of early Colonial history. At the time of European contact (by John Smith in 1606-1608) they were the dominant culture in Pennsylvania and had their home base around present-day Lancaster. Although their cultural and linguistic heritage was Iroquoian, their political relationships with the Iroquois League at this time were most likely unfriendly, as was the case later. Apparently, the Susquehannocks controlled a good part of Pennsylvania (from the Delaware River to the Allegheny River) in the early seventeenth century. Northern and west-central Pennsylvania and parts of southern New York are supposed to have been their hunting territories and were probably uninhabited at this time.

Several archeological studies (reported in Witthoft and Kinsey, 1959) suggest that the Susquehannocks originally inhabited the Upper Susquehanna Valley and migrated to the Lower Valley sometime in the late sixteenth century. The best evidence for this thesis, as demonstrated by Witthoft (1959), is the distribution of European trade goods. On burial sites in the Lower Valley objects of iron, brass and/or copper, and especially glass beads are found in abundance. Northern Susquehannock burial sites, on the other hand, have almost no glass beads, very few objects of iron, and no brass items. Trade goods are represented chiefly by ornaments fashioned from copper sheets in Indian technique and style. These data suggest that the northern sites are earlier.

Witthoft's analysis of Susquehannock pottery provided further evidence for a migration. Pottery from prehistoric sites (Shenks Ferry) in the same vicinity as the historic Lower Valley Susquehannock sites is quite unlike Susquehannock pottery. Witthoft found that the closest proto type to the historic Lower Valley Susquehannock pottery is the proto-historic Susquehannock pottery (formerly called Andaste pottery) found in Bradford County, Pennsylvania, and in southern Tioga and Broome Counties in New York. In the historic Lower Valley sites a sequence of three pottery types can be distinguished. The earliest is Schultz Incised, the predominant type at the Schultz site. Early historic pottery from the Washington Boro sites (Ibaugh and Eschelman) is predominantly Washington Boro Incised. The final type, Strickler Cordmarked, is found at the Strickler, Bert Leibhart, and Oscar Leibhart sites.

Through these changes in pottery style and trade goods, Witthoft constructed a sequence of sites, placing the Bradford County ones at the early end. Heisey and Witmer's (1962) seriation, using Susquehannock pottery, burial traits, and glass beads produced the same site sequence. They added another type, Blue Rock Valanced, which is contemporary with Schultz Incised in the Lower Valley. Witthoft also proposed that Schultz Incised pottery shares roots with Cayuga pottery, both evolving out of the western group of Chance Incised pottery (i.e., Richmond Incised).

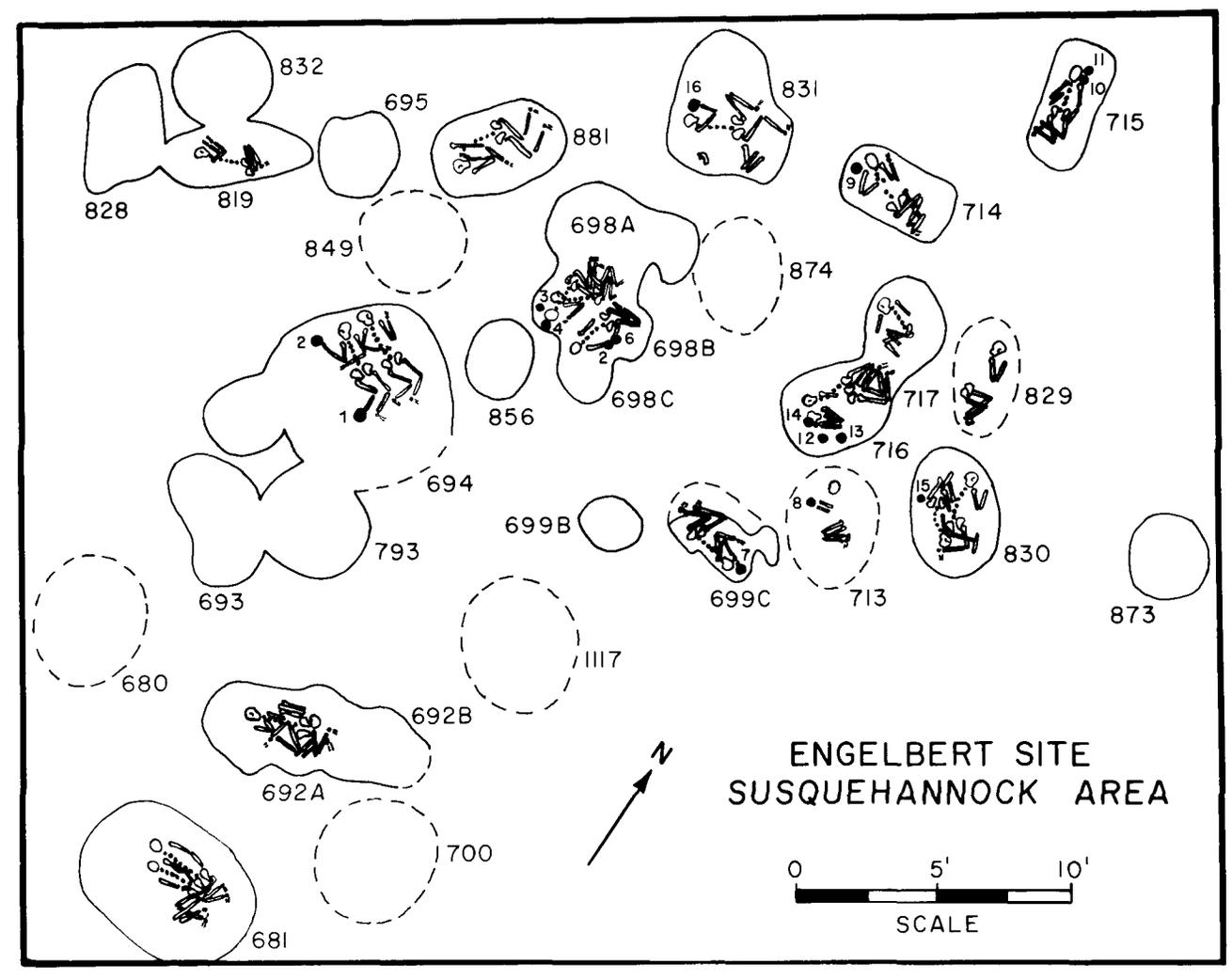


Fig. 2. The Susquehannock Burial Area.

and related types) during the late prehistoric period. He feels that Schultz Incised was influenced in its earlier stages by Munsee pottery and credits Susquehannock use of shell tempering to influence from the Alleghany Valley.

Since some of the sites in the Lower Valley were described in historic accounts (particularly the Leibhart sites, which were destroyed by the Iroquois in 1675), the later end of Witthoft's sequence is well-dated. The early end corresponds to the emergence of the Susquehannocks as an identifiable entity, at a time which, until recently, was thought to coincide with the beginning of the proto-historic period. Excavations in the West Branch in 1971 revealed the presence of a prehistoric Susquehannock component there (Ira Smith, personal communication). It is unlikely, however, that this component predates the proto-historic by much. The proto-historic, that period when European goods were available but contact had not yet been made with Indians of the interior, began sometime after 1497 (the date of John Cabot's visit to the Atlantic coast). Ritchie (1954) argues convincingly that organized fur trade was established by about 1550 in the St. Lawrence and Lower Great Lakes area and that this is the best date for the beginning of the proto-historic. Witthoft assumed a similar date for the proto-historic in northern Pennsylvania.

The dating of the remainder of the Susquehannock sequence is based on relative abundance of trade goods as compared with the Seneca sequence worked out by Charles Wray (Wray and Schoff 1953). Witthoft concluded that the Bradford County sites were "a decade or two later" than the earliest Seneca site (Adams) because they showed a higher incidence of copper or brass - one fragment per small hamlet or burial site as compared with only one brass bead in the large

village at Adams (Witthoft 1959:29). Assuming that the migration to the Lower Susquehanna required ten years to complete, he dated the Schultz site, the first Susquehannock village in Lancaster County, at 1580-1590, partly contemporary with the Seneca Cameron site (1575-1590) which has a similar pattern of trade goods.

These dates, while reasonable, cannot be accepted as demonstrated. Implicit in Witthoft's argument are many assumptions which are questionable. Among these are the following:

1. That the Susquehannocks acquired European goods at the same time and in the same amounts as the Seneca.
2. That the source was the same for both.
3. That the two groups were equally wealthy (i.e., that they had as much to trade or that prices were the same).
4. That all the Bradford County sites together represent a duration equal to the much larger Adams site.
5. That the frequency of brass or copper per site is the best of the several methods that could be used to compare amounts of trade goods in sites.
6. That the Seneca dates are correct.

An independent chronology and a study of Susquehannock trading relationships are badly needed. If the Susquehannocks moved south in order to profit from trade on the Chesapeake Bay, as Hunter (1959) suggests, these trading relationships could provide some clues to socio-political events throughout Pennsylvania and southern New York at this time. Competition for the Chesapeake Bay trade surely had some connection with the extinction of the Wyoming Valley, Shenks Ferry, and Monongahela cultures.

It has been recently suggested by Ira Smith (1970) that the Wyoming Valley and Shenks Ferry cultures were indeed extinguished by the Susquehannocks. In sites of both cultures there is evidence of a kind of peaceful coexistence at first, but at least some Wyoming Valley villages apparently met a violent end at the hands of the Susquehannocks. The fate of the Monongahela culture, which also suddenly disappeared in the proto-historic period, remains a mystery, although there are hints of Monongahela influence in historic Susquehannock pottery (Heisey and Witmer 1962:126).

Most archeologists have accepted the migration hypothesis on the basis of the arguments outlined above, but there is contradictory evidence in Bruhle's account of Carantouan, a large Susquehannock village thought to be near Athens in Bradford County, Pennsylvania, in 1615. A Dutch map dated 1614 also places the Susquehannocks on the North Branch at this time. Both documents are in serious question, however. The problem can only be solved by a better knowledge of Bradford County archeology.

This paper is basically a site report and is not concerned with establishing a chronology or examining trading relationships. The data from the Engelbert site can be used however to test partially Witthoft's migration hypothesis. Any Susquehannock remains found in southern New York will provide further support or modifications of the migration theory according to how well they meet these implications of Witthoft's hypothesis:

1. Susquehannock remains in this area are likely to date from the early proto-historic, which we will take to be between 1500 and 1550.
2. They are likely to include some European items, chiefly copper with some brass and iron, these materials having been made into ornaments in indigenous styles and technology. Very few glass beads should be found.
3. Burial traits will follow the pattern described by Heisey and Witmer for Bradford County sites.
4. The pottery will be most similar to late Schultz Incised pottery, Richmond Incised types found in central New York, and Munsee pottery. Resemblances to Monongahela pottery in the Allegheny Valley, Witthoft's (1959:50-51) candidate for the source of shell-tempering, should also be present.

The Engelbert Site

The Engelbert Susquehannock cemetery was located near the top of a large knoll (see Figs. 1, front cover, and 2) on the farm of the late Richard Engelbert. The site was a gravel kame deposited in the flood plain of the Susquehanna River by the last glacier. Prehistoric remains were discovered in 1967 when gravel removal operations were begun by the Perini Corporation, principal contractor for the Southern Tier Expressway through the area. Material from over 500 pit features and 120 graves was recovered in two eight-month salvage excavations by members of the Triple Cities Chapter of the New York Archeological Association, volunteers from the local area, and students from SUNY Binghamton. The excavations were directed by William D. Lipe and Dolores N. Elliott, and were funded by the Tioga County Historical Society, the New York State Museum, the Graduate School of State University of New York at Binghamton, State University of New York Research Foundation, and the National Geographic Society.

The Engelbert site was occupied intermittently over the last 5000 years. In addition to the proto-historic component which is the topic of this paper, there was an Archaic component consisting of hearth features probably of the same tradition as Lamoka, a Castle Creek Owasco component represented by bath graves and pits, and one or more proto-Iroquois components of the Oak Hill and Chance Horizons, which are represented almost solely by pits. Traces of longhouses were found but could not be identified with either Owasco or Iroquois pits. The identified prehistoric graves all belong to the Owasco phase, with the exception of two late prehistoric Iroquois graves.

Four charcoal samples, one from each of the prehistoric cultures were submitted for radiocarbon analysis. A sample from an Archaic hearth gave a date of 3850 ± 140 radiocarbon years, or 1900 \pm 140 B.C. (Y-2618). The true date in calendar years was determined by use of a chart (Olsson 1971) showing the relationship of radiocarbon dates to three ring dates on bristle cone pine samples [for dates younger than 2000 years the less accurate chart in Stuiver and Suess (1966, 1967) can be used if Olsson is not available]. Radiocarbon dates are especially inaccurate for the period around 2000-2500 B.C. Our radiocarbon date of 3850 ± 140 years corresponds to four equally probable dates in calendar years: 2460 ± 140 B.C., 2360 ± 140 B.C., 2300 ± 140 B.C., and 2210 ± 140 B.C. These cannot be averaged because a specimen which died in any one of these years will produce a radiocarbon date of 3850 years. It can only be said that the true date lies between 2600 B.C. and 2070 B.C.

The dating of the other components is less problematic. Charcoal from a Castle Creek burial produced a date of 670 ± 160 radiocarbon years, or 1280 \pm 160 A.D. (Y-2616), which stands as is; and a sample from a prehistoric Iroquois burial was dated 390 ± 80 radiocarbon years, or 1560 \pm 80 A.D. (Y-2615), which corrects to 1550 \pm 80 A.D.

The Proto-Historic Component

The Susquehannock graves were part of a component dated as proto-historic by the presence of ornaments made from European-made copper sheets (analyzed by Kathryn Ruhl of Case Western Reserve University and Helene R. Dunbar of SUNY Binghamton) and of a few decomposed "Early Blue" glass beads (identified by Charles Wray). A radiocarbon date of 490 ± 100 radio-carbon years, or 1460 \pm 100 A.D. (Y-2617) was obtained on charcoal from grave 716. This corrects to 1450 \pm 100 A.D. in calendar years - the plus error bringing the date just barely up to our expected 1550. Two cultural traditions are represented, Monongahela (one double burial of probable proto-historic date) and Susquehannock (four double and five single burials). In this paper, these traditions are treated together as if they are one component, since they seem to be roughly contemporary.

Seven of the Susquehannock graves were in silt-clay-gravel soil (found nowhere else in the knoll) which was similar to river-deposited silt found along the banks of the Susquehanna in southern New York. The soil filled a basin-shaped area, 34 ft. x 20 ft. x 24 ft. This depression may well have been artificial (see arguments in Crannell 1970:37-40) but the salvage nature of the excavation prevented the recovery of good evidence to test this theory.



PLATE 1. The Monongahela double burial. Vessel 1 is in the lower left corner. Vessel 2 is above the arrow.

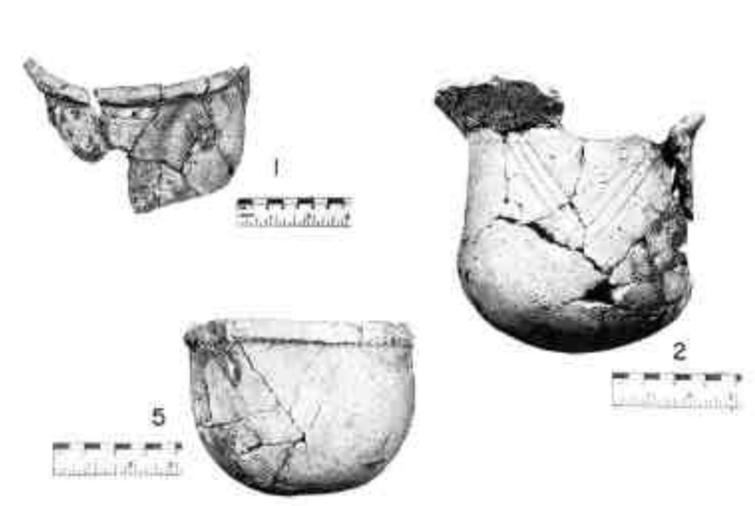


PLATE 2. Monongahela vessels (1, 2) and a Fort Ancient vessel (5) from grave 698B.



PLATE 3. A Susquehannock burial with ornaments made of European copper. Vessels 10 and 11 are in the lower right.

Graves

Space does not allow for the verbal description of all ten graves. The important traits of each are summarized in Table I. Terms used in the table are defined as follows:

Grave: A delimited area, usually a definite pit, containing one or more burials.

Single burial: The remains of an individual and the burial goods thought to have been deposited with the body at time of interment.

Double burial: The remains of two individuals in the same grave, plus burial goods. In all cases, both individuals are thought to have been interred contemporaneously, or nearly so.

Burial goods: In general, these are artifacts which are closely associated with a skeleton, and which, in most cases, are present in their entirety (e.g., whole pipes or vessels).

Other artifacts: These are artifacts that were fragmentary and/or lacked close association with a skeleton, and which are inferred to have been accidentally included in the fill that was thrown in the grave.

Orientation of skeletons:

Direction heading: This is measured in a straight line through the sacrum and mid-skull, with reference to cardinal directions.

Right or left side: Direction in which knees point.

Direction facing: Direction in which orbits point, including cardinal directions and up and down.

Depth of burial: This is the depth of the top of the skull measured from the subsoil surface. The original ground level was two feet above subsoil surface.

The typical burial was semi-flexed in a shallow oval grave and was covered with baseball-sized river cobbles. Burial goods included food, a few ornaments and/or tools, and one or more incised shell-tempered pottery vessels. All the graves fit this pattern except that four of the ten lacked the rock cover. By definition, burial goods were present in all the burials, since only those with shell-tempered pottery vessels were recognized as belonging to the component. Another four or five graves having similar characteristics but no pottery may eventually be demonstrated to be Susquehannock. In the graves assigned to the Susquehannock component, adults outnumbered children and adolescents 12 to 3, and adult females outnumbered adult males 8 to 4 (the skeletons were studied by Audrey Sublett of Florida Atlantic University).

The Engelbert Susquehannock burials resemble those at Blue Rock, the earliest cemetery in the seriation of burial traits worked out by Heisey and Witmer (1962). Like Blue Rock burials, they are laid on either side, supine or prone; placement of burials within the cemetery seems to have no pattern; and grave vessels are nearly all (15 of the 16) small and probably not utilitarian. A subjective appraisal of direction heading indicates a possible avoidance of east (13 of 15 individuals) which seems somewhat less true of Blue Rock (5 of 36 face east), but reveals no other definite pattern. Traits which contrast with Blue Rock could indicate an earlier date for Engelbert. The scarcity of glass beads, for example, is a probable indicator of prior date since Blue Rock and later Susquehannock cemeteries in the Lower Valley have these in abundant quantities. The custom of superimposing burials, which is very common at Blue Rock, occurs in only one grave at Engelbert (698A). The most significant contrast is the surprisingly large amount of copper found in grave 715. Such an occurrence of a European commodity would seem to indicate a later period than that represented by Blue Rock or any other Engelbert Susquehannock burial. The absence of utilitarian items of brass and iron, and of large quantities of glass beads suggests, however, that Engelbert is earlier than Blue Rock.

The resolution of the dating problem will depend on a more refined pottery seriation and on better dating methods for recent remains. If the radiocarbon dates we now have are acceptable (and the large standard deviations are a problem) then the prehistoric Iroquois and Susquehannock



PLATE 4. Schultz Incised vessels from graves 698A (3, 4), 698B (6), 713 (8), and 714 (9).

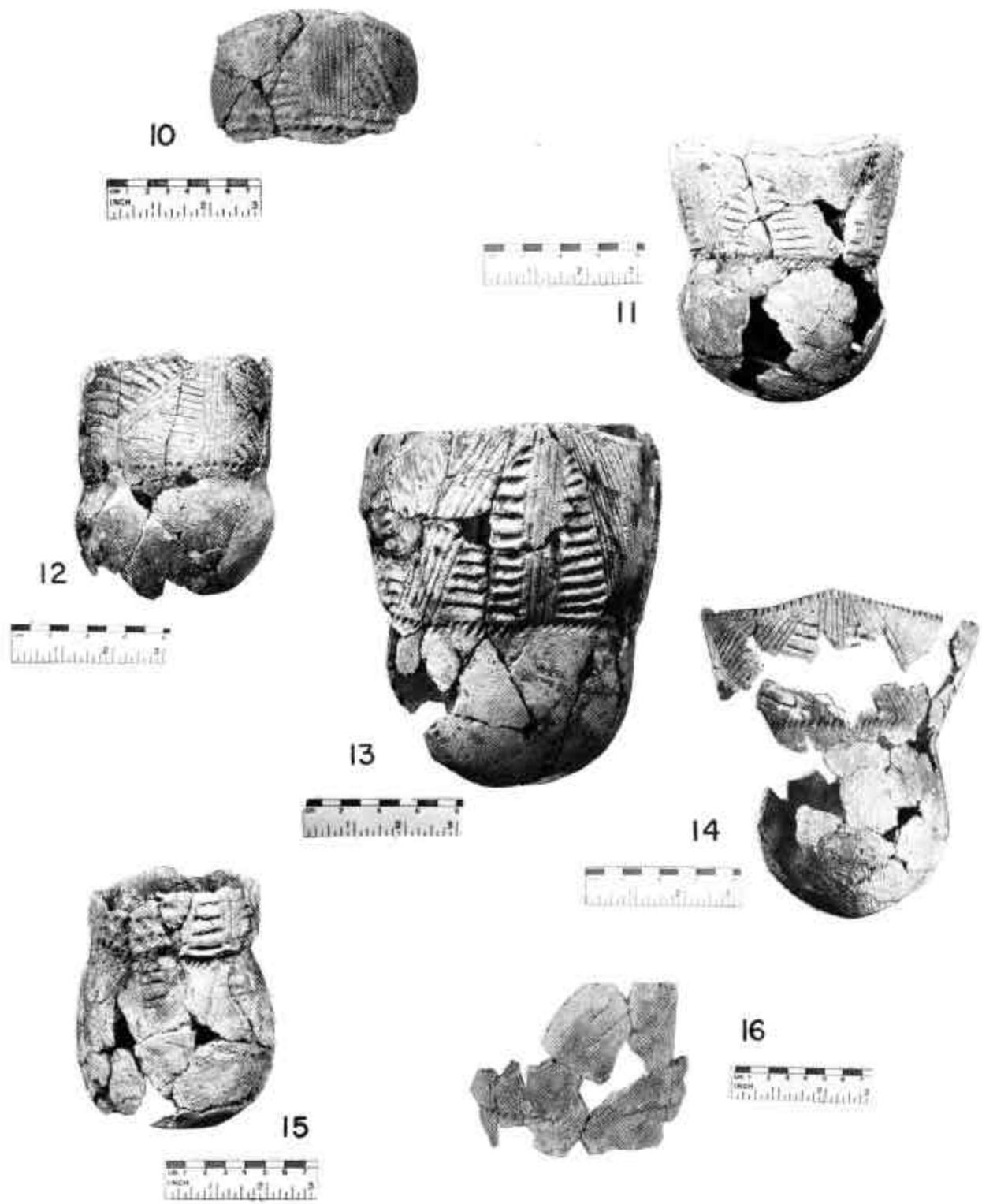


PLATE 5. Schultz Incised vessels from graves 715 (10, 11), 716 (12, 13, 14), 830 (15), and 831 (16).

components could be contemporary, and there is a possibility that the "prehistoric Iroquois" at the site were Susquehannocks who were making grit-tempered pots in traditional styles. The "Susquehannock cemetery" could then be interpreted as an exclusive cemetery for a powerful socio-economic unit which controlled access to European goods. This group would have strengthened its identity by making shell-tempered funerary vessels in styles imitating those of the more advanced groups in the Ohio Valley. The less advantaged members of the society would be buried with few or no grave goods - never with pottery vessels or European trade goods. This hypothesis would account for several unidentified graves which were without pottery but had burial traits similar to the Susquehannock ones (possibilities are 819, 692, and 881 in Fig. 2). It would also account for the near-absence of habitation sites with shell-tempered pottery in the Upper Susquehanna Valley. The hypothesis will be explored in subsequent research.

Pottery

The most distinctive items in the graves were the shell-tempered pottery vessels. Thirteen of the sixteen vessels were classified as Schultz Incised (Witthoft 1959:47-49), a pottery type distinguished by medium to high collars on globular bases, which may be finely corded. The collars are decorated in triangular and trapezoidal plats filled with incising or linear punctates and divided into zones by encircling lines of punctates at the neck and lip. Incipient castellations usually top a series of parallel vertical incised lines. The paste is tempered with shell, in contrast to all other Iroquoian pottery. Of the remaining three vessels, two (in the same grave) are Monongahela types. Vessel 1 is Monongahela Plain and Vessel 2 is Monongahela Cord-marked (Mayer-Oakes 1955:196-199). One vessel (5) is a Fort Ancient vessel, possibly Wellsburg Simple Stamped (Mayer-Oakes 1955:203-204) from the Clover complex of West Virginia, or as Witthoft (personal communication) suggests, a Madisonville vessel.

The vessels were subjected to an analysis which is summarized below. The chief objective of the study was to test Witthoft's thesis about the origins and migration of the Susquehannocks. For the hypothesis to be correct, then 1) the pottery should exhibit stylistic relationships to late Schultz Incised, Cayuga and Munsee pottery and to Allegheny Valley styles; and 2) only early forms of Schultz Incised pottery should be present since the Upper Susquehanna Valley is presumed to have been uninhabited once the village at Schultz was established.

Pottery analysis involves two basic operations, description and comparison. The first step, description, is a matter of defining attributes in such a way that anyone can repeat the procedure with the same results. In most cases this can be best attained by making attributes measurable or countable in some way. It is ambiguous, for example, to state that temper particles are of "medium" size, unless the range of particle size in this category is precisely defined. The Wentworth scale of grain size used in geology defines "medium" as .25 - .5 mm in diameter. Because this scale is related to empirical reality and is widely accepted it is recommended by Shepard (1968:118) as the best method of describing temper size.

Once attributes are defined, comparison can be undertaken on different levels. On the level of typology, groups of artifacts which share certain characteristics, or combinations of attributes abstracted from artifacts, are called types. There are different kinds of types for different purposes, depending on the criteria used to define similarity. Most typologies have been constructed for the purpose of delimiting cultural units in time and space, and the criteria used have been chiefly stylistic. The present Iroquois and Susquehannock pottery typologies are examples of this kind of classification.

The existing Susquehannock typology was found inadequate for testing the migration theory because it does not precisely define the difference between early and late Schultz Incised. Witthoft felt that the differences between the two variants were too small to justify separating them into types. In other words, he was working on a level where larger differences were significant. The Susquehannock typology is unsuitable for discovering a pattern of variation within a site, such as Engelbert, where only one type is represented, whether the variation is due to temporal differences or to social factors (such as social stratification and kinship groupings). These differences are likely to be so minute as to be unobservable through intuitive comparisons of

Table I—Vessel Attributes

VESSEL NO.	Color, refired	Temper size	Temper Percent	Surface treatment	Workmanship	Contour	Silhouette	Lip shape	Rim angle	Total height	Collar height	Castellation height	Orifice diameter	Neck diameter	Major point dia.	Overall proportion	Body ht./ Body dia.	Coll. ht./ Coll. dia.	Coll. ht./ Body ht.	Cast. ht./ Coll. ht.	Wall thick., body	Wall thick., collar	No. Castellations	Symmetry
1	lt	m-c	20	cd	poor	simp	simp	point	40	4.4 est	0.5	-	6.5	6.0	5.8	1.48	.67	.08	.13	-	.24	-	-	-
2	buff	m-c	10	cd	good	ind rest	cplx	bevel	45	7.5	1.5	-	7.7	6.1	6.1	1.05	.98	.19	.25	-	.27	.36	-	cr
3	buff	f-vc	10	pl	good	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	.27	ND	ND	ND	ND
4	buff	vc-gran	20	cd	good-ex	ND	ND	flat	90	12-18	7.5	1.5	ND	ND	ND	ND	ND	.25	1.76	.2	.24	.24	ND	v+s
5	lt	f-c	40	cd	good	simp	simp	bevel	55	4.7	0.6	-	5.7	5.6	5.8	1.25	.71	.10	.15	-	.31	.31	-	-
6	buff	c	20	pl	fair	dep rest	com-pos	round	85	8.0	2.9	0.3	7.4	5.8	5.7 est	.925	.895	.445	.57	.1	.27	.24	3	bi
7	buff	m-c	10	pl	good	ind rest	com-pos	bevel	90	5.75 est	2.0	0.5 est	4.0	3.25	3.75	.715	.6	.49	.87	.25	.20	.20	ND	bi
8	buff	ND	10	pl	poor	ind rest	com-pos	round	90	4.8	2.0	-	3.0	3.2	.67	.875	.65	.71	-	.31	.16	ND	ND	ND
9	buff	c	und 10	pl	good	dep rest	cplx	round	80	9.2	4.8	0.7	7.5	5.7	6.1	.82	.72	.64	1.09	.15	.20	.24	ND	v+s
10	buff	f-c	30	pl	ex	ND	ND	flat	90	5.7 est	2.2	0.35	4.3 est	ND	ND	ND	ND	.47	.63	.16	ND	.20	MD	non
11	buff	f-c	30	pl	good	dep rest	com-pos	flat	75	5.5	2.3	0.4	4.2	3.7	4.1	.76	.78	.55	.72	.17	.20	.24	3	bi
12	buff	m-c	und 10	pl	fair	dep rest	cplx	bevel	90	5.5	2.5	0.5	4.35	4.05	4.25	.79	.705	.58	.83	.2	.27	.20	4	ro
13	lt	m-c	20	cd	ex	dep rest	com-pos	bevel	90	7.9	4.1	0.3	5.6	5.35	5.6	.71	.68	.73	1.08	.07	.24	.20	3	v+s
14	buff	f-c	10	cd	ex	ind rest	cplx	bevel	65	6.3	2.0	0.8	5.2	3.5	3.8	.86	1.13	.37	.47	.4	.20	.20	4	v+s
15	buff	ND	und 10	pl	poor	dep rest	com-pos	flat	90	5.4	1.0	0.2	3.7	3.3	4.1	.76	1.08	.285	.23	.2	.36	.36	3	bi
16	buff	c	und 10	pl	good	dep rest	ND	flat	90	6.5 est	2.5	0.25	6 est	4.7	5.5 est	.81	.73	.43	.63	.1	.24	ND	ND	bi

Table II—Grave Attributes

GRAVE	DIMENSIONS	SKEL. NO.	SEX	AGE	DEPTH	POSITION	DIRECT. HEADING	SIDE	FACING	GRAVE GOODS	OTHER ARTIFACTS
694A	6' X 6'	54A 54B	F F	40-50 25-40	0' 0'	supine supine	NW NW	left left	NE SW	Vessels 1 and 2, food, marine shell gorget, 12 <i>Marginella</i> shell beads, turtle carapace (bowl?), unfired clay, hematite pebble, quartz pebble, powdered ochre	rolled sheet copper fragment, beaver incisor, 2 marine shell fragments, 3 flint chips, 73 grit-tempered cord-marked body sherds
698A	4.5'X3'	81A 81B	F M	50+ 25-50	0.2' 0.4'	side side	SW SW	right left	NW SE	Vessels 3 and 4, food, antler bear effigy comb (3-tined) with skeleton 81 B	cobble cover, charred wood, cord-marked grit-tempered body sherds
698B	3.5'X2.5'	92	F	25-50	0.8'	prone	SW	right	down	Vessels 5 and 6, food, red and yellow ochre mixed with clay, antler paddle-like object	cobble cover, netsinker, preform, Richmond Incised or Proto-Susquehannock rim, 27 cord-marked grit body sherds
699C	7' X 2.5'	97	M	40-50	1.5'	side	E	right	N	Vessel 7, 11 deer cannon bones, small double-bitted adz of basalt, quadrilateral knife of Pennsylvania jasper	preform, Lamoka point, flint chip, bone fragments
713	unknown	70	?	und. 8	0.4'	unknown	NW	left	SW	Vessel 8,,shell bead	cobble cover
714	4' X 3'	75	F	18-25	0.7'	prone	NW	left	N	Vessel 9, probable bone tools, beaver incisor	cobble cover, 2 grit-tempered cord-marked body sherds
715	4' X 2'	71	F	18-25	1.0'	prone	NNW	left	down	Vessels 10 and 11, food, 43 rolled copper beads, 2 copper ring-shaped ornaments, marine shell gorget, 2 7-inch copper tubes, 4 copper spirals, 4 or more glass beads	cobble cover with 5 netsinkers, 2 Owasco Corded Collar rims, Richmond Incised rim, 7 cord-marked grit-tempered body sherds, Levanna flint point, 6 flint chips, fired rock, bone fragments
716	3' X 2'	82A 82B	? F	12-14 40-50	1.6' 1.6'	prone prone	SW SW	left right	SE SE	Vessels 12, 13, and 14, charred wooden objects, copper ring-shaped ornament with 82 A; flint knife with 82 B	cobble cover, 2 Owasco Corded Collar rims, Richmond Incised rim, 9 grit-tempered cord-marked body sherds, 6 flint chips, fire-cracked rocks, bone fragments
830	3' X 4'	91A 91B	M F	40-50 18-25	1.6' 1.6'	prone prone	E NNW	right left	N SE	Vessel 15, food, rolled copper bead	16 grit-tempered body sherds, 40 flint chips, bone fragments
831	5' X 6'	100A 100B	M ?	40-50 12-14	1.4' 1.4'	side side	SW SW	left right	NW SE	Vessel 16, celt of basalt, Madison flint point, preform	15 grit-tempered cord-marked body sherds, crude triangular point

vessels or sherds, and they must be isolated through statistical techniques, such as those used by Brown and Freeman (1964), Hill (1966), and Whallon (1968). This will be the next step in the Engelbert analysis.

Vessel Descriptions

It is the responsibility of the pottery analyst to describe thoroughly the vessels (or sherds) by trying to include all the attributes that he knows to be potentially useful for other purposes as well as his own at the time of his analysis. Typology and social structure analysis ("new archeology") both tend to rely heavily on stylistic attributes because these are probably the least affected by the limitations imposed by function and technological know-how, and therefore more subject to experimentation and changes in ideas of what is acceptable. There is, however, a potential in technological variables that has not been realized. Differences in paste are probably the most significant. Shepard's (1942, 1962) analysis of mineral distributions in Southwestern pottery and their usefulness in reconstructing trading spheres is an example of what can be done. Paste differences and manufacturing technique have occasionally been used in defining Northeastern pottery types and should have significance at lower levels of analysis, as well. Therefore, this analysis includes many technological attributes in addition to the usual stylistic ones.

The vessels were originally described (Crannell 1970a, 1970b) according to the following format, which will also serve in part as a key to Table II. Attributes were defined by techniques discussed in Shepard (1968:95-305). Every effort was made to use standard, replicable measures for every dimension.

Sample

Extent of reconstruction: percent reconstructed and number of remaining sherds.

Preservation: extent of leaching, erosion, and flaking.

Physical Properties

Color: exterior surface, core (interior of wall) and interior surface: measured by means of Munsell Soil Color Charts.

Texture: size (measured by means of thin sections) and amount (measured by means of standards prepared by mixing differing proportions of shell in clay) of aplastic inclusions.

Technology

Firing atmosphere: oxidized, reduced, or smudged; inferred from color attributes.

Manufacture: forming, shaping, and finishing techniques; determined from marks seen on the vessels.

Surface treatment: cordmarked or plain.

Workmanship: regularity of form, precise design execution, extent of oxidation.

Form

Shape: contour in terms of Birkoff's points and Shepard's silhouette classes (Figs. 3-4); rim shape; and lip profile.

Size: height of vessel, collar, body, and neck (see Fig. 5); average wall thickness of collar and body; diameter at orifice, inflection point, and major point; diameters measured at exterior walls or estimated by tracing sherd edge and comparing to curves of known diameter (length of sherd given as confidence factor); height of castellations.

Decoration

Techniques: punctates (impressions made with small pointed instruments), nicks (short incisions resembling punctates), cordmarks, incising, gouges, linear techniques (interrupted linear, linear punctates, linear punches).

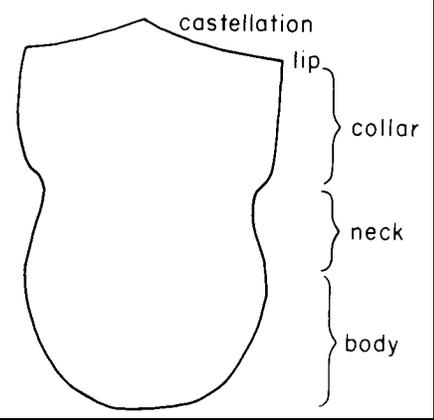
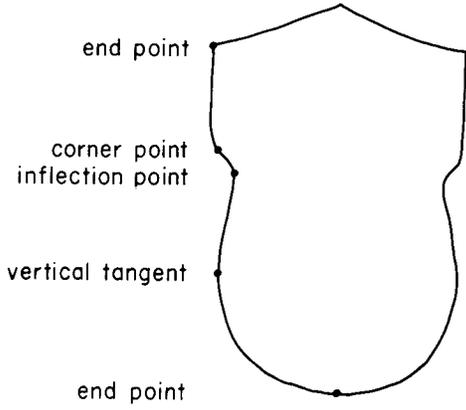


Fig. 3. Birkhoff's Characteristic Points. End points, base and lip of vessel; Corner point, point where the direction of the tangent changes abruptly; Inflection point: point where vessel curvature changes from concave to convex or vice versa; Major point, point where the vessel diameter is greatest. Vertical tangent point, point where the tangent is vertical (Shepard 1968:226).

Fig. 4. Vessel Parts. Neck, the hyperbolic area between the vertical tangent point and the corner point (or border of design); Body, below the vertical tangent point; Rim, above the corner point (or border of design); Collar, a rim that is more than 1/4 the height of the body; Lip, border of rim walls at orifice; Castellation, peak measured from lowest to highest collar height.

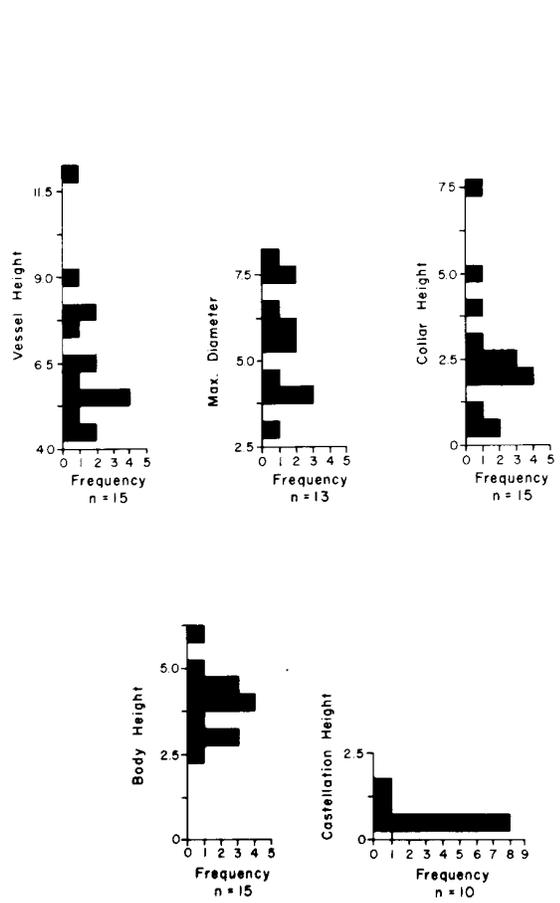


Fig. 5. Vessel Dimensions.

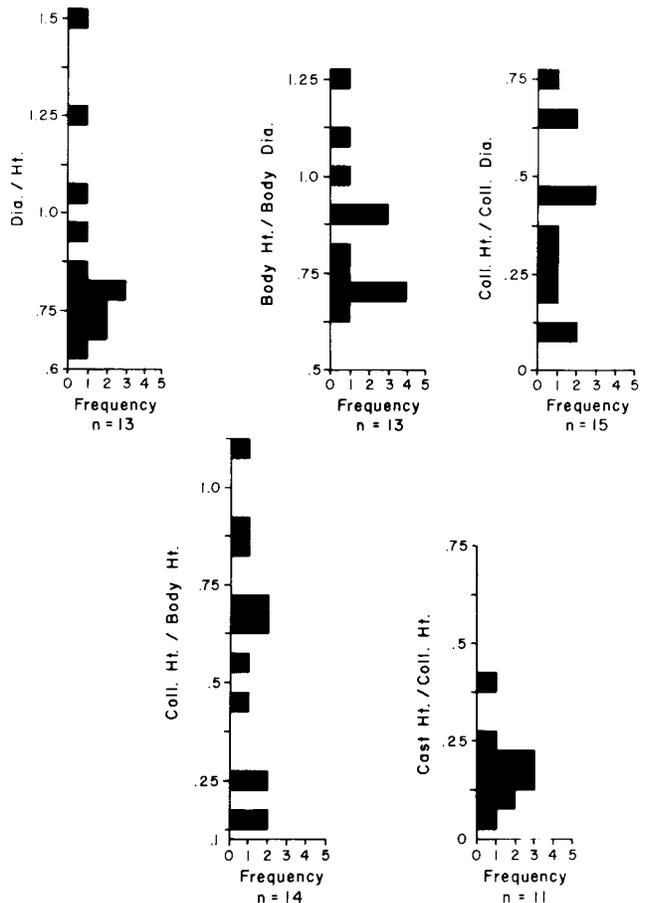


Fig. 6. Vessel Proportions.

Design: formation of bands by repetition of elements (smallest, irreducible units of design) and motifs (groups of elements which appear to have been conceived by the pottery to be single units); symmetry classes (Fig. 6); motion (falling or unbalanced figures as indications of dynamic designs).

Summary of Descriptions

Physical Properties. In color the vessels are predominately brown with black cores, indicating that they are partially oxidized and probably smudged. A refiring experiment (see Shepard 1968:217-220) conducted on small chips from each vessel produced buff (hue yellower than 2.5YR and value of 7/ and under) as the fully oxidized color for the clay in all but Vessels 1, 5, and 13, which are made of light-firing clay (value over 7/). Since the fully oxidized color is a way of classifying clays, this is a startling result because it conflicts with the classification of these vessels as different types belonging to different "tribes" (1-Monongahela, 5-Fort Ancient, 13-Susquehannock). Since one would expect that different clays would indicate different sources of material, why is not Vessel 2 made of the same clay as Vessel 1 and why is Vessel 13 not of the same clay as the other Susquehannock vessels? These questions are unanswerable at present.

Shell particles range from fine (.125 - .25 mm) to coarse (.5 - 1 mm) in nearly all the vessels. Exceptions are Vessels 3 - fine to very coarse (1 - 2 mm) and 4 -very coarse to granule (2 - 4 mm). The percentage of shell temper is 10% or less in half of the vessels, the remainder being 20% or 30%, excepting Vessel 5, with 40%. Mineral inclusions were noted in at least six (not all have as yet been thin-sectioned).

It is likely that all the vessels were made by the paddle and anvil method of construction in combination with the coil method. Many of the vessels show interior undulations from the probable use of an anvil and exterior markings from cord-wrapped paddles. Some also show coil junctures. All were wiped (with a soft tool) while somewhat plastic, and some were scraped (with a hard tool) after the clay became leather hard. The collars were generally smoothed (Vessel 7 is the only exception) before decorating, and sometimes the body, too, was smoothed.

Workmanship varies considerably and seems not to be a very useful attribute for comparative purposes, although Witthoft (1959:29-30) considered the early variant of Schultz Incised to be in general more competently made than the later vessels. For the record, three were recorded as "excellent", eight as "good", two "fair", and three "poor".

Form. (See Fig. 6) There is considerable variation in shape, Witthoft's references (1959: 29, 29) to the typical tulip shape of the early Schultz Incised vessels notwithstanding. In a sample of 12 vessels, all but Vessels 1, 2 (both Monongahela) and 5 (Fort Ancient) are restricted forms with high incipient collars. Six are dependent and four independent, while Vessels 1 and 5 are simple unrestricted forms with rims. One vessel is inflected, five are composite, and four are complex. Few (three) have necks and most have quite flat bases. Collars tend to be straight, although five are convex. Rim angle is 90 deg. in eight vessels, varying from 40 deg. to 85 deg. in the remainder (65 deg. to 85 deg. in Susquehannock vessels). Lips vary from flat to rounded to tapered.

There seem to have been some standard sizes in the minds of the potters (see Fig. 7-4). Five (one of these was separated from the group by the interval used in the histogram) of the vessels are very close to 5.5 in. in height with ten between 4 in. and 7 in. and thirteen between 4 in. and 8 in. Maximum diameters - usually at the orifice but sometimes at the major point - are between 5.5 in. and 6.5 in. (seven vessels) or between 3.0 in. and 4.5 in. (five vessels). Collar heights vary around 2.2 in., with eight between 2 in. and 3 in. Preferred body height seems to be 4.3 in., with four vessels close to this and seven between 4.0 in. and 4.5 in. Vessels 9 and 13, along with 1, 2, 5, and 15 on the other pole, are significantly aberrant in most of these dimensions. Castellations showed an overwhelming preference for just under .5 in., with eight between .25 in. and .7 in.

Several proportions were calculated, with some indications of preferred relationships (see Fig. 8-5). The overall proportion, height to maximum diameter tends to cluster around .75 (five vessels), with nine between .65 and .86. Body height to body diameter is optimally .7 or .75, with seven between .65 and .8 and eleven between .65 and .98. Collar height to collar diameter

hovers around .55 with nine between .4 and .65 and all between .08 and .75. Collar height to body height varies widely. Of the Susquehannock vessels, nine are between .45 and 1.1; while the others are between .13 and .25. Castellations to collar height is between 1.5 and 2 in six and between .05 and .1 in three.

Wall thickness varies from .20 in. to .36 in. (5 mm to 9 mm), with eleven between .20 in. and .27 in. (5 mm to 7 mm). Half show no difference between thickness of body and collar walls. The other half are evenly divided between thicker and thinner collar walls.

Decoration. The Susquehannock potters employed a variety of decorative techniques, not the least interesting being the various linear techniques. Rows of oblique or circular punctates, interrupted lines, and linear punches seem to have been produced with a motion that is neither incising nor impressing but a combination of both.

The designs are always panels (3 or 4 around the collar) made up of geometric plats (triangles, parallelograms, trapezoids, and rectangles) which are filled with incised lines or rows of linear punctates. The dominant motif is a triangle in six vessels and a trapezoid in four.

Some (four) had as many as 7 or 8 different geometric shapes. With some exceptions (7, 8, 10, and 12) linear techniques are used only horizontally, while incising may be horizontal, oblique, or vertical. The panels are divided by means of vertical incised lines topped with castellations, and the entire band is bordered at top and bottom with a row (occasionally two rows) of oblique (occasionally circular) punctates or nicks - all falling toward the right. Oblique punctates fall toward the left only when they are in plats. Construction of the design generally began with the punctates or nicks under the collar. Then the vertical and oblique lines were drawn, followed by filling the plats. The lip was underlined last. Sometimes the plats were made and filled before the collar and lip were underlined.

No preferred form of symmetry (Fig. 6) is indicated. Five designs are bilateral, four are vertical and slide reflection, three are translated, and one is rotated (see Shepard 1968:269). Although highly structured and abstract, the designs are very dynamic, by virtue of the abundance of oblique lines and the frequent use of slide reflection.

The Monongahela vessel, Vessel 2, (Vessel 1 is undecorated) is done in cord-punching, using a translated dynamic design. Vessel 5, the Fort Ancient vessel, has a translated design done in oblique punctates or nicks, which look exactly like the Susquehannock technique.

Classification

Except for the probable trade vessel (5) and the two vessels from the Monongahela burial (1 and 2) all the vessels were classified as Schultz Incised by comparison with illustrations and descriptions in Witthoft (1959), Lucy (1959) and Kinsey (1959) and corroborated by Ira F. Smith III and Barry Kent of William Penn Memorial Museum in Harrisburg. Not all were good "fits", however. The most interesting, possibly even "aberrant", were Vessels 12, 14, and 15. Vessel 15 is the most unusual. In form it resembles Oak Hill Corded types (Lenig 1965); the technique is most similar to Bristol Linear, and the neck design is duplicated in Castle Creek Incised Neck, Monongahela Incised, and a Canandaigua vessel from the Snell site (Ritchie, Lenig, and Miller 1953). The collar design is most like Schultz Incised, however. Vessel 12 compares in form to a late Seneca (Steele site) vessel in the Wray collection. The design is what Witthoft (1959:47) calls "the simplest and rarest motif on Schultz Incised". Vessel 14 has Schultz Incised motifs but is aberrant in form, resembling nothing I have seen.

An attempt was made to classify the Engelbert Schultz Incised vessels as early or late forms. It quickly became evident that the present Susquehannock typology is not applicable to this problem. The vessels from Schultz are obviously different from the northern vessels when they are seen together, but so far the differences have not been well defined. Witthoft (1959:2930) noted a few "trends" between early and late Schultz Incised: the Bradford County vessels have a higher frequency of notched lips and shallow lower rim contours, with small diffuse notches, a low rate of variability, and only rare occurrences of lobed lower rim edges and face effigies under castellations. In addition, they are more likely to have three castellations while later vessels generally have four, lips are angular in cross-section, and grave pots (as a different form than utility pots) are rare. To quote Witthoft (1959:29-30), early forms

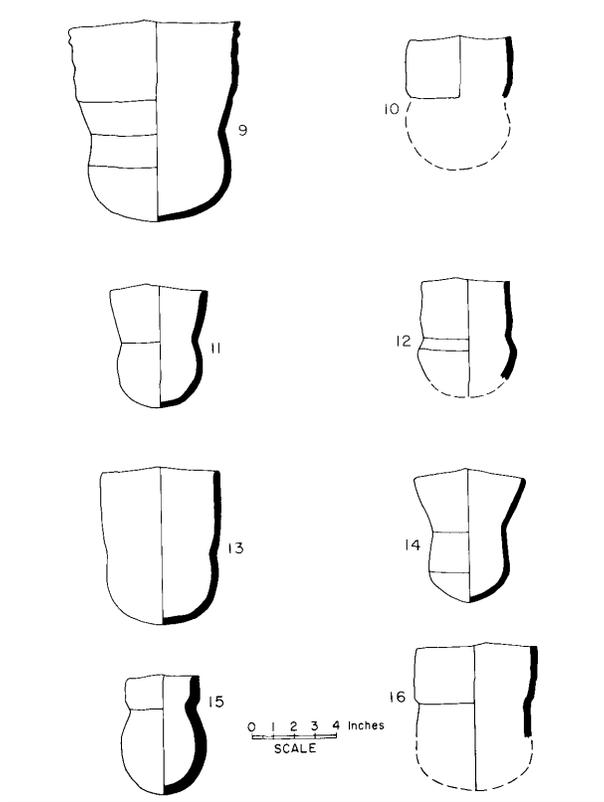


Fig. 7. Vessel Shapes.

	unrestricted	dependent restricted	independent restricted
simple			
composite	c.p.	c.p. v.t.	c.p. v.t.
inflected	i.p.	v.t. i.p.	i.p. v.t.
complex	i.p. c.p.	i.p. v.t. i.p. c.p.	c.p. c.p.

Fig. 8. Contour and Silhouette, defined with Birkhoff's characteristic points (see Shepard 1968:226, 230-232).

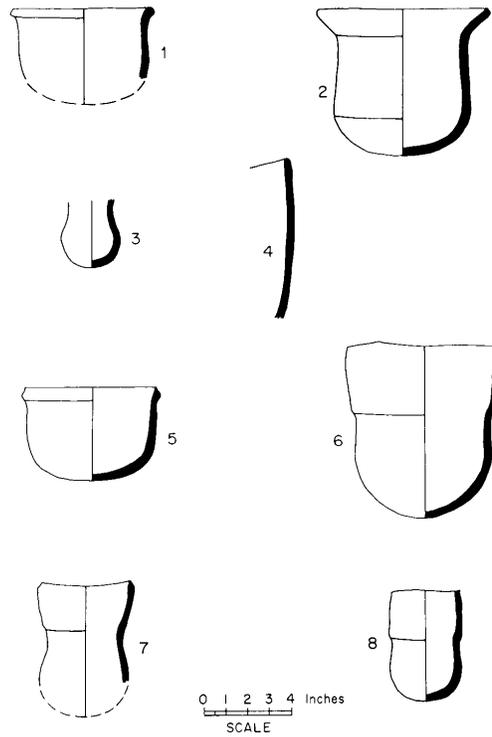


Fig. 9 Vessel Shapes.

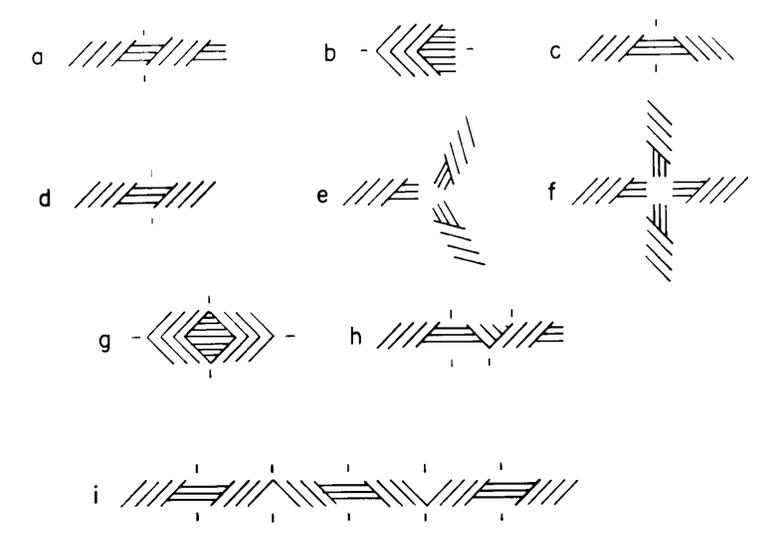


Fig. 10. The Seven Classes of Symmetry, illustrated with a typical Susquehannock element. a, Translation, the fundamental part is moved without change in orientation; b. Horizontal Reflection, movement across a horizontal axis; c. Vertical Reflection, movement across a vertical axis; d-f. Rotation, the fundamental part rotates around a point; g. Combined Horizontal and Vertical Reflection; h. Slide Reflection, a screw-motion; i. Alternate Rotation and Vertical Reflection. (Shepard 1968:269).

generally [show] better character in form and surfacing, as seen in the high, tulip-shaped rims, the even sweep of the castellated lips, the slight vertical convexity of rim, the blending of this outline to the pot body, more precise incising, and the skill with which plats were textured by punctation [and they are] remarkably clean-cut and crisp.

In my judgment, the vessels meet most of these criteria. All but one vessel (8) have notched lips and all but four (8, 10, 15, and 16) have the collar blended to the body. All have shallow lower rims, slight vertical convexity of rim, and skillfully textured plats. Only one (14) seems especially clean-cut and crisp. Although variability is considerable, it is low in comparison to the range of forms and motifs in the Lancaster County pottery described by Kinsey (1959). If we assume that my perceptions of these subtle characteristics is reasonably similar to Witthoft's, we can identify all the vessels as early. Only two characteristics are contradicted by a majority of the Englebert vessels. Lip forms are angular in only five (1, 2, 5, 7, and 12) and rims are "barrel-shaped" like later forms (Witthoft 1959:40) in six (4, 8, 10, 13, 15, and 16).

Comparison of motifs seems to be a more accurate way of identifying early and late vessels. Five (6, 9, 11, 13, and 14) of the Englebert designs resemble early motifs (drawn from Bradford County vessels) illustrated in Witthoft (1959:45, Fig. 3). Four (10, 11, 14, and 16) resemble Kinsey's (1959:81-83, Figs. 9 and 10) motifs drawn from late Schultz Incised vessels from the Ibaugh site. The rest do not match any of the motifs illustrated.

Relationships

For comparisons of the Engelbert vessels with pottery from other areas, the best dimensions are form and design, chiefly because these are easily conveyed through drawings and photographs. By comparison of the vessels with illustrations in MacNeish (1952), Mayer-Oakes (1955) and Guthe (1958), in conjunction with type descriptions, it was confirmed that the greatest similarities are with Cayuga pottery. Bristol Linear and Ithaca Linear are the closest prototypes to five vessels (4, 6, 9, 11, and 13). Next closest are Richmond Incised and Cayuga Horizontal, especially the latter. No great similarity to Munsee (which is predominately Otstungo Incised according to Witthoft 1959:40) is noticeable. At this point, not a great deal can be said about Susquehannock origins until more work is done on Munsee pottery and late prehistoric Iroquois pottery in the northern Susquehannock area. The analysis of the remaining Engelbert pottery should do much to illuminate the problem.

Other relationships seen in the pottery are with Erie-Neutral-Wenro (Vessel 14) and Chautauqua (Vessels 2 and 11), a southwestern New York shell-tempered pottery with close similarities to Monongahela types. One vessel (7) employs incising over cording, a trait common in McFate Incised pottery of the Allegheny Valley (Mayer-Oakes 1959:200). It is interesting to note here that the body of the Fort Ancient vessel (5) would be indistinguishable from the Schultz Incised vessel bases except in the higher percentage of shell temper in the former.

These ceramic relationships hint at interesting trade connections with the Fort Ancient, Monongahela, and Erie-Neutral-Wenro peoples. The presence of vessels probably made by the first two groups reinforces this probability. Two proto-historic grave vessels (described in Crannell 1970a) found about .5 mile east of Engelbert on the Ruth Kuhlman farm also suggest western influences on the Susquehannock area. One is Munsee, with much Erie-Neutral-Wenro influence, while the other is shell-tempered and also shows considerable stylistic similarities to Erie- Neutral-Wenro and Huron types.

Conclusions

An early date (sixteenth century) for the Engelbert Susquehannock cemetery is reasonably certain, on the grounds that trade goods and burial traits conform to those found in other early Susquehannock cemeteries. An early date could be more accurately established through the construction of a more refined typology which distinguishes between early and late Schultz Incised and of an independent chronology for Susquehannock sites. The Engelbert data do not refute

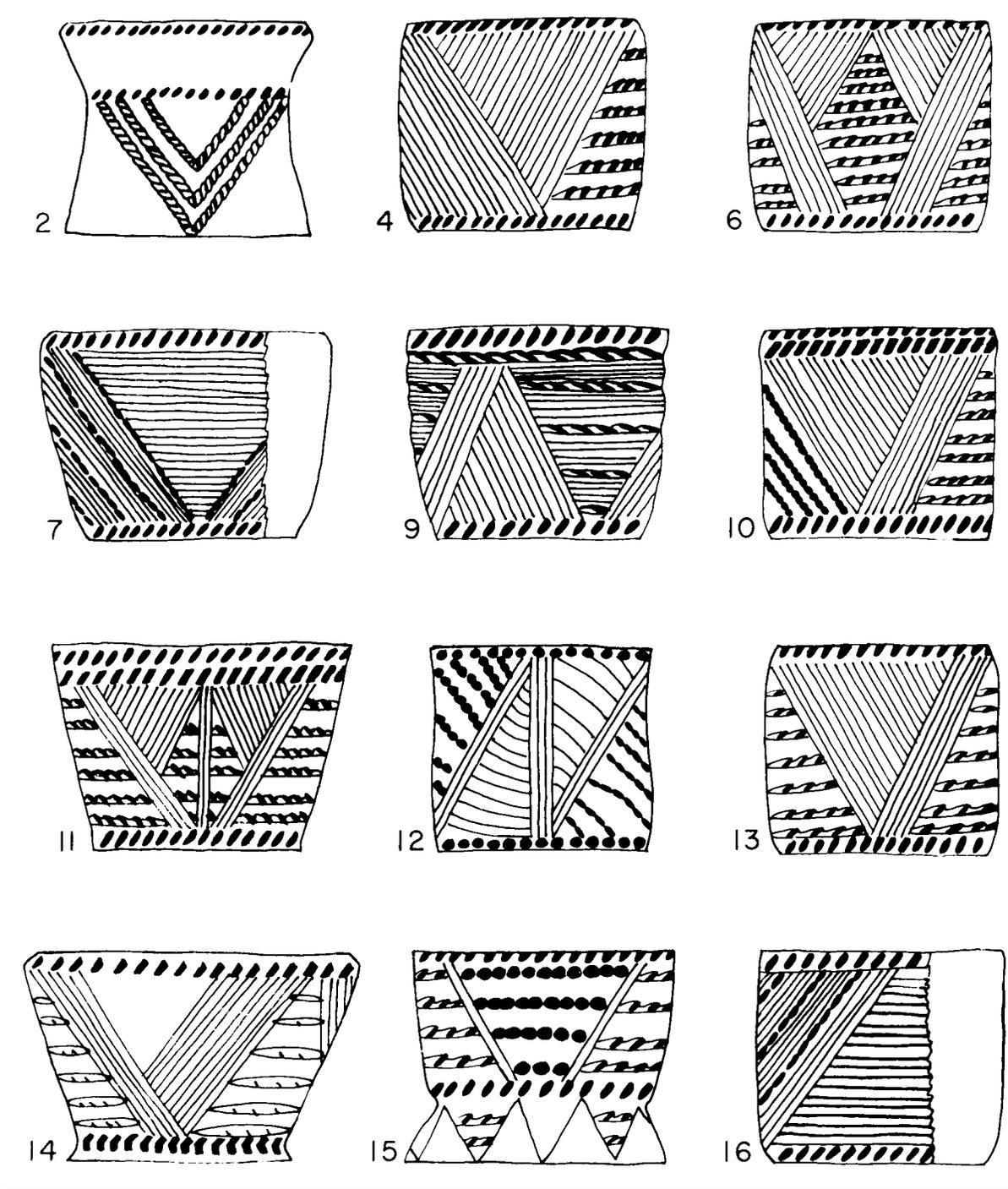


Fig. 11 Design Motifs.

Witthoft's migration theory, then, since they date earlier than the presumed exodus, although it is still possible that the migration theory will be modified by the discovery of sites post-dating 1570 in the Upper Susquehannock Valley. Such discoveries would no doubt be very gratifying to those students of history who would like to believe Bruhle and the Dutch map of 1614.

The pottery conforms to Witthoft's analysis of the external relationships of early Schultz Incised; that is, it has stylistic similarities to Cayuga, to Richmond Incised and related types, and to Munsee pottery. Contrary to expectations, there are more similarities to allegedly late Cayuga pottery (Ithaca Linear in particular) than to Richmond Incised, and the Munsee traits are low. Relationships to western New York (Erie-Neutral-Wenro) and to southwestern Pennsylvania are stronger than expected, increasing the suspicion that the Susquehannock migration had something to do with the disappearance of the Monongahela culture. A lack of obvious similarities to Allegheny Valley pottery probably reflects the general lack of data from that area.

The general conclusion to be reached is that a great deal more needs to be done before the most interesting questions can be probed.

Acknowledgments

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THE DEAD SHEEP II SITE
A Frost Island Phase Workshop

Paul L. Weinman NYSAAF
Thomas P. Weinman NYSAAF

Auringer-Seeyle Chapter
Auringer-Seeyle and Morgan Chapters

The Dead Sheep II site (Cox 37-4) is located in Greene County, New York immediately east of and slightly overlapping with the Dead Sheep I site (Weinman and Weinman, 1969). The site lies on the property of Lloyd Zimmerman on a slight rise near a small swamp approximately 6.5 mi. north of Catskill and 4 mi. west of the Hudson River. Several miles to the northeast is the Flint Mine quarry and a quarter mile to the south-west is the Scott Farm flint quarry, both of which are rich in green to gray to black colored Normanskill flint.

During excavation of Dead Sheep I, we found 4 Susquehanna Broad type points, a form known to have been associated with the Frost Island phase (Ritchie, 1965) along with 25 Snook Kill type points, generally assigned to the Snook Kill phase (Ritchie, 1965). Although dates available at present show that the Snook Kill phase (1470 B.C. \pm 100, Ritchie, 1965, p. 135) preceded the Frost Island phase (1250 B.C. \pm 100, Ritchie, 1965, p. 156), we suggested that the Susquehanna Broad points found during the Dead Sheep I excavation were either intrusive or contemporary with the Snook Kill points. However, after excavating the Dead Sheep II site and re-examining the data from the Dead Sheep I site, we now believe that these are two separate components which overlap slightly in one small area. Of the 4 Susquehanna Broad points found at Dead Sheep I, 2 were recovered from an exploratory trench some 10 ft. from what was in fact the edge of the Snook Kill occupation and turned out to be from the area encompassed by Dead Sheep II. The remaining 2 Susquehanna Broad points were found at the overlap zone of Dead Sheep I and II.

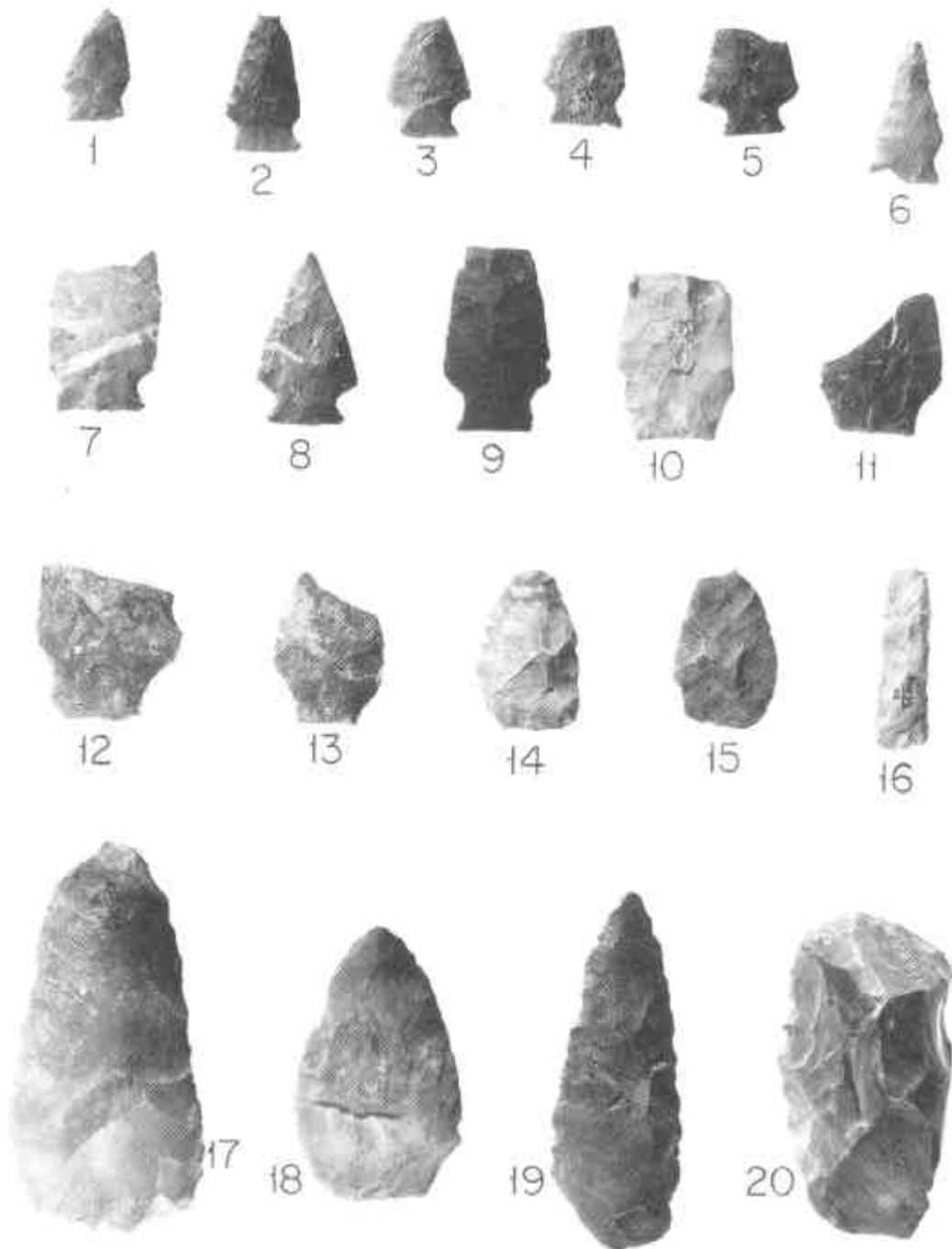
We excavated 11 five-foot squares at Dead Sheep II from the surface through the brownish, 8-12 in. thick, clayey plow zone to a depth of several inches into the greyish clay subsoil. Including those examples formerly attributed to the Dead Sheep I site, we found 9 Susquehanna Broad points (figs. 1-9); 22 point tips; 7 corner-removed knives typical of the Frost Island phase (figs. 10, 11, 14, 15, 17); 2 large endscrapers, 1 based on a core (fig. 20), the other on a blade; 1 oval chopper; 1 millingstone; 1 straight drill fragment (fig. 16); 3 flake knives; 8 flint cores; 6 hammerstones; 4 variously worked flint pieces; and 29 ovoid to triangular blades-blanks (figs. 12, 13, 18, 19) which appear to represent various stages in the making of knives or points.

Except for the millingstone of Normanskill grit and the 6 quartzite hammerstones, all artifacts were of Normanskill flint from nearby quarries.

In sharp contrast to the Dead Sheep I site, (which was intensively used for flint working), we found few primary and secondary flint tailings at Dead Sheep II. It is also interesting to note that the Dead Sheep I blades-blanks were all well-roughed out and nearly two-thirds were whole or only slightly damaged. From this, it can be suggested that the Dead Sheep II (Frost Island phase) blades-blanks were worked into shape elsewhere, whereas the Dead Sheep I people (Snook Kill phase), used their site for a workshop as well as a habitation area.

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DEAD SHEEP II, Greene County, New York



LOCAL ARCHAEOMAGNETIC RESEARCH

D. F. Griffiths

Houghton Chapter

For the past two years preliminary investigations have been made to determine the feasibility of establishing an archaeomagnetic sequence for the northeastern region of the United States. Work now nearing completion in the Southwest and Mesoamerica, not yet published, will increase awareness of the importance of this dating technique.

Archaeomagnetism is a geophysical dating method used by archaeologists to determine the age of clay-bearing materials subjected to strong firing by some past cultural event. Clay containing iron oxides, when heated to a high temperature, preserves a trace of its magnetic environment as it cools. This magnetic moment is measurable and can be used to reconstruct the local component of the earth's magnetic field at the time of firing. If the substance tested has been relocated since the firing, only the intensity of the past magnetic field is measurable, but if the object has been preserved in situ, both the intensity and direction of the original magnetic field can be reconstructed. Because the latter situation yields more precise results, the focus of the research is on obtaining samples of materials in their original orientations, namely, samples from hearths and other fired areas imbedded in the soil.

This research has already passed through two stages. The first stage answered the question: is the material from Eastern United States good enough to construct the archaeomagnetic sequence. Positive results at this stage suggested the more widespread sampling of the second stage. The third stage will be an intensified effort to collect as many samples from as many sites as possible. This article hopes to aid this effort by making both the research and the general basis of the technique known to a broader group of amateurs and professionals. The result of the third stage will be the construction of an archaeomagnetic sequence for the Northeast and adjacent areas. Upon completion of the sequence, all contributed samples should have dates assigned that should be within 20-50 years of the actual cultural event. Then, as new materials become available, they can be compared with and added to the existing chronology. One may note that this dating technique resembles dendrochronology in that the sequence must be constructed before the actual dates of the discrete samples are known. However, preliminary dates for relative dating may be available before the actual completion of the chronology. Archaeomagnetism also resembles dendrochronology in that it is useful to have the dates from some recent historic sites to help pin down the sequence. Hopefully, the utility of this method of dating will convince excavators to have samples removed from fired areas before excavation eliminates any possible chance of obtaining undisturbed samples. Furthermore, the introduction of this new technique serves as an additional example for the dictum opposing total excavation of sites. Even during the initial stages of this investigation, hearths were being destroyed in the Northeast by investigators unaware of this dating technique.

The actual benefit to the archaeologist is a dating method that yields better dates than C-14; the confidence level for the dates is 95%, as opposed to the 67% for C-14. It should be noted that archaeomagnetism is an absolute dating method, and will provide calendar dates within the previously mentioned limits. One should note that the geophysicists are not merely serving archaeologists, but are providing themselves, in turn, with data on the nature of changes in the earth's magnetic field. Samples for cooperating individuals and organizations will be collected and tested at no charge to the contributor. Should this dating method ever be commercialized, the author predicts that the cost should be substantially below that for C-14 samples.

Hopefully, then, funds will be available to collect samples from anyone who contacts the author or Robert L. DuBois, Earth Sciences Observatory, 830 Van Vleet Oval, Norman Oklahoma 73069. Several criteria follow that should enable the archaeologist to decide whether his material is usable: The material should (1) show indication of strong firing, usually reddening with associated ash, charcoal, and fire-shattered rock; (2) be a cohesive clay-bearing soil (high sand content is undesirable); (3) not show indication of disturbance on any major scale (e.g., numerous animal burrows, mazes of root molds, etc.); and (4) have some approximate date (± 500 years) from other considerations. Some attention will be given, on a low priority basis, to marginal features; and some portable artifacts, such as pot sherds, bricks, etc. will be accepted for

paleo-intensity studies, but the emphasis should be on well-fired, high clay content features.

The actual collection technique involves cutting small pedestals into the fired clay *in situ*. The pedestals are cast in special molds of known orientation to the present magnetic field. When the pedestal is completely enclosed with plaster, it is removed as a small cube from the mold and is then ready for analysis. Usually a set of eight cubes is taken for each feature, usually taking 2-4 hours of collecting time, depending on specific problems of the feature.

A short list of references is appended to this article to provide more specific information for interested individuals. The article by Weaver, in spite of its popularized superficiality, should provide a ready introduction to some of the specific techniques of this research.

Acknowledgement

This research could not have been conducted without the generous support of Dr. Marian E. White, Department of Anthropology, SUNY Buffalo and Dr. Robert L. DuBois, Department of Geophysics, University of Oklahoma. Part of this research was conducted with funds provided by the Institutional Funds Committee of the Faculty of Social Sciences and Administration of SUNY Buffalo.

Additional information may be obtained from the author c/o Department of Anthropology, SUNY Buffalo, 4242 Ridge Lea Road, Amherst, N.Y. 14226.

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FAUNAL ANALYSIS OF THE COLE QUARRY ARCHAIC SITE

Christa Brown, James Kelley, John Penman and John Sparling

Florida State University

Over a three year period, salvage operations were conducted on the Cole Gravel Pit, a component of the Farrell Farm, an Archaic site in Western New York. Geographically, the site lies almost on the dividing line between the Great Lakes lowlands and the Appalachian uplands, about twenty miles south of Rochester, New York. The Farrell Farm and its gravel pit lie on a terrace about one mile west of a bend in the Genesee River at an elevation of fifty feet above its floodplain. The site itself consisted of nearly 300 pits, some shallow, some up to five feet deep. The site is placed chronologically in the Archaic stage circa 2000 B.C.

When first tested (Hayes, 1966) there was no indication of extensive occupation. In 1967 and 1968 however, favorable circumstances enabled the Anthropology Division of the Rochester Museum and Science Center to spend several concentrated weeks salvaging material. As the

excavations progressed, the importance of the Cole Gravel Pit to the interpretation of the Archaic stage of western New York prehistory became evident (Hayes and Bergs, 1969). In order to obtain maximum return of information from the salvaged material, specialized attention was required; therefore it was decided to send the faunal remains to Professor Stanley J. Olsen, Anthropology Department of Florida State University, for complete zooarchaeological analysis. The students credited with evaluating different portions of the study are listed under the section headings.

This analysis was conducted by a laboratory class of 22 anthropology and archaeology majors under the direction of Professor Olsen. With access to a comparative collection, a total of 2865 bones were compared, recorded and, if possible, identified as to genus and species. The analysis was oriented to several problems concerning occupation of the Cole Gravel Pit. These were:

- (1). How long an occupation could be determined from the faunal remains for the whole site area?
- (2). During what seasons of the year was the site occupied?
- (3). Were the individual pits used for more than one year?

Because of probable stratigraphic disturbance (indicated by the distribution of remains), and because of the use of arbitrary 6 in. levels in excavation (due to the lack of visible natural stratigraphy) these questions were only partially answered.

Analysis of the faunal remains from the Cole Quarry did produce an unusually diverse animal population. Five classes of vertebrates were represented as follows:

- Fish: 2 orders, 3 families, and 2 genera.
- Amphibians: 1 order, 2 families, and 2 genera.
- Reptiles: 2 orders, 4 families, and 8 genera.
- Birds: 8 orders, 9 families, and 15 genera.
- Mammals: 3 orders, 10 families, and 22 genera.

The nature of the faunal population supports the presence of a hardwood forest environment as hypothesized in the progress report.

The most noteworthy feature of the faunal collection from the Cole Quarry is the complete absence of rabbit remains and the apparent substitution of squirrels and relatives as food items. This is a reversal of conditions generally found in sites elsewhere of similar age.

MAMMALS (Nancy Herring and Kay Lynn)

The large and small mammals combined represent 53.1% of the identified faunal remains at the Cole Gravel Pit. The larger mammals include elk, black bear, and puma. The small mammals were identified as squirrel, beaver, porcupine, wolf, dog, raccoon, woodchuck, and otter. They were apparently utilized for food, fur, and bone tools.

White tailed deer- *Odocoileus virginianus*

Deer remains were found in nearly every pit of the site. A minimum of 10 individuals were determined from 568 bones. Based on an analysis of the dentitions, the deer range in age from immature to 2-1/2 years. Two complete antlers were among the material studied. One is a full growth antler which seems to have been shed. There are rodent gnaw marks on the tines and burr which indicate that the antler had lain in the open for some time. The other antler has cranial fragments still attached to the burr and its growth stage indicates that the animal from which it came was most likely killed in the fall.

Squirrels - *Sciuridea*

Thirty-five individuals of this family were identified at the site. Though fox, grey, and flying squirrel are well represented at the site, only one red squirrel was positively identified. Level A had the widest distribution when plotted on a map of the site. It was noted that flying squirrels were absent from Level E, although they do appear in lower levels.



Since there is a total absence of rabbits in the site, and an abundance of squirrel, it seems that the squirrels filled the niche of the rabbit which is generally preferred elsewhere.

Woodchuck- *Marmota monax*

Eight woodchucks were present among a total of 30 bones. In the area of the site the woodchuck retires with the first hard frost, about October, and hibernates until late February or early March. These animals would not be dug out of their burrows in winter due to the depth of the den and the nature of the frozen ground. This would not be true for the hibernating bear which could be killed in its near surface den during the winter months.

Raccoon- *Procyon lotor*

Fourteen individuals of raccoon were identified from 50 elements. This animal would be easily captured and was probably quite common in the area at the time of occupation. It is an adequate food item. The Beaver, *Castor canadensis*, represented by two individuals and the Muskrat, *Ondontra zibethicus*, also by two individuals, would be unavailable throughout mid-winter except by difficult chance trapping. They would however be easily caught in the warmer months.

Domestic Dog- *Canis familiaris* and Wolf- *Canis lupus*
(Jackie Moore)

The Family Canidae is represented by at least one, and possibly four individuals of *Canis lupus*, and at least four, possibly 11, individuals of *Canis familiaris*. Foxes are conspicuously absent from the site; both red and gray foxes are present in the area today.

Wolves were represented by one canine, three incisors, and a phalange. There is no duplication of skeletal elements and minimum number of individuals represented is one but the distribution of the elements in five separate pits creates a possibility of five individuals, especially since these remains were distributed in levels ranging from A to H. Dog remains were found in 11 pits from Level A to below the level line. A minimum of four individuals is indicated by the bones, including one immature animal. However, by distribution through different levels there could be as many as 11 individuals. Three individuals were represented by a significant quantity of bone; the remainder were mostly isolated fragments.

Canid remains that could not be assigned to species were found in four pits and were mostly skull fragments.

In Pit 224-Level B, 180 bones and fragments were excavated and determined to be from the same individual. In Pit 226-Levels C and E, 260 bones and fragments were determined to belong to one individual indicating some sort of stratigraphic disturbance. In Pit 205-Level B, 160 fragments were separated and determined to be one individual.

Due to the extremely fragmented condition of all the remains, only one of the animals was selected for study. The dog from Pit 205 was selected for concentrated attention because of an obviously pathological condition.

Skull and skeletal remains belong to a beagle-sized (not to imply that this dog is in any way related to the beagle) mesaticephalic (Sisson, 1953) individual between the ages of 12 to 18 months. Age was determined from the unworn condition of the molars. Post-cranial elements represented (not reconstructed): left and right scapulae, one cervical vertebra, a right humerus and tibia, one metatarsal, and one proximal phalange.

The fragmented skull consisted of the following areas: right maxilla and areas around and including P3, P4, M1, M2. Also left maxilla and areas around and including P4 and M1, right mandible from the canine to the M2, ascending ramus is missing; including P2 and P3, and left mandible in two pieces: (a) canine to the P4 including P2 and P3, (b) area around and including M1 and M2; no ascending ramus present, both upper canines, upper right 13 and P2, upper left 12, lower left 12 and 13.

Both left and right mandibles are abnormally narrow. While the teeth are approximately the same size as the comparative specimen (an adult beagle), the mandible itself is roughly one half as deep. Measurements of the carnassial and of the mandible on both sides of the carnassial

show that the height of the crown and the depth of the right mandible on both sides of the tooth are the same-1.2cm. On the comparative right mandible the height of the crown is 1.0 cm. and the depth of the jaw on both sides of it is 2.1 cm. and 2.2 cm. A safe conclusion is that the right mandible is only one half as deep as it should be in a normal dog having that skull size.

This condition is reflected to a lesser degree in the left mandible. The height of the carnassial crown is 1.2 cm. and the depth of the bone containing it is 1.5 cm. On the comparative left mandible the height of the crown is 1.0 cm. and the depth of the mandible is 2.2 cm.

Other pathologies are noted: there is a thickening of the bone tissue beneath the carnassial of the right mandible similar in nature to bone which has been fractured and healed. The thickness of the jaw at this point is 1.2 cm. compared to .9 cm. from the left jaw at the same point. Both comparative mandibles measure 1.0 cm. This swelling is quite visible and is probably associated with the diastema where the M1 should be. This diastema measures 1.0 cm. between the P3 and the M2. The bone tissue is completely healed if the tooth was lost, but the possibility exists that the tooth was never present. The M1 is present in the left mandible, but the bone area beneath it could not be reconstructed for comparison; the left mandible is in two pieces and those fragments that would complete the jaw are from the area around the M1 and could not be found in remains from Pit 205 nor in associated pits.

BIRDS

(Julia Converse and Pat Sullivan)

Nineteen species of birds were identified in the faunal remains. They include a wide range of waterfowl and game birds. The waterfowl represent migrating forms, as do some of the passerines (perching birds), but their small numbers do not suggest any particular preference or importance of these birds. By far the most abundant species are turkeys and passenger pigeons.

Turkey- *Meleagris gallopavo*

A minimum of 11 individuals are represented by the identified bones. As with the squirrels, a concentration of turkeys occurs in the southern portion of the site.

Passenger pigeon- *Ectopistes migratorius*

The total number of Passenger pigeon was calculated from right coracoid bones (the most numerous element present). The minimal number of individuals derived from this source was fifty. As with the rest of the represented fauna from the site, the pigeons seem to be concentrated in the south and north ends of the site. Some pigeons are noted to have wintered in the north, but since they are coterminus with hibernating forms in these pits it may be safe to assume that these birds were hunted in times other than winter.

FISH, AMPHIBIANS AND REPTILES

(Frederick Wilson)

Fish remains were mostly small teleosts (Perciformes) and were not present in large enough quantities to suggest a particular preference for these forms.

Turtles, both aquatic and terrestrial, were perhaps taken for food as chance encounters rather than to have been specifically sought out. Two vertebrae of a colubrid snake were identified but are given no special importance. They are probably natural, intrusive elements from a snake living in the area at the time of occupation or perhaps later.

CHARRED AND BUTCHERED BONE

(Susan Brooks and Patricia Olney)

Charred bone occurred exclusively in the southern half of the site, indicating that the pits in this portion of the excavated area were used for cooking and not for storage. The worked and butchered bones occurred almost entirely in the northern half of the site. Perhaps this indicates that animals were butchered and stored in the northern pits and that cooking took place in the southern pits.

Pits were noted to have been linked with rocks in some instances, as if in preparation of a fire. The occurrence of fire-cracked rocks indicates that rocks were used as implements to boil water in some sort of containers. As a result, hearths would be of secondary importance. The majority of the small mammal and bird bones was believed to have been boiled, since the bone was not charred and was found with fire-cracked rocks in a majority of the pits.

CONCLUSIONS

(Robert Carr, Lynn Nidy, and Edward Fausel)

Although a thorough correlation between the pits and levels was made in an attempt to document years of occupation of the site, no definite evidence of an extended occupation can be presented on the basis of the faunal remains. Because of the presence of a fauna which is in accessible during the winter, such as hibernating woodchuck and migratory birds, the site appears to have been occupied only during the warmer months.

On the basis of the number of possible individuals in the site and the pounds of meat obtainable (see Guilday, p. 55-6), it is highly unlikely that the pits were used for more than one season. It was also noted that, in, several instances, one individual was distributed throughout the levels in a pit. (Several turtle carapaces were reconstructed across levels.) This would support the suggestion made by Charles F. Hayes in 1966 that the site was a short-term, seasonal occupation. However, this does not eliminate the possibility that the concentrations of faunal remains noted in the extreme southern and northern ends of the crescent might be the result of separate seasonal occupations. It has been suggested in the past that the pits might have been used for storage. The faunal remains, nevertheless, indicate that several pits were open at one time and the bone was distributed at random through them. For instance, a bear molar from Pit 14-A was found to fit in a maxilla located in Pit 12-A. As stated above, a possible differentiation in pit use was noted between the southern concentration and northern concentration, i.e., charred bone was located in the south indicating a cooking area, whereas worked and butchered bone was concentrated in the north, suggesting storage pits. Perhaps the distribution of the bone artifacts can illuminate this question.

A TAXONOMIC LISTING OF FAUNAL REMAINS FROM THE COLE QUARRY

Jackie Moore

Class Teleostomi

Order Cypriniformes

Family Catostomidae: Suckers

Moxostoma sp.

Family Ictaluridae: North American Freshwater Catfishes

Order Perciformes

Family Centrarchidae: Sunfishes

Poxomis nigromaculatus Black Crappie

Class Amphibia

Superorder Salienta

Order Anura

Family Bufonidae: Toads

Bufo americanus American Toad

Family Ranidae: Frogs

Rana pipiens Leopard frog

Class Reptilia

Subclass Anapsida

Order Chelonia: Turtles

- Family Chelydridae: Snapping, Mud, and Musk Turtles
 - Subfamily Chelydrinae: Snapping Turtles
 - Chelydra serpentina* Snapping Turtle
 - Subfamily Kinosterninae: Musk and Mud Turtles
 - Kinosternon subrubrum* Mud Turtle
 - Sternothaerus odoratus* Stinkpot
- Family Testudinidae
 - Subfamily Emydinae: Terrestrial and Aquatic Turtles
 - Clemmys guttata* Spotted Turtle
 - Terrapene carolina* Box Turtle
 - Chrysemys picta* Painted Turtle
- Family Trionychidae: Softshell Turtles
 - Trionyx spiniferus* Spiny Softshell
- Order Squamata: Lizards and Snakes
 - Suborder Serpentes: Snakes
 - Family Colubridae
 - cf. *Coluber*

Class Aves

Subclass Ornithurae

Infraclass Carinatae

- Order Gaviiformes
 - Family Gaviidae: Loons
 - Gavia immer* Common Loon
- Order Ardeiformes
 - Family Ardeidae: Herons
 - Ardea herodias* Great Blue Heron
- Order Anseriformes
 - Family Anatidae: Swans, Geese, and Ducks
 - Anus platyrhynchos* Mallard
 - Anas strepera* Gadwall *Anas sp.*
- Order Accipitriformes
 - Family Accipitridae: Hawks, Eagles, Old World Vultures
 - Buteo sp.*
- Order Galliformes
 - Family Phasianidae
 - Subfamily Odontophorinae: American Quails
 - Colinus virginianus* Bobwhite
 - Subfamily Tetraoninae: Grouse
 - Bonasa umbellus* Ruffed Grouse
 - Subfamily Meleagridinae: Turkeys
 - Meleagris gallopavo* Wild Turkey
- Order Columbiformes
 - Family Columbidae: Doves
 - Ectopistes migratorius* Passenger Pigeon
 - Zenaidura macroura* Mourning Dove
- Order Strigiformes
 - Family Strigidae: Typical Owls
 - Otus asio* Screech Owl
 - Bubo virginianus* Great Horned Owl
 - Strix varia* Barred Owl

Order Passeriformes

Family Corvidae: Crows and Jays

Corvus brachyrhynchos Common Crow Family Turdidae: Thrushes*Turdus migratorius* Robin

Class Mammalia Subclass Theria

Infraclass Eutheria Cohort Glires

Order Rodentia

Suborder Sciuromorpha

Family Sciuridae: Squirrels and Relatives

Sciurus carolinensis Eastern Gray Squirrel*Sciurus niger* Eastern Fox Squirrel*Sciurus sp.**Tamiasciurus hudsonicus* Red Squirrel*Marmota monax* Woodchuck*Tamias striatus* Eastern Chipmunk*Glaucomys volans* Flying Squirrel Family Castoridae: Beavers*Castor canadensis* Beaver Suborder Myomorpha

Family Cricetidae: New World Mice and Voles

Subfamily Cricetinae: New World Rodents

Peromyscus maniculatus Deer Mouse*Neotoma floridana* Florida Pack Rat

Subfamily Microtinae: Voles and Lemmings

Ondatra zibethicus Muskrat

Suborder Hystricomorpha

Family Erethizontidae: New World Porcupines

Erethizon dorsatum Porcupine

Order Carnivora

Suborder Fissipeda: Land Carnivores

Family Canidae: Wolves, Dogs, Foxes

Canis lupus Gray Wolf*Canis familiaris* Domestic Dog*Canis sp.*

Family Ursidae: Bears

Ursus americanus Black Bear

Family Procyonidae: Raccoons

Procyon Zotor Raccoon

Family Mustelidae: Mustelids

Martes sp. **Mephitis mephitis* Common Striped Skunk*Lutra canadensis* River Otter

Family Felidae: Cats

Felis concolor Mountain Lion*Felis sp.**Lynx rufus* Bobcat

Order Artiodactyla

Suborder Ruminantia Family Cervidae: Deer

Cervus canadensis Elk*Odocoileus virginianus* White-tailed Deer

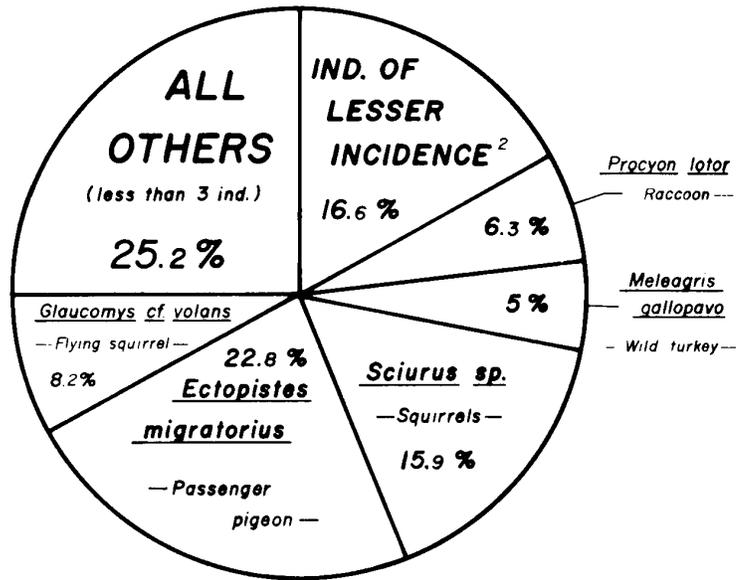
*Either Fisher or Marten

Group	Number of Individuals	% of Total Individuals	Number of Pieces	% of Total Pieces
Class Teleostomi	2	.9	25	.87
Family Ictaluridae	2	.9	9	.31
Family Catostomidae	1	.4	1	.03
<u>Class Total (Fish)</u>	<u>5</u>	<u>2.2</u>	<u>35</u>	<u>1.21</u>
<i>Bufo americanus</i>	3	1.3	14	.48
<i>Rana pipiens</i>	2	.9	18	.62
<i>Chelydra serpentina</i>	1	.4	13	.45
<i>Kinosternon subrubrum</i>	1	.4	9	.31
<i>Sternothaerus odoratus</i>	1	.4	3	.10
<i>cf. Sternothaerus</i>	1	.4	1	.03
<i>Clemmys guttata</i>	1	.4	19	.66
<i>Terrapene carolina</i> & <i>Terrapene sp.</i>	5	2.2	292	10.19
<i>Chrysemys picta</i>	1	.4	8	.27
<i>Trionyx spiniferus</i>	1	.4	2	.06
Family Colubridae	1	.4	201	7.01
<u>Class Total</u>	<u>18</u>	<u>7.6</u>	<u>580</u>	<u>20.18</u>
<i>Gavia immer</i>	1	.4	1	.03
<i>Ardea herodias</i>	1	.4	1	.03
<i>Anas platyrhynchos</i>	1	.4	29	1.01
<i>Anas strepera</i>	1	.4	1	.03
<i>Anas sp.</i>	1	.4	3	.10
<i>Buteo sp.</i>	1	.4	1	.03
<i>Colinus virginianus</i>	2	.9	7	.24
<i>Bonasa umbellus</i>	1	.4	2	.06
<i>Meleagris gallopavo</i>	11	5.0	97	3.38
<i>Ectopistes migratorius</i>	50	22.8	343	11.97
<i>Zenaidura macroura</i>	1	.4	6	.20
<i>Otus asio</i>	1	.4	1	.03
<i>Otus sp.</i>	1	.4	1	.03
<i>Bubo virginianus</i>	1	.4	7	.24
<i>Strix varia</i>	1	.4	1	.03
<i>Corvus brachyrhynchos</i>	1	.4	1	.03
<i>Turdus migratorius</i>	1	.4	1	.03
<u>Class Total (Birds)</u>	<u>77</u>	<u>34.3</u>	<u>503</u>	<u>17.47</u>
<i>Sciurus sp.</i>	35	15.9	515	17.97
<i>Sciurus niger</i>	1	.4	6	.20
<i>Tamiasciurus hudsonicus</i>	1	.4	1	.03
<i>Marmota monax</i>	8	3.6	30	1.04
<i>Tamias striatus</i>	6	2.7	32	1.11
<i>Glaucomys volans</i>	18	8.2	77	2.68
<i>Castor canadensis</i>	2	.9	27	.94
<i>Peromyscus maniculatus</i>	1	.4	6	.20
<i>Neotoma floridana</i>	4	1.8	26	.90
<i>N. floridana</i> (immature)	1	.4	5	.17
<i>Ondatra zibethicus</i>	2	.9	14	.48
<i>Erethizon dorsatum</i>	1	.4	2	.06

Group	Number of Individuals	% of Total Individuals	Number of Pieces	% of Total Pieces
<i>Canis lupus</i>	1	.4	6	.20
<i>Canis familiaris</i>	4	1.8	281	9.80
<i>Canis sp.</i>	1	.4	4	.13
<i>Ursus americanus</i>	2	.9	57	1.98
<i>Procyon lotor</i>	14	6.3	50	1.74
<i>Martes sp.</i>	1	.4	3	.10
<i>Lutra canadensis</i>	1	.4	6	.20
<i>Mephitis mephitis</i>	1	.4	2	.06
<i>Felis concolor</i> & <i>Felis sp.</i>	1	.4	9	.31
<i>Lynx rufus</i>	1	.4	8	.27
cf. <i>Lynx rufus</i> (imm.)	1	.4	2	.06
<i>Cervus canadensis</i>	1	.4	10	.34
<i>Odocoileus virginianus</i>	10	4.5	568	19.82
Class Total	119	53.1	1,747	60.80
Site Total	219	97.2	2,865	99.66

% INDIVIDUALS OF GREATER INCIDENCE¹

—By Specie—



COLE QUARRY —

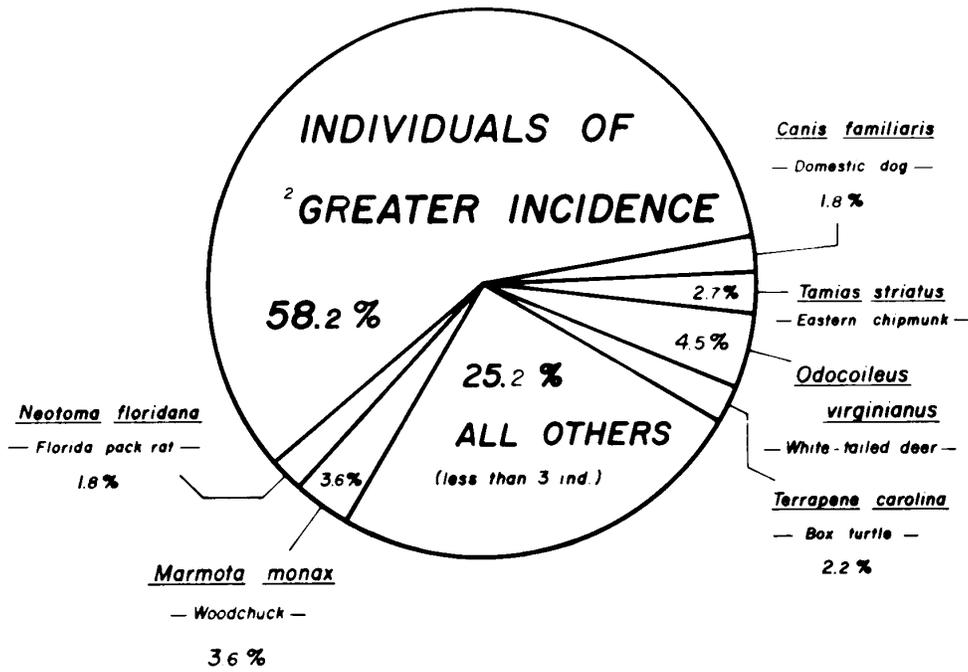
Farrell Farm, N.Y.

1 - Represented by 11-50 individuals
2 - Represented by 3-10 individuals

GARY MILLER

% INDIVIDUALS OF LESSER INCIDENCE

— By Specie —



COLE QUARRY—

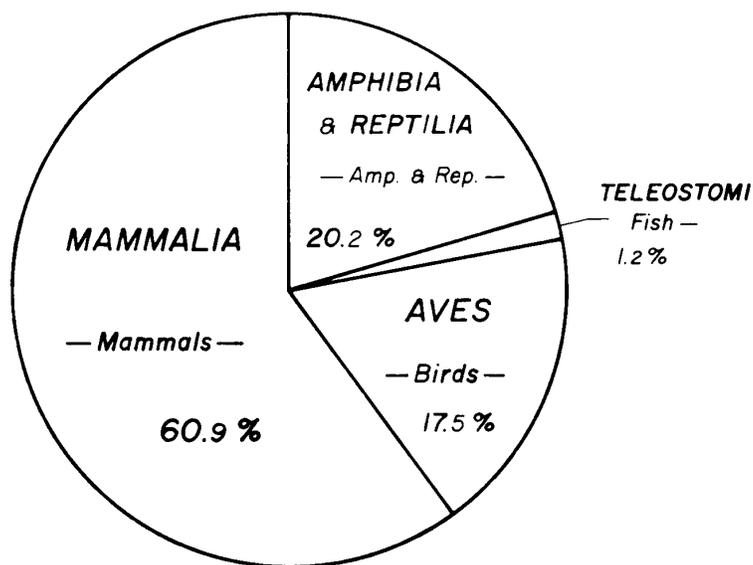
Farrell Farm, N.Y.

1— Represented by 3-10 individuals
 2— Represented by 11-50 individuals

GARY MILLER

% IDENTIFIED BONE

— By Class —



COLE QUARRY—

Farrell Farm, N.Y.

BONE TOTALS:

Fish - 35

Birds - 503

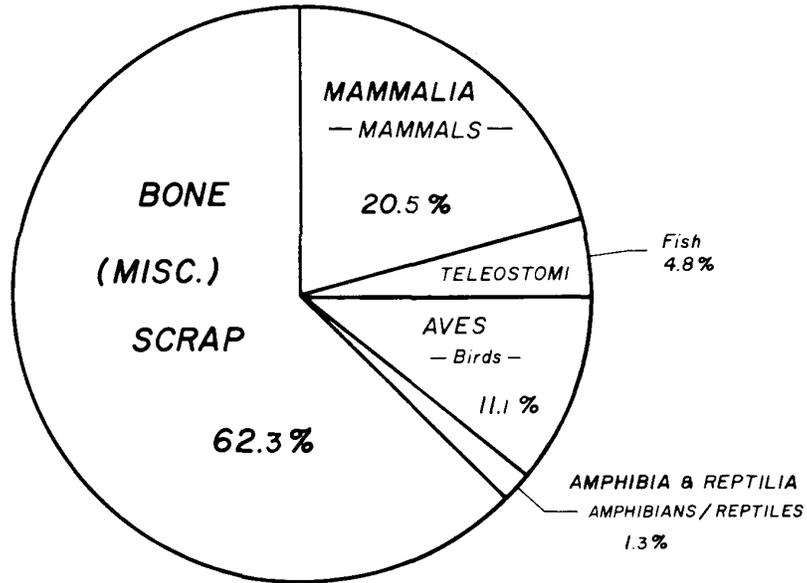
Mammals - 1747

Amp. & Rep - 580

GARY MILLER

% UNIDENTIFIED BONE

— By Class —



COLE QUARRY —

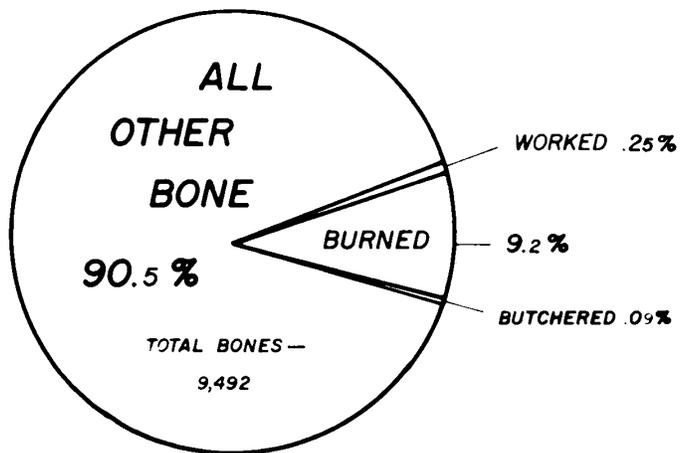
Farrell Farm, N.Y.

BONE TOTALS:

- Fish - 307
- Birds - 709
- Mammals - 1311
- Amp & Rep. - 87

GARY MILLER

% INCIDENCE OF BURNED, WORKED AND BUTCHERED BONE



COLE QUARRY —

of Bones —

Farrell Farm, N.Y.

BURNED — 878

WORKED — 24

BUTCHERED — 9

GARY MILLER

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TWO REVIEWS

Foundations of Pennsylvania Prehistory Edited by Barry C. Kent, Ira F. Smith III and Catherine McCann. No. 1. Anthropological Series of the Pennsylvania Historical and Museum Commission. Harrisburg, 1971. \$10.

Archeology in the Upper Delaware Valley: A Study of the Cultural Chronology of the Tocks Island Reservoir by W. Fred Kinsey III; contributors: Herbert C. Kraft, Patricia Marciando and David C. Werner. No. 2 Anthropological Series of the Pennsylvania Historical and Museum Commission. Harrisburg, 1972. \$10.

The two volumes under review, issued within months of each other, summarize comprehensively the archaeological work done in Pennsylvania during the past 20 years or more. The first title consists of reprints, some abridged and revised, modified or edited for this publication, from the *Pennsylvania Archaeologist*, the *NYSAA Bulletin*, *American Antiquity* and various monograph series, the New York State Museum Science Service bulletins, the University of Michigan Museum of Anthropology papers and the *Proceedings of The American Philosophical Society*, as well as full book publications such as Cross' *The Archaeology of New Jersey*; the earliest piece is Witthoft's study of the Shoop site, 1952.

The second volume consists of 14 site reports in the Delaware River Tocks Island Reservoir area by the excavators, with a synthesis of the work and addenda on projectile point and pottery typologies by Kinsey, one of the major excavators. This work is all recent, as the long process of digging, writing and publishing goes, completed between 1964 and 1971.

Taken together the two volumes bring up to date the account of work done in Pennsylvania prehistory and are the analogue of Ritchie's "The Archaeology of New York State", and its

complement in prehistoric studies in the Northeast. All three works are integrated, written in the same language as it were, by the common cultural threads that bind the region together. Had such synthesis been published of all states in the Northeast for the territory within their borders our knowledge of aboriginal America would be a decade ahead of where it is now.

Pennsylvania is, indeed, the Keystone State archaeologically; or, better still, the crossroads state, stretching east-west from the Atlantic coastal plain to the Ohio River, and south-north from Chesapeake Bay to the Great Lakes. The Delaware and Susquehanna were the conduits and highways of cultural movements northward out of the Southeast coastal and piedmont regions, and Adena and Hopewell, perhaps even Mississippian influence, had to move across it in their scatter into the Northeast and Middle Atlantic section. It is at the apex of a great inverted V, one leg of which is the Ohio-Mississippi drainage system to the west and south, and the other the Susquehanna-Delaware drainage to the south and east. Joining in at the apex is the spine of the Appalachians which, in view of the astonishing "bear wallow" sites on mountain tops in West Virginia, may prove as productive and influential as the river system milieu. Pennsylvania is not the territory of origins but it is a territory across which moved every migrant culture and cultural trait to be found in the Northeast quadrant.

The depth and breadth of Pennsylvania prehistory is outlined in the "Foundations" volume, where are to be found most of the "classic" references of which one or more is certain to appear in the bibliographies of nearly every work on Eastern archaeology: Witthoft on the Paleo-hunter Shoop site and on the Broadspear Tradition; Kinsey on the Bare Island site; Stephenson's reference on the Accokeek Creek site, Dragoo on the Adena of the Upper Ohio Valley; Heisey and Witmer on the Shenks Ferry people; Julius Lopez on coastal pottery. There are 23 pieces in all, a priceless convenience to the student and researcher to have gathered together in one compact volume. The whole is greater than the sum of its parts, for here, in 615 pages of site reports, summations, interpretations, bibliography and illustration is a post-graduate course in Pennsylvania prehistory.

Archeology in the Upper Delaware Valley is something else again, intensive instead of extensive, the plowing of a narrow environmental furrow, close to, but not quite, salvage archeology. Only two of the 14 sites reported seem to have been found by survey contingent upon Federal government plans to create a vast lake for recreation purposes in the Upper Delaware. Most of the sites, all of the important ones, have been long known and surface-scoured by collectors. What made them worth the digging, when Department of the Interior funds were made available, is that they are riverbank or river terrace sites and, as eastern sites go, they are of considerable depth. The situation is explained in a report in *Science*, 26 January 1973 by Dale Ritter, Kinsey and Marvin Kaufman, thus:

"A thick sequence of floodplain sediments has accumulated in the Delaware River Valley by the process of overbank deposition. Textures in the sediments indicate that the sequence contains no point-bar deposits and is unbroken by periods of erosion. Fourteen radiocarbon dates show that deposition began at least 6000 years ago and has continued to the present."

At Kinsey's Faucett site, reported in both the *Science* article and the volume under review, the deposition was 259 cm, or about 8.5 ft. thick. It was at a similar riverbank soil build-up, of about 10 ft. in depth, along the fall-line rivers of the Carolina Piedmont that Coe pioneered what is now proving to be the most fruitful line of research in Eastern archaeology, the excavation of stratigraphic columns in which cultural surfaces were separated by sterile strata of flood-laid silt. This work, reported in 1962 in Coe's *The Formative Cultures of the Carolina Piedmont*, was followed by Bettye Broyles' corroborative and independently significant excavation of a riverbank site on the Kanawha River at St. Albans, West Virginia. Here excavation has reached 19 ft., with another 19 ft., as shown by core drilling, yet to be dug. The riverbank sites of the Upper Delaware have no such depth, and the stratigraphy is not there, but the deposits are accretional and depth provenience is of considerable value, unlike open field sites where internal movement in shallow soils has mixed cultural materials vertically. These sites, therefore, establish local sequences with a high degree of probability.

It is unfortunate that the full results of the lowest level excavation at the Upper Delaware riverbank sites at Faucett Farm and Kraft's Harrys Farm sites, were not available as this volume went to the printer. Faucett Farm yielded a Middle Archaic level dated at about 6200 C-14 years,

which would convert to about 7000 calendar years ago, and Harry's Farm produced a Kirk-like point at a level dated at about 7000 C-14 years, convertible to about 8000 calendar years ago. If the volume under review does nothing else it shows that the archaeological resources necessary to expand our knowledge of prehistory substantively are still in existence, and it shows where to look for them. Continued investigation of the riverbank environment along all major and tributary streams subject to periodic flooding and overbank deposit (Funk has begun such a program in the Upper Susquehanna; see NYSAA *Bulletin* No. 57) is clearly of the first priority.

The excavations reported in the volume under review produced refinements and clarifications of current tenets rather than anything novel or additional. It is a surprise, for instance, to learn that the fishtail point manifestation predates, in the Upper Delaware, the Orient focus on Long Island by something over 150 years. But the position of the fishtail identified culture does not change relatively; though no longer a broad-spear the fishtail is obviously an inheritor of broad-spear traits, which are themselves traceable to Coe's Savannah River point makers of circa 4000 years ago. Now clarified is the time value of the hiatus between the Susquehanna, last of the true broad-spears and the Upper Delaware fishtail. Using the unrecalibrated C-14 dates employed in the volume under review, the 23 Susquehanna points found by Werner at the Zimmerman site were dated at 1650 B.C. \pm 80 years, while the early fishtails at Kraft's Miller Field site were dated at 1220 B.C. \pm 120 years. This span of 430 years becomes about 500 years when the dates are re-calibrated.

Into this interim falls very plausibly Werner's Drybrook point type, convincingly transitional in form between Susquehannas and fishtails and dated, at the Zimmerman site, at 1280 B.C. \pm 120 C-14 years. But this still leaves a gap of 370 years during which there must have taken place a shift away from the hunting practices associated with broad-spears, by reason of the type of game or methods of killing, to the practices indicated by the much slimmer fishtails.

It seems reasonably clear on the evidence from the Upper Delaware that the broad-spear people moved rather rapidly from the south up the valley into the resident territory of narrow-bladed, stemmed point making cultures, and their contemporaries, the Brewerton notched-blade people. Whether the movement was from the Carolina Piedmont or a point between the Carolinas and the Upper Delaware-southern New Jersey with its Koens-Crispin broad-spear type seems a possibility-is not yet established. Coe has remarked that the Savannah River people put in a sudden appearance in the area, where there is no likely predecessor for the type. But in the Upper Delaware the Koens-Crispin, Lehigh and Perkiomen broad-spear types have a C-14 (conventional dating) identical age of 1720 B.C. with a later age of 1500 B.C. at Faucett, while the Carolina Savannah River points have been dated at 1944 B.C. C-14 years.

The most prominent Archaic stemmed point manifestation in the Upper Delaware is the long-bladed Lackawaxen, with a strong representation of probably congeneric Lamoka-like short blades and the new types McPherson and Egypt Mills. The Lackawaxens are believed to date as early as 3230 B.C. (conventional dating) and as late as 1710 B.C. This stemmed point tradition has been named by Kinsey in his summary of lithics the Piedmont and he has attached to it, (quite properly, we think), by calling them a northern Piedmont tradition, a series of Normanskill and Normanskill-like points.

Kinsey recognizes two new point types in the Archaic, the Shriver, a broad stemmed point first identified at the Gay Shriver site in Greene County, Pennsylvania, and the Eshback, a bottom notched style which resembles the Eva of Tennessee, at least in design. But beyond these the points from the Upper Delaware fall into, according to Kinsey, the familiar Laurentian types from Vosburg and Otter Creek through the Brewerton series. The post-Transitional typology and nomenclature are equally conventional. Quite evidently the archaeology of the Upper Delaware and upper New York are very much of a piece.

This is all very reassuring and corroborative of the participation of the Upper Delaware Valley (and of crossroads Pennsylvania) in Northeast cultural movements and developments, but it does nothing to explain the nature of that participation. In fact it obscures all that is important about the nature and timing of the participation. Laurentian, for instance, is a very capacious bag in which to stuff all sorts of miscellaneous materials and, within the Laurentian, the Brewerton focus, with its four point types lumped into a "complex", is particularly meaningless. It has already been pointed out that the testimony of the book under review shows that Upper Delaware

Valley fishtails, without ceremonial burial practices, are 150 years older than Orient fishtails, with ceremonial interments. Obviously the discovery of fishtails in, say, the Lower Hudson, or the Upper Hudson, cannot be dated and placed in cultural context by reference to either the Upper Delaware or Long Island. The only sanction for the placement of a cultural manifestation is by local excavation.

But a much larger discrepancy is evident in another "complex", the Vosburg. Both Otter Creek and Vosburg points are reported in the volume under review as occurring in the Upper Delaware but they are not dated there. In continuing excavations at Faucett Farm, however, Kinsey encountered a Vosburg hearth which he reported in the Eastern States Archeological Federation Bulletin of July, 1971 (No. 30). The C-14 date on this hearth was 5580 years. This is to be compared with a date of 4730 C-14 years obtained by Funk on a Vosburg horizon at the Sylvan Lake Rockshelter, a date of *more than* 5095 C-14 years (the dated material was shell lying directly on a Vosburg Point) reported by Brennan from the Dogan locus on Montrose Point, and a date of 4340 C-14 years reported by David Thompson for a Vosburg layer at the Binette Rockshelter in Connecticut. If all these dates are accepted at face value, then Vosburg points were in use in the Northeast for a matter of 1200 years, a wide net to cast indeed. Furthermore, with the older Vosburgs appearing at more southerly sites, Faucett Farm and Dogan Point (directly east of Faucett Farm) it seems that the point type was moving from the south into the north and east, rather than in the reverse direction.

A cautionary attitude is indicated by these data. Not only do "types" not equate chronologically, within acceptably narrow time limits, across appreciably wide territories, but the practice of typing itself is suspect, and the use of cultural names for point types is mischievous. In a recent private communication Kinsey has expressed his current opinion of types and typology for projectile points as follows:

"I am convinced that typologies are required for riverine systems; that is, the Upper Delaware has a typology, the Lower Hudson, the Lower Susquehanna, etc. One cannot take projectile points out of context and say they are thus and so. Each area needs its stratified site so that the remnants from shallow sites, mixed sites and surface collections [may be interpreted]. I do not think that you can superimpose typologies from one area directly upon another though there may be cross-cultural ties."

This reviewer has been arguing for years for the adoption of such an attitude. It is obvious that certain traditions of projectile point design were in use over wide areas and through long periods of time, but these traditions are expressed in local variations and these local varieties are the important diagnostics. The establishment of a "type" should await the synthesis of data from localized excavation and recovery; types should not be assumed from the material from one site and then imposed on other sites at some remove from it geographically and, perhaps, environmentally. As important archaeologically as the form of a point is its provenience, where it is found geographically and sequentially. What is true of projectile points is equally true of ceramics.

The most thumbed section of "Archeology in the Upper Delaware" will be the 150 pages of summary and appendices, Kinsey's interpretations, type descriptions of points and pottery, and sequential arrangement of traditions. This reviewer, working in the Lower Hudson at the same latitude as the Upper Delaware, has constant resort to these sections. New York workers in the headwaters drainage of the Delaware will find them even more valuable. They will be especially interested in his division of Late Woodland into Owasco and Tribal pottery periods, the latter the equivalent of Iroquois in central New York. Kinsey defines Tribal as "In this context the term Tribal is used as an adjective to refer to incised pottery. It designates all Chance phase, Bowmans Brook, Overpeck and Munsee as well as other late incised pottery types". The definition is clear enough, and the need for a designation other than Iroquois for incised decorated pottery outside Iroquoisia is urgent enough, but the choice of the "Tribal", which has other anthropological implications, is going to be questioned. But because it is needed it may well catch on in the literature.

Such considerations aside the two volumes under review will appeal to and have basic reference value for the entire Northeast and to the Middle Atlantic states. Admittedly the price of the two, \$20, is high, but not for the more than 1100 pages of text. They are a library in themselves.

L.A.B.

AWARDS-1973

The Awards and Fellowship Committee, headed by Theodore Whitney, announced the following designations at the Annual Meeting, 1973:

Herbert C. Kraft for Fellowship. He has published forty-four articles on regional Archeology over a dozen years. Extensive field work in the Upper Delaware River Basin. Member and Vice President of the Metropolitan Chapter, NYSAA. Member of the Orange County Chapter, NYSAA, Fellow New Jersey Academy of Science.

Stanford J. Gibson for Certificate of Merit. He has written ten articles in the Chenango Chapter Bulletin and has been junior author of three more. He has done special research on sinew stones, pottery effigies, and the topographical features of sites. Field work consists of Oran-Barnes Cza 15, White Site Nbn 2, Buyea Site Ond 13, Olcott Site Msv 3, MorNor Nrh 3, Gravesen Nbn 1-C and many others. Services are NYSAA Publications Committee, Chapter President, Secretary, Treasurer, Charter Member, Lecturer, Teacher Adult Archeology Classes.

Fred Dibello for Meritorious Service, who although he is not a member of the Orange County Chapter, assisted in the excavation of the Sugar Loaf Mastodon. He loaned his tractor, stone boat, and other equipment, outfitted fifteen members, helped on Saturday and Sunday and removed equipment from the field. The skeleton was stored in his barn and for all these services he was in no way compensated materially.

Lawrence Rockelein (deceased) for Meritorious Service, owner of the current site being excavated by the Orange County Chapter, he granted permission for cutting roads through the forests to get to the site; he stored equipment, allowed camping on the site, and aided in the security of the dig.

William Herbert Rice (deceased) for Certificate of Merit. He reported on the Snook Kill Site in NYSAA Bulletin #9, 1957. Research consists of Archaic settlement distribution in the Upper Hudson, Champlain and Vermont regions. With his wife Beulah Rice, he excavated the type site for Snook Kill. He was President of the Auringer-Seeley Chapter many times and trustee for NYSAA. He was also curator and preserver of Chapter artifacts and the field records, catalogued and arranged so they will be suitable for future research and review.