BULLETIN NO. 14

SOUTHEASTERN ARCHAEOLOGICAL CONFERENCE

THE WOODSIDE COMPONENT OF THE SLONE SITE, PIKE COUNTY, KENTUCKY

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Morgantown, West Virginia

1971

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PREFACE

The authors undertook the writing of this report both for the reasons detailed in the Introduction and because we felt that it would make a substantive contribution to the archaeology of the central Appalachians as well as a more general contribution to archaeological field strategies and interpretation. We hope that the extensive horizontal excavation of a Late Prehistoric town presented in this report can provide a new perspective on the internal structuring of such communities and, largely through the vehicle of our own shortcomings, can emphasize how traditional recovery programs fail to provide the kinds of information necessary to modern archaeological analysis. Approaches that treat such sites as homogeneous structures not only obscure the internal patterning present, but also, if based upon excavations of limited horizontal extent, may present a highly biased picture. Hopefully, both excavation programs and interpretation of previously conducted investigations can benefit from our experience.

To separate, even roughly, the contributions of the various authors is not an easy matter. Hanson, then a graduate student at the University of Kentucky, began the excavation in 1963. Dunnell, at the time an undergraduate at the same institution, continued the work in the following year with Hardesty as a field assistant. This report is largely a revised version of one submitted to the funding agency, the National Park Service, in 1964. In the earlier work, Hanson was largely responsible for the description of the artifacts and summary, Hardesty for the description of the structures and midden analysis, and Dunnell for the description of the non-structural features and general internal structuring. Since then, Hanson has restudied the ceramics, and Dunnell the projectile points, graves, and burials, while Hardesty has performed additional statistical analyses, principally the ceramic clustering.

Difficulties arose with the separation of the authors both from each other and from the material housed at the University of Kentucky. Late in 1970 Dunnell undertook the general editorship and began rewritting the manuscript in its entirity as well as adding additional analyses. The senior author attempted to respect the individual contributions as far as possible while trying to produce a coherent whole, but not without an occasional protest. In the end, the failings of this report should rest mainly with the heavy hand of the senior author.

It is even more difficult to acknowledge all of those who have aided us over the years in which this report was in preparation. The excavation itself was funded through the cooperation of the University of Kentucky and the National Park Service as part of the Inter-Agency Archaeological and Paleontological Salvage Program under contract 14-10-0131-1130. Dr. Douglas W. Schwartz, as the mentor of all the authors and the general administrator of the salvage program, is owed a major debt both for providing the opportunity for the excavation itself and for encouragement and advice in the preparation of the original reports. Drs. Martha A. Rolingson, Philip Drucker, and Lathel F. Duffield each contributed valuable information and the opportunity to restudy the materials in their custody. Identification of the skeletal remains by age and sex was done by Mr. Oren Breek, a graduate student at the

University of Kentucky, and were checked by the late Dr. Charles Snow. Messrs. Jerry Jermann, John Fuller, and Joshel Namkung aided in the preparation of tables and figures. Mrs. Irene Castle of Garden Village, Kentucky, fed us cheerfully for two years and provided a home away from home when the tents became unbearable. The Army Corps of Engineers, especially Major B. G. Whaller, cooperated at every turn and made our chore easier. Mr. Victor Justice lended mechanical assistance both field seasons. Perhaps the greatest debt is owed to the men who did the work under conditions far from ideal and all of whom contributed far more than they could be recompensed for by their meager wages. Of the nearly twenty men who worked at Slone over the two years that excavations were in progress, Mr. Michael A. Hoffman and Mr. A. C. Stagg should be singled out for their outstanding contributions to the success of the project. Bettye J. Broyles provided typing of the final draft of the manuscript. Finally, the senior author should like to express his gratitude to his wife who turned the "stuff" produced by the three of us into some semblance of English. To these and many others, this report owes its existence.

University of Washington

National Park Service

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INTRODUCTION

The eastern highland region of Kentucky, and the mid-Appalachians as a whole, has seen little systematic archaeological activity until recent years. Under the River Basin Salvage Program, the University of Kentucky, in cooperation with the National Park Service, began salvage excavations in the Fishtrap Reservoir area located on Levisa Fork of the Big Sandy River in Pike County, Kentucky (Fig. 1). As part of this project nearly eighty percent of the remaining portion of a small Fort Ancient town was excavated, and this report presents the descriptive results of this work. Earlier components from the Slone Site and investigations conducted in other localities within the Fishtrap area will be treated elsewhere. Since the site presented an opportunity to excavate a large portion of a town and therefore to place the more commonly encountered artifact descriptions in the context of the prehistoric community, it is hoped that this report, while descriptive in content, will be of interest to students of eastern prehistory as well as specialists of the Appalachian region. Considerable effort has been expended upon description of the portable objects found in the process of excavation; however, the main focus is upon the community as a whole and the structures and smaller features which constitute its principal components.

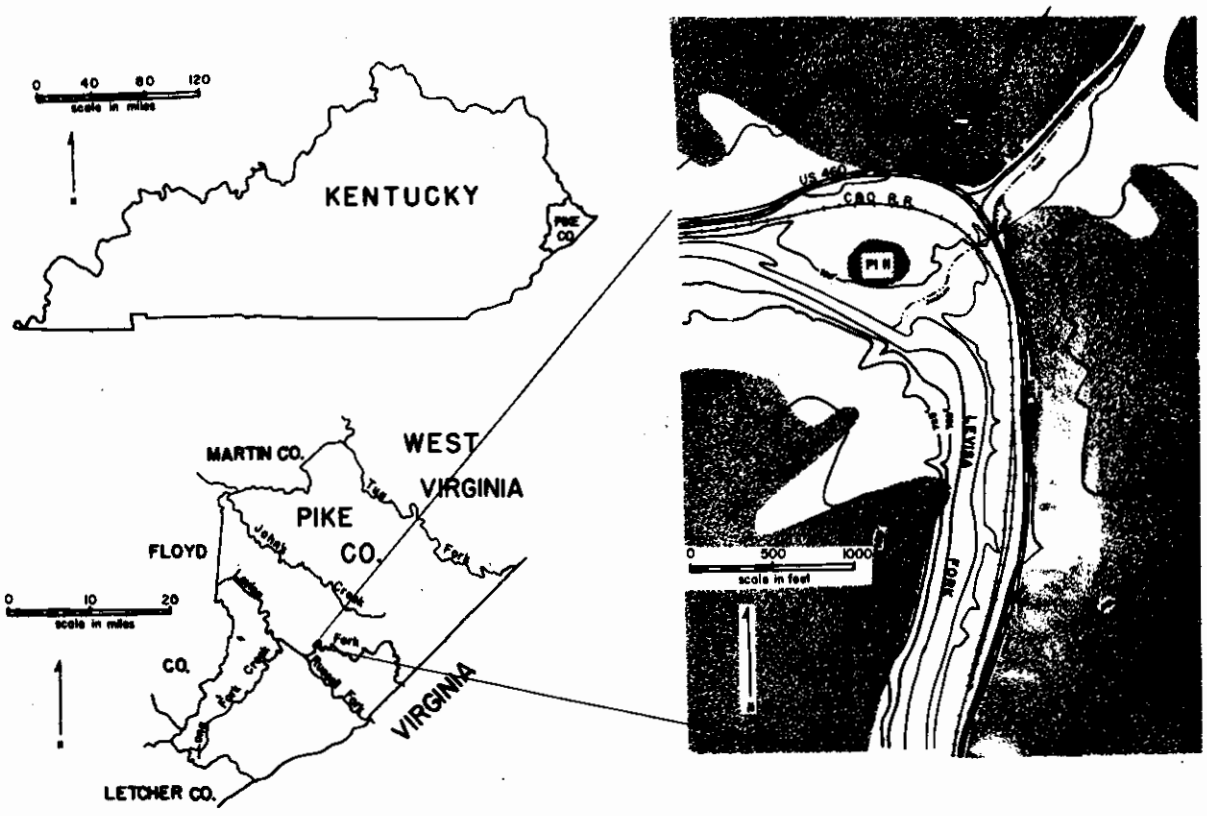

FIGURE 1

Location of the Slone Site and the surrounding terrain.

Previous archaeological investigations in the Levisa Fork drainage system have been exceedingly limited. Webb and Funkhouser recorded few sites from this area in their 1932 Archaeological Survey of Kentucky. As part of the W. P. A. archaeological program administered by Webb, three sites in Johnson County were excavated: the C and O Mounds, Jo-2 and Jo-9, and the Mayo Farm Site, Jo-14. The C and O Mounds, representing quite different and presumably earlier populations in the Levisa area, have been reported in the literature (Webb 1942), while the Mayo Site, closely similar to the material considered here has only recently been studied in any systematic fashion, and the results of this study are not yet available. Two salvage projects prior to the Fishtrap program had been undertaken, a survey for the Dewey Dam reservoir located on John's Creek, a tributary to Levisa, and a survey conducted for the John W. Flanagan Reservoir on the Pound River, in Virginia, a tributary of Russell Fork which in turn is a tributary to the Levisa (Slone n.d., 1960). Neither of these projects produced substantial results (Purrington 1967: 107-109).

Work in adjacent areas of the Appalachians has been equally restricted in character. Systematic investigations in southern West Virginia have been limited to surface survey (Solecki 1949), and in southwestern Virginia to the survey and testing programs of Evans (1955) and Holland (1970) and to the excavation of the Shannon Site in Montgomery County by Benthall (1969). Ceramics described by Solecki, Evans, and Holland suggest that material similar to that at Slone is widely distributed in the mid-Appalachian region, but the Shannon Site excavation demonstrates that at least some of these superficially similar ceramic assemblages are associated with settlement types unlike that indicated in the Fishtrap area generally and reported here for

FIGURE 2

View of the Slone Site during the 1963 excavation.

the Slone Site. Webb's Norris Basin project (1938), south of the Fishtrap area, includes excavations of sites of a roughly comparable age; however, the similarities between these ceramics and settlements are even more tenuous with the Fishtrap material than those obtaining with the Virginia and West Virginia areas. Systematic surveys have been conducted in southeastern Kentucky, but these projects have failed to recover comparable manifestations (e.g., Slone 1958; Purrington 1966; Fryman 1967). In short, there is a dearth of published materials reporting excavations in the mid-Appalachians, and those which have been published report materials unlike those found in the Levisa drainage area. Because of this lack of published data of a comparable sort, and because of the physiography of the region, no comparisons with other archaeological manifestations are made here. Broad scale and meaningful synthesis is precluded by the lack of comparable material and must await additional systematic and detailed work, for which this study hopefully lays a foundation.

The Slone Site, 15-Pi-11, is situated west of the mouth of Jonican Creek on the north bank of Levisa Fork on a former flood plain approximately 25 feet above the level of the river (Fig. 1). At this point the valley floor is only 1,500 feet wide (Fig. 2) and is flanked by mountains which rise sharply more than 800 feet above the flood plain. The biota, though now second-growth and somewhat impoverished by the absence of chestnut and the effects of selective lumbering, is typical of the Cumberland Plateau region and within the Mixed Mesophytic deciduous forest (Braun 1950; Küchler 1965). As is typical of this forest type, local slope, exposure, hydrological and edaphic features as well as the underlying geological structures all act to present a mosaic of microenvironments, often differing radically in their appearance and major components, both floral and faunal (Dunnell 1967: 9). Associations or microenvironments with substantial evergreen components are limited to hemlock-dominated stands on dry, poor-soil slopes with southern exposure at lower elevations and pine-dominated stands on the highest elevations. The fauna includes most of the larger species known in the eastern United States. A complete list of recent species recorded for the area may be found in Barbour (1957), and the only major additions in the immediate prehistoric past would appear to be elk (Cervus canadensis), porcupine (Erethizon dorsatum), cougar (Felis concolor), and perhaps beaver (Castor canadensis).

The Slone Site and the surrounding area experience an average rainfall of 41.84 inches which is evenly distributed throughout the year. The temperature extremes recorded range from -18° F in the winter to 140° F in the summer with mean temperature at 52.6° F. Killing frosts usually end in middle or late April but are known in early May. Frost begins in middle October, giving the area an effective growing season of 175 to 186 days.

The former floodplain upon which the Slone Site is situated is composed of irregularly stratified sandy to silty clay-loams and has a thickness, at least at the Slone locality, in excess of 20 feet. These soils have been recently studied by McDonald and Blevins (1965), and the soils at this locality are included in their Pope series of the Pope-Stendall association. More detailed soil data may be obtained in that publication. Because of the density of debris at Pi-11, the soil has been considerably altered so as to differ in most parameters (e.g., color, humus content, pH, phosphate content, texture, etc.) from the soils typical of the association.

Levisa Fork has cut away a portion of the former flood plain during historic times, and this process has resulted in the loss of a considerable portion of the site adjacent to the river. This erosion was marked at the time of excavation by a precipitous drop of eleven feet from the southern edge of the site to low bottoms regularly overflowed by the river today. In the past, several burials have eroded from this bank, and local inhabitants were well acquainted with this locality as an "Indian burial ground." The land has been more or less continuously farmed for at least the past 75 years, and there is no record of any structures other than fences having been built by Europeans at the site.

Excavation was begun in 1963 by Hanson (1964a) and was confined to the eastern third of the site. The following summer Dunnell completed the excavation of the Fort Ancient component (Hanson, Dunnell and Hardesty 1964). Further excavations at this locality were conducted by Dunnell (1966a) in 1965; however, the work concentrated upon earlier materials unrelated to the Fort Ancient occupation. During both seasons of work directed toward the Fort Ancient component the same grid system of two-meter squares, oriented along the cardinal directions, was employed. The uppermost vertical unit consisted of a 20 cm. thick level incorporating the plow-disturbed material (often difficult to recognize as a distinct natural unit because of the very dark soils). All subsequent vertical units were 10 cm. thick. Features, concentrations of debris, and other areas of particular interest were isolated and their contents segregated from the general midden. Three large sections, on the north, east, and west sides of the site, were excavated in this manner. As a final step, the intervening areas were removed with power equipment to facilitate the location of structures and the reconstruction of the general community plan.

The major structural features revealed by the excavation relating to the Fort Ancient component were portions of two roughly circular villages, and consisted of three stockade lines, twelve identifiable houses, a number of smaller wooden structures, and a plaza (Fig. 3). The presence of three stockades and several overlapping house patterns indicates substantial time depth to the occupation; however, it is not possible, largely because of the tremendous amount of vertical mixing coincident with intensively occupied town sites, to demonstrate how long the site was occupied or whether the pattern of occupation was continuous or repeated reoccupation. The latter speculation is, of course, most consistent with the inferred subsistence system of swidden agriculture dominated by maize cultivation. For this reason it is necessary to treat the entire component as a single unit for the purpose of describing the sixty graves, 127 other minor features, and the portable objects.

The artifacts, structures, and radiocarbon dates are all consistent with assigning the Slone Site to the late prehistoric period and regarding it as generally allied to the highly variable Fort Ancient unit of the Ohio Valley and tributaries, first systematically described by Griffin (1943). It is important to note that the Slone Site is not unique in the Fishtrap area. The initial survey revealed two other highly similar localities (Schwartz 1962), and Dunnell's investigations in 1965 and 1966 produced six more such settlements in addition to abundant evidence of earlier occupation (Dunnell 1966a, 1966b). Carefully controlled surface collections at all of these sites and test excavations at four localities, Pi-8 (Hanson 1964b; Dunnell 1966b), Pi-13 (Dunnell 1966a, 1966b), Pi-15 (Dunnell 1966b), and Pi-23 (Dunnell 1966b) indicate that these sites not only share the same distinctive

ceramic styles and types of other portable objects, but are closely similar in terms of size, shape, community plan, and burial type. On the other hand, these sites differ in a number of important respects from the material described by Griffin as Fort Ancient in the Ohio Valley proper and even from Ohio Valley Fort Ancient sites nearer to the Fishtrap area (Hanson 1966). For these reasons the Fort Ancient-like manifestations of the upper reaches of Levisa Fork have been grouped together as the Woodside phase and can be regarded as a Cumberland Plateau adaptation of one or more of the Fort Ancient foci described by Griffin (Dunnell 1967). Thus the description set forth here of the most completely investigated Woodside town site can, on the basis of the other work described, be regarded as an accurate representation of late prehistoric settlements in Fishtrap and adjacent regions.

It has already been stated that the description and analysis presented are oriented toward relating all aspects of the settlement to the general community plan and, in particular, the major structures. To accomplish this end, the first substantive chapter, FEATURES, is divided into three parts: structures, minor non-structural features, and graves and burials. This chapter serves not only to describe the above named categories of remains but also constitutes the framework within which the artifacts and midden are examined in succeeding chapters.

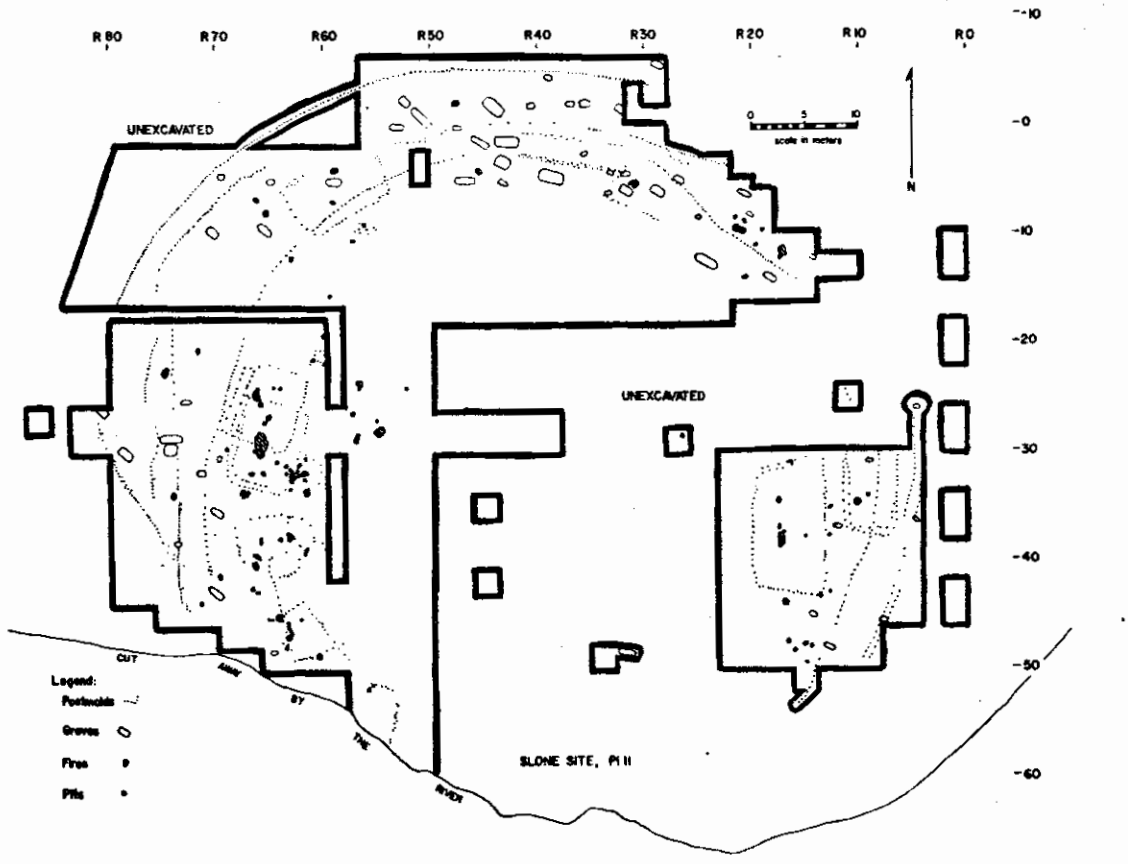

FIGURE 3

Site plan showing the excavated area and features.

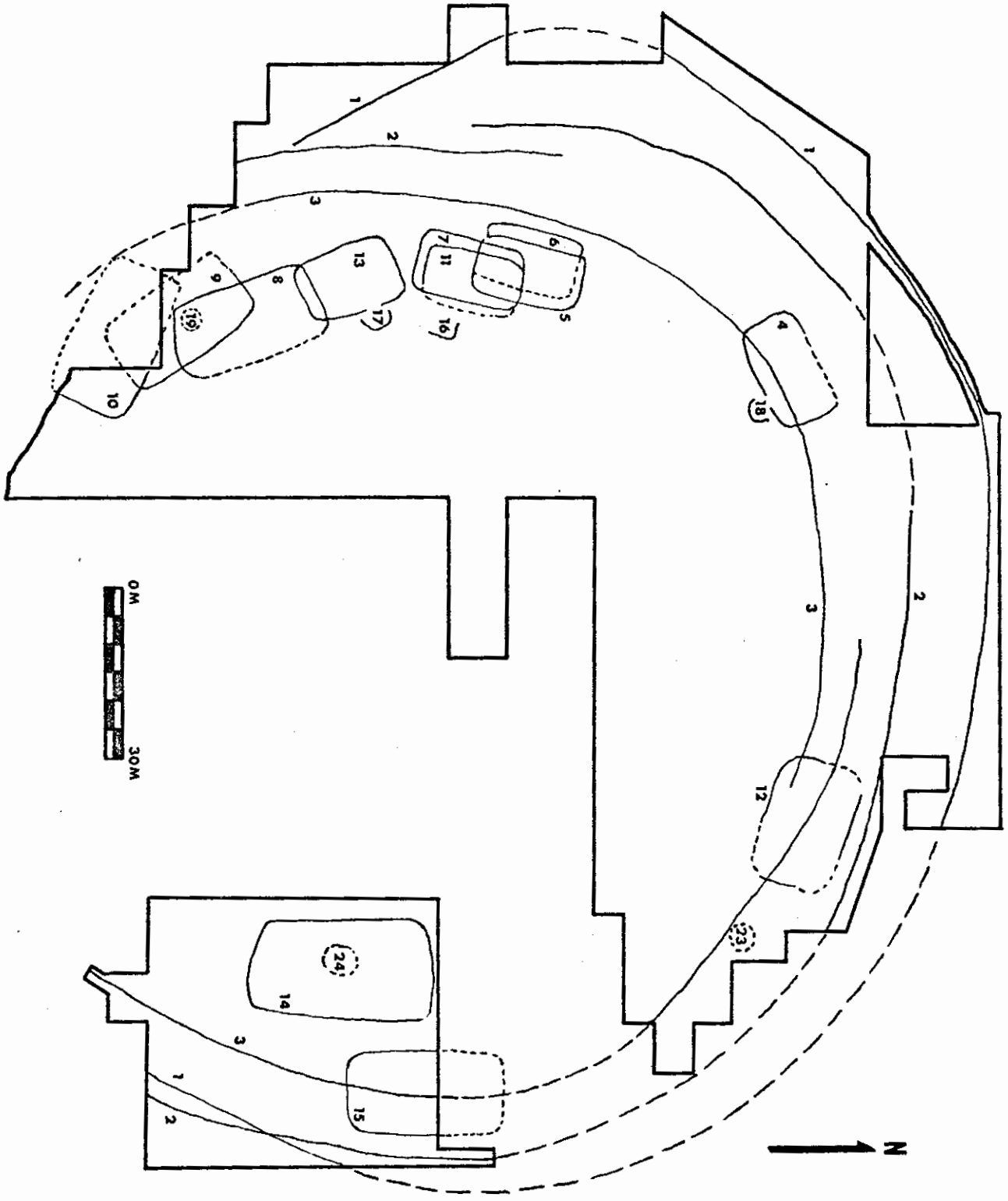

FIGURE 4

Schematic plan of aboriginal structures.

FEATURES

The term feature is used for any artifact which lacked, at the time of discovery, sufficient physical coherence to permit its removal intact. These kinds of artifacts are necessarily studied and recorded in the field. Because of the generally large size of features compared to the other kinds of artifacts encountered, they often contain portable artifacts and thus present circumstances which require a separate treatment for description. Three kinds of features are conveniently distinguished: structures, largely synonymous with the ordinary usage of "building"; non-structural features, including both pits and surface concentrations; and graves and burials. The Slone Site exhibits an overall pattern in the occurrence of these and portable artifacts, and the description that follows attempts to demonstrate the important contribution made by the several kinds of features to this pattern.

The numbering system used for features deserves some comment. The two seasons' excavations each employed its own system of numbers; thus duplicate feature designations occur. Because of the numbers involved, it has been deemed most feasible to differentiate the two where necessary by indicating the 1963 series with the addition of "(63)" after the designating number. All structures were numbered serially, but the original field feature number is given in parentheses. The designating numbers for features are not continuous. Several apparent constructions, upon analysis, proved to be of natural or modern origin, and these numbers have simply been deleted without reordering the designations of other features.

Structures

Structures, with the single exception of the plaza, are wooden constructions which were recorded in the field as post mold patterns. These patterns provide the most obvious segments of the patterning observed in the spatial location of artifacts (Figs. 3 and 4). On the basis of formal characteristics, it is possible to delineate three classes of structures whose function may be readily inferred, along with several minor classes whose function is not directly obvious, but which in combination with the major classes form a remarkably consistent pattern. The recovery of this overall community pattern, while unusual in most salvage archaeology, is a function of the small size of the site coupled with horizontal stripping techniques specifically employed to recover this kind of data.

Stockades:

This class of prominent and easily recognized structures probably functioned as defensive constructions. They are recognized as long circular or arc-shaped lines of posts which form rings around the other material recovered. On the whole, stockade post molds averaged three centimeters greater in diameter than those comprising the house patterns.

Structure # 1 (37): This is the most exterior of the three stockades uncovered. It was possible to trace the post molds almost continuously around the entire excavated portion of the site (Fig. 4), showing its circular nature. The line of posts turns to parallel the river bank just before it is truncated by erosion, eliminating the possibility that it might have simply abutted the river bank in a C-shaped pattern. The estimated original circumference is 243 meters of which 92.5 meters were excavated and recorded, and the maximum diameter is about 75.5 meters. With the exception of the southeastern segment of the village, where this stockade crosses Structure 2, it is concentric with the other stockades.

While both Structures 2 and 3 had gates of the overlapping type of construction, this is not noted for Structure 1. However, in the southwestern section, this structure appears to merge with Structure 2. There is no clearly distinguishable line of post molds representing Structure 1 in this area. This is suggestive of a former gateway, but since the outermost structures were eroded away south of this area, the lack of an easily distinguished line of post molds may only be a function of the lines crossing one another. The gateway may lie in any of the unexcavated segments in the west, northeast, or south.

Feature 91 is so closely associated with this stockade as to be considered an integral part of this defensive work. The construction and nature of this feature indicate that it was probably an exterior drainage ditch. It occurs only in the northwestern area parallel to the stockade where the site is low and even at the time of excavation generally plagued with poor drainage in wet weather. Its absence in other areas is probably a function of the better drainage. Over most of its length it is about two meters in width and generally less than thirty centimeters in depth. The interior face of the ditch adjacent to the stockade itself was rock-faced, apparently to prevent loosening of the base of the stockade by hydro-erosion.

Structure # 2 (144): This stockade is represented by a rather continuous, well-marked, circular line of posts lying between the outermost stockade (Structure 1) and the interior stockade (Structure 3). The estimated circumference is 228 meters, 98 meters of which have been excavated and recorded in detail. The diameter of this structure is 72.5 meters. A gate is situated in the southwest portion of the structure formed by a 14.8 meter overlap of the walls, with the opening toward the south. This kind of gate construction is common in the East in late prehistoric times (e.g., Mayer-Oakes 1955: 100-103; Benthall 1969: 25) and occurs again in Structure 3 at Slone.

Structure # 3 (145): This stockade, again a roughly circular pattern of post molds (Fig. 5), is the smallest and innermost of this class of structures. It has an estimated circumference of 196 meters, of which 110 meters were exposed and recorded in the course of excavation, and a maximum diameter of 62.5 meters. A gate occurs in the northwestern section and is formed by an overlap of fifteen meters of wall with the outside opening to the west.

The three stockades at the Slone Site display considerable similarity in their main constructional features. All are circular and composed of single lines of individually-set posts. Both of the inner stockades have overlapping gates, and, especially in view of the modest exposure of the third and largest stockade, it seems quite likely that it too had such a gateway. The innermost stockade (Structure 3) is, on the basis of stratigraphic posi-

FIGURE 5

Structure # 3, the interior stockade.

tion, earlier than the other two; however, it is not possible to suggest the amount of time that may have elapsed between its construction and that of the other two, themselves inseparable in terms of time. There is no evidence to suggest that more than one stockade was in use at a time; in fact, the amount of superimpositions of houses and stockades argues that each stockade marks a distinct period of occupation be it continuous or discontinuous at this location. The general trend in community size, based on the known sequence, is from small to large through time.

Houses:

Another common and easily distinguished class of wooden constructions is houses, recognized as rectangular post mold patterns or portions of such patterns. There were undoubtedly additional houses at the Slone Site which

went unrecognized because only small portions of the patterns survived the extensive aboriginal disturbances and modern agricultural activity. The dark color of the soil in many parts of the site also inhibited the recovery of posts. Thus the twelve positively identifiable houses are a sample of these structures at the site and do not constitute all such structures which may have been built.

In addition to the common shape and construction technique, all of the twelve houses had rounded corners and a variable number of interior posts which probably functioned not only as roof supports but partitions, or other domestic furnishings. The more important variable features of house construction and associated features are presented in Table 1.

TABLE 1

Variable Characteristics of Houses and Their Associations

Structure Number	Feature Number	Maximum Dimensions*	Orientation	Central Fire Pits**	Porticos ***
4	146	9.50 x 6.50	NE-SW	none	S. 18
5	147	7.00 x 5.60	NE-SW	F. 81	none
6	148	7.00 x 6.58	NNE-SSW	F. 40	none
7	149	8.50 x 6.25	NNE-SSW	F. 3	S. 16
8	150	10.00 x 5.25	NW-SE	none	none
9	151	? x ?	?	none	none
10	152	? x ?	?	none	S. 19
11	153	8.25 x 5.75	NNE-SSW	F. 26	none
12	154	? x 6.00	WNW-ESE	F. 110	none
13	155	5.50 x 4.50	NNW-SSE	F. 63	S. 17
14	156	12.30 x 6.80	N-S	none	none
15	157	? x 4.90	N-S	none	none

* measurements in meters.
** presence of an associated central fire pit is indicated by the feature number of such a pit.
*** presence of an associated portico is indicated by the structure number of the portico.

The range in size of houses is not great. The range in length is 6.8 meters, from 5.5 meters to 12.3 meters, with an average of 8.5 meters; the range in width is 1.9 meters, from 4.9 meters to 6.8 meters, averaging 5.8 meters. The range in square meters of floor space, perhaps a more pragmatic standard, is from 24.75 square meters to 83.64 square meters averaging 49.44 square meters. The variation in orientation measured in terms of cardinal directions is a function of the circular pattern of house arrangement, parallel-

ing the stockades. Table 1 indicates that fifty per cent of the houses have central fire basins. This is deceptive. In three cases where central fire basins are lacking, the entire house was not excavated, and the absence therefore is meaningless. In the other cases in which fire basins are lacking, complicated superpositioning of several structures coupled in some cases with the fact that plowing had removed the living surface are likely explanations for the absence of fire basins. In short, in every case where it can be ascertained, a fire basin or fired area occurs in the center of houses, and this feature can probably be regarded as a universal constant with this class of structure. The final column indicates the cases in which porticos, structures to be described subsequently, can be directly associated with specific houses. Again, complications arising from multiple superpositions made it impossible to distinguish specific associations of this kind in several cases. Undoubtedly more porticos are associated with houses than indicated in the table; however, there is nothing to suggest that a portico is found with each and every house.

In the west and southwestern portions of the village, several houses are superimposed upon each other. The density of houses in this area is undoubtedly a function of the more careful excavation and generally lighter soils here and may represent the actual occurrence of houses more accurately than other areas. Also of note in this section are the four northernmost houses, Structures 5, 6, 7, and 11 (Fig. 4). Both Structures 6 and 11 are quite incompletely preserved and highly similar in shape and orientation to Structures 5 and 7 respectively. It is possible that what has been treated as four houses may in fact have been only two structures with the partial plans representing rebuildings of the structures represented by the more complete plans. A few other cases of double walls occur, but they involve only a few feet of outer wall and may represent either repairs or interior furnishings attached to the house wall.

Universal orientation of the long axis of the house parallel to the stockade, uniformity of both construction techniques and styles, and narrow variation in size and associations all combine to make the houses a remarkably consistent and regular feature of the Slone Site. The concentration of storage pits, fires other than the constructed basin type, and earth ovens outside the houses, suggest that many of the "domestic" activities took place outside these structures and thus that the houses were dwelling units in which people slept and spent the winter.

Porticos:

In the course of the 1964 excavation the close spatial association of large post pits, fired areas, storage pits, and earth ovens, often densely concentrated, was noticed (Fig. 6). While the overview of these structures presented in Tables 2 and 3 does not suggest regular walled buildings, the occurrence of the post pits and occasional walls does indicate the presence of roofed areas, sometimes sheltered by one or more walls of irregular construction, in which most of the culinary activities took place. For these reasons, porticos, the term applied to such concentrations, are considered as a distinct class of structure at the Slone Site. Most of these buildings can be associated with specific houses (Tables 1 and 3) and in a few cases (Fig. 4), may have been actually attached to the houses as some kind of porch. All porticos occur on the plaza side of the house.

FIGURE 6

Structure 16, a portico with associated surface fire (Feature 51) and storage pits (Features 52 and 53).

TABLE 2

Portico Constructional Features

Structure Number	Feature Number	Maximum Dimensions*	Orientation	Number of Walls	Number of Post Pits
16	158	2.50 x 2.25	ESE-WSW	2	7
17	159	2.25 x 2.25	none	2+ ?	4
18	160	---- ----	----	?	1
19	162	---- ----	----	none	4
23	166	5.00 x 3.00	(ca.)NW-SE	none	3
24	167	7.00 x 3.00	(ca.) N-S	?	3

* measurements in meters

TABLE 3

Portico Associations

Structure Number	Internal Associations				House
	Fired Areas	Storage Pits	Earth Ovens	Rock Concentrations	
16	F. 51,54	F. 50	F. 48	-----	St. 7
17	F. 60,61	-----	-----	-----	St. 13
18	-----	-----	-----	-----	St. 4
19	F. 95	F. 97	F. 64,83	-----	St. 10
23	F. 2(63)	-----	-----	-----	none
24	F. 37(63)	-----	-----	F. 29,32(63)	none

Tables 2 and 3 summarize the constructural features and associations of members of this class, respectively. There is considerable variation in construction technique (e.g., some have pole walls, others do not), shape, and number of roof supports (post pits). The size of the structures is likewise variable with a range in floor area from 5.06 square meters to 21.00 square meters, averaging 11.02 square meters. In many cases much of the floor space is occupied by fired areas, storage pits, and ovens. The soil in and immediately around the porticos contains large quantities of ash and charcoal, in two cases ash being so prominent as to make the floors of the porticos appear as heaps of ashes (Fig. 6). The porticos represent the most concentrated primary loci of activity found within the Slone Site and both the nature of the debris found in and around these structures as well as the nature of the incorporated features strongly suggest that the major activity represented is that of cooking. Structure 18 is deficient in most categories in Tables 2 and 3. This is a function of its rapid excavation by machinery at the very end of the 1964 field season and is not indicative of any important difference from the other porticos.

Miscellaneous Post Structures:

In addition to the three major classes of wooden structures, whose interpretation is almost axiomatic, several other classes of less frequently encountered and more poorly understood wooden structure remains are known. These remains have been grouped into three categories for the sake of convenience in description.

Linear post patterns: The largest single group of miscellaneous wooden constructions falls into the category of straight lines. Since technically only three posts would be required to constitute a straight line, accurate counts of such post patterns are neither possible nor useful. Undoubtedly some of these lines are portions of house patterns too poorly preserved to be recognized as such; however, other such patterns may represent fences, screens, or small domestic structures in their own right. There is

a tendency for such post arrangements to occur in the areas of the houses and porticos, although they do occur in other areas.

Clusters of posts: A second group of miscellaneous post mold patterns may be described as small clusters with no evident geometric pattern in their relationship. The apparent clustering may in some cases simply be the fortuitous results of random superpositions of isolated and random posts, but the possibility that irregularly shaped wooden structures are represented should not be discounted. It is possible, for example, that a number of these might have porticos, but incomplete recording does not permit their inclusion in that class. Their horizontal distribution indicates an association with the house and portico areas.

Isolated posts: Numerous posts were encountered in the course of excavation that bore no obvious relationship to other post molds and thus cannot be properly considered "structures." Again, it is highly possible that their random occurrence is partly a combined function of poor preservation and differential recovery, but some isolated posts were erected at the Slone location. These occurred most often in the living areas and between the houses and the stockades. They did not occur in the plaza proper though they are scattered around its periphery.

Plaza: An extensive area, roughly 35 meters along the east-west dimension and 40 to 45 meters along the north-south dimension, was entirely devoid of structures and post molds as well as other kinds of evidence of aboriginal activity (Figs. 3 and 4). Thus, while not properly a "structure," this unit of the site is best described in terms of structural evidence, or rather its lack, and is therefore included here. The circumference of the plaza is not clearly defined as it merged with the culinary zone of activity represented by porticos. Scattered posts, non-structural features, and a gradually increasing portable object density characterized its circumference. The contrast between the total absence of structures and the almost total absence of smaller artifacts even in the plowzone over all but the periphery of this area, make it one of the most striking aspects of the Slone community pattern. The lack of evidence of activity in this area precludes non-speculative statements about its function, but strongly suggests that it was intentionally kept clean of debris. Spatially the plaza is the focus of the Slone community and is presumably public in nature.

Non-Structural Features

The two seasons of excavation produced 121 non-structural features that can be directly related to the late prehistoric component of the site. These features have been assigned to ten classes, defined in such a way as to represent broadly conceived functions. The classification, its basis in attributes, and the frequency of occurrence of representatives of each class is shown in Figure 7. For most of these classes, the function represented can be easily argued, especially in those cases in which a class has a large number of occurrences. The class labeled "pits," however, may represent several functions, which either do not leave much direct evidence or which are numerically poorly represented in the sample, or it may be functionally homogeneous. There is less certainty about the function of this class than any of the others. In a few cases different styles of construction, which may or may not have functional significance, have been noted. These are described with the

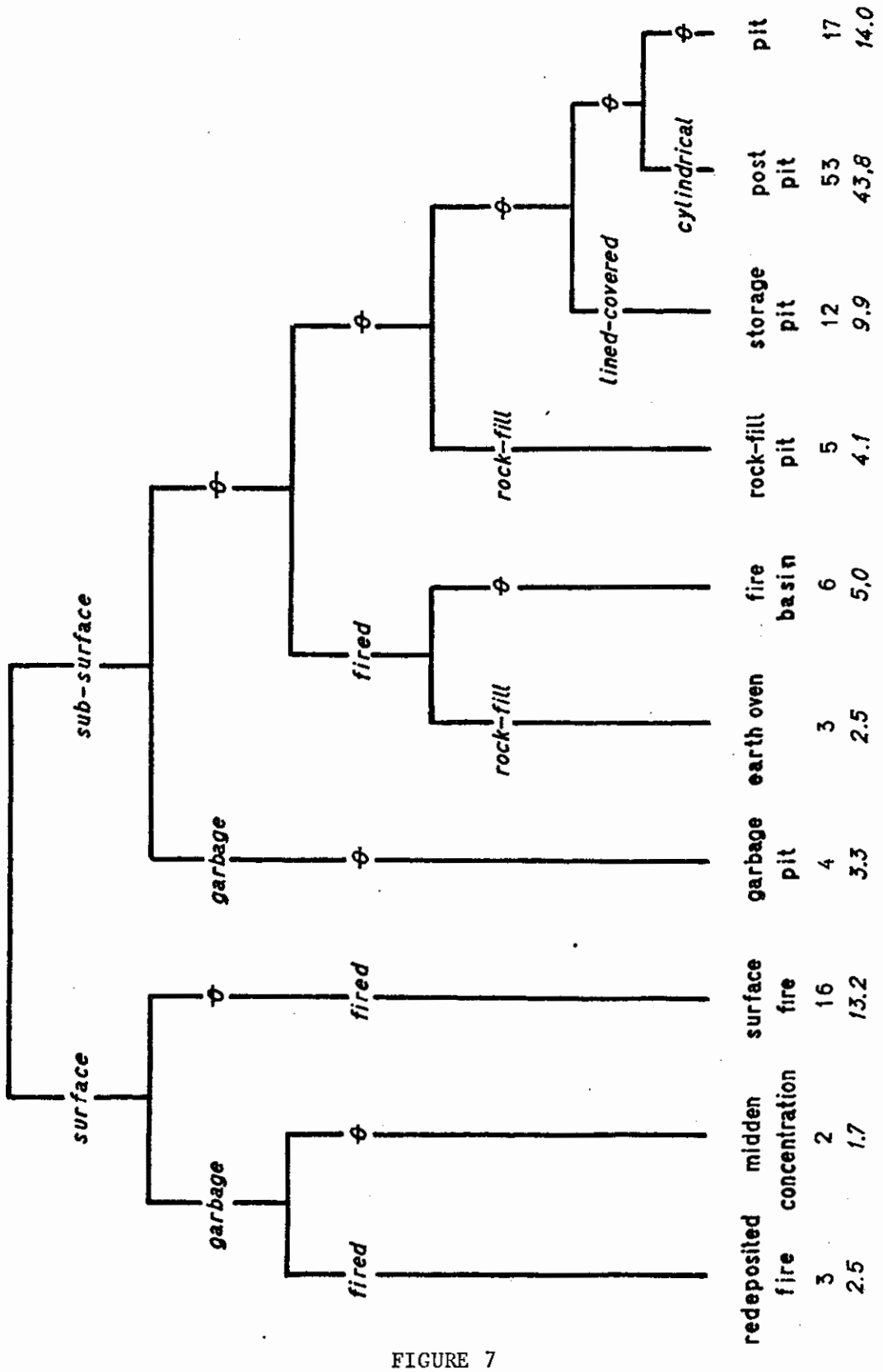

FIGURE 7

Classifucation and frequency of occurrence of non-structural features. The arabic numerals indicate the number of occurrences; the italic numerals the percentage of the total features.

classes concerned and have not been incorporated in the overall scheme. The descriptions are presented in the order of frequency of occurrence with the exception of the functionally indeterminant "pits" which are considered last.

Post Pits:

Fifty-one small cylindrical pits, with a circular or nearly circular plan and no artifactural contents beyond scrap from the general midden, have been assigned to this class. The average length of 35.9 cm. and width of 31.2 cm. reflects the nearly circular plan. The horizontal distribution of post pits displays a clear-cut pattern: they tend to occur slightly nearer the center of the village than do the houses. Specific associations are with porticos, where they are the major constructional features and with the centers of houses where, it is presumed, they functioned as roof supports. In their general construction they are closely similar to the post molds that make up the structures previously described with the single important exception of their size.

Three styles of construction are recognized within the class, and these styles reflect the function as holes in which large posts were placed to support substantial weight, contrasting with the smaller post molds that they otherwise resemble. Only 38 post pits can be identified with a particular style of construction. The necessary profile of the feature is not available for most post pits encountered in 1963 and is lacking for those recovered in the areas excavated with heavy machinery too late in the 1964 season to be individually excavated. Sixteen examples, 42.1 per cent of the identifiable post pits, exhibit the use of stone for chinking the post in place, sometimes in combination with a large stone placed in the bottom of the pit to prevent settling (Figs. 8 and 9). The second construction style

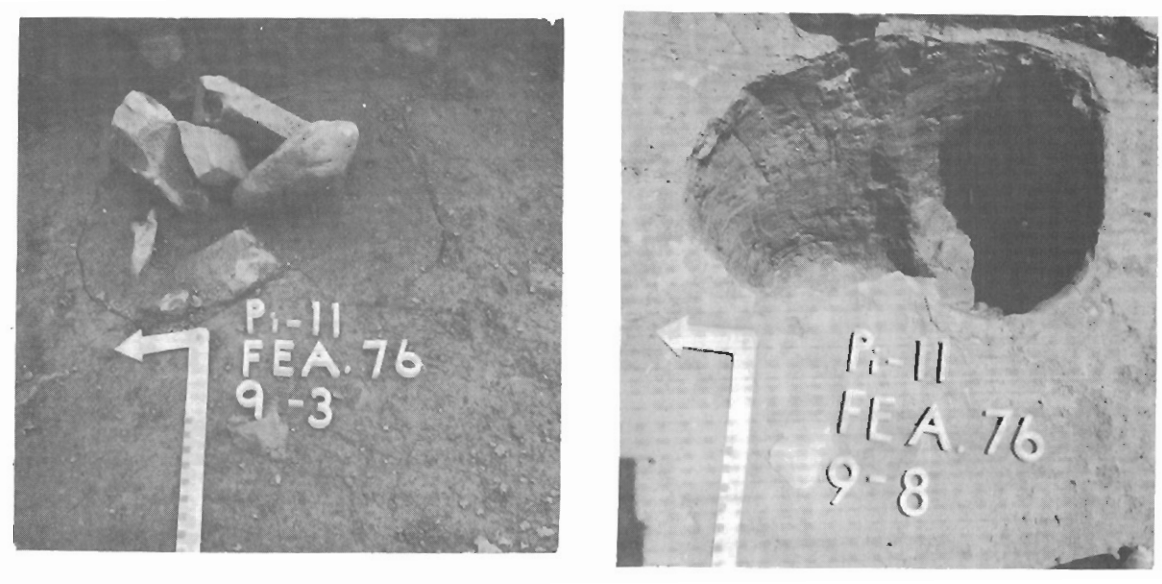

FIGURE 8

Feature 76, a double post pit, using stone for chinking and footing; (left) before excavation; (right) after excavation.

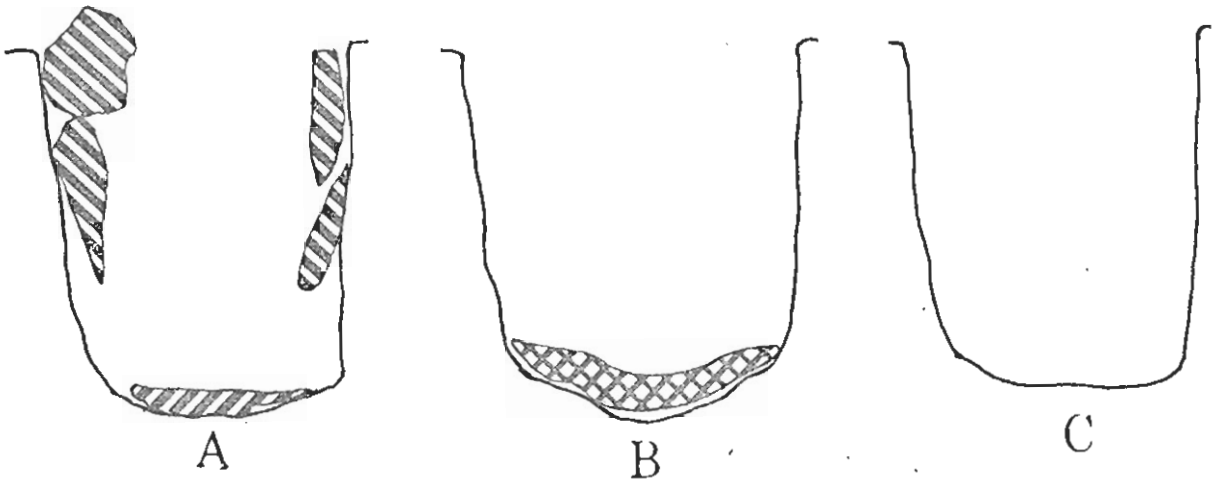

FIGURE 9

Schematic sections illustrating the three styles of post pits. (A) stone-chinked, (B) clay-filled, and (C) earth-filled.

FIGURE 10

Feature 121, a clay-filled post pit before excavation.

is represented by an equal number of examples and is distinguished by the use of clay in the pit fill to accomplish much the same effect as the stone described for the first style. Dense clay is either placed in the bottom of the pit as a layer fulfilling the function of the footer stone, or the entire pit is filled with clay (Figs. 9 and 10). Clay is not naturally present at the site and must have been specially acquired for use in post setting. The effects of supporting heavy weight are often evident in the depression and compaction of the central portion of the basal clay layers. A final style of construction is best termed earth-fill post pits, for these are not distinguished by the presence of any special constructional elements (Fig. 9). The pits themselves conform in all respects to post pits generally, but their fill is soil from the immediate vicinity of the construction. These constitute only 15.8 per cent of the identifiable post pits or a total of six examples. While the lack of special constructional elements may relate to functional requirements (e.g., large posts but not supporting heavy weight), they may also represent cases in which removal of the post may have been accompanied by removal of chinking stones. In nearly all cases, the post does seem to have been removed from the pit.

Surface Fires:

Sixteen areas with well marked evidence of in situ fires are identified in the Slone village. Their outlines are irregular, and their dimensions highly variable, largely as the result of agricultural activity which has destroyed the living surface except in portions of the southwestern area. Thus it is not surprising that the heaviest concentration of such surface features is in the southwestern section, and this not only confirms their surface nature, but indicates that they are generally under-represented in other parts of the site. Unlike specially prepared hearths, surface fires were recognized in the field as areas of burned earth rather than precisely delimited concentrations of ash and charcoal (Fig. 11). Surface fires tend to occur in the area of porticos and are the only feature that occur on the plaza fringes. Two features assigned to this class merit special note in that both occur in the center of houses in the eastern section of the site. It is quite possible that they represent the bases of otherwise plow-destroyed fire basins, since the living surface has been almost completely removed in the eastern area.

The association of surface fires with porticos (Fig. 6) suggests that they functioned as cooking fires, and this is reinforced by the fact that the other kinds of fires recorded do not seem to have functioned primarily for cooking.

Storage Pits:

Twelve pits with either linings or covers are recorded for Slone. All of them are circular in plan, although the vertical section differs among the three styles distinguished within the class. All are filled with soil derived from the immediately adjacent surface, and intentional contents are usually limited to the lining or covering of the pit itself. It is presumed on the basis of the lining or covering that the function of this class is storage, though the nature of the material stored may vary with the particular style of pit.

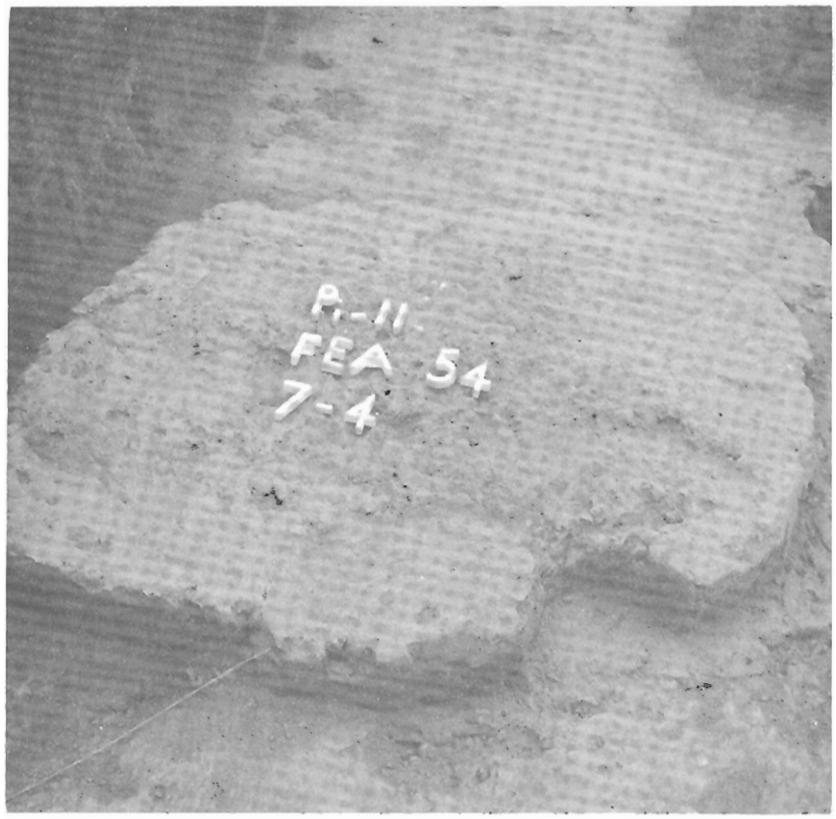

FIGURE 11

Feature 54, a surface fire

FIGURE 12

Feature 133, a stone-lined storage pit.

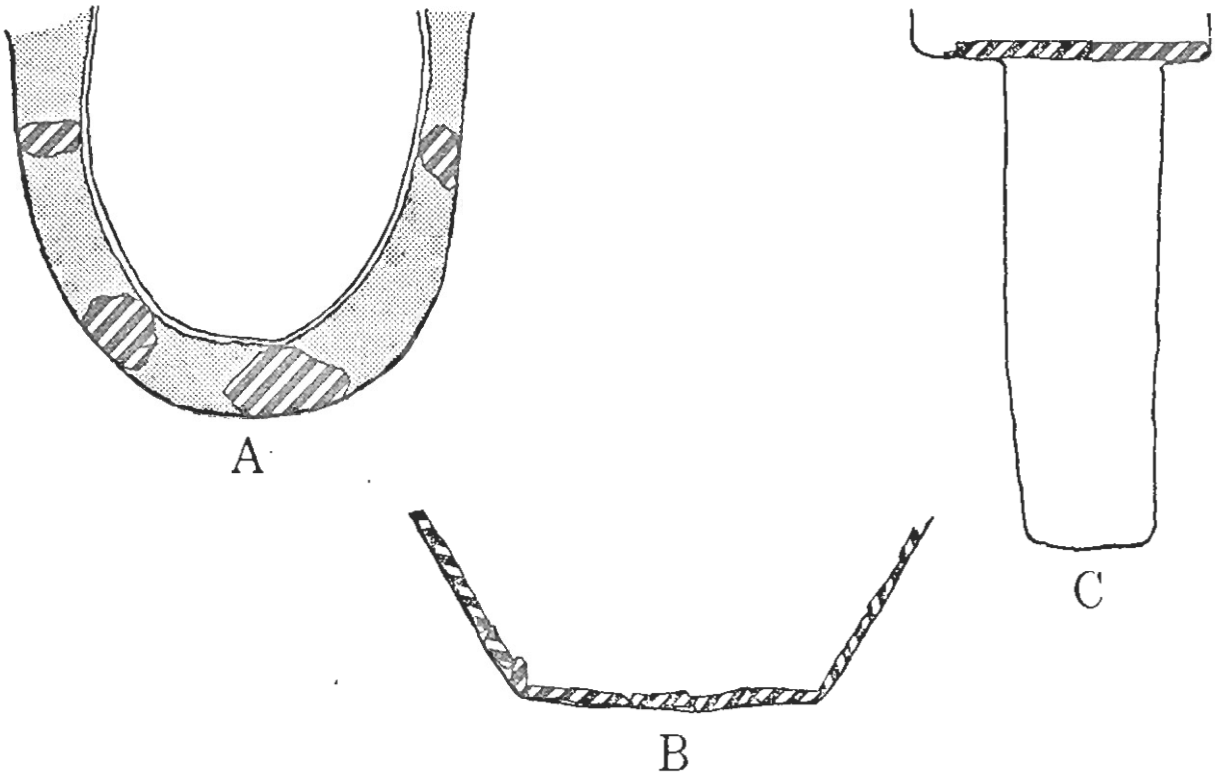

FIGURE 13

Schematic sections illustrating the three styles of storage pit; (A) vessel type, (B) stone-lined, and (C) stone-covered.

Accounting for 58.3 per cent of the storage pits, a total of seven examples are stone-lined storage pits (Figs. 12 and 13). These are circular in plan, averaging 48.8 cm. in diameter with sharply slanting walls and nearly flat bottoms. Thickness of these features is meaningless, since in no case had modern agricultural activity left the mouth of the pit intact. The floor of the pit and the sloping walls are covered with small sandstone slabs. Some examples had only a partial lining, but this would appear to be a function of poor preservation rather than differing construction. The function of the lining may have been to inhibit access to the pit by burrowing rodents, and it is quite possible, although no direct evidence bears upon this point, that the materials stored were placed in some other containers, such as a basket, and not directly in the pit.

The next most frequently occurring style of storage pit represents those in which a pottery vessel is incorporated into the pit structure (Figs. 13 and 14). Three pits are assigned to this style and constitute 25.0 per cent of the storage pits. All three are circular in plan, averaging 50.3 cm. in diameter, and roughly basin-shaped in cross section. As usual, the mouth region of all the pits has been removed by plowing so that there is no evidence of the means of covering or closure. In this style a large jar is chinked in place inside the pit with small pieces of sandstone, and the interspace between vessel and wall is filled with soil taken from the adjacent surface.

Thus the storage space is restricted to the space inside the pottery jar. The buried pot may only be a stylistic variation of the stone-lined pit in which the vessel combines the function of inhibiting entry to the pit from the surrounding soil with that of the container of the material stored. It might well be, however, that the difference is functional and that different materials were stored in these pits rather than in their stone-lined counterparts.

The remaining two storage pits, comprising 16.7 per cent of the total storage pits, are assigned to the stone-covered style. The horizontal plan is circular, averaging 44.0 cm. at the mouth, but the cross section reveals that two pits have been dug, both shallow flat bottomed pits, through each of which has been dug a deep cylindrical hole about half the diameter of the mouth (Fig. 13). The purpose of this construction would appear to be the provision of a shelf to hold and recess a sandstone-slab cover over the cylindrical hole. Since the walls of these pits are not lined, the materials stored must have been of a different nature than those stored in the other two styles. One of these pits when opened proved to be still hollow for the better part of its depth and contained one mano-anvil and nothing else.

The provision of linings or covers has been taken to mark the storage function; it may well be that some of the pits to which specific functions could not be assigned may have served for the storage of non-perishable artifacts, the protection of which does not involve special constructions. The distribution of storage pits as a functional class is restricted to actual living areas, the house zone and the portico zone, with the highest correlation with the latter area. The correlation with cooking areas represented by the porticos does suggest storage of foodstuffs as a principal function of the lined pits.

FIGURE 14

Feature 130, an example of the buried vessel style of storage pit.

Fire Basins:

Five shallow pits filled with ashes and with deeply burned walls (Fig. 15) and a sixth pit not completely investigated but consistent with this constellation of features are assigned to this class. All have a roughly rectangular plan averaging 91.2 cm. in maximum length and 78.0 cm. in maximum width. Viewed in section all are shallow basins averaging 13.4 cm. from the rim to the deepest part of the basin. In several cases the uppermost portions had been removed by plowing. Fire basins are the only constructed hearths at the Slone Site, and the considerable amount of ashes characteristically included and the deep, often several centimeters, burning of the pit walls and floor argues for sustained reuse. All the fire basins occur in the centers of houses, the long axis of the basin paralleling the long axis of the house. Fire basins may be a universal aspect of house construction, for only two houses whose central sectors have been adequately explored lacked fire basins. It has already been indicated that features identified as surface fires located in the centers of these two houses may simply be badly preserved fire basins.

The pit type construction coupled with the universal location of fire basins in house interiors and the general lack of any other evidence of activity in or about the location of these structures prompts the suggestion that their function was primarily that of heating the house. Evidence of substan-

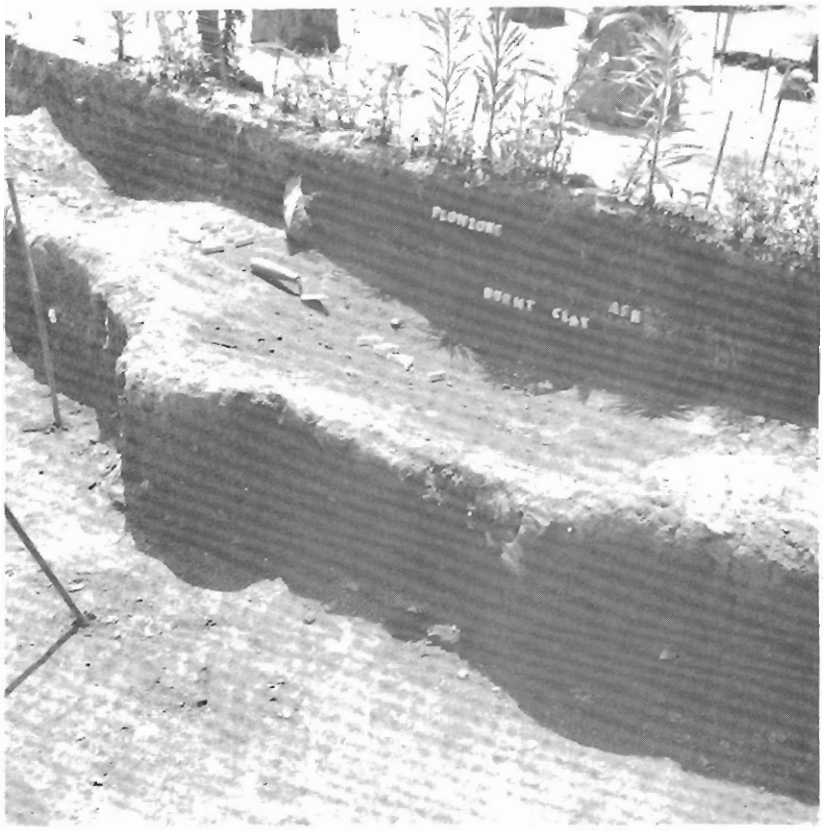

FIGURE 15

Feature 1, a fire basin.

tial amounts of culinary activity, either in the form of artifacts, waste, or charred food remains is simply not encountered in this class of feature. Largely upon this basis, in combination with the presence of surface fires associated with porticos, it is inferred that cooking was mainly an outdoor activity associated with the porticos, and not a function ordinarily performed inside the houses themselves.

Rock-Fill Pits:

Five features are identified as rock-fill pits by their sub-surface construction and the presence of quantities of unburned rocks accumulated on their floors. None of the pits contained substantial quantities of midden debris; in fact, the few large sherds incorporated in them were employed as if they had been stones and piled with the stones, in the bottom of the pit. The walls of the pits are uniformly free of any evidence of heat or fire. Feature 102, considerably larger than other structures in this class, measuring 96 cm. by 50 cm., departs from the general description of members of this class in that the rocks used in the fill were of a uniform size and systematically and compactly stacked on the pit floor. In the other cases, the rock, while concentrated on the floor, is irregular in both size and arrangement. Their spatial distribution is uninstructive. Rock-fill pits are found both in the house zone and immediately to the exterior of the houses in areas of garbage disposal. In general then, these structures tend to be found further away from the center of the community than most classes of non-structural features, but the lack of garbage within them does not argue for any close functional connection with garbage disposal. It may be that several functions are involved, but there is insufficient evidence either on this point or on the function of the class as a whole.

Garbage Pits:

Sub-surface structures characterized by a fill consisting of concentrated midden number four at the Sloan Site. The debris consists primarily of bone and mussel shell with considerable amounts of pottery but with little or no chipping waste or stone tools. The plans of these features are all roughly rectangular, but this is a function of their peculiar mode of construction. All of the identified garbage pits are dug in the fills of previously constructed graves and thus assume the rectangular outlines and dimensions of these structures (Fig. 16). The depth also would appear to be a function of the depth of the grave, the garbage pit stopping just short of the body, though bones from the interment are sometimes found in the fill. This particular association of garbage pits and graves is not fortuitous. The zone of garbage disposal in general coincides with the area in which graves were dug; further, digging was at the time of investigation and presumably even more so in the past, much easier in the disturbed and loosely compacted grave fills than in the undisturbed sediments. All of the garbage pits are located in the garbage disposal zone lying immediately exterior to the houses and adjacent to the stockades. In the field, two additional features were initially identified as garbage pits, but upon completion of their excavation and analysis, they are best considered individual loads of garbage that had been used to fill graves at the time of their construction. The fact that fresh garbage was acceptable as a grave fill is consistent with the knowing reuse of old graves as garbage pits and the coincidence of the garbage disposal and burial activity zones at Slone.

FIGURE 16

A garbage pit (Feature 39) intruding a grave (Feature 31) and associated with a redeposited fire (Feature 38).

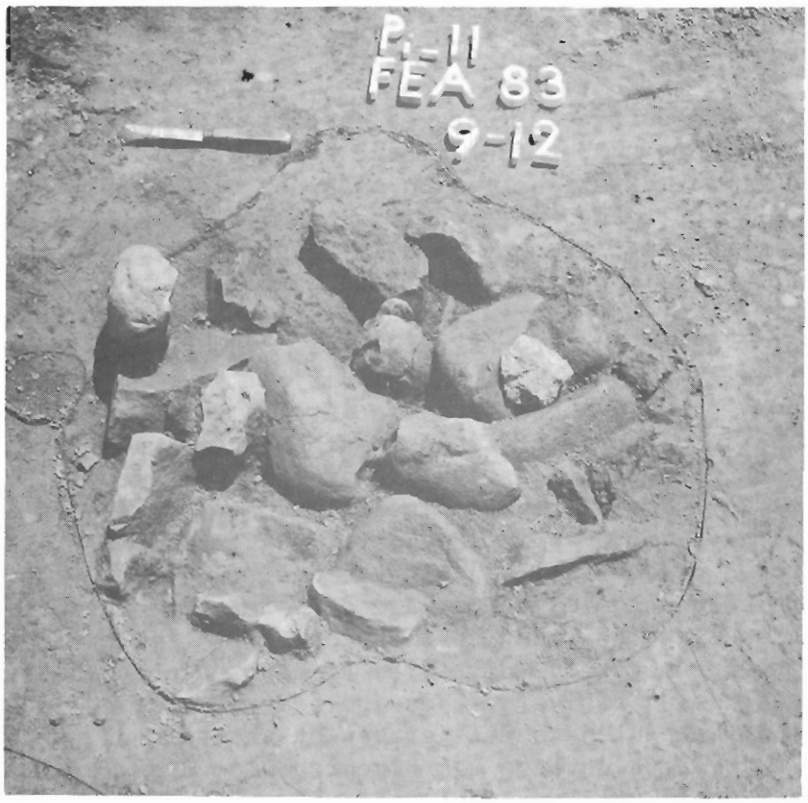

FIGURE 17

Feature 83, an earth oven.

While the function of these structures is almost axiomatic, especially in view of the high frequency of animal food waste as a fill constituent, it must be emphasized that garbage pits are not the major means of garbage disposal. The amount of debris contained within these structures is a very tiny fraction of the amount, either by count, by volume, or by weight, of garbage that was spread in sheets or piles around the periphery of the Slone community. Why the particular debris found in these pits merited burial as opposed to the quantities of animal wastes disposed of on the surface is not clear from the pit contents.

Earth Ovens:

Three pits filled with fire-cracked rock and with slightly altered walls and floor, but lacking evidence of in situ fires, are identified as earth ovens (Fig. 17). All three pits are roughly oval in shape averaging 62.6 cm. in length and 49.6 cm. in width. In profile they are steep-sided basins, but the vertical thickness is meaningless since all lacked their upper portions as a result of plowing. Each pit contains a basal layer of white sand, of the sort that may be collected from the beaches on Levisa Fork today. These are the only pits at the site which incorporate any sand in construction. Layers of sandstone rocks, heated somewhere beyond the confines of the oven, were placed on the sand and presumably at higher levels in the pits. Two of the pits had been emptied of their stones except for those on the bottom, presumably to extract the contents being cooked; the other was completely filled with layers of fire-damaged sandstone. The slight heat damage to the pit and the presence of small bits of burned earth adhering to rocks all indicate that the rocks were placed in the pits while still hot.

The use of this class of feature as a source of heat is obvious, and their association with porticos, along with numerous discoveries of similar features elsewhere, prompt their designation as earth ovens. Aside from the fact that all occur in close proximity to porticos, the horizontal distribution is uninstructive given the small sample size.

Redeposited Fires:

Three surface features, all distinguished as irregular concentrations of burned earth mixed with unburned soil and including lesser quantities of charcoal and ash are known from the site. The surrounding in situ soils are unmodified by heat. One of the three secondary deposits is directly associated with a garbage pit (Fig. 16); all three occur in the area between the houses and stockade where refuse was commonly deposited. Even given the small sample size, the restriction of redeposited fires to the refuse-disposal zone would appear to be significant in view of the nature of their contents. The importance of distinguishing this class, simply garbage deposits except for the fact that the material is burned, lies in the relationship of this class to other classes of features. It is clear that the Slone inhabitants, at least on occasion, cleaned up and deposited in the refuse area some surface fires, and the obvious consequence of this activity is that the number of surface fires, even in the southwestern section of the site where the living surface is preserved, is smaller than the number of fires actually built. Since there is no evidence for the similar removal of other classes of features as garbage, the surface fire class is probably considerably underrepresented by the recovered, and indeed recoverable, remains.

Midden Concentrations:

Two surface deposits of unburned refuse are designated as features belonging to the midden concentration class. This number of midden concentrations is deceptive. A large number were recorded on the groundplans made of the 1964 excavations, but because of the overlap between midden concentrations, nearly continuous around the site between the houses and the stockades, because of the difficulty of delineating precise outlines for relatively thin and irregular surface deposits; and because their nature as surface deposits was not appreciated in the 1963 season generally, it is not possible to treat most of them as discrete features. The two recorded as features are thus simply examples which, because of the specific circumstances of deposition and recovery, have relatively well marked boundaries and can serve as examples of what is a common occurrence at Slone and the source of much of the cultural debris that makes up the Slone assemblage.

In cross section, midden concentrations are lenticular, thickest in the center of the deposit and thinning toward the edges. In no case where measurement was possible did a midden concentration exceed five centimeters in thickness, but because of the gradual thinning toward the edges measurement of the horizontal extent is impossible. The primary constituents of midden concentrations are mussel shell and bone waste. Pottery sherds are important components, but other kinds of tools are present only in small quantities. Stone chipping waste, relatively common in the living areas, is only infrequently a component of the midden concentrations. The soil within these concentrations is very dark and considerably softer than in situ soils, and it is presumed that these dark humus deposits represent perishable waste residue such as wood, fiber, and perhaps fleshy animal parts.

Where it has been possible to accurately plot the distribution of midden concentrations, they generally parallel the house and stockade patterns and occur everywhere around the periphery of the site in the immediate vicinity of the stockade. The drainage ditch to the exterior of the stockade in the northwestern section of the site was largely filled with midden deposits by the time of abandonment. Figure 18 depicts schematically the relationship of midden concentrations and the major structural features in the southwestern section of the site where the living surface, and thus the midden concentrations, is largely intact. In the eastern section, the difficulty of recognizing midden concentration was exaggerated by the nearness of the living surface to the modern surface, resulting in considerable plow disturbance further diffusing the already ephemeral nature of midden concentrations. Figure 18 probably resembles most closely the condition of the site before plowing of any area explored.

Based upon the recovery and recognition of midden concentrations, even in the absence of clear-cut isolation of even a large proportion of these deposits, it is possible to infer that the typical pattern for the disposal of refuse was to spread the unwanted material in sheets at the periphery of the village, sometimes inside the stockade and sometimes outside but against the stockade. Burial of garbage, as represented in the garbage pit class, is the exception rather than the normal pattern of refuse disposal. It is worth noting that the materials transported to the refuse disposal areas are organic in nature. Mussels and animal food wastes dominate the preserved material, and the organic soils indicate substantial perishable organic material also found its way to the dump. On the other hand, stone tools and chipping debris apparently were not removed intentionally, sugges-

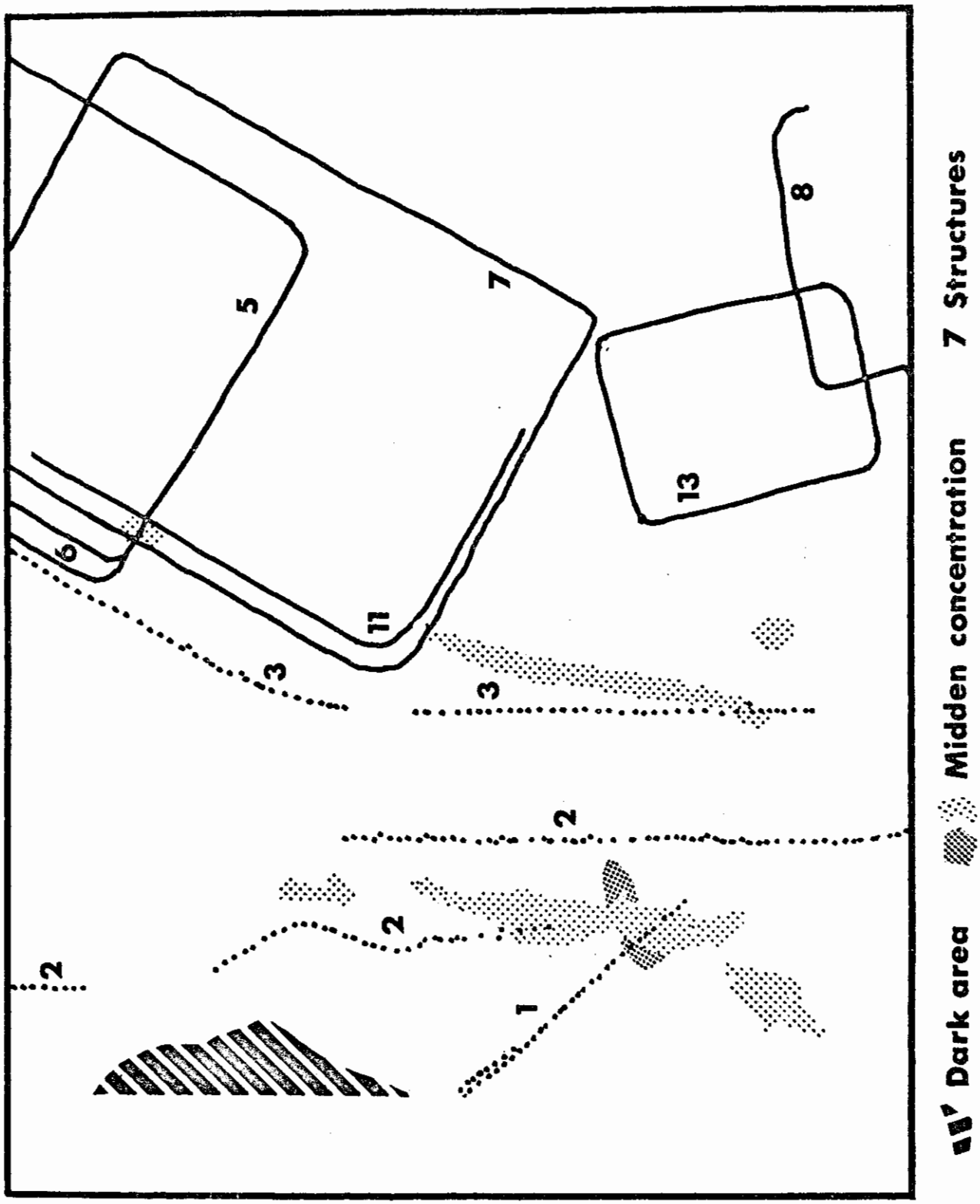

FIGURE 18

Schematic plan illustrating the relationship of midden concentrations and structures in the southwestern portion of the Slone Site.

ting that the primary reason for removal was not simply to rid the living areas of waste, but to remove the more obnoxious components of the waste. By any standards, the Slone community was not clean-- it was surrounded by an envelope of raw garbage, unburied and uncovered.

Pits:

The seventeen constructions called simply pits hold in common only their sub-surface structure and their lack of internal constructions and special fills. In general these pits are small, under 50 cm. in their maximum dimension, and, with but two exceptions enumerated below, their contents do not differ from the surrounding surface soils. In plan they vary between oval and rounded rectangular shapes, but all save one share a more or less shallow basin-shaped cross section. Undoubtedly a number of functions might be represented in this class, especially in view of the distribution of pits in all the areas in which non-structural features occur; however, the unifying aspect is the lack of evidence of any activity beyond their construction. The most plausible function for the class as a whole is that they are indeed functionless, that they are constructions which once belonged to other classes but which had been abandoned and filled before aboriginal activity at Slone had ceased.

Two features included in this class are clearly not amenable to this interpretation. The first of these is a pear-shaped pit almost completely filled with mussel shells. The vast majority of these shells were still articulated at the valve which suggests that they were not garbage. In view of the perishability of mussels, it does not seem likely that storage could have been the function of the pit, and no similar features suggest any other use.

The second unusual feature is a large, relatively shallow pit incorporating in its fill a dense concentration of fine charcoal fragments. There is no indication of *in situ* fire. The charcoal is uniformly small in size and all apparently wood charcoal. The western end of the construction is destroyed by the superposition of a rock-fill pit. As in the case of the mussel-filled pit, the lack of other examples, any sort of distributional evidence, and the unusual nature of the contents combine to make any inference as to its function speculative.

Graves and Burials

During the two seasons of excavation sixty graves containing 54 humans and three dog interments were recorded. Three graves, identified on the basis of their distinctive construction, contained no skeletal material, apparently as a result of poor preservation. A number of other graves contained only traces of oseous material. Herein, the term grave denotes a construction built to receive a body; the term interment denotes the body itself. The term burial is used to include all the contents of a grave, the body, and any associated grave goods.

The separation of graves and burials for the purposes of description serves to emphasize the distinction between the construction of graves and the people buried in them. Both elements combine in what might be termed a burial pattern, but graves are essentially non-structural features sharing a

specific function; whereas, the burials represent a dimension absent in other kinds of features, one which bears upon population characteristics of the inhabitants of the Slone community and is the only source of information about individuals and their status within a community. These two components of the burial pattern, graves and burials, are treated separately below.

Burials:

Fifty-four bodies, or portions thereof, with and without associated burial goods are known from the site. The preservation of the skeletal material varied from sound, easily removed bones to complete disintegration of the skeletal material. Since the sample of skeletons is small and in many cases poorly preserved, inquiry into population characteristics is limited to age and sex. Figure 19 shows the age and sex assignments for the fifty bodies on which age determination is possible. No attempt is made to ascertain sex for interments in the infant and child categories because not only are sex indicators few in number and weakly developed in younger remains, but these tended to be the most poorly preserved. The range in age at the time of death is from pre-natal to forty years (± 5). As is evident from Figure 19, there are two peaks in mortality, infants and adults. Most of the deaths in the infant category occurred in the first year of life and many may well have died at birth. The adult peak is comprised by a large number of early female deaths which may be connected with childbearing. The average age of death for mature (adult or older) individuals is 25.5 years, a figure strongly biased by the high female mortality in early adulthood. The high ratio of females to

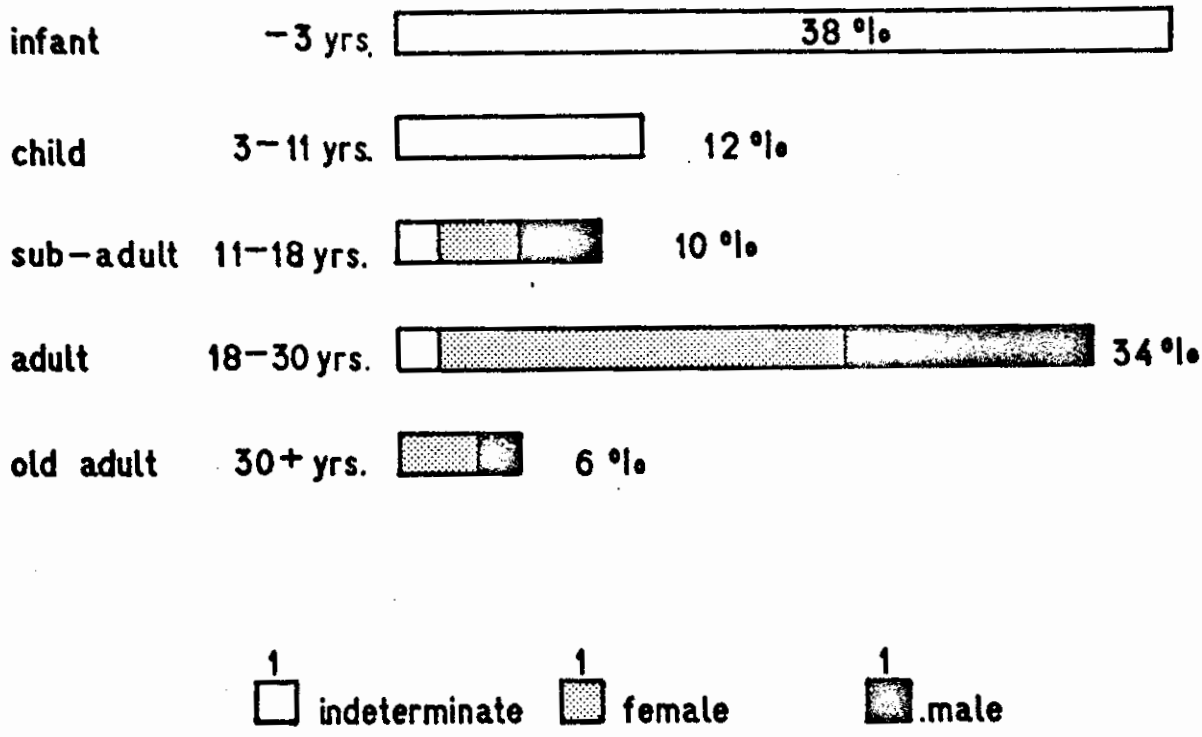

FIGURE 19

Age and sex characteristics of the Slone population.

FIGURE 20

Burial 17,
fully flexed position.

FIGURE 21

Burial 11,
partially flexed
position.

males is a function of the higher mortality rate for females in those age categories for which sex determinations are possible and should not be taken as an accurate indicator of the ratio of males and females in the population at large.

Little else can be said of the skeletal remains as such. A special attempt was made during the 1964 season to obtain data on stature from in situ measurements, but the preservation of most bodies was too poor and the number of adults too few to permit even the grossest estimate of this population characteristic. All of the individuals over eighteen years of age had lost at least one tooth through abcess. In fact, most adults had completely lost their upper and lower molars and a few were nearly adentuous. The occluding surfaces of the intact teeth of all sub-adults and older individuals were badly worn.

More information is obtainable from a cultural point of view than from the more strictly biological treatment as interments. Three body positions are noted: fully flexed, in which the legs are drawn up against the chest and the arms folded (Fig. 20); partially flexed, in which the legs are bent slightly but otherwise the body is extended (Fig. 21); and extended, in which the legs are unbent and the body laid out full length (Fig. 22). All

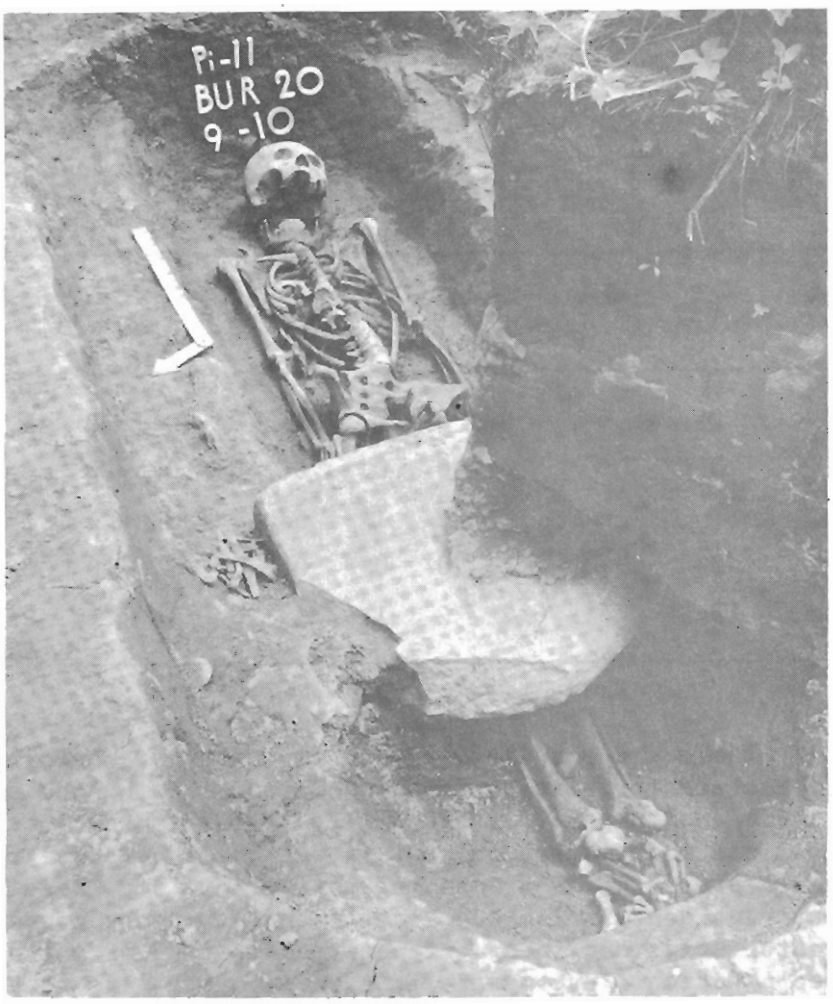

FIGURE 22

Burial 20, extended position.

interments, irrespective of body position, are placed on their backs; however, in the case of the fully flexed position, the body is often markedly twisted so that the head and shoulders lie flat on the bottom of the grave, but the pelvis is raised on one side permitting the legs to be flexed to the side. There is considerable variation in the placement of the hands in the extended and partially flexed positions. They are always extended at one side, but are usually bent slightly toward the body, and, in several cases, the hands cross over the body in the pelvic region. As will be evident from later discussion, there are a number of reasons for regarding the partially flexed position as a variation of the fully flexed position reserved for infants. Since infants are found both partially flexed and extended, these two styles contrast and are thus properly considered culturally different (Table 4). The distribution of the fully flexed and partially flexed positions is entirely complimentary on the other hand, with no fully flexed infants or partially flexed non-infants known (Table 4). It ought to be noted that from a biological rather than cultural point of view, the partially flexed position quite likely results from an absence of special concern for the interment position of some infants, the partial flexing being simply a manifestation of infant posture. Culturally, however, there is every reason to recognize but two styles of interment position, flexing and extension, with partially flexed and fully flexed positions being alternative expressions regardless of whether partial flexing is a special kind of flexing or the absence of any special treatment.

TABLE 4

Burial Position Correlated with Age and Sex of Interment

age / sex	inf	chi	sad			adu			oad			ø			
			m	f	ø	m	f	ø	m	f	ø	m	f	ø	
F	0	0	0	0	0	1	3	0	0	1	1	1	0	1	7
P	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5
E	9	5	1	2	1	5	7	0	1	1	0	0	0	0	32
ø	5	1	1	0	0	0	0	1	0	0	0	0	0	2	10
T	19	6	2	2	1	6	10	1	1	2	0	1	0	3	54

Table 4 shows the distribution of these position classes over the age and sex characteristics of the population. Using the simple technique advanced by A. C. Spaulding (1953: 310-311) to establish the correlation of several variables, the information in Table 4 was examined. The results of this examination are presented as d^2/pqk values in Table 5. These results confirm what is directly evident in Table 4, namely that the only correlation of population characteristics and interment position is that of infants and the partially flexed position. The partially flexed position is restricted to the infant category, and this is one of the reasons for suspecting that this position is an alternative to the fully flexed position governed by the age of the inter-

ment at time of death. There are no other combinations of population characteristics and interment position that cannot be regarded as a function of the frequency of occurrence of the variables and sampling.

TABLE 5

d^2/pqk Values for the Determinant Combinations in Table 4*

	age					sex	
	inf	chi	sad	adu	oad	m	f
F	1.74	.61	.47	2.40	1.17	.06	.04
P	6.93	.61	.47	2.01	.37	**	**
E	.35	.40	.31	.00	.03	.03	.02

* k for age correlation is 42, for sex correlation is 23.
** partly flexed is deleted from the sex correlation since all partly flexed burials involved infants which were not identified as to sex.

Another variable characteristic of Slone burials is the presence of artifacts with the body. Of the 43 instances in which it is possible to determine the presence or absence of associated artifacts, nineteen burials or 44.2 per cent contain such material. Without exception these associations are personal ornaments made of shell. No artifacts are known from the burial context which might be termed "mortuary goods," in the sense of items made especially or exclusively for inclusion with the dead and not used in everyday activities. The most common form of ornament is the bead or pendant frequently employed in necklaces and bracelets, and less commonly in clothing and hair decorations. The most unusual use of beads is the construction of small rectangular sheets, rather than simple strings, of marginellas which were found at the back of the head in two burials and are presumed to represent some kind of hair ornament. The only other kind of ornament encountered in a burial context is a single pair of conch shell ear plugs found in place with Burial 30. Given the infrequent occurrence of burial associations generally and the lack of variety of such associated material, only the presence and absence of burial goods is noted in Table 6. Using the same technique as employed in the examination of correlation between position and population characteristics, an attempt was made to delineate any correlations between the presence of burial associations and age and sex. No correlations are indicated, with d^2/pqk values for sex and presence of burial associations ranging between .14 and .60 and for age categories and burial associations ranging between .07 and 1.7. Thus it would appear that ornaments of the sort recovered in burial associations are not directly linked to the status of the interments in terms of sex or age. The lack of correlation is of some interest in view of the commonly held notion that burial associations often are determined by these gross population characteristics. Likewise, there is no correlation between the interment position and the presence of burial associations, as might be expected given their common lack of correlation with age and sex classes.

TABLE 6

Burial Associations Correlated with Age and Sex of Interment

age / sex	inf	chi	sad m	sad f	sad ø	adu m	adu f	adu ø	oad m	oad f	oad ø	ø m	ø f	ø ø	
Present	7	4	0	1	0	3	1	0	1	1	0	1	0	0	19
Absent	7	1	1	1	1	3	8	0	0	1	0	0	0	1	24
ø	5	1	1	0	0	0	1	1	0	0	0	0	0	2	11
T	19	6	2	2	1	6	10	1	1	2	0	1	0	3	54

FIGURE 23

Burial 25, dog burial in simple pit.

Graves:

Of the sixty graves recovered, five lacked human interments-- three are simple pits containing dog interments (Fig. 23), and two others completely lack visible oseous material, most probably as a result of decay. Because of their distinctive shapes, their distinctive construction, and their consistent SE or E orientation, a larger percentage of graves has probably been identified in the recovered remains than any other kind of feature, and thus they may be somewhat over-represented in relation to other non-structural feature classes.

Early in the 1964 season, three highly coherent patterns of construction were noticed, and this observation has led to formulation of three types or styles of graves based upon constructional attributes: the Compound Pit, Simple Pit, and Slanting-Roof Pit types. Three graves encountered during the 1963 season before the constellation of constructional features had been recognized cannot be assigned these types for lack of sufficient information. All three belong to either the Compound Pit or Slanting-Roof styles since they involved stone construction; however, it is not possible on the basis of the recorded information to assign these graves to one or the other. Only one grave falls outside this classification, a small reburial of a portion of a single skull a little nearer the center of the community than usual for graves. The fragmentary condition of the remains suggests the reburial of bones accidently encountered by the inhabitants in the process of digging pits or setting posts. Several instances of later construction intruding graves and disturbing skeletal remains were noted in the course of excavation.

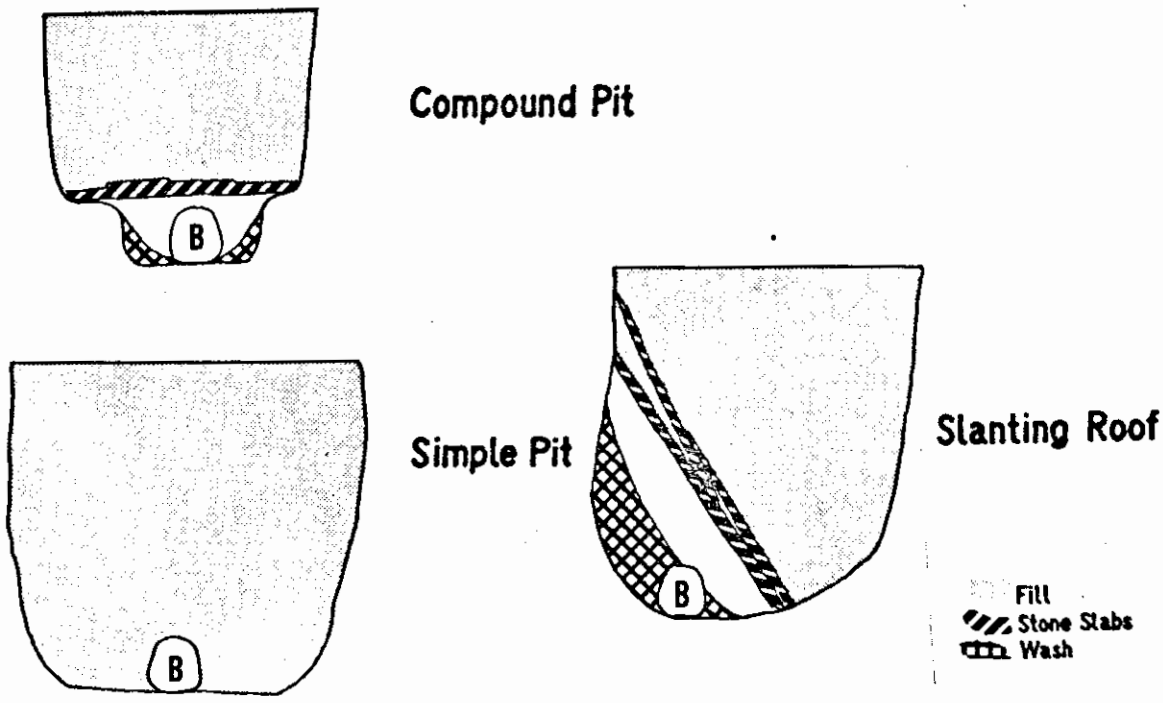

FIGURE 24

Schematic sections illustrating the three grave construction styles.

FIGURE 25

Feature 74,
a Compound Pit grave,
showing the roof of
the burial chamber.

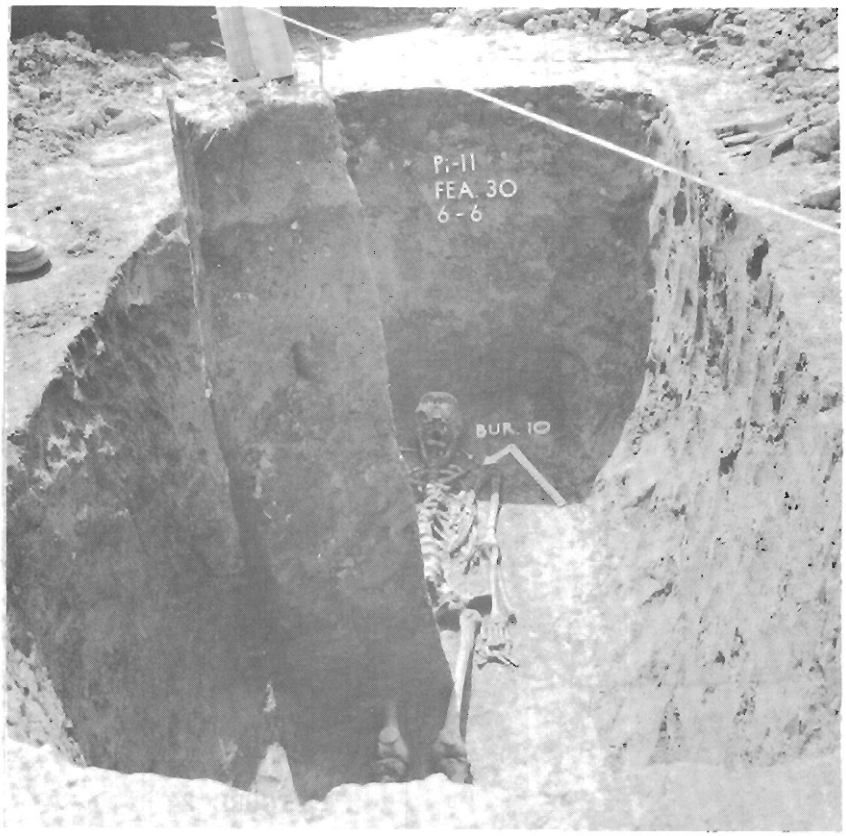

FIGURE 26

Feature 30,
a Simple Pit grave.

The Compound Pit type is by far the most common, being represented by 26 examples accounting for 49.1 per cent of the identifiable graves. In horizontal plan, this style is relatively long with respect to width and is one of the two styles designed to accommodate extended interments. The exact dimensions are closely determined by the size of the individual to be interred, and thus there is a rough correlation between grave size and age of interment. The walls of these graves are relatively smooth and not indicative of the use of a dibble stick but more likely a broader kind of digging tool. The initial construction procedure was the digging of a rectangular pit substantially wider than the body to be interred but only slightly longer. In the bottom of this pit, a deep, narrow trench, often no wider than the body, was dug the full length of the first pit so as to leave an elevated shelf on each side of the grave (Figs. 24 and 25). The body was then placed in the trench and covered with several large sandstone slabs resting on the shelf. The first slab laid is invariably in the center of the grave and subsequent slabs were added in both directions to the ends of the grave, each overlapping the stone preceding it. The stone slabs form a burial chamber or tomb, free of earth when the upper pit was filled. In most cases at the time of discovery this chamber still remained empty save the body and varying amounts of fine silt percolated from above.

The second most popular form is the Simple Pit grave represented by 14 examples accounting for 26.4 per cent of the identifiable graves. This style may be characterized as the largest of the three styles, the maximum dimensions of the grave usually substantially exceeding the dimensions of the enclosed body, especially in width. Nontheless, they are accurate indicators of the size of the individuals buried within them and thus correlated roughly with age at time of death of the individual. They are simple in construction compared to the other two grave types. A large rectangular pit, usually with markedly rounded corners, was dug and the body placed directly on the flat floor of the pit (Figs. 24 and 26). The grave was then filled with dirt. There is no special chamber for the body, and the preservation of skeletal remains is poorest in this type of grave. Because a large pit is dug the full depth of the grave, more dirt is moved in this kind of grave construction than either of the other two styles.

The third grave style, the Slanting Roof type, is nearly as popular as the Simple, being represented by 13 examples or 24.5 per cent of the identifiable graves. These graves are oval, or sometimes nearly round, in horizontal plan, and the size of the grave bears little relationship to the size or age of the individual buried in it. Construction began with the digging of a short, wide pit with a flat bottom. No special receptacle for the body was dug, but it was placed directly on the floor of the pit nearest the south wall. Then large sandstone slabs were placed at an angle over the body, resting one edge of the slab on the pit floor north of the body and resting the other edge against the south wall above the body, producing a hollow burial chamber for the body (Figs. 25 and 27). The order in which the slabs were placed over the body is not as regular as in the case of the Compound Pit style, but there is still a strong tendency for the central slab to be the first placed. Because it was impossible to close either the ends of the top edge of this chamber much more wash is encountered in this type of grave, and frequently the body was nearly covered with fine silt.

As has already been implied, there is a correlation between grave dimensions and body dimensions in the case of the Compound and Simple Pit style

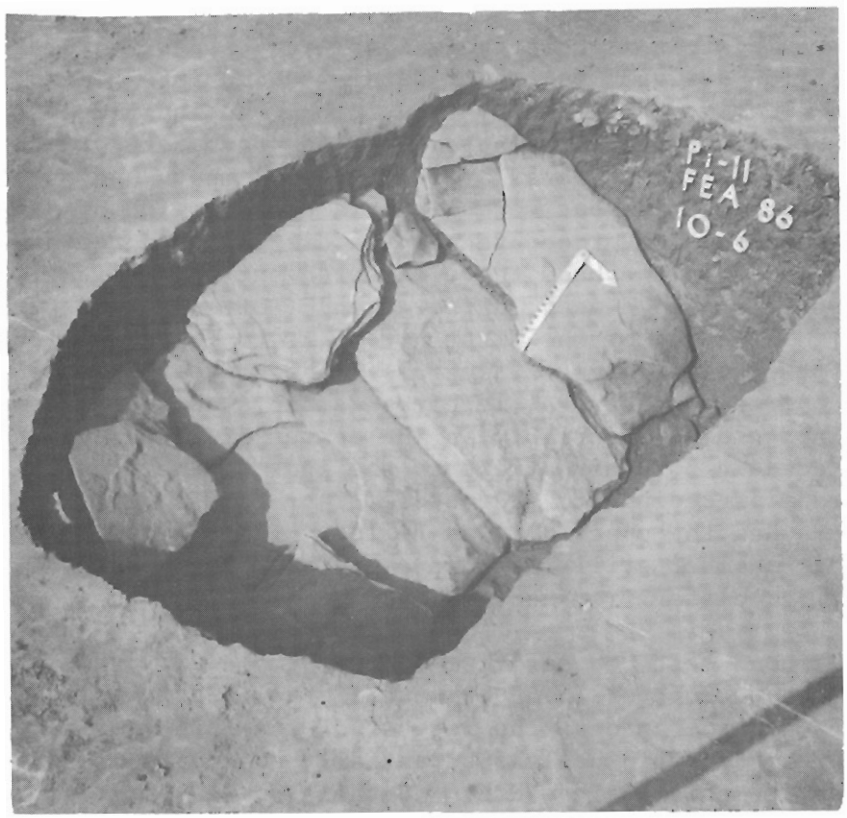

FIGURE 27

Feature 86, a Slanting Roof grave showing the placement of slabs.

graves. This correlation, and the lack of correlation with body and grave dimensions in the Slanting Roof type, is a rather direct function of a correlation between burial position and grave type. Flexed and partially flexed positions in general are restricted to the Slanting Roof type; the exceptions, the infrequent occurrence of flexed or partially flexed positions in other grave types, are almost without exception infant interments in which, because of size, there is considerable latitude in burial. Correlations between burial position and grave type are shown in Table 7. For these data d^2/pqk values were calculated, and these are presented in Table 8. Here significant correlations are evident: high positive values for the co-occurrence of flexed and partially flexed positions and Slanting Roof grave type; and high negative correlations (avoidance) of extended position/Slanting Roof and flexed/Compound Pit combinations, confirming the observations upon correlation between grave and burial. The essential feature of the linkage is the physical impossibility of interchanging the flexed and extended positions in either the Compound Pit or the Slanting Roof types because the bodies simply would not fit. The Simple Pit type, permitting a maximum of flexibility in size and position of interment, shows no high correlations; in fact, excluding infant burials, the only flexed interment occurring in other than a Slanting Roof grave occurs in the Simple Pit style.

TABLE 7

Interment Position Correlated with Grave Type

	Ex	PF	FF	Ø	Total
C-Pit	22	1	0	3	26
S-Pit	11	1	1	1	14
S-Roof	0	3	6	4	13
Ø	0	0	0	4*	4
Total	33	5	7	12	57

* includes the single redeposited skull.

TABLE 8

d^2/pqk Values for the Determinate Combinations in Table 7

	Ex	PF	FF
C-Pit	2.44	.95	3.80
S-Pit	.32	.16	.58
S-Roof	7.69	3.93	15.12

A search was made for possible correlation of grave type with presence or absence of burial associations. None is indicated by the low d^2/pqk values ranging between .009 and .662. Similarly, a search was made for possible correlations that might obtain between population characteristics, sex and age, and grave type with similar results as indicated by d^2/pqk values for the sex correlation between .002 and 1.245 and values between .029 and 2.452 for the age comparison. From the surveys for correlations, one is forced to conclude that the choice of grave type is not directly determined by age or sex of the individual nor is it correlated with whatever factors led to the inclusion of burial associations with some individuals while not with others. The only conditioning directly affecting the choice of grave type is the size of the interment as modified by the interment position, for the pragmatic reason that the dimensions of the several grave types are not compatible with the dimensions of the several interment positions. Where such physical restrictions do not obtain as in the case of the Simple Pit grave, there is no tendency for correlation.

An examination of the horizontal distribution of graves and burials shows a remarkable consistency in patterning. These structures lie around the periphery of the site, between the houses and the stockade in essentially the same area as garbage disposal took place. There is a particularly heavy concentration of graves in the northern section of the site, but even here the distribution is peripheral to the living areas. Only two possible exceptions to this distribution out of the 60 examples can be noted. One burial took place outside the outermost stockade in the extreme northern section of the site. Its location in relation to the stockade is quite clear since the stockade is well marked in this area. One other burial is apparently located nearer than normal to the center of the village in the southeastern section; however, given the fact that extensive excavations were not conducted in this section, its relationship to living areas and stockade is conjectural and may be inaccurate if the village is not completely circular. Despite these exceptions, the consistent location of graves in the area between the houses and the stockades is one of the most striking features of the horizontal patterning of the Slone community.

In terms of grave types, horizontal distribution is also revealing. Grave styles are not randomly distributed within the burial area. Only two graves in the entire western section of the site are not Compound Pit graves. In the north all three styles are found with Compound Pit graves most common toward the west, Simple Pit graves most popular in the center, and Slanting Roof graves becoming more popular toward the east. In the eastern section dug in 1963, no Compound Pit graves were found and the Slanting Roof style predominates. There is no difference in grave distribution, and thus there is nothing to suggest that temporal factors play an important role in this distribution. The most plausible account for this distribution is that of differential popularity of grave types within the Slone community at any one time (Dunnell 1970: 314).

There is some evidence from the Slone Site itself and from other Woodside communities in the Fishtrap area that the three types reach their maximum popularity at different times, the Compound Pit earliest, the Simple Pit intermediate, and the Slanting Roof latest. If these temporal differences are borne out upon further investigation, it might well be possible to characterize various segments of the Slone community as progressive or conservative with respect to acceptance of changes in grave styles; so that, for example, the eastern section of the site can be seen as being more receptive to change in this regard than the western section. Given the lack of evidence directly bearing upon the interpretation of the distribution of the three types in time, this characterization of the Slone community must remain conjectural; however, it does seem certain that the explanation of this distribution lies within differential preference of a contemporaneous nature.

Summary

The features of the Slone Site have been considered as a unit because, despite numerous superpositions indicative of substantial temporal duration of the Woodside component, perhaps even reoccupation, the loss of the living surface through aboriginal digging and mixing and the effects of modern agricultural techniques effectively preclude relative dating of even a modest number of these constructions. Only in the case of the stockades is it possible to suggest chronological relationships, but even in this case it is only pos-

sible to state with certainty that the smallest of the three stockades, Structure 3, precedes the larger of the two. On this basis it is possible to suggest that the Slone community grew in size from its initial settlement to its final abandonment. The importance of this observation for temporal relationships lies in its consequences for distinguishing temporal differences in horizontal distributions. If there are stylistic differences represented in the Slone Site that are due to time, these will be manifest as radial changes in frequency of occurrence, that is, differences from the inside to the outside of the settlement along any given radius. The distribution of the few stylistic elements isolated in the features do not show any radial changes. In view of the number of superpositions, the known differential in the construction time of stockades, and the large amount of debris, it does not seem possible to interpret this lack of change as due to short duration of settlement, but rather to comparatively slow change in the styles of feature construction noted. This interpretation, as will be shown in the section concerning portable artifacts, is confirmed by ceramic distributions.

Two aspects, the uniformity of style within functional classes and the horizontal distribution of the functional classes, deserve some special consideration. There is little stylistic variety within functional classes. All wooden structures were made in much the same manner utilizing individually set posts. All of the houses, aside from this standard construction, are rectangular with rounded corners, very nearly the same size, and insofar as is possible to ascertain, all had centrally located heating hearths. The stylistic differences noted for both post pits and storage pits are quite likely connected with functional differences rather than alternative styles of accomplishing the same function. It is only in the case of graves and burials that there are strong, clearcut, stylistic differences. The differences in frequency of occurrence of the three styles are not, however, radial as would be expected if such differences in representation were due to time, but rather the differences appear from one section of the site to the next indicating contemporaneous stylistic divergence.

The highly consistent concentric patterning of the distribution of functional classes provides useful information. Without exception, each functional class of feature has a distribution restricted to a band around the settlement, classes differing from one another in terms of the width of the band and its distance from the center of the circular community. These distributions were noted in the description of the individual classes; however, a correlation of these distributions points to the delineation of four, rather clearly demarked, zones of cultural activity as shown in Figure 28. The Plaza zone is distinguished by the absence of features and the general lack of living debris. It occupies the geographic center of the community with a diameter of approximately 37 meters. Moving from the Plaza zone toward the periphery of the community, the next zone distinguished is termed the Culinary zone, characterized by the presence of porticos as the only wooden structures, the high frequency of storage pits, surface fires, and as the only area in which earth ovens occur. Since all of these features are interpreted as functioning in food preparation, this zone would appear to be the one in which the prominent activity was cooking. Irrespective of the interpretation of the zone and its constituent features, it is clear that a narrow zone about 5 meters in width bordering the plaza and backed by the houses has a distinctive combination of features and represents a distinctive activity area. The next zone proceeding away from the center of the village is termed the Dwelling zone. This band, varying from 12 to 15 meters in width is the

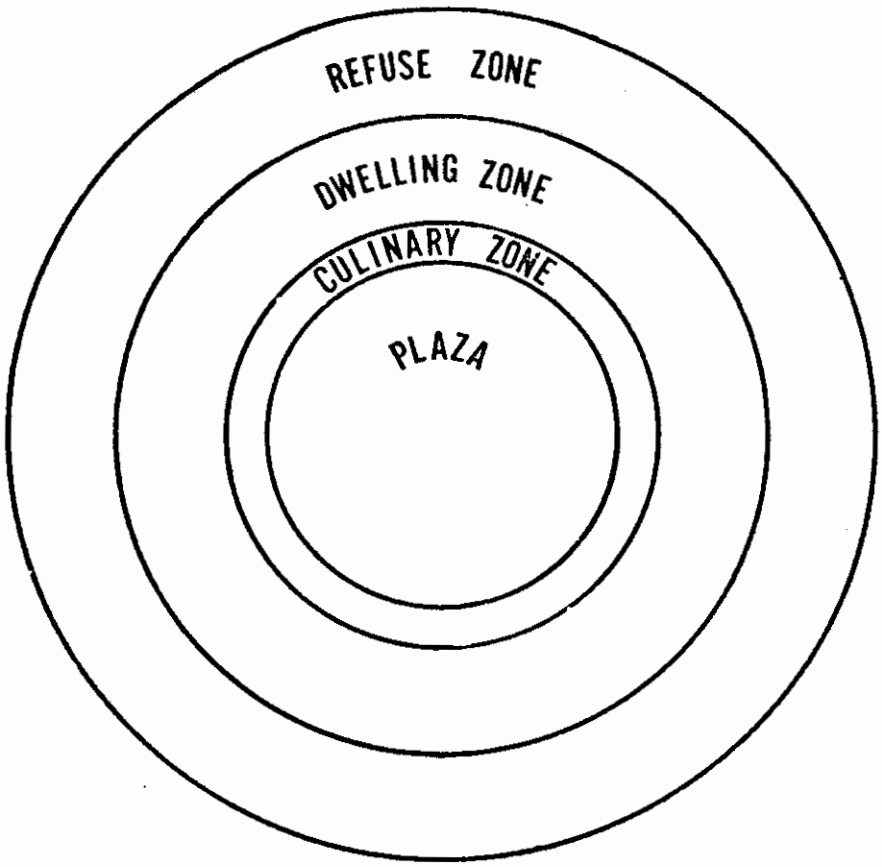

FIGURE 28

Schematic representation of the zones of cultural activity.
The width of the zones are proportional.

locus of all houses as well as all the fire basins. Only infrequently are other kinds of features encountered. Reflecting the circular pattern and undoubtedly conditioned by the stockades, the long axes of all houses parallel the stockades even though a substantial amount of space often separates the two kinds of structures. Between the houses and the stockades, and extending somewhat beyond the stockades, a fourth activity zone, the Refuse Deposition zone, is recognized. The outstanding characteristic is the high concentration of debris, principally food wastes such as animal bone and mussel shell, but even the density of potsherds exceeds that of the Dwelling zone by a factor of five to ten. This garbage was deposited largely as sheet midden, recognized as midden concentrations; however, all garbage pits are found in this zone as are all redeposited fires. The unexpected aspect of this zone is the concentration of all burial activity. The width of the Refuse Deposition zone varies between 10 and 15 meters including the space occupied by the stockades themselves.

The growth of the Slone community through time and the expansion of the diameter of the town has, of course, acted to blur these zones so that, for example, the inward edge of the garbage associated with Structure 3, the earliest stockade, overlaps the outer edge of the Dwelling zone of a later

time. In spite of these effects, the concentric patterning of activities is quite evident, and their strength bespeaks a strong tendency for the segregation of activities to particulat areas within the community.

Even with the rather poorly controlled data collection resulting from the multiplicity of techniques necessitated by the salvage nature of the excavation and the extension of the project over two seasons, three broad kinds of patterning are evident in the horizontal distribution of features:

1) Functional differences are represented by the concentric distributions of the functional classes and serve to delineate four zones of cultural activity;

2) Contemporary stylistic preferences are represented by changes in frequency of styles around the site within a single functional zone. Differential preferences of this sort are noted only for the graves and burials;

3) Temporal differences are the least marked and are evident only in the community plan and its expansion through time as stratigraphically indicated.

TABLE 9

Functional Classes and Types Correlated with Material

Functional Class	Type	Stone	Bone	Shell	Ceramic	Total	%
CUTTING-SCRAPING						609	2.65
	worked flake	584	0	0	0	584	
	bifacial knife	11	0	0	0	11	
	scraper	11	0	0	0	11	
	graver	3	0	0	0	3	
PIERCING- 1						125	.54
	projectile point	113	8	0	0	121	
	fish hook	0	4	0	0	4	
PIERCING- 2						82	.36
	awl	4	78	0	0	82	
PERCUSSION						79	.34
	hammers	19	0	0	0	19	
	balls	7	0	0	0	7	
	anvil	49	0	0	0	49	
	drift	0	4	0	0	4	
CHOPPING-WEDGES						30	.13
	celt	23	0	0	0	23	
	wedge	0	7	0	0	7	
DRILL						12	.05
	drill	12	0	0	0	12	
ABRADING						18	.08
	millingstones	5	0	0	0	5	
	"pottery scrapers"	0	0	0	13	13	
SPOON						36	.16
	spoon	0	36	0	0	36	
DISC						170	.74
	disc	160	0	0	10	170	
ORNAMENT						942	4.10
	bead	2	117	761	0	880	
	pendant	13	27	7	0	47	
	gorget	0	0	13	0	13	
	ear plug	0	0	2	0	2	
WHISTLE						4	.02
	whistle	0	4	0	0	4	
PIPE						49	.21
	elbow pipe	3	0	0	46	49	
NON-UTILITARIAN						24	.10
	paintstone	20	0	0	0	20	
	fossil, etc.	4	0	0	0	4	
CONTAINERS						20,775	90.32
	pots (sherds)	0	0	0	20,775	20,775	
FRAGMENTS-UNFINISHED						47	.20
	none	8	33	3	3	47	
TOTAL	number	1051	318	786	20,847	23,002	100.00
	percent	4.57	1.39	3.42	90.63	100.00	

3

ARTIFACTS

A total of 23,254 artifacts, in the sense of portable objects, was recovered by the 1963 and 1964 excavations. Of this total, 23,002 objects are treated as the assemblage of the Woodside component. Several pottery and projectile point types are demonstrably products of pre-Woodside settlement, and these along with a few other items similarly known to be associated with earlier occupations have been deleted from consideration here. The number of eliminated objects, as can be seen from a comparison of the two totals, is quite small, about one percent of the total number of objects recovered. It should be pointed out, however, that it is not possible to delete non-Woodside material from those categories in which stylistic differences are minimal such as is the case with hammers, anvils, worked flakes, and similar artifacts.

Thus, it is highly probable that some non-Woodside material has been included in the assemblage presented here, but since such material has been deleted wherever possible and since such deletions suggest less than one percent mixture with earlier materials, the effects of the mixing should be negligible. In general, all the portable objects conform to Fort Ancient assemblages from the Ohio River area with some stylistic and specialized functional differences which are undoubtedly due to the marginal location of the Slone Site with respect to the reported Fort Ancient assemblages and to different ecological settings.

In the original reports of the Slone Site excavations (Hanson 1963; Hanson, Dunnell, and Hardesty 1964) the classification of portable objects follows traditional lines using material as a principal definitive criterion. Although restudy of several of the categories of artifacts, notably ceramics and projectile points, has been undertaken since the original reports, it has not been possible, because of the size of the collection and the distance of the several authors from the material, to completely revise the earlier classification. The classes used in the following description are thus basically those of the 1964 report with additions and corrections as indicated by restudy and with the criterion of material deleted from a definitive role. In order to have a set of categories that closely conforms to the functional classification used for the features, the types employed have been grouped into larger functional units. Table 9 shows this grouping along with the distribution of the classes with respect to material. The percentage of the total assemblage is given for each of the functional categories. For the most part, the rational for each of the groupings follows directly from the descriptions of types; however, in a few cases some additional explanation is necessary. Cutting and scraping tools, while relatively easily distinguished on the basis of wear, are treated as a unit because the worked flakes, a class in the original scheme, includes both kinds of tools and these items were not available for restudy. Piercing tools, essentially pointed objects, are broken into two groups to reflect the differences between hand-held hole making tools and those pointed objects which are elements of complicated killing devices. Chopping tools and wedges are combined since they exhibit the same kinds of edge wear, differing only in the means by which force was applied.

A number of classes-- drills, discs, spoons, whistles, and pipes-- do not consistently show clear-cut evidence of use, so that the descriptive classes are retained in the system of functional categories. It is important to recognize that this scheme is a grouping of descriptive classes and not a functional classification; however, once the groupings were made it was possible to recheck several examples of each class specifically with reference to function in order to ascertain whether or not the functional groupings were indeed consistent. As a result of this procedure, it was necessary to change several classes from one functional category to another. While inaccuracies undoubtedly do exist as a result of the procedures used, every attempt within practical limits has been made to assure that they are minimal. The order of description follows that in Table 9.

Artifact proveniences, exclusive of objects found in situ are found within the confines of features, are limited as a result of excavation techniques to three vertical lots: 0 - 20 cm., which includes all plow-disturbed material; 20 - 30 cm.; and 30 - 40 cm. In the descriptions that follow, these vertical units are termed the upper, middle, and lowest levels, respectively. In most cases, too few items represent any given class to make vertical distribution statements meaningful; however, when sufficient numbers are present, the vertical distribution is considered in the description. Horizontal proveniences, again excluding in situ specimens and those found in features, are the two meter squares of the grid system. For most purposes, these horizontal units are too small, and the sixteen square meter sections are used in making distributional statements where the quantity of data warrant such consideration.

Cutting-Scraping

All those tools with one or more sharp, hard edges showing some diminishment, either chipping (most common) or abrasion (least common), are included in this category. All of these tools are relatively small compared to the remainder of the assemblage, and their lack of robustness as well as different character of wear serve to separate these tools from those included in the Chopping-Wedges category. This is a relatively populous category insofar as non-ceramics are concerned, being comprised of 609 tools. The four types recognized with this category are distinguished primarily on the basis of intentional manufacture and resultant shapes.

Worked flakes:

Five hundred and seventy-one worked flakes were found in the general midden, plus twelve from features and one from a post mold. Characteristically, they are unshaped waste flakes which exhibit fine chipping or abrasion along one or more edges. Almost all are unifacially worn. They range in length from .9 cm. to 3.2 cm. with an average of 2.0 cm. The only distributional difference noted is a tendency for the worked flakes in the lowest level to be smaller than those in the upper two levels.

Knives (Fig. 29):

Ten bifacially chipped stone tools and an additional object from a

graded area are called knives. With few exceptions these are fragments of larger thin blades. In the only cases in which overall shape is discernable, the plan is triangular with a convex base. Two complete specimens are 4.15 cm. and 4.35 cm. long with widths of 3.33 cm. and 3.13 cm. respectively. No distributional differences are noted, with knives coming from all levels in the excavation.

Scrapers (Fig. 29):

The seven tools termed scrapers, six from the general midden, one from a feature, and four from graded areas, are a heterogeneous lot sharing only steep chipping along one or more edges and a regular plan as the result of manufacture. Eight of the items included in this category are cores and the chipping, occurring along the striking platform, may be the result of core preparation rather than scraping wear. These cores range in length from 2.17 cm. to 4.82 cm. The other three items included are large lunate-shaped flakes with steep chipping along both sides. These range in length from 2.17 cm. to 5.56 cm. The core-scrapers are found in all levels of the excavation, while the lunate form appears only in the upper two.

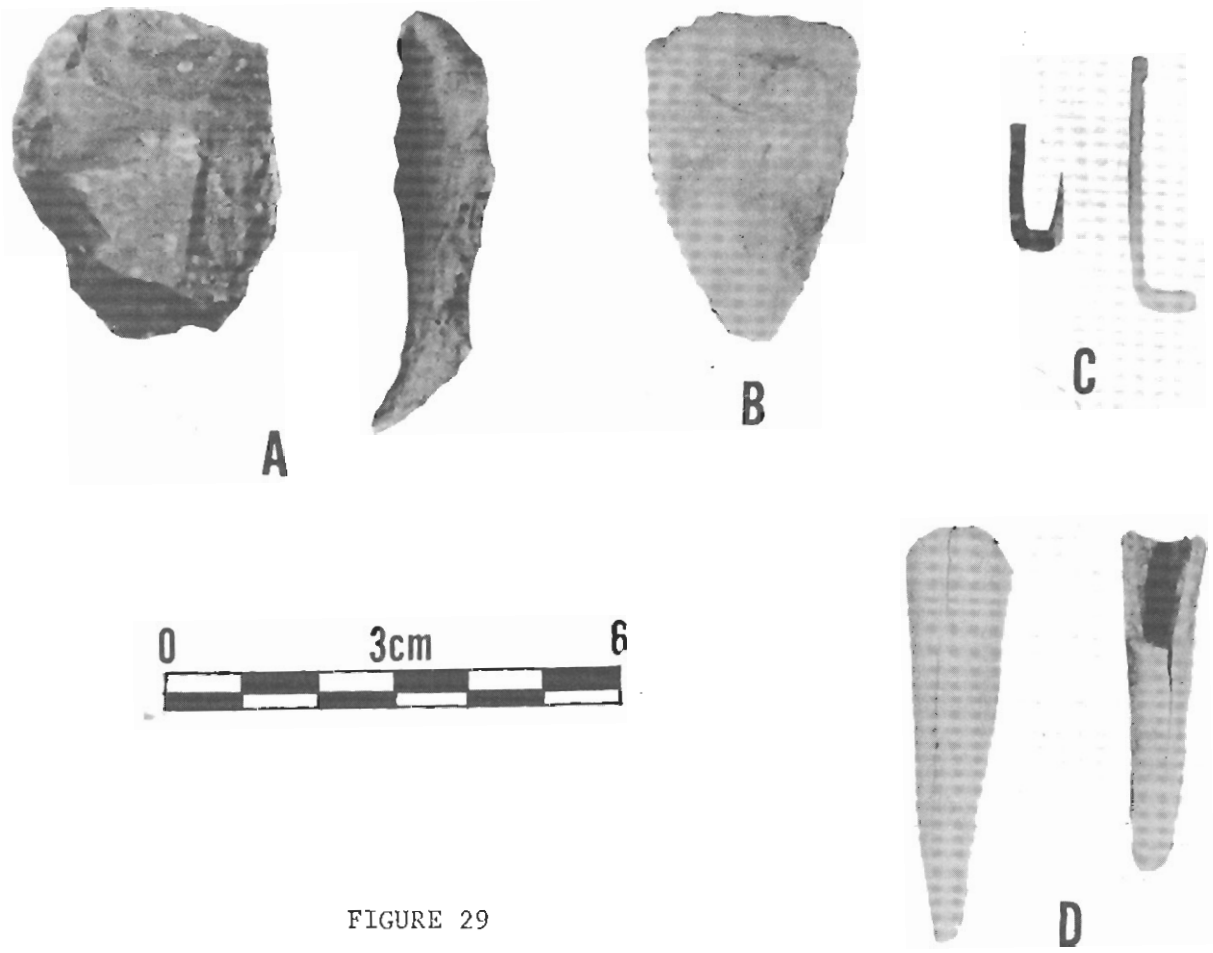

FIGURE 29

Cutting-Scraping and Piercing Tools.
(A) scrapers, (B) bifacial knife, (C) fish hooks, and (D) antler projectile points.

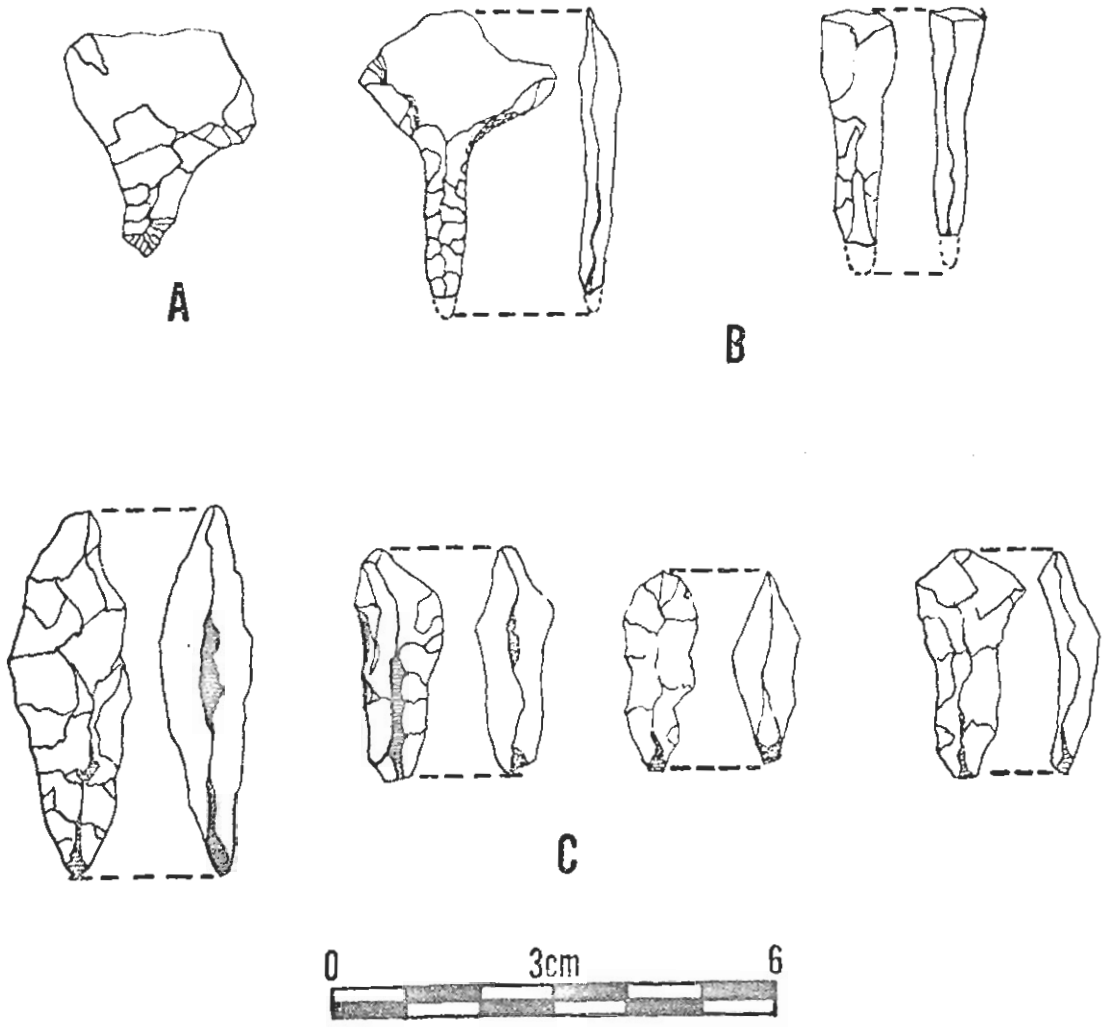

FIGURE 30

Cutting tools, Piercing tools, and Drills.
(A) graver, (B) stone awls, and (C) drills.

Gravers (Fig. 30):

Three flakes, all from the general midden, have been shaped by bifacial chipping so as to produce a conical projection near one corner. They range in length from 1.60 cm. to 2.39 cm. and originate in the upper two levels of the site.

Piercing- 1

One hundred and twenty-five tools, all pointed but exhibiting no wear, are included in this class. Their diminutive size and the provision for hafting usually incorporated in their design suggest that they functioned as points for larger devices.

Projectile Points:

All Woodside projectile points are stemless and roughly triangular in shape. The vast majority, 93.2 per cent, are made from cryptocrystaline stone with only a few made of antler. One hundred and eleven were found in the general midden, plus six from features, three from backfill, and one from a graded area. Because of the significance of projectile point styles in constructing local chronologies (Dunnell 1967), considerable effort has been expended on the construction of stylistic types that can serve this chronological function. The stylistic classification is modified after that of Dunnell (1966: Appendix I) and thus is based upon the full range of Woodside settlements known from the Fishtrap area rather than the Slone Site alone.

Type I- Type I points hold in common their lack of retouch, rough and irregular shape, both in plan and section, and lack of sharp point (Fig. 31). Type I points may not have been functional, instead they may constitute preforms for the other styles of projectile points recognized. Eight specimens, 6.8 per cent of the Slone points, are known, with a vertical distribution as indicated in Figure 32. Metrical data for Slone Type I points are presented in Tables 10 and 11. These points are longer and thicker than any other Slone styles, and their general crudeness is reflected in the high thickness-width ratio.

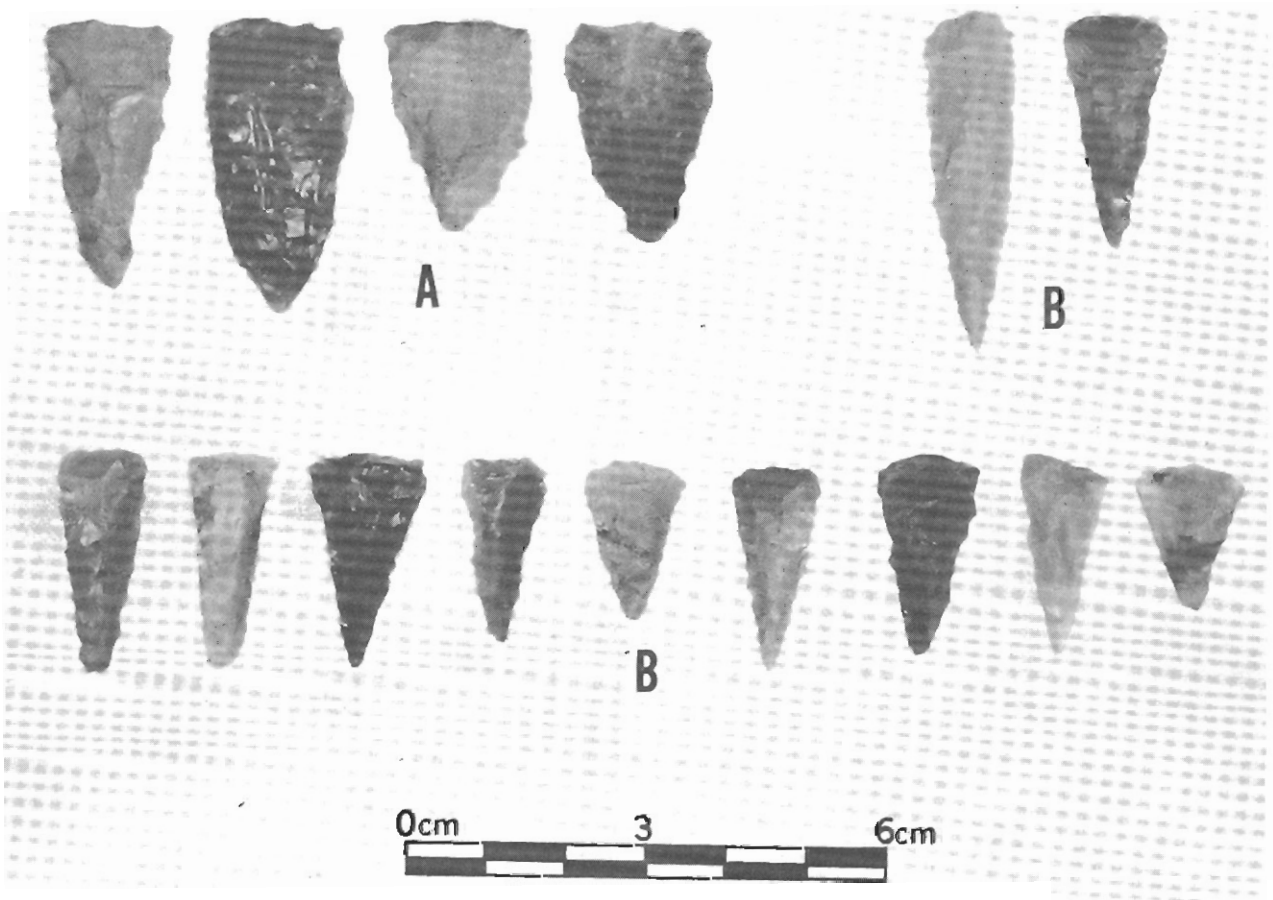

FIGURE 31

Projectile Points.
(A) Type I points; (B) Type IIb points.

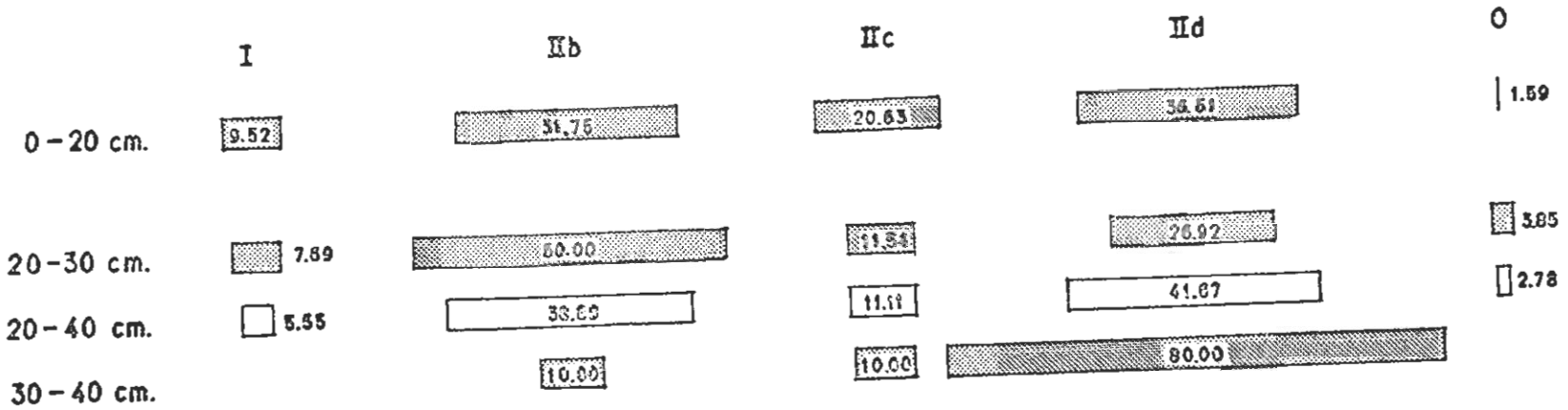

FIGURE 32

Vertical distribution of Projectile Points by frequency;
the unshaded bar represents the combination of the two lowest levels.

TABLE 10

Average Dimensions* and Ratios for Slone Projectile Points by Type

Type	Max. Len.	Max. Wid.	Max. Thi.	Len/Wid	Thi/Wid	N
I	28.4	17.6	7.9	1.62	.44	4
IIb	23.5	12.8	4.7	1.88	.37	30
IIc	20.2	14.4	3.7	1.40	.25	10
IId	20.6	18.1	3.6	1.16	.20	15
Total Measurable Points**						59

TABLE 11

Range in Dimensions* and Ratios for Slone Projectile Points by Type

Type	Max. Len.	Max. Wid.	Max. Thi.	Len/Wid	Thi/Wid	N
I	26.0-32.0	15.7-18.6	6.2-1.0	1.40-2.03	.36-.54	4
IIb	17.3-41.8	9.2-16.7	2.9-6.8	1.27-3.37	.20-.59	30
IIc	15.2-30.8	12.0-16.2	2.8-4.6	.94-1.93	.20-.34	10
IId	14.1-27.5	14.0-22.5	2.9-5.6	.96-1.59	.14-.30	15
Total Measurable Points**						59

* Measurements in mm.

** Only points from which all measurements are possible are included.

Type IIb: Type IIb points are narrow, relatively thick points with convex bases and characteristically display a thick diamond-shaped cross section. Flaking is well controlled, nearly parallel, but retouching is restricted to the area immediately adjacent to the tip and the base (Fig. 31). Most are slightly dulled on the base. Observable variation in the shape of the convex base may permit further subdivision of this type if additional samples can be obtained. Forty points and point fragments are assigned to this type at Slone, constituting 33.9 per cent of all projectile points. The vertical distribution of IIb points is shown in Figure 32. Metrical data for Type IIb points in Tables 10 and 11 show the long narrow character of these points to advantage, in particular the high length/width value in Table 10.

Type IIc: Nineteen, 16.1 per cent of the Slone points, are assigned to the Type IIC, characterized by thin lenticular section, convex blade edges, and generally extensive retouching (Fig. 33). This series of points most often shows a substantial unmodified area of the flake from which they are made, and the base, while usually straight, is not well prepared and is clearly a function of the shape of the flake. This lack of concern and preparation of the basal section contrasts with the other styles of points. The Type IIc point is the only style to undergo marked change in frequency of occurrence.

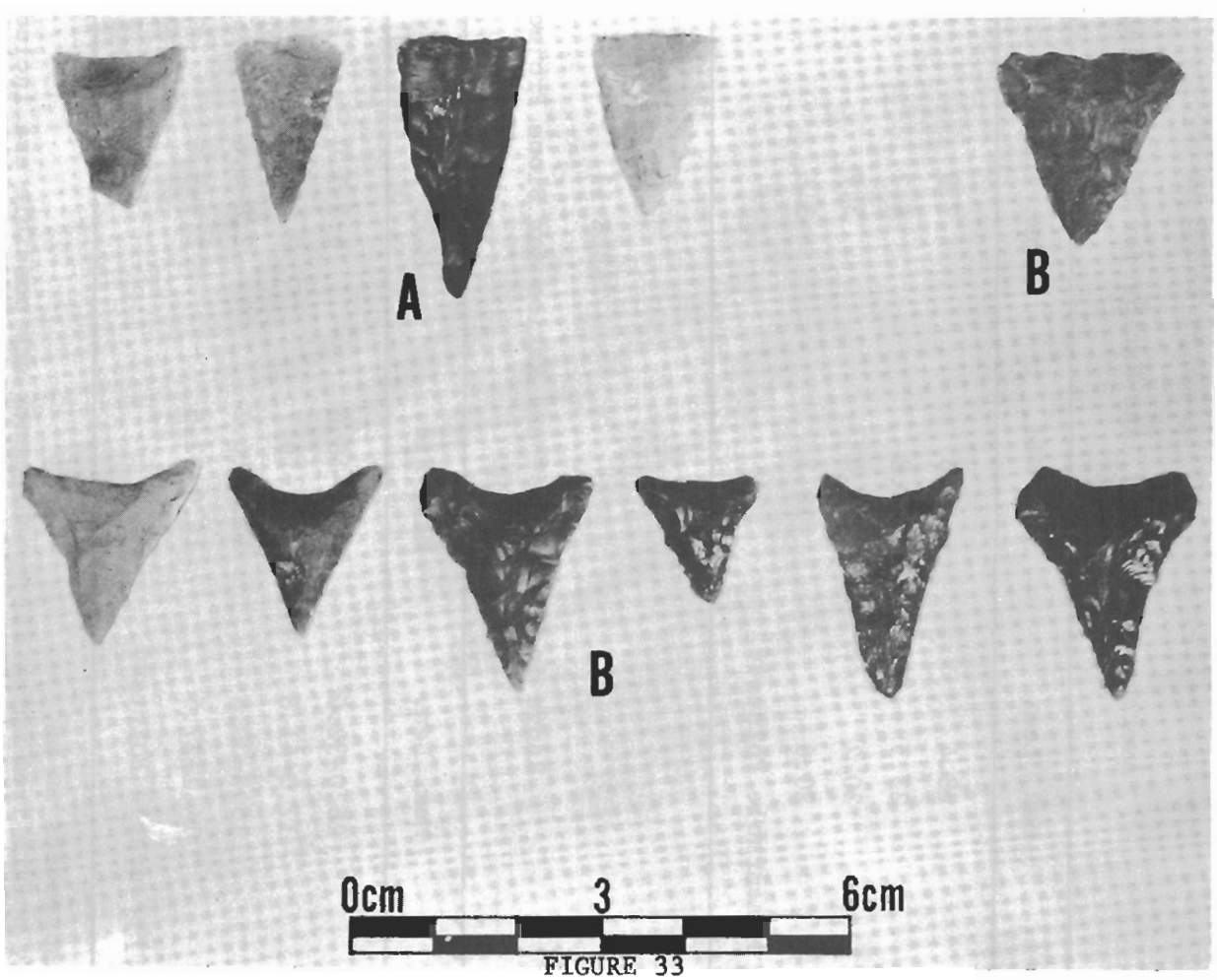

FIGURE 33

Projectile Points.
(A) Type IIc points; (B) Type IId points.

vertically within the site (Fig. 21), increasing in popularity in the uppermost level. The matrical data in Tables 10 and 11 show the IIc type to be the smallest at Slone, though moderately broad, and substantially less robust than the Type I and IIb points.

Type IId: Characteristically IId points have concave bases and concave blade edges (Fig. 33), often resulting in basal "ears." The ears have the effect of broadening the point at the base so that IId points are the widest of all the Slone projectile points despite their otherwise modest size (Tables 10 and 11). All points of this series are carefully made and exhibit extensive retouch over all edges. Care in constructing the base is particularly evident in the delicate ears of several distinct shapes and in slight dulling of the concavity. While the metrical data in Tables 10 and 11 show these points to be quite similar to IIc points, excepting their excessive width, the careful workmanship gives them a substantially different overall appearance. Had the sample been larger, the various styles of ears might well have proved to be of cultural significance. The vertical distribution of IId points is given in Figure 32.

Type O: Two basal fragments of stemless points have been assigned to Type O. This type, better known from other sites in the Fishtrap area, is characterized by the deep, concave base, pentagonal shaped blade (often resembling the Dalton-Meserve outline) and is, by a substantial amount, the largest of the Woodside phase projectile points. The fragmentary nature of the two points assigned to this type precludes any useful measurements, and the vertical distribution, one point from the upper and one from the middle levels, is uninstructive.

Antler Points (Fig. 29):

Because of the different nature of the material, these projectile points have not been incorporated in the scheme of styles for stone points. Nonetheless the basic stemless, triangular form is retained in the conical antler point made by grinding the tip of a deer antler to a sharp point and reaming the base with a conical hole to receive the shaft. The eight antler points originate in all three levels and range in length from 27.4 to 70.5 mm., averaging 49.3 mm.

Fish hooks (Fig. 29):

Four fish hooks constitute the only other piercing tools which appear to have served as killing equipment. All four are made from sections of mammal long bone and exhibit barbless points parallel to the shank of the hook. On the only two in which the shank is intact, attachment to a line is provided by notching. Their distribution is not significant given the small number.

Piercing- 2

All the tools grouped together in the Piercing- 2 class have in common a point as the working portion of the tool and, unlike the preceding class, this point shows substantial diminishment through use in the form of linear striations emanating at the point, through occasional impact fractures

originating at the point, and often through high polish on the tip. A number of the bone specimens also show some polish on the opposite end, presumably as a result of hand use. All of these tools are inferred to be awls.

Stone awls (Fig. 30):

Four bifacially chipped tools, each made from a flake, are assigned to this type. The base preserves the basic shape of the flake and is not symmetrical with regard to the carefully chipped and delicate projections which display wear on the tip. The projection, more than half of the total length of the tool, is nearly as thick as it is wide and joins the base with a distinct shoulder. These tools range in length from 27.2 mm. to 37+ mm., with basal widths varying between 19.3 mm. and 27.4 mm. Because of their diminutive size, these tools may have been hafted. It should be noted that tools of this shape are often called drills in the literature of the eastern United States; however, the wear on the awls is linear in character and contrasts stongly with the tools herein considered drills. One stone awl displays an impact fracture. Stone awls originate in the upper and lowest levels of the site, but in view of the small number of items, the distribution is insignificant.

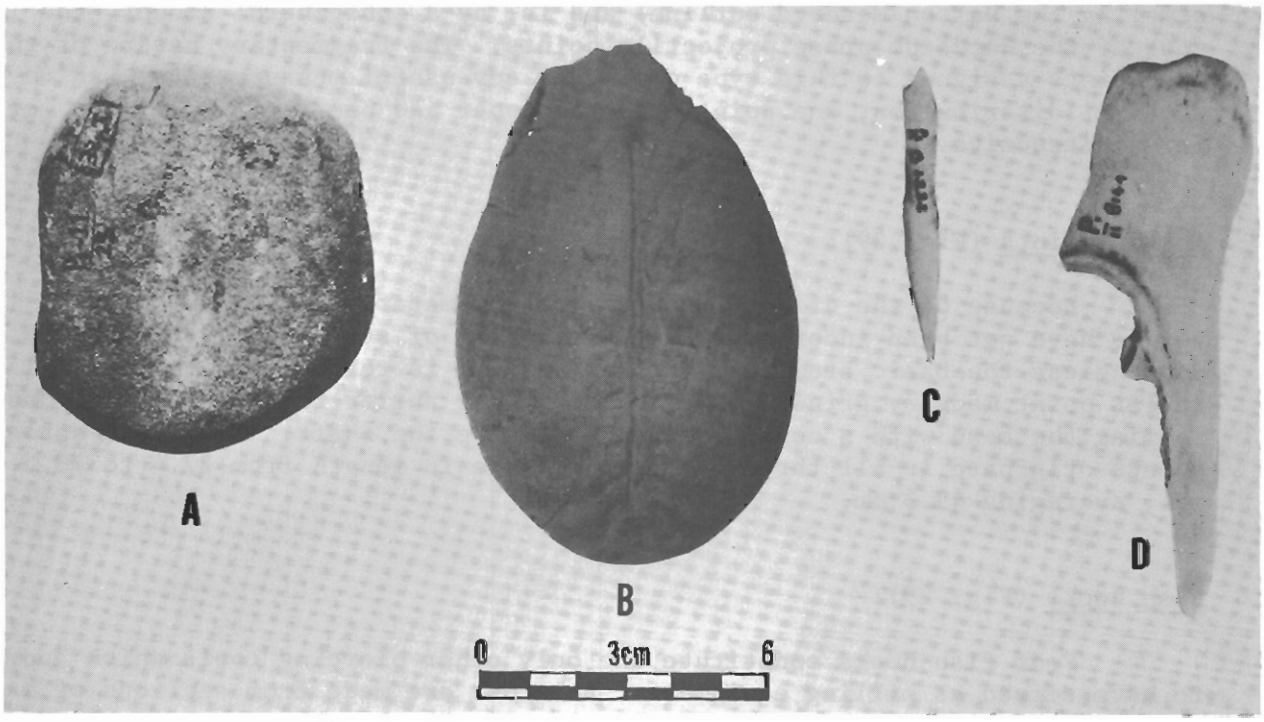

FIGURE 34

Piercing tools, Abrading tools, and Spoons.
(A) milling stone, (B) turtle carapace spoon,
(C) splinter awl, and (D) joint end awl.

Bone Awls (Fig. 34):

Bone awls are represented by 78 specimens, 64 from the general midden and 14 from features. Sixteen of these are long bones, mostly deer, that preserve a joint end and have been ground to a point on one side of the former shaft. Sixteen others are sharpened deer antler, broken at the base and with only a minimal amount of smoothing away from the tip. The remainder of the artifacts assigned to this class are mammal bone splinters sharpened on one or occasionally both ends. Some of these may be broken examples of the joint-end variety. No measurements were taken for this class since the size of the bone clearly determines the size of the artifact and since, in the case of the splinter awls, it is not possible to determine whether the specimen is broken.

Percussion Tools

All of the types grouped under this heading share crushing wear as the principal kind of diminishment, manifest as battered edges or surfaces. As might be expected, most of these tools are stone which could stand this kind of use better than other materials. It is presumed that these types are appropriately considered primary tools, that is, tools whose main function was the manufacture of other tools. Four types, based upon the character of the battering and its location, as well as the overall shape of the object are recognized.

Hammers (Fig. 35):

Sixteen stone tools from the general midden and three from features are assigned to this class. Without exception these tools are ellipsoid water-worn cobbles with varying degrees of battering along the edges, often concentrated at the polar ends of the long axis. The material includes both local sandstone and imported quartzites, the latter material being considerably tougher and more admirably suited than the local stone. The maximum diameter of these cobbles ranges from 3.8 cm. to 12.0 cm. and averages 6.2 cm. Hammerstones are found in all levels of the site.

Balls (Fig. 35):

Seven stone artifacts, six from the general midden and one from a feature, while exhibiting the same kind of battering, are separable from the hammers in that they are nearly spherical in shape and are completely or nearly completely altered over their entire surface by the battering. It may be that these tools are intentionally manufactured to the spherical plan or it may be that they have worn to this shape through continued and selective wear. Both local sandstone and imported igneous rock are used in their construction. They range in diameter from 18.4 cm. to 30.3 cm., averaging 25.8 cm. While the number of balls is small, it is worth noting that all originate in a small section of the western part of the site. They are found in both the upper and lowest levels.

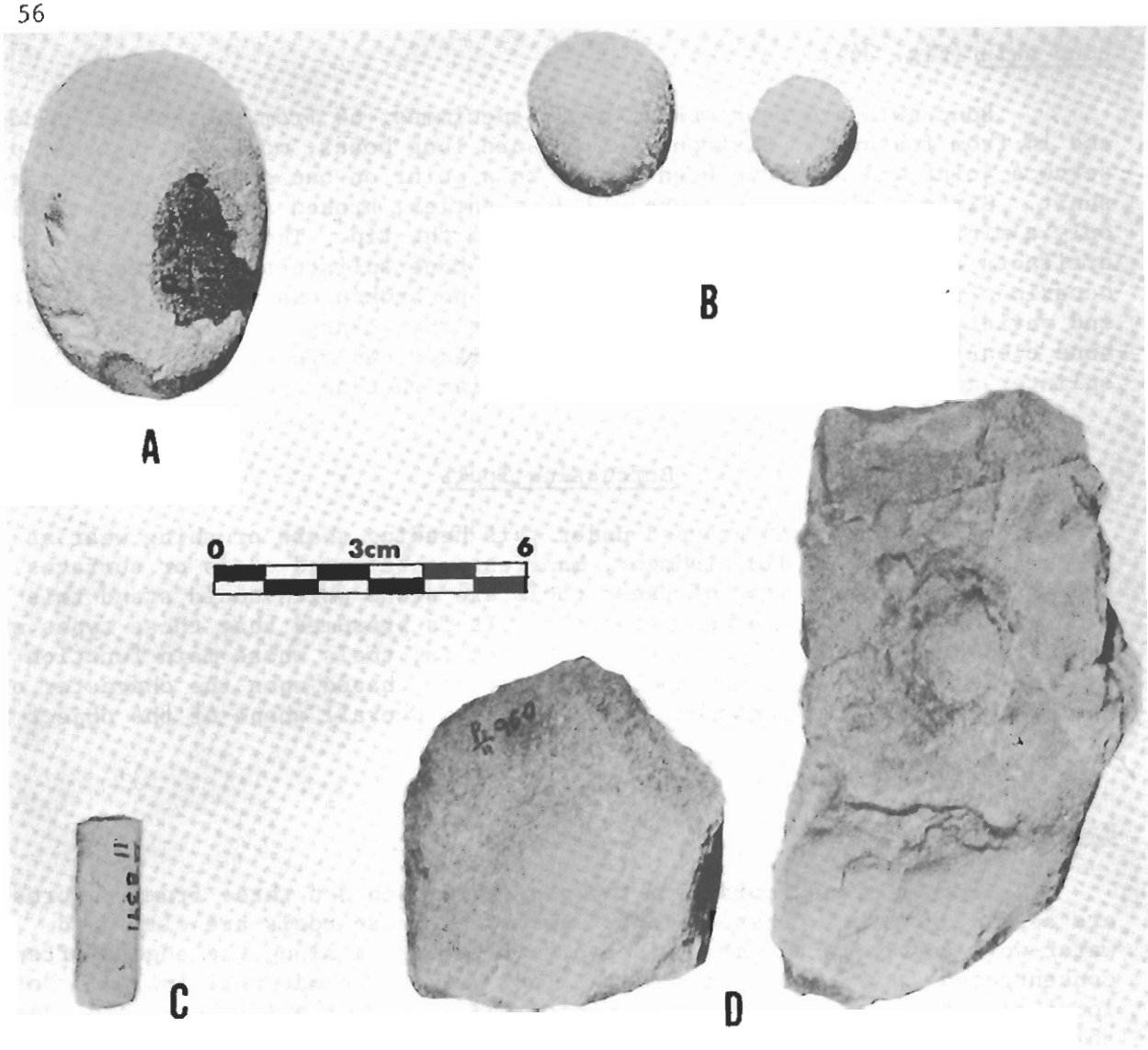

FIGURE 35

Percussion Tools.
(A) hammer, (B) balls, (C) antler drift, and (D) anvils.

Anvils (Fig. 35):

A total of 49 anvils are identified, 42 from the general midden, six from features, and one from the backfill. All but one are sandstone rocks, still roughly tabular in form but showing the effects of water erosion and presumed to be of local origin. The exception is a flattened cobble of metamorphic material. The distinguishing feature is the presence of concentrated battering in the center of one or both of the flat surfaces resulting in pits of varying depths. The number of depressions in each face varies from one to nine, but the two most common patterns are those with a single depression on each face and those with a single depression on one face. Many of these tools were broken in use through one or both of the pits. Several also display edge battering and thus were occasionally used as hammers. The size range is 5.3 cm. to 16.6 cm. in maximum dimension with an average diameter of

10.2 cm. Anvils are homogeneously distributed throughout the site with no noticeable variation in the frequency of occurrence or in size and shape from area to area or level to level.

Drifts (Fig. 35):

Four antler drifts, cylindrical sections of deer antler with squared ends, originate in the general midden and are the only tools made of a material other than stone that display battering. The battering is not extensive and is restricted to the squared ends. One specimen displays an impact fracture emanating from a battered end. While these artifacts are widely reported in the East associated with stone working, the possibility that the battering is part of a manufacturing process rather than wear should not be completely discounted. The sample of four, however, does not provide any basis for resolving this question nor does it provide useful distributional data.

Chopping-Wedges

The two types of tools included in this functional grouping display worn edges transverse to the long axis of a rather stout body. Wear is manifest both as abrasion away from the edge over the faces of the tools and as chipped and crushed areas on the edges themselves. All of these tools are the product of manufacture-- that is, their entire shape is constructed rather than simply the edge.

Celts (Fig. 36):

Twenty-three stone tools, two from features and the remainder from the general midden, are included in this class. All are rectanguloid in plan, though some are more or less pointed at the butt, and flattened ellipsoid in section. The cutting edge is oriented at right angles to the long axis of the tool and slightly curved in plan. All the celts are made of metamorphic, igneous, or silaceous stone, the first two of which had to be imported to the Slone locality. The metamorphic and igneous stone celts were shaped by pecking and grinding, the edge always being ground but with considerable variation in the extent of grinding and polishing on the body. All the polls are battered, presumably from use as hammers. The three silaceous stone celts, made of chert, are shaped by chipping their main outlines and grinding the cutting edges. Two specimens show secondary use as anvils, displaying battered depressions on both surfaces. Two distinct sizes within the class are recognized as follows:

Small: Length- Range, 3.6 cm. to 7.6 cm.; Average 5.9 cm.
Width- Range, 2.7 cm. to 4.2 cm.; Average 3.5 cm.
Thickness- Range, 1.2 cm. to 1.8 cm.; Average 1.5 cm.

Large: Length- Range, 8.5 cm. to 13.0 cm.; Average 10.2 cm.
Width- Range, 3.8 cm. to 7.2 cm.; Average 5.9 cm.
Thickness- Range, 1.4 cm. to 3.5 cm.; Average 2.4 cm.

The vertical distribution of these tools is homogeneous, reflecting the overall increase in number of objects in the upper levels; however, over half of

The celts came from a small area in the dwelling zone on the western side of the site. There is no distinction in distribution of the two sizes of celts.

Wedges (Fig. 36):

Seven bone tools, all from the general midden and restricted to the upper and middle levels, have been assigned to this class. All are large sections of mammal bone which have been extensively ground, flattening the overall section of the tool and producing a broad flat bit on one end. While these are termed wedges, this distinction is primarily based on material. In view of the fact that none of them are extensively battered on the end opposite the blade and that they display wear similar to the celts, these tools may simply be bone celts. The two complete specimens are 8.6 cm. and 6.9 cm. long and 2.5 cm. and 2.4 cm. wide respectively. In view of the small number of these objects, their restriction to the upper two levels cannot be considered significant.

Drills

No stylistic classes are recognized within the category drills. All share the major constructional features and wear patterns. They are bifacially flaked stone implements consisting of a roughly parallel-sided thick body with a somewhat spatulate base (Fig. 30). The degree to which the base is flattened and flared beyond the body is highly variable, ranging from a

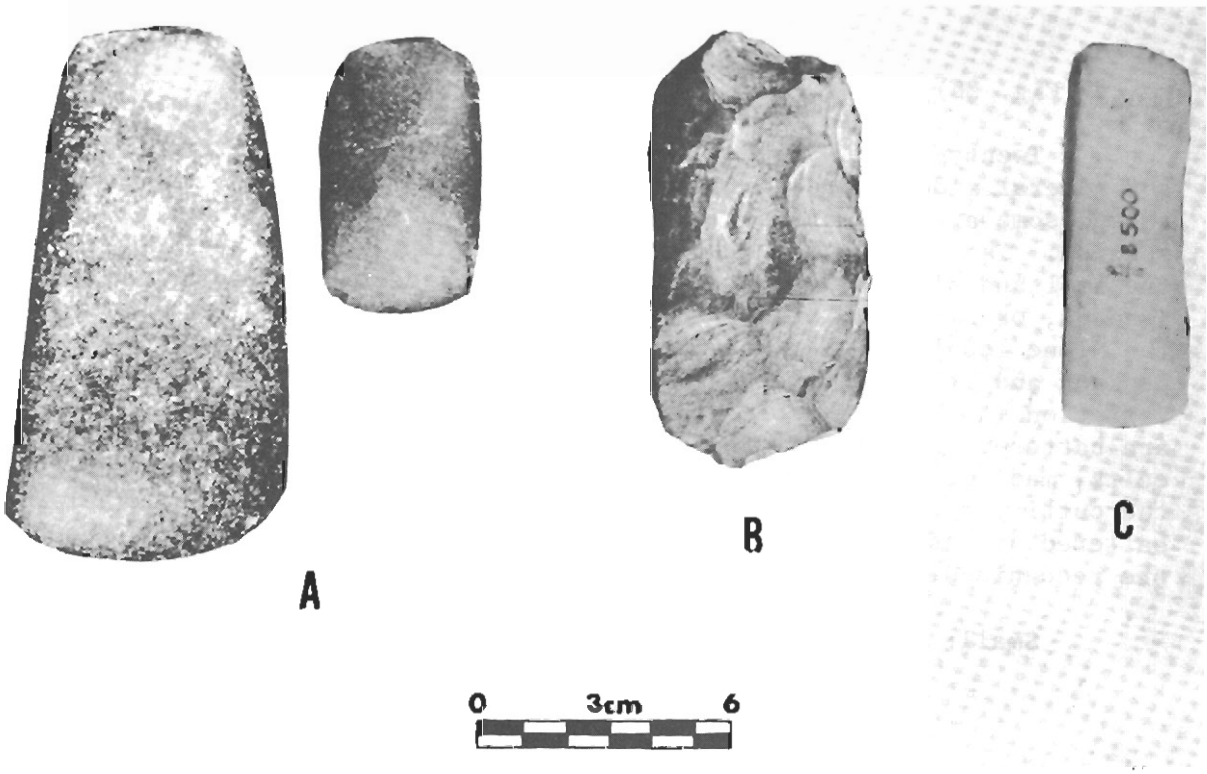

FIGURE 36

Chopping tools and Wedges.
(A) ground stone celts, (B) chipped stone celts, (C) bone wedges.

nearly imperceptable juncture of base to body to a widely expanded base with distinct shoulders. The tip of the rod-like projection exhibits heavy circular wear at the tip, leaving it quite devoid of relief, and shows wear at right angles to the long axis of the tool on the high areas between flake scars on the faces. Twelve specimens, all from the general midden, belong to this class and originate in all vertical units within the site. The wear on these tools is quite distinct from that on the less robust but otherwise similarly shaped stone awls. Because of their diminutive size, it is presumed that these artifacts were hafted and such is indicated by the presence of a distinctly flattened base. Many of these items are broken; however, the measurable drills are short, ranging in length from 2.6 cm. to 3.1 cm.

Abrading Tools

The two types grouped under the term abrading tools share abrasion or grinding wear on their working surfaces. In all other respects the two classes are dissimilar, suggesting that a substantial difference may obtain in their respective functions.

Milling Stones (Fig. 34):

Five sandstone objects from the general midden show abrasion wear on their flat surfaces and are thus interpreted as manos or metates. Because none of the surfaces are markedly concave or convex and three of the five specimens are fragmentary, it is not feasible to distinguish manos and metates as separate classes. The two whole specimens, measuring 13.3 cm. by 7.0 cm. and 13.2 cm. by 10.2 cm. respectively, are manos. Representation of this class may be somewhat skewed by the difficulty of recognizing the abrasion wear on fragments of sandstone under field conditions unless the wear was quite pronounced.

Pottery "scrapers" (Fig. 37):

Thirteen sherds from the general midden exhibit one edge ground flat. The grinding is sufficiently irregular to suggest that it constitutes wear rather than manufacture. These objects originate in all levels of the site and show no unusual horizontal distribution.

Spoons

Thirty-two fragments of terrapin carapace showing ground edges are known from the general midden with an additional four originating within features. All are symmetrically oriented with the dorsal structure of the carapace where this can be ascertained (Fig. 34). Only one complete specimen, measuring 12.7 cm. long, 8.5 cm. wide, 2.7 cm. deep, is known. Assignment of the other pieces to this class takes into account: (1) the spoon is the only object known to have been made from turtle carapace; and (2) using the whole object as a model, all of the fragments are compatable in shape and size with interpretation as pieces of similar objects. These are found in all levels of the excavation.

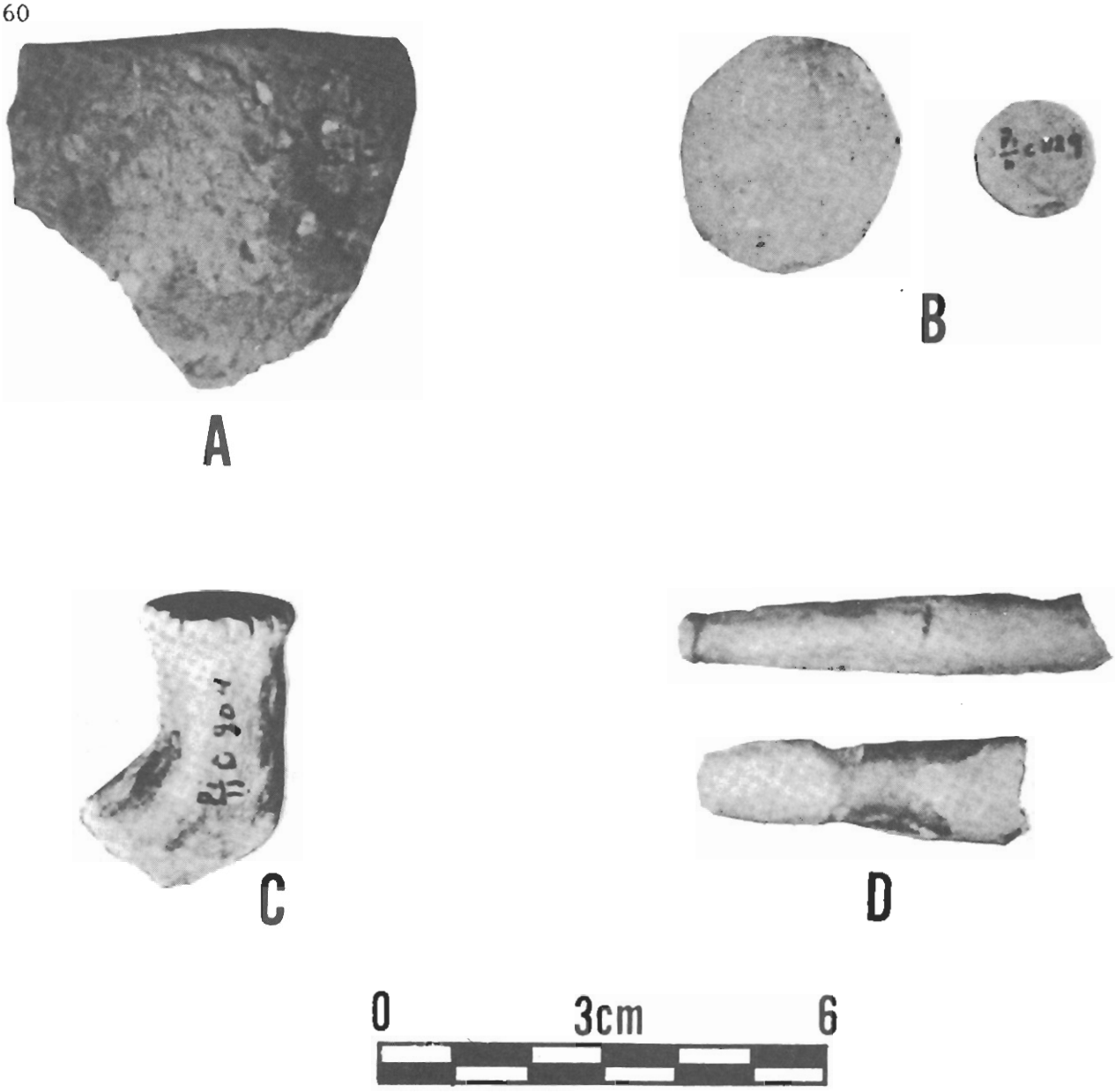

FIGURE 37

Abrading tools, Discs, and Pipes.
(A) "pottery scraper," (B) plain ceramic discs, (C) ceramic pipe bowl, and (D) ceramic pipe stem fragments.

Discs

One of the most striking similarities with archaeological remains described elsewhere is the presence of large numbers of stone and fewer numbers of ceramic discs which show no evidence of wear or use and which only infrequently bear incised designs. One hundred and sixty-one discs, ten ceramic and the remainder stone, came from the general midden, and nine stone discs are known from within features. All the discs have parallel or nearly parallel sides, usually smoothed to varying degrees, and the edges have been ground (Figs. 37, 38, and 44). In some cases the chipping and breaking employed

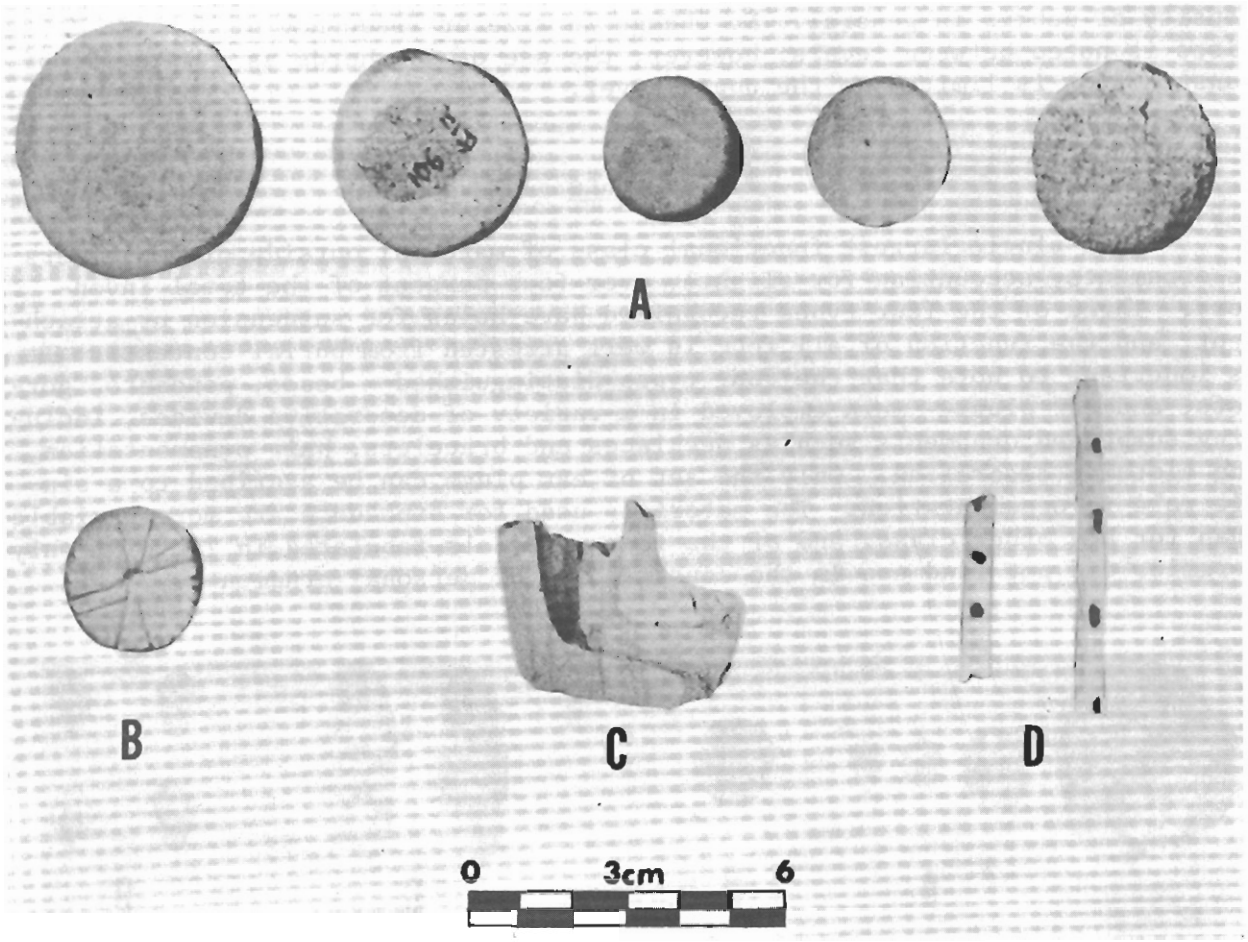

FIGURE 38

Discs, Pipes, and Whistles.
(A) plain stone discs, (B) incised stone disc,
(C) stone elbow pipe fragment, and (D) bone whistles.

to shape the disc are not completely obscured by the grinding. Of the stone discs, all but eight are made of the locally available sandstone. The others are cannel coal (4), limestone (1), hematite (1), and an unidentified metamorphic or igneous rock (1). All of the ceramic discs, made in the same fashion as those of stone, are constructed from Madisonville Plain sherds. Only ten stone discs show any further work, though generally the non-sandstone stone materials exhibit more care in preparation, and this is limited to the following: drilled dimples in the center of each side (3); incised lines crossing at right angles in the center of the disc on both sides (2); intersecting crossed lines on both sides with a drilled central dimple on one side (1); the dimple and crossed lines pattern on one side only (1); central dimples on both sides intersected by two crossed lines on one side and four on the other with two groups of seven notches each on the periphery (1); a dimple on one side and an unidentified engraving on the other (1); and a cannel coal disc with two concentric incised circles and a central dimple on one side (1). The ceramic discs show no further work. The maximum diameter of the discs ranges from 19.4 mm. to 65.0 mm. and averages 33.1 mm. The maximum thickness, almost always near the center of the disc, ranges from 5.4 mm. to

30.6 mm., averaging 14.0 mm. Despite the large sample of discs, their distribution is quite homogenous, reflecting only increases and decreases in the density of debris in general. No change in size or frequency of decorated discs is noted between levels; however, the use of potsherds as a material of construction is limited to the upper level.

Ornaments

The single largest functional class of material outside of containers is ornaments, accounting for slightly over four percent of the total inventory. Three of the four types recognized have holes for suspension or attachment, and the function of all four is well attested from burial contexts. It is important to note that the four types distinguished-- beads, pendants, gorgets, and ear plugs-- were employed in a variety of decorative devices, including suspended ornaments such as necklaces and bracelets, hair ornamentation, and clothing decoration. Only the set of ear plugs can be ascribed to a single role in ornamentation. The materials used for ornaments are more variable than for any other class, and of the four materials tabulated in Table 9, only ceramics did not find use in the construction of personal ornaments.

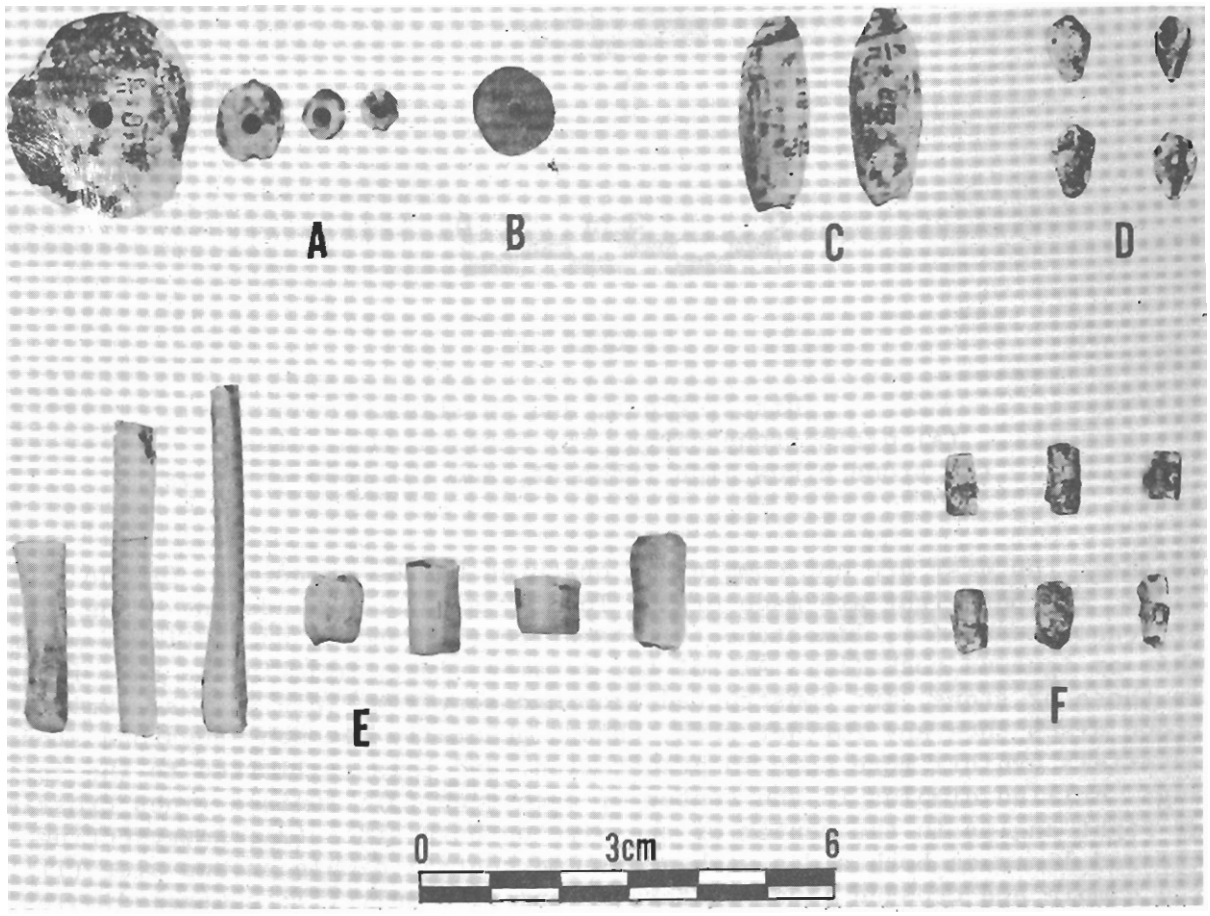

FIGURE 39

Beads.
(A) shell disc beads, (B) stone disc bead, (C) ollivela shell beads, (D) marginella shell beads, (E) tubular bone beads, and (F) tubular shell beads.

Beads (Fig. 39):

Eight hundred and ninety-two artifacts, approximately 93 per cent of the ornament class are radially symmetrical about a single central perforation and are termed beads. Three general styles are distinguished: disc-shaped beads perforated through the short axis of the object; tubular beads in which the hole runs through the long axis of the object; and beads which retain the shape of the object from which they are made, which in the case of the Slone beads is various marine shells. In this latter style, radial symmetry is only approximated.

The most frequently occurring kind of bead is that which preserves the shape of the object from which it is made. This style is restricted to shell in material (analogous ornaments of bone, perforated bones and teeth, are classed as pendants because of their lack of natural symmetry) and restricted in provenience to burial contexts. The restriction of shell ornaments to burials may be more apparent than real, for all the shell material is very fragile and would not be preserved except under the protected conditions of burial. Two kinds of marine shell were perforated as beads, marginellas accounting for 521 examples and olivellas for the remainder. Both kinds of shell are perforated by grinding off a portion of the apex and inserting a string through the mouth of the gastropod and pulling it through the constructed entry at the opposite end.

The tubular form is the next most common, represented by 117 bone examples and 113 shell specimens. Again the shell specimens are restricted in occurrence to graves, whereas bone beads occur both in the general midden (108) and in features (9). Bone tubes were made by cutting sections from long bones, usually of bird, freeing the central cavity of any marrow, and grinding off the ends. The bone tubes range from 5.6 mm. to 89.9 mm. in length, averaging 29.2 mm. The shell tubes are cylindrical segments of marine shell columnae which have been ground to a roughly cylindrical shape and perforated by drilling lengthwise.

The disc bead, circular in plan and thin and flat in section, is represented by 70 specimens of marine shell, all from burials, and two specimens of stone, both from the upper level of the general midden. Four of the shell examples were termed gorgets in the original report (Hanson, Dunnell, and Hardesty 1964: 112) on the basis of their size and presumed function; however, since they display but a single central perforation and are disc-shaped, they have been included with the disc beads. While all of the specimens appear to have been manufactured from marine shell, it is possible, in view of the substantial modification involved in these ornaments, that a few may have been made from local mussel. Regardless of material, all of the disc beads have been made by grinding and centrally perforated by drilling.

Two rectangular flat pieces of shell centrally perforated with a single hole make up the smallest category of beads. Both of these objects, because of their larger size and shape, were termed gorgets in the earlier report (ibid.: 112), but since they have only single central perforations, they are included here as beads. Both come from burials.

Pendants (Fig. 40):

All of the ornaments with asymmetrical perforations are termed pendants and, with the exception of a small number of shell items, only one hole is present. Forty-seven pendants, seven of shell originating in both features and the general midden and thirteen of stone all coming from the upper two levels of the general midden, make up the Stone sample. Six shapes are recognized: rectangular, triangular, circular, and natural which are restricted to single materials, shell in the first three and bone in the last; diamond and claw/tooth shaped which are executed in more than one material, shell and stone in the first instance and bone and stone in the second. The frequency of these various forms is shown in Table 12.

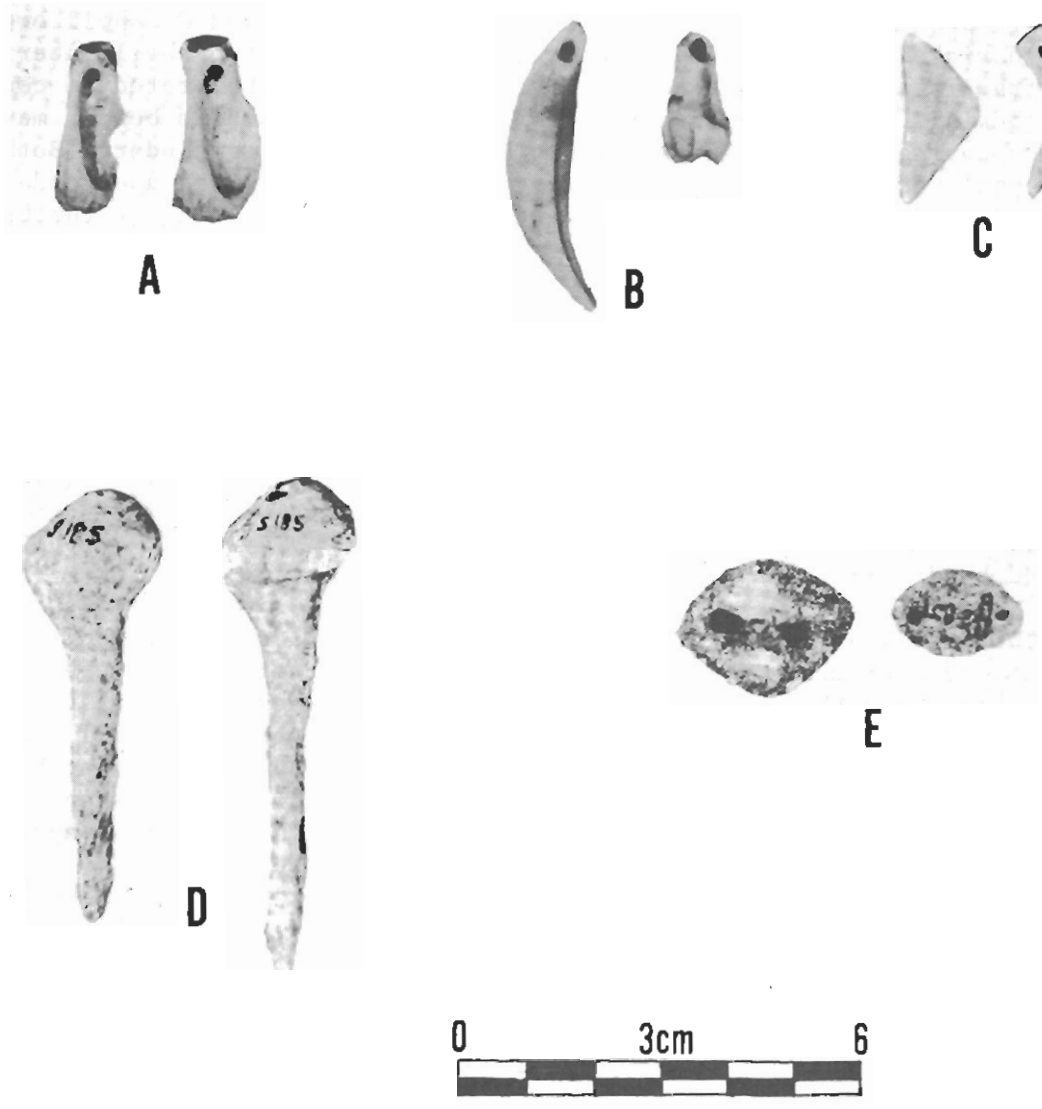

FIGURE 40

Ornaments
(A) turkey digit pendants, (B) perforated teeth,
(C) stone imitation claw pendants, (D) shell ear plugs, (E) shell gorgets.

TABLE 12

Pendant Shape with Respect to Material

Material	Rectangular	Triangular	Circular	Diamond-Shape	Natural	Tooth-Shape	Total
Stone	0	0	0	1	0	12	13
Bone	0	0	0	0	18	9	27
Shell	3	2	1	1	0	0	7
Total	3	2	1	2	18	21	47

The rectangular, triangular, and circular forms are all flat in cross section and are perforated with one or two holes set adjacent to one edge. The diamond-shaped pendants are symmetrical but perforated with a single hole at one end; the shell example is flat, while the stone example is a thicker hexagon in cross section and executed in cannel coal. The natural forms retain the outline of materials from which they are made; in the Slone case, this is the shape of a bone. The majority of these are turkey digits and perforated with a single hole obliquely drilled through the base of the bone out through one side. The only other bone employed is a scrap of terrapin carapace which is drilled near one end through the short axis of the bone. These drilled bones occur in the general midden only in the upper and middle levels.

The teeth or claw-shaped pendants are actual drilled teeth when the material is bone, or when the material is stone, conventionalized, pointed, oblique, L-shaped objects. The curvature, size, and point all suggest that the model for the stone examples is either a canine tooth or a claw. Only seven of these are perforated, all with a single hole drilled at the blunt end; however, the distinctive shape argues that the other six examples are unfinished representatives of this category. Cannel coal is the material used in twelve of the stone pendants; siltstone accounts for the single exception. That the model for the stone ornaments is a canine tooth is supported by the fact that all but two of the actual teeth are canines perforated at the root end. The principal animal is dog, but the canines of other animals, including bear, occur. The two exceptions are a bear molar and an incisor, both perforated at the root.

Gorgets (Fig. 40):

Only thirteen artifacts, all made of marine shell, are perforated for suspension by two symmetrically placed holes. All of these originate in burials and share a common diamond-shaped plan and a thin, nearly flat, cross section. The holes are placed along the long axis of the ornament near opposite ends.

Ear Plugs (Fig. 40):

A single pair of ear plugs were found in situ with one burial. They are made from the central column of marine conch shell. The stem, slightly flattened in cross section and pointed on one end, is 7.1 cm. and 6.1 cm. for each plug respectively. A small, thin, flattened disc surmounts each plug on the end opposite the point.

Whistles (Fig. 38)

Four bird bone tubes, having from one to five holes piercing only one wall of the tube, came from the general midden. The single specimen having only one hole may be a pendant; all of the others are broken and may have had more holes before breakage. The method of perforation is variable: in two the holes are formed by notching or sawing and then enlarging by drilling; one has the holes burned through the bone and enlarged by drilling; and, the fourth specimen which may be a pendant, is simply drilled.

Pipes (Fig. 37 and Fig. 38)

Forty-six fragments (43 ceramic and three stone) are identified as pipes on the basis of their distinctive structures. They are limited to the upper two levels of the general midden. The stone fragments consist of a broken vasiform bowl, a longitudinally split stem section of a non-vasiform type, and the longitudinally split segment of the rectangular bowl of an elbow pipe. All of the ceramic pipes are similarly fragmentary; however, it is possible with the larger number of pieces to posit a typical form. The stem is long and tapered with either a collared or plain bit. The stem joins an ovoid bowl at an obtuse angle. The bowls display collared lips, and in one case the pit is decorated by notching.

Non-Utilitarian

Two kinds of artifacts are included in this category, neither of which displays any modifications from a natural state-- it is their concentration that distinguishes these as artifacts, and suggests their selection and transportation to the Slone Site by its prehistoric inhabitants.

Paintstones:

Twenty pieces of soft, reddish siltstone occur in the upper two levels of the general midden. The reddish color may be a result of burning, although this is not established, and it is the occurrence of these stones in the otherwise stoneless alluvium of the Slone Site that demonstrates their artificial nature. Their designation as paintstones reflects only the fact that pigment could be readily obtained from them, especially in view of their soft, powdery nature.

Miscellaneous:

For want of a better name, the three Pennsylvanian fossil tree fragments and the one iron concretion recovered in the general midden have been grouped under miscellaneous. Again, these kinds of objects do not naturally occur in the Slone alluvium and thus must represent some selection and transportation on the part of the Slone people. None show any workmanship and probably represent curiosities picked up by the Slone inhabitants.

Containers

A total of 20,775 objects were recovered from the general midden and features which, upon the basis of shape, appear to be fragments of containers. All such objects are ceramic. No container approached being complete. Of this number, 19,107 sherds from the general midden could be used for distributional studies.

The series of types recognized within the container category follows the traditional practice in the Southeast and are binomial, historical types of the sort successfully employed in chronological studies. This choice is necessitated if the ceramics are to be presented in a manner comparable to other site descriptions in the East. All of the types recognized at Slone are known elsewhere where they have been previously defined and described. As a result, definitive criteria, along with major bibliographic references in which full descriptions may be found, are noted in parentheses, and the descriptions that follow focus upon distinctively Slone variations, primarily in vessel decoration and form. It is worth noting that three types-- Madisonville Plain, Madisonville-Fox Farm Cordmarked, and New River Knot-Roughened and Net-Impressed-- comprise 99.34 per cent of the total container series. The remaining five types-- Fox Farm Bowl, Fox Farm Salt Pan, Madisonville Net Impressed, Madisonville Grooved Paddled, and Fox Farm Check Stamped-- are rare and insignificant in the overall ceramic assemblage.

Since pot sherds account for slightly more than 90 per cent of all portable objects recovered at the Slone Site, they provide the only solid basis for discussing both vertical and spatial distribution. For this reason, a separate section immediately following the type descriptions considers these distributional characteristics.

Madisonville Plain (Fig. 41).

(Shell-tempered, plain exterior; Griffin 1943: 349; Hanson 1969:6-7). This type consists of 11,487 sherds from the general midden, 60.19 per cent of the pottery, plus 970 from features. Incising was the most common decorative style, with nineteen examples. The only recognizable designs are zig-zag lines. Three sherds with a fugitive red paint on the interior and one with black paint on the exterior were also found, all in the upper level. Five sherds from the upper two levels had been drilled, and three others had small nodes on them.

Vessel forms were vertical or flaring rimmed jars with strap handles and sub-conical bases. Rim diameters ranged from 12.0 cm. to 58.0 cm. with the majority of vessels in the 25.0 to 40.0 cm. range.

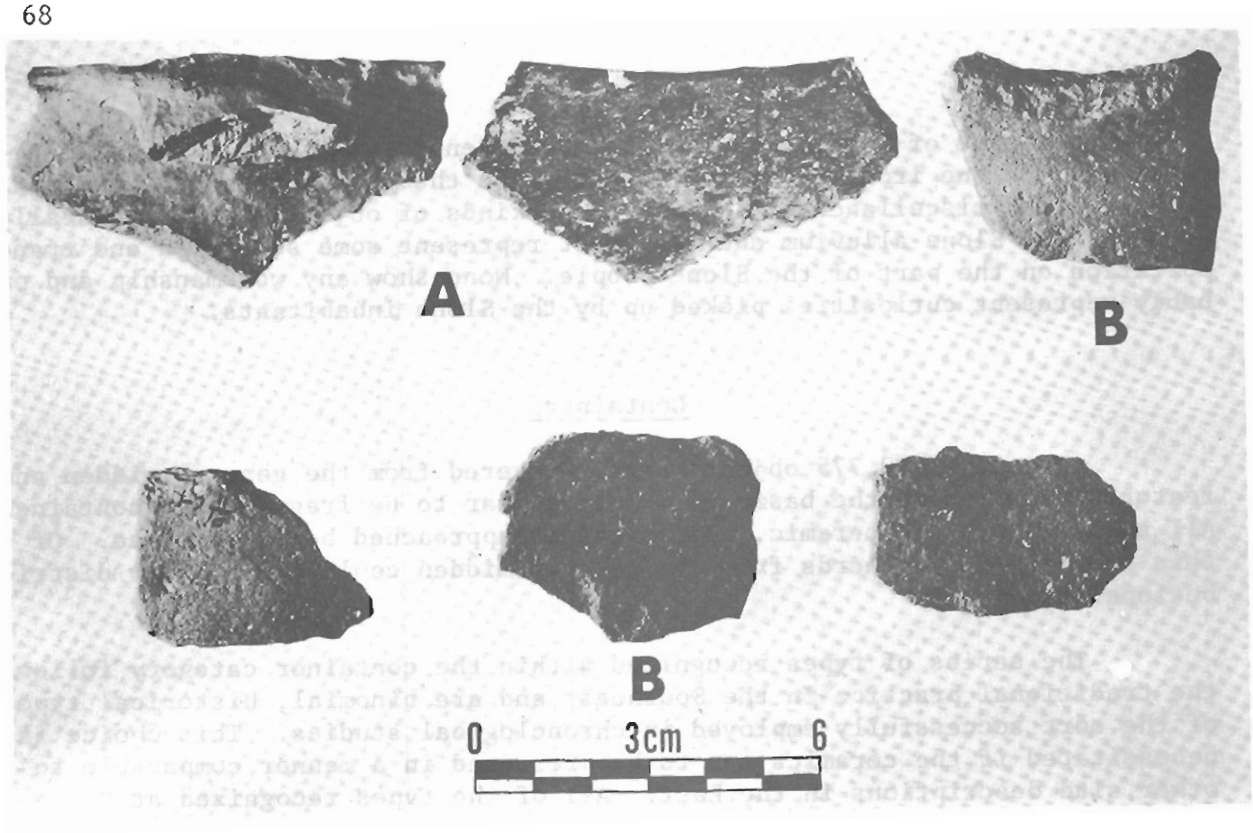

FIGURE 41

Madisonville Plain
(A) rim sherds and (B) body sherds.

This type superficially resembles the Mississippian type Neeley's Ferry Plain (Phillips, Ford, and Griffin 1951: 105-110), but differs in being made by a paddle and anvil technique as opposed to the Mississippian scraping technique.

Madisonville-Fox Farm Cordmarked (Fig. 42):

(Shell-tempered, cordmarked exterior; Hanson 1969: 3-6). There are 3,973 sherds from the general midden of this type, 20.82 per cent of the pottery, plus 342 from features. Decoration, while less frequent than on Madisonville Plain, did occur in the form of two incised sherds and one punctated sherd. In addition, five sherds were drilled. All decorated sherds came from the upper two levels.

Vessels were almost exclusively flaring rimmed jars with sub-conical bases and rim diameters ranging from 12.0 cm. to 41.0 cm. Rounded lips remain dominant over flattened lips throughout the sequence. Appendages were strap handles cordmarked on the exterior.

This type combines two of Griffin's types (1943: 346-347) into one, since they can only be distinguished on the basis of rim sherds; the primary difference being the absence of cordmarking on the Madisonville variety and the prevalence of flaring rims. At the Slone Site, these attributes merge with the predominance of cordmarking and flaring rims.

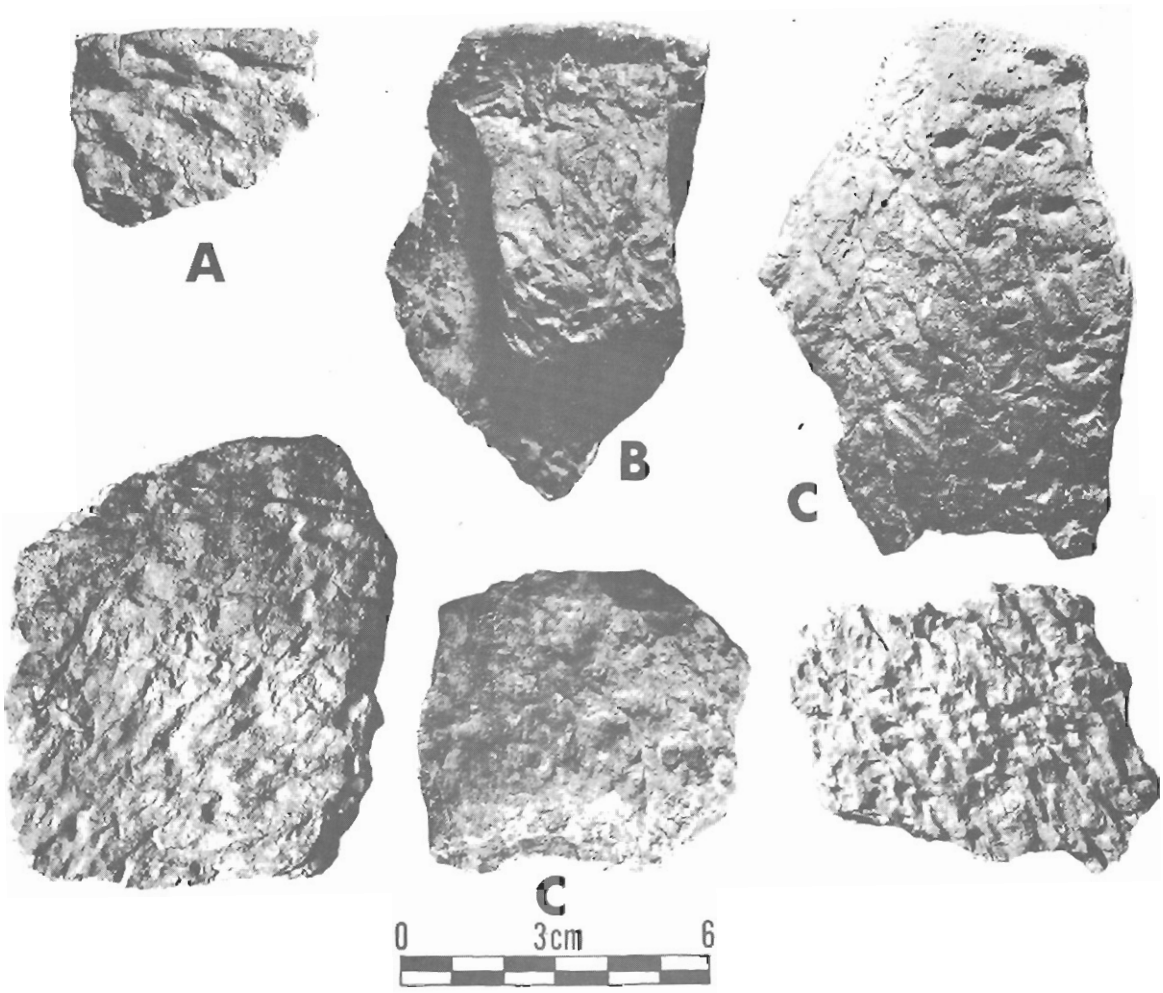

FIGURE 42

Madisonville-Fox Farm Cordmarked
(A) large strap handle, (B) rim sherds, and (C) body sherds.

New River Knot Roughened and Net-Impressed (Figs. 43 and 44):

(Shell-tempered, knotted-cordage and/or net impressed exterior; Evans 1955: 57-58). There are 3,521 sherds of this type from the general midden, 18.45 per cent of the pottery, plus 171 from features. No warp or weft elements are discernable, and this type should not be confused with Madisonville Net Impressed which has a distinct net impression on its exterior surface.

The roughened treatment is carried up to the lip in many cases and occurs on the exterior of strap handles attached to the lip. Vessels are subconical, flaring rimmed jars.

The New River type is restricted to the central Appalachian Mountains and the Slone Site lies near the western margin of its known distribution. It is not found in Ohio Valley Fort Ancient sites, and there are no Mississippian equivalents. It is a diagnostic trait of the Woodside Phase of the Fort Ancient Tradition.

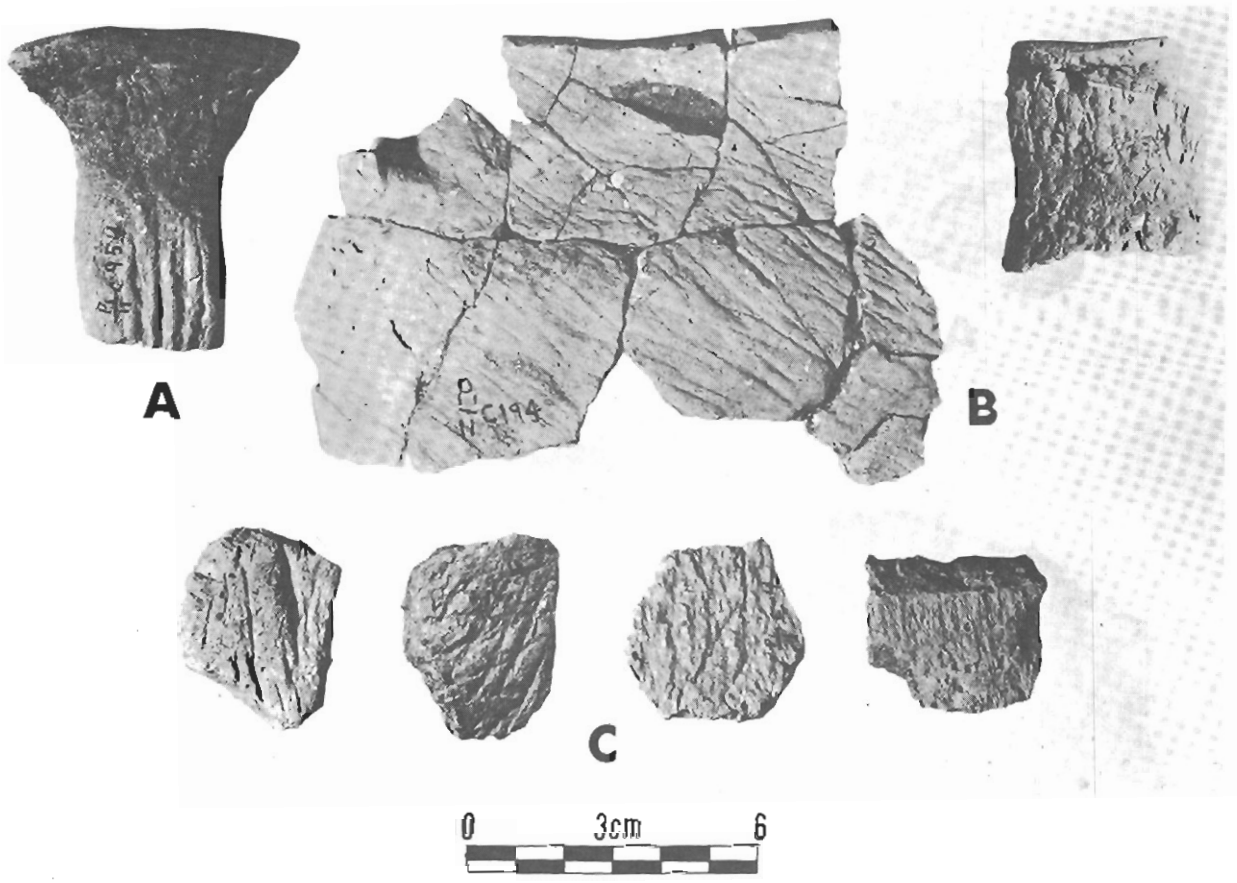

FIGURE 43

New River Knot Roughened and Net-Impressed.
(A) rim sherds, (B) strap handle, and (C) body sherds.

Fox Farm Bowl:

(Fine shell-temper, smoothed exterior; Griffin 1943: 345-346; Hanson 1969: 9-10). Seventy-nine sherds of this type, .41 per cent of the pottery, came from the general midden, plus six from features. These sherds are tempered with shell less than 2 mm. in diameter. Vessel forms at this site are small jars with flattened lips and strap handles.

This type was poorly defined initially, but rather than create a new type, it was adapted to account for sherds which are the Fort Ancient equivalent of Bell Plain (Phillips, Ford, and Griffin 1951: 122-126). Essentially, these appear to be the same except for their cultural affiliations, although

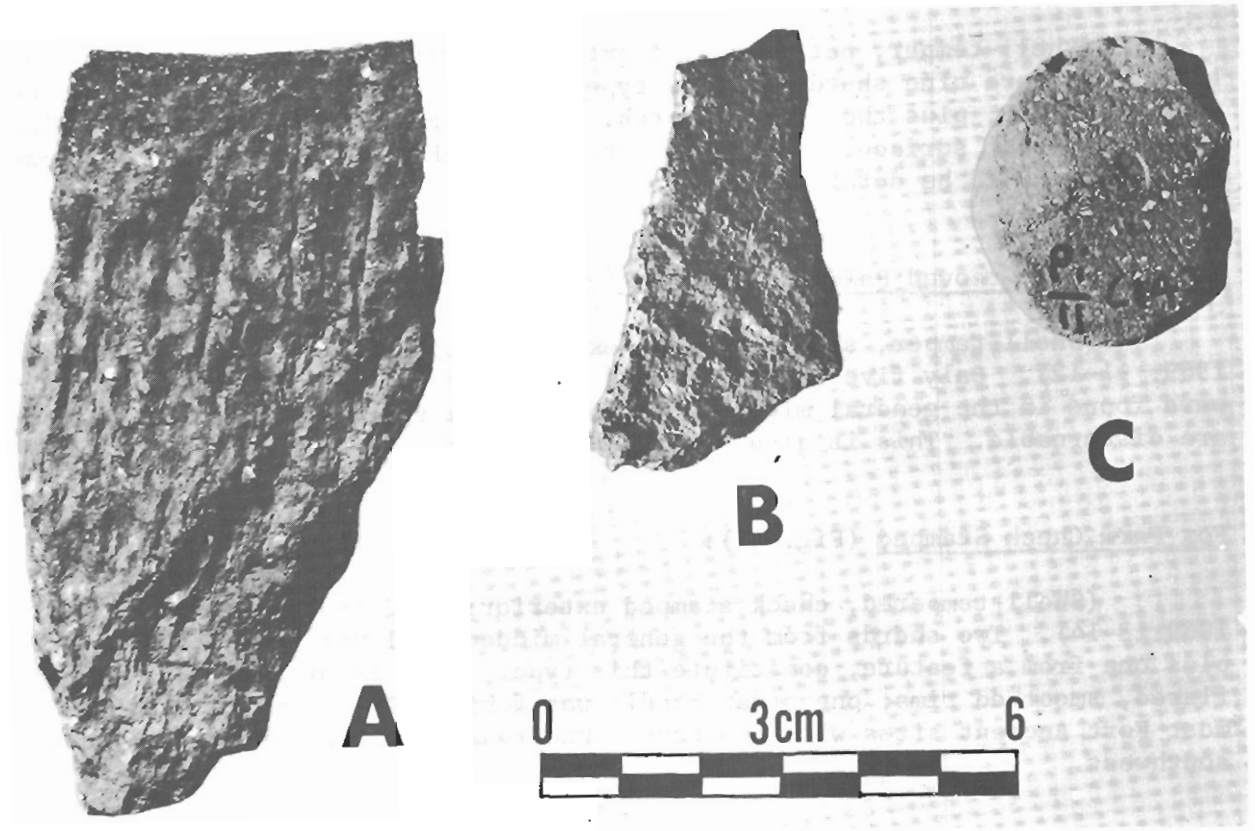

FIGURE 44

Miscellaneous Ceramics.
(A) New River Knot Roughened and Net-Impressed rim sherd with incised and punctate decoration, (B) Fox Farm Check Stamped body sherd, and (C) Madisonville Plain pottery disc.

the possibility that Fox Farm Bowl vessels were produced with a paddle and anvil technique has been suggested based on the presence of cordmarking and tool marks (Hanson 1963: 233).

Fox Farm Salt Pan:

(Shell-tempered, untreated exterior; Griffin 1943: 345; Hanson 1969: 7-9). There were 31 sherds, .16 per cent of the pottery, from the general midden of this type, plus three from a feature. The interior surface is plain to smooth and this treatment is carried to the exterior only around the rim. The vessel shape is a large shallow pan.

This type is found on most Fort Ancient sites and on Mississippian sites under the name Kimmswick Plain (Williams 1954: 219-220). Vessels were molded in a pit, often lined with fabric at other sites.

Madisonville Net Impressed:

(Shell-temper, net-impressed exterior; Griffin 1943: 350; Hanson 1969: 15). There are nine sherds of this type from the general midden, .05 per cent of the pottery, plus two from features. They display a clear net impression on the exterior surface. This is a late, minor, Fort Ancient type. No vessel shapes could be determined.

Madisonville Grooved Paddled:

(Shell-temper, simple stamped exterior; Griffin 1943: 349; Hanson 1969: 11-12). Only five sherds of this type, .03 per cent of the pottery, were found in the general midden, plus one from a feature. No vessel forms are discernable. This is also a late, minor type.

Fox Farm Check Stamped (Fig. 44):

(Shell-tempered, check stamped exterior; Griffin 1943: 350; Hanson 1969:13-14). Two sherds from the general midden, .01 per cent of the pottery, plus one from a feature, constitute this type. Vessels of this type have flared, smoothed rims; one strap handle was found. This type is minor on most Fort Ancient sites with numerous counterparts to the east, south, and southwest.

Pottery Distribution

For the purposes of pottery distribution investigation, the three vertical units (0-20 cm., 20-30 cm. and 30-40 cm.) have been employed; however, the two-meter square horizontal collection units proved too small both in terms of absolute numbers and the vagaries introduced by differing excavation techniques. The horizontal units employed are "sections," sixteen contiguous squares arranged four rows by four columns. The 1964 excavations were actually carried out in these sections, balks being retained every four meters for vertical control and all work completed section by section. The 1963 work was not conducted in terms of sections; however, it is an easy matter to group adjacent collection units into sections for these analyses.

It was noticed during the 1964 season that the frequency of occurrence of the various pottery types varied considerably and, intuitively, regularly from one area of the site to another. In view of the demonstrable areal variations noted in the graves and burials, this prompted further investigation of spatial variation. In the 1964 report, utilizing only the collections made during that season, an attempt was made to identify and isolate relatively homogeneous areas, minimal statistical entities, through the use of significance tests. The procedures used are described in detail in that report (Hanson, Dunnell, and Hardesty 1964: 125-131) and need not be recited here, save to point out that the resulting groups are based upon the percentage of Madisonville Plain alone and that the basic procedure was to compare adjacent excavation units in terms of the Null Hypothesis Significance Test, grouping those units together which are not significantly different from one another. The results of this crude evaluation are shown in Figure 45 and register both radial differences, Area A, Area B, Area C, and concentric variations Area C, Area D, and Area E.

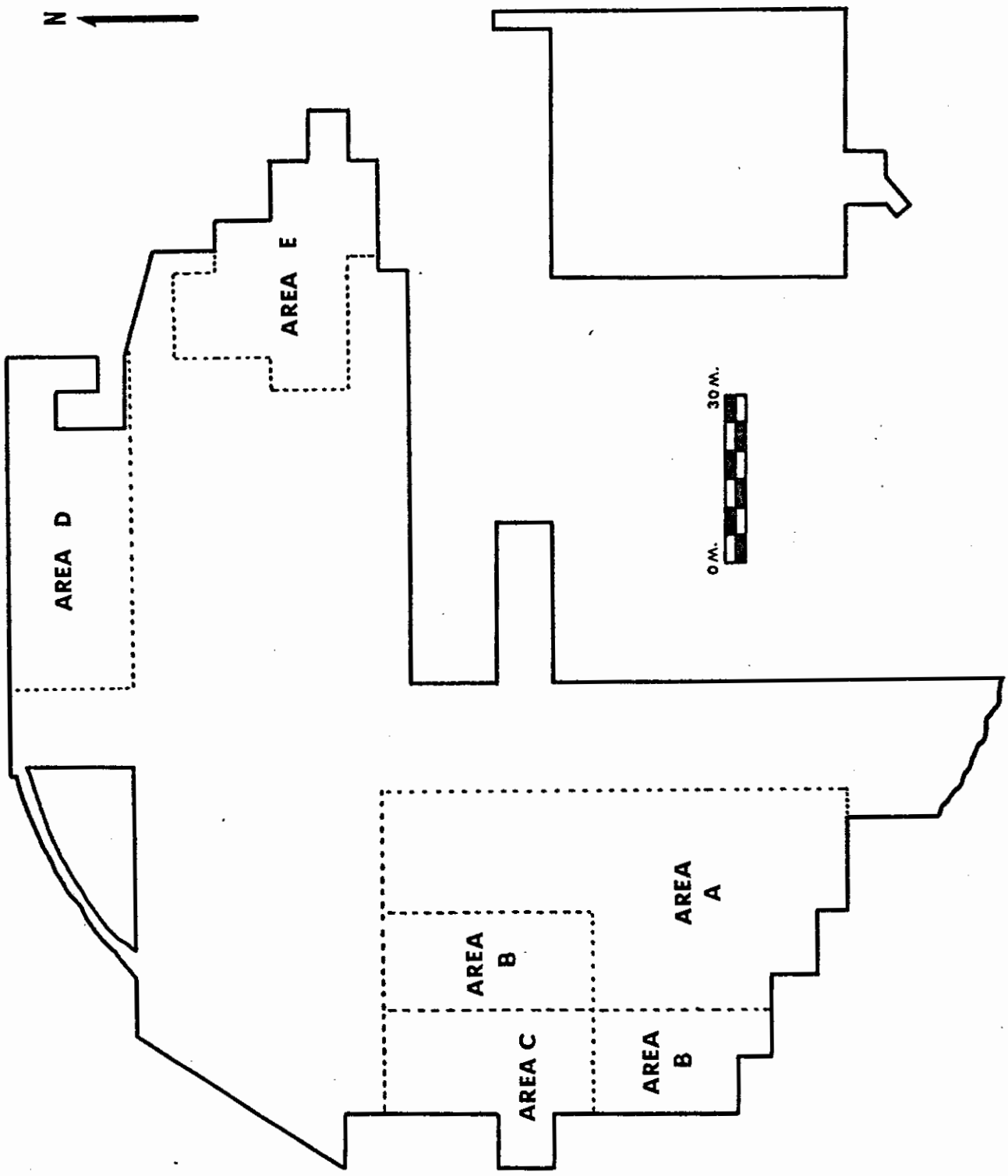

FIGURE 45

Chi-square Clustering of Madisonville Plain in Space.
Those areas excavated but not within a cluster
have too few sherds to be included in the analysis.

Recognizing that the above analysis is unsatisfactory in many respects and that it is most desirable to increase the size of the operational units and consider the effects of differential distribution for all the types, Hardesty undertook the linear scaling of the upper two levels section by section. Counts and percentages in terms of several types were calculated for each section. No sample smaller than thirty was included, the size being selected on the basis of recommended minimum frequencies for large sample studies (Siegel 1956). A measure of formal similarity among all of the ceramic units (hereafter referred to as lots) was obtained by applying Robinson's Index of Similarity (Robinson 1951). This similarity score is particularly useful for Q-technique studies (Stephenson 1953) and also minimizes the effect of rare-type intrusion (Lipe 1964), a factor of concern since heavy mixing is demonstrable at the Slone Site.

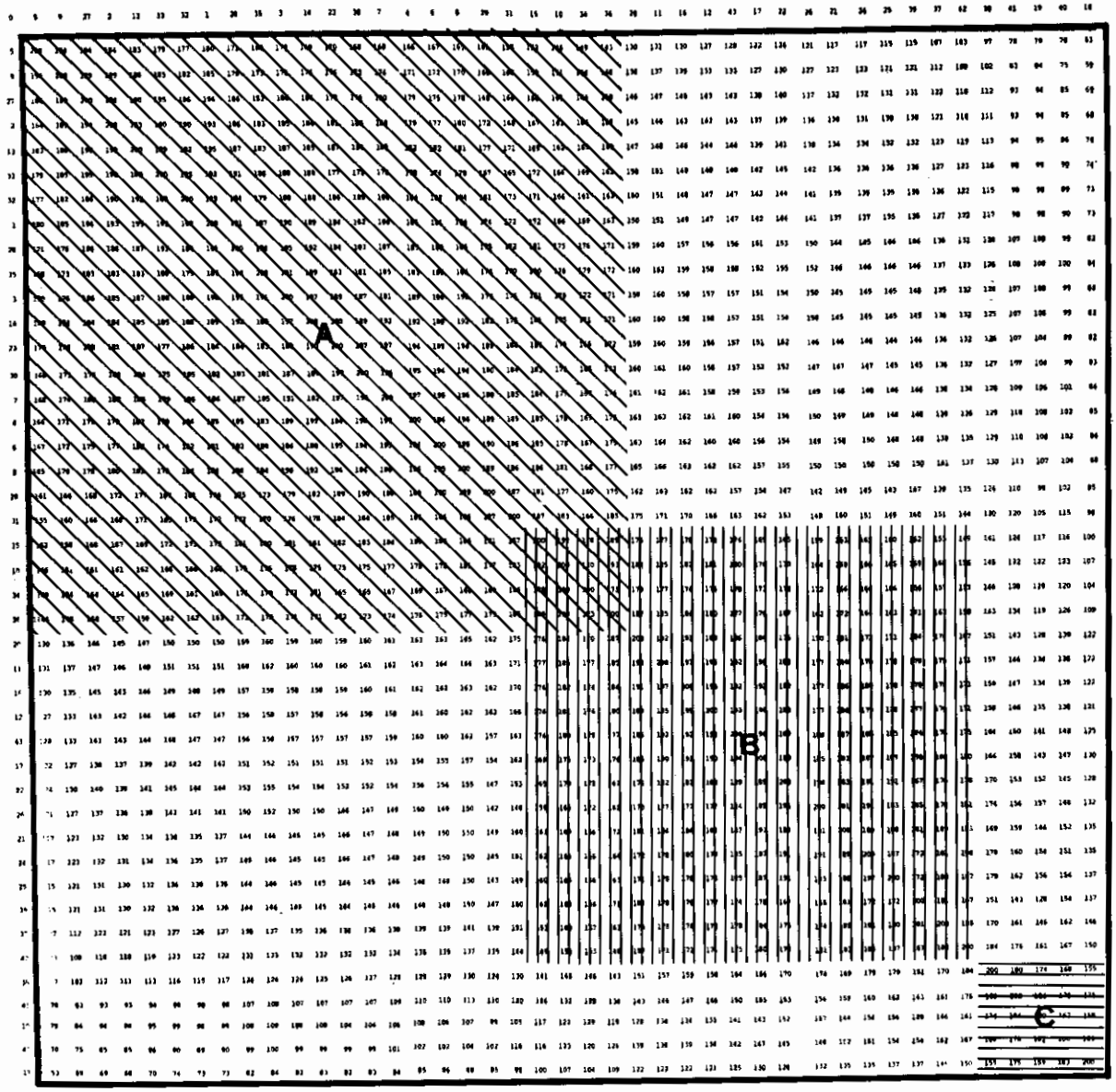

FIGURE 46

Ordered Matrix with Homostats Isolated.

Similarity scores were calculated for all pairs of lots. The similarity scores for the lots were arranged in a matrix table and, using PROGRAM SERIATE (Craytor and Johnson 1968), were ordered with the IBM 360/50 computor of the Statistical Laboratory and Computing Center at the University of Oregon. PROGRAM SERIATE compares trial data orderings by two criteria termed Coefficient H and Matrix Coefficient C. Fifteen independent orderings of the matrix yield identical Coefficient H and C values, suggesting an easily discerned and readily obtainable order in the distribution of the several pottery types. Clustering was facilitated by topographic contouring, treating similarity scores as elevations (Robinson 1951), which recognizes areas of similar scores or homostats within the matrix. Homostats are complete linkage clusters, defined as "... a group of items which have a degree of similarity to each other above a specific minimum" (Johnson 1968: 16) (cf. the single link clusters and average link clusters of Sokal and Sneath 1963).

Figure 46 presents the results of the topographic analysis. Three homostats are isolated and illustrated by hatching. Investigation of correspondence between homostats and spatial origin of the constituent lots was then undertaken by plotting their location by level and horizontal origin. Figure 47 and Figure 48 illustrate the spatial arrangement and homostat membership for upper level and middle level lots respectively. A comparison of these figures reveals one factor immediately: variation in pottery frequencies in the horizontal dimension overrides any and all variation in the vertical dimension. There is no correspondence between the level and the homostat assignment. Irrespective of vertical origin Homostat A occupies the periphery of the town while Homostat B is restricted to the interior in the southwestern section. As can be seen from either of these figures, the abundance of Homostat B from other portions of the site appears to be due to the lack of usable sections from the interior area in other portions of the site. Reference to Lots 10, 34, and 36 in the Matrix indicates that these units are intermediary to Homostats A and B and are not readily placed in either. Further, the spatial affiliation of these units in both Figure 47 and 48 indicates that they originate in the border region between the two Homostats and are thus most susceptable to mechanical mixing. Homostat C lies to the interior of A, again only in the southwestern portion of the site; however, the placement of Homostat C units from level to level is not consistent and these units contain minimal numbers of sherds. Further Lots 18 and 19 in Figure 47 are almost certainly products of plowing, since no evidence of occupation occurs in this area except in the plow disturbed zone. These considerations suggest that, in spite of the generally consistent location of Homostat C, it is best regarded as an artifact of the matrix and unreliable for purposes of interpretation. Small sample size and mixing may be the source of apparent similarity.

The distributions in Figures 47 and 48 are, of course, purely formal; the significance of these clusters must be inferred from the correlation of their distribution with kinds of evidence available and from the definitions of the types used in the calculations. Further, it must be remembered that the nature of the technique employed combines all sources of variation and thus the radial arrangement of the three homostats, though the overwhelming tendency is in space, may mask other distributional characteristics of less intensity as suggested in Figure 45 and as will be considered in connection with vertical distribution. Interpretation of the main tendency as represented in the distribution of Homostats A, B, and C is relatively straight forward given the structure of the Slone community as presented in the section

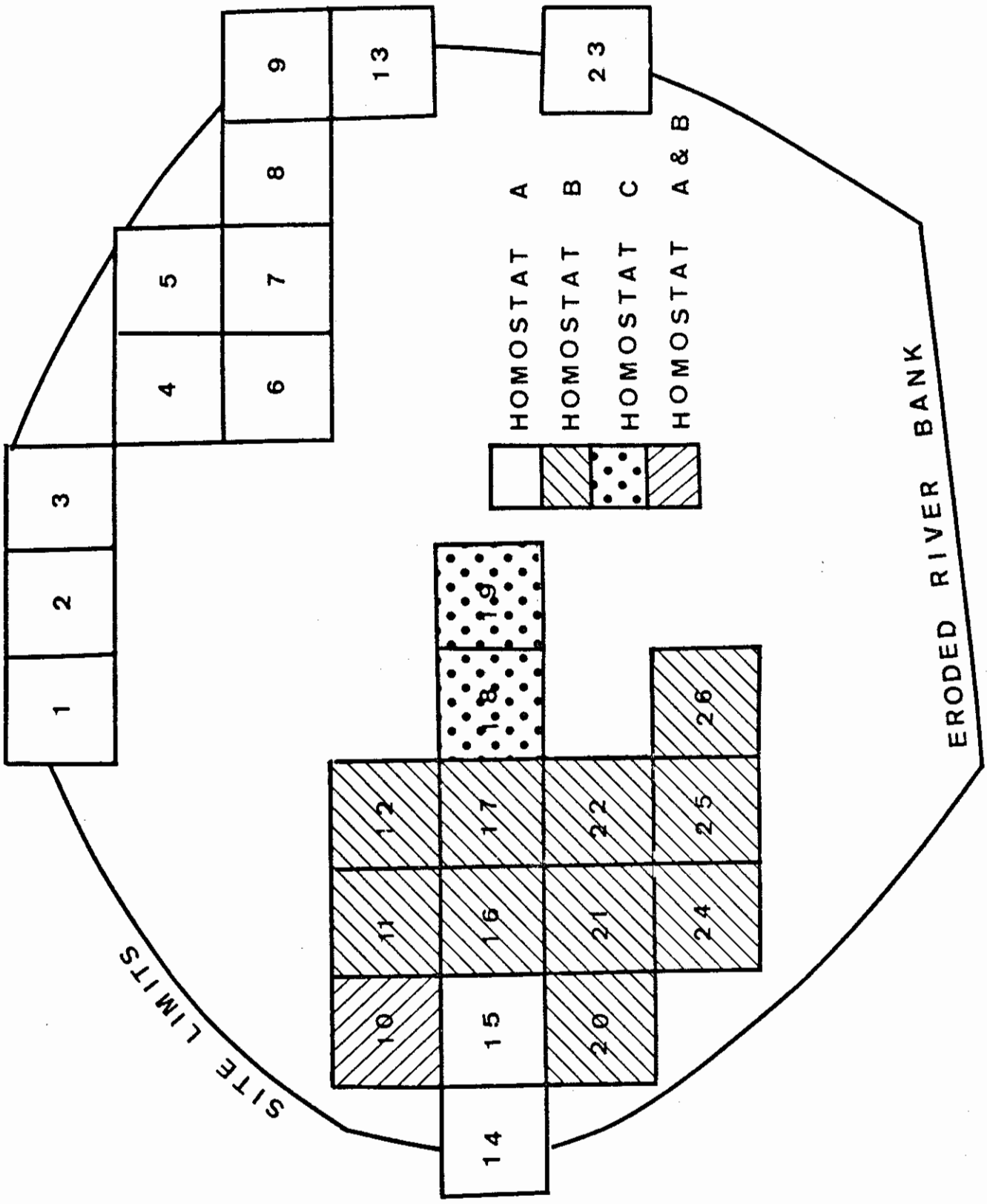

FIGURE 47

Spatial Arrangement of Homostats, Upper Level.

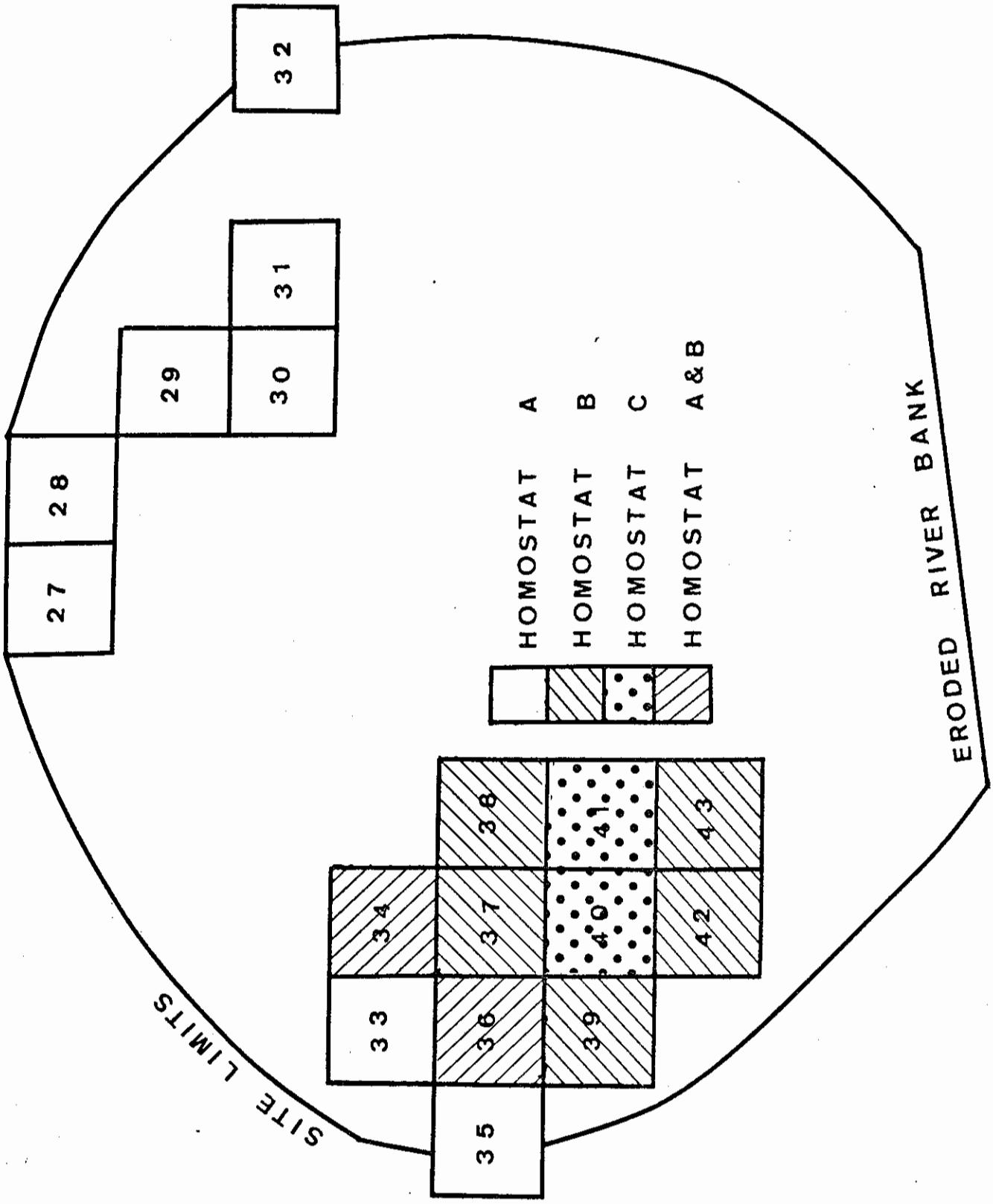

FIGURE 48

Spatial Arrangement of Homostats, Middle Level.

TABLE 13

Vertical Composition of Clusters A-C by Pottery Type Counts

Pottery Types	Homostat A			Homostat B			Homostat C			Total
	total	0-20	20-30	total	0-20	20-30	total	0-20	20-30	
Madisonville Plain	4,160	2,789	1,371	6,294	5,153	1,141	209	18	191	10,663
Madisonville-Fox Farm Cordmarked	889	549	340	2,598	2,038	560	205	17	188	3,692
New River Knot Roughened	420	264	156	2,554	1,989	565	282	32	250	3,256
Fox Farm Bowl	28	19	9	49	44	5	0	0	0	77
Fox Farm Salt Pan	8	4	4	20	18	2	0	0	0	28
Madisonville Net-Impressed	5	2	3	4	4	0	0	0	0	9
Madisonville Grooved Paddled	1	1	0	3	1	2	0	0	0	4
Fox Farm Check Stamped	1	1	0	1	1	0	0	0	0	2
Total	5,512	3,629	1,883	11,523	9,248	2,275	696	67	629	17,731*

* Total sherds included in this vertical distribution is less than the total used in analysis by virtue of the exclusion of the 30-40 cm. level and higher horizontal units with less than thirty sherds, and includes only those sherds assigned to one or another of the three clusters

TABLE 14

Vertical Composition of Clusters A-C by Pottery Type Percentages

Pottery Type	Homostat A			Homostat B			Homostat C			Total
	total	0-20	20-30	total	0-20	20-30	total	0-20	20-30	
Madisonville Plain	75.47	76.85	72.81	54.62	55.72	50.15	30.03	26.87	30.37	60.14
Madisonville-Fox Farm Cordmarked	16.12	15.13	18.06	22.55	22.04	24.62	29.45	25.37	29.89	20.82
New River Knot Roughened	7.62	7.47	8.28	22.16	21.51	24.83	40.52	47.76	39.74	18.36
Fox Farm Bowl	.51	.52	.48	.43	.48	.22	0.00	0.00	0.00	.43
Fox Farm Salt Pan	.15	.11	.21	.17	.19	.09	0.00	0.00	0.00	.16
Madisonville Net-Impressed	.09	.06	.16	.04	.03	0.00	0.00	0.00	0.00	.06
Madisonville Grooved Paddled	.02	.03	0.00	.03	.01	0.09	0.00	0.00	0.00	.02
Fox Farm Check Stamped	.02	.03	0.00	.01	.01	0.00	0.00	0.00	0.00	.01
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

on Features. Radial distributions can be of two sorts: functional correlates of community activity patterns or temporal correlates of the rebuilding and/or reoccupation that resulted in the concentric patterning of the main structural features. There are two reasons for rejecting the functional correlate hypothesis: (1) the types used are historical not functional, and thus any functional correlation would be purely chance; and (2) there is no direct correlation between the location of the three clusters and the activity zones in space. The temporal correlation hypothesis can be accepted because: (1) the types used in the computations are historical and are demonstrably sensitive to temporal factors (Dunnell 1967, 1970); (2) the unequivical evidence of rebuilding, whether actual reoccupation or simply rebuilding to accommodate the growing population, argues that temporal change is to be expected in any set of sensitive categories; and (3) it follows from the concentric patterning of the rebuilding and/or reoccupation that any temporal changes will be manifest in space in radial differences. In short, the only plausible account for the radial arrangement of the homostats is that they represent temporal differences in ceramic assemblages associated with the expanding Slone community.

TABLE 15

Robinson's Index of Similarity Values
for Homostats and Their Constituent Vertical Units.

	A-B	B-C	C-A
as units**	158	149	108
0-20 cm.	158	141	99
20-30 cm.	151	160	113
average*	155	150	106

** computed without regard to vertical units
* averaged values for the two levels in each unit

The strength of the differences between homostats can be roughly gauged from Table 15 which presents Robinson's Index of Similarity scores for comparisons of the three homostats in terms of: (1) total sherd composition; (2) their sherd composition by level; and (3) averages of the level scores. Both the close coincidence of (1) and (3) and the scores level by level indicate that vertical provenience does not make an important contribution to the constitution of the homostats. The table also conclusively demonstrates the insignificance of plowing as a mixing agent in the upper level. If plowing had a significant effect in the constitution of the clusters, it would be expected that the scores for any given homostat comparison would be highest in the 0-20 cm. level and substantially lower in the 20-30 cm level which nowhere has been effected by plowing. No such pattern is evident; in fact, if anything, there is a counter trend.

In turning to consider the vertical distribution of pottery types, it is important to consider the effects of vertical disturbance. All living surfaces which represent the origin of the materials considered have been mixed by plowing, destroying the discreteness of any temporally separated occupations. Only in the southwestern area is there an exception, and here only portions of one living surface are sporadically preserved. Thus, while plowing has had minimal effect on the horizontal distribution of pottery, it has had important effects on its vertical distribution. Differences in vertical distributions cannot be expected to be sharp. Vertical mixing, both modern and aboriginal, would blend any sharp differences into gradual shifts in popularity. Table 16 presents the vertical distribution of pottery types for the site as a whole. To assess the significance of the frequency variation evident, Chi-squares, following Spaulding's example (1960: 80), were calculated for Madisonville Plain, Madisonville-Fox Farm Cordmarked, and New River Knot Roughened and Net-Impressed frequency distributions, which account for 99.34 per cent of the total ceramics. Chi-square values of 52.70, 13.38, and 50.81 were obtained respectively. Chi-square values of this magnitude, especially in concert, effectively preclude the interpretation of these frequency variations as products of chance.

TABLE 16

Vertical Distribution of Pottery Types by Count and Percentage

Pottery Types	0-20		20-30		30-40		Total	
Madisonville Plain	7,950	61.90	2,769	56.75	768	55.49	11,487	60.12
Madisonville- Fox Farm Cordmarked	2,591	20.17	1,102	22.59	280	20.23	3,973	20.79
New River Knot Roughened	2,208	17.19	980	20.09	333	24.06	3,521	18.43
Fox Farm Bowl	63	.49	16	.33	0	0.00	79	.41
Fox Farm Salt Pan	22	.17	6	.12	3	.22	31	.16
Madisonville Net-Impressed	6	.05	3	.06	0	0.00	9	.05
Madisonville Grooved Paddled	2	.02	3	.06	0	0.00	5	.03
Fox Farm Check Stamped	2	.01	0	0.00	0	0.00	2	.01
Total	12,844	100.00	4,879	100.00	1,384	100.00	19,107	100.00

There is a general increase in the frequency of Madisonville Plain through time with a corresponding decrease in both textured surfaces, New River Knot Roughened and Net-Impressed decreasing somewhat earlier than Madisonville-Fox Farm Cordmarked. This pattern can also be observed without Homostats A and B (Table 14). Homostat C, because of the small sample from the 0-20 cm. level (67 items), is just as dubious for vertical distributions as it is for horizontal. This change in the frequency of pottery types occurrence is readily attributed to time; not only are the types used historical and sensitive to temporal change, but the most plausible account for vertical change is traditionally regarded as temporal. Furthermore, especially of interest because of its independence of Slone ceramics, this pattern is replicated in all seriations of Woodside Phase settlements in the Fishtrap area (e.g., Dunnell 1966: 39a; 1967: 97). Of particular importance to a temporal explanation for the radial arrangement of Homostats A, B, and perhaps C, is the fact that the same pattern of frequency change occurs horizontally from the center of the site to the periphery, the innermost homostat having the lowest percentage of plain pottery which increases toward the periphery, first at the expense of roughened surfaces and then cordmarked surfaces. Adding still further plausibility to this correlation is the fact that the direction is also the same; both the structural evidence and the distributional evidence indicate that the smallest community near the center is the earliest with a gradual expansion in size through time.

In summary, Slone ceramic distributions are best accounted for by attributing the major source of variability to the effect of time upon a growing community with a minor expression of contemporaneous sub-community level differences. The temporal hypothesis finds support in both horizontal and vertical distributions with its strongest expression in the horizontal dimension. Only the preliminary and relatively crude analysis of horizontal distributions (Fig. 45) indicates some variation around the community in a pattern similar to that displayed by the distribution of graves and burials. The lack of adequate ceramic samples from interior locations in all areas except the southwestern segment obviously precludes a strong expression of these kinds of differences in ceramic distributions.

Fragments-Unfinished

A total of 47 items, all bearing clear evidence of manufacture and which had they been complete could have been assigned to one or another of the categories already presented, were recovered in the two years' excavations. With the exception of two specimens, one a ground barrel-shaped piece of cannal coal and the other a large slab of sandstone with its edges broken by percussion, all the stone objects included here are fragmentary. All of the bone artifacts included in this category are fragmentary. Ten are ground at one end and may be portions of beads; seven may be parts of awls; three show grinding along one edge; two are ground along both edges and one end but the other end is missing; two have ground edges which have been transversly notched; one piece has a portion of a bit and may be a wedge fragment; one is notched at one end but the body of the tool is missing; and there is one drilled fragment. The three shell items assigned to this category are all unfinished items exhibiting some grinding, one being roughly rectangular, one circular, and one triangular. Three pieces of fired clay constitute the ceramic items assigned to this category; two fired lumps may be fragments of figurines or scrap from pot-making that accidentally were fired, while the third, being clearly shell-tempered, is apparently scrap from pot-making.

4

GENERAL MIDDEN

The major portion of the artifactual material recovered from the Slone Site does not occur within the boundaries of discrete structural units, but is instead material that accumulated on or slightly under the surface of the site when it was occupied. Most of the material occurs in the refuse zone where it was originally deposited as sheet midden. Aboriginal churning and digging as well as deposition have played roles in the accumulation of this material in a loosely structured context. The term general midden is applied to this kind of provenience.

The following section will describe the procedures used in the collection and analysis of these data, as well as the conclusions reached based upon the analysis. With the exception of ceramic density, the sample utilized is drawn from the 1964 excavation since the earlier excavation did not sample all of the relevant categories.

Reliability

Both the kinds of analysis that are feasible and the interpretation and reliability of analyses performed are a function of the quality and control of the collection procedures. The excavation of the Slone Site during both seasons was a salvage project, and while substantial experience acquired during the first season could be applied during the second, the main constraints remained time, money, and the general objective of recovering a relatively complete community pattern. The general objective has been met; however, this was possible only through the use of expedient collection techniques and varying the techniques employed to suit the achievement of the general objective. While more detailed and better controlled sampling would have permitted much more latitude in the kinds of analyses that could be profitably performed, it is the variation in technique that limits the reliability of what has been done. This bias has been corrected in part by excluding the 1963 sample from most analyses since it is known to be skewed; however, the quantitative information presented for each of the general midden categories must be evaluated in light of these limitations. Percentages are useful for gross comparative purposes only and are tendered as such. Small differences in counts and percentages may be due solely to sampling vagaries. On the other hand, major differences along these parameters reflect the operation of factors other than the sampling procedures.

Because of these limitations, the analysis of the general midden has been largely restricted to the presentation of factual data for general midden composition in a series of tables (Tables 17-22). Within each category (pottery, shell, bone, and stone), both counts and weights and percentages based on these are calculated. Assessing the relative roles of the several categories in the general midden as a whole is more difficult since breakage size and density of material effect counts and weights respectively. To provide a means of comparing the relative roles of each category in the midden

as a whole an additional statistic, corrected weight, has been calculated as follows:

$$\frac{\text{total category weight}}{\text{weight per ml.}} = \text{corrected weight}$$

The decision to correct weight rather than count was based upon the pragmatics of correcting for piece size or material density. Since piece size varies with material and with provenience (e.g., effects of plowing) and density varies only with material, the latter correction is the simplest to calculate. The corrected weight figure provides a rough volume comparison independent of the kind of material or size of piece. Because of the difficulty encountered in their quantification, heavy ground stone tools have been deleted from consideration.

Stratigraphic Considerations

All evidence indicates that the surface of the river terrace was geomorphologically stable at the time of Woodside occupation and has remained so since that time. There are no substantial fluvial deposits either overlying or within the Woodside cultural deposit. This stability has minimized the number of recognizable strata so that only two strata can be traced over the entirety of the site, excluding features. The distinction between these is well marked by a number of physical attributes detailed below; however, the cultural significance of the two strata and their correlation with the arbitrary levels employed varies and merits a somewhat extended consideration.

The uppermost stratigraphic unit, the plowzone, is an artifact of modern cultivation techniques. Its thickness varies from one part of the site to another but almost always lies between 15 and 20 centimeters in thickness. In general this unit is thinnest along the western edge of the site, along the northern and southern boundaries of the site, and along a north-south line dividing the eastern third of the site from the remainder; the thickest areas lie on the extreme eastern boundary of the site and in the approximate center of the western two-thirds. This pattern of thickness is a function of field structure and plowing pattern, one field covering the western two-thirds of the site with northern, southern, and western boundaries almost coincident with the extent of the site in these areas, and another field incorporating the eastern section of the site along its western edge. Plowing was done around the field, rather than back and forth, with the result that the plowzone assumes its minimal depth near the edges of fields and its maximum depth in the center where this plowing pattern gradually increases the elevation. As the plowzone deepens near the field center, the actual depth of penetration remaining the same, less mechanical disturbance is inflicted upon the underlying remains. Unfortunately, the only area in which this effect is significant lies almost wholly within the plaza where there is virtually nothing to be disturbed by plowing or protected by the increasing depth of the plowzone.

The plowzone is physically distinguished by its lack of compaction and by its dark brown color, both of which present sufficiently marked contrast with the underlying material to make its field recognition generally

extremely easy and accurate. Extending from the base of the plowzone to the bottom of the excavation is the second stratum, comprised by a light brown and exceedingly compact clay-loam, occasionally containing noticeable sand. The plowzone is always included within the 0-20 cm. level; however, since this stratum frequently is less than 20 cm. thick, the 0-20 cm. level almost always includes a small portion of the second stratum. The 20-30 cm. and 30-40 cm. levels are always within the second stratigraphic unit.

In the southwestern portion of the site a third stratigraphic unit is sporadically represented resting upon the light brown compact stratum and truncated by the plowzone (Fig. 49). These are lenses of dense accumulations of midden, the midden concentrations discussed in the Features section, and presumably are preserved by virtue of thickness.

Figure 49 presents a schematic section along the 34 line in the southwestern area where the greatest variety of stratigraphic units occur. The situation between R 75 and R 65 is typical for the site as a whole. All former living surfaces have been destroyed by incorporation in the plowzone with only fragmentary preservation of the lowest such surface represented by partially disturbed fired areas. In such situations there is a dense concentration of midden in the plowzone and little midden in the compact lower stratum which decreases in density with depth. The source of midden in the lower stratum is probably two-fold: (1) a certain amount of material may represent pits dug from higher levels into this stratum but which were not detected in excavation; and (2) material that worked its way into the ground during the occupation of higher surfaces. The section of Figure 49 between R 65 and R 60 and between R 80 and R 75 are unique to the southwestern area. In the first instance the lowermost living surface is preserved largely in situ by a thick plowzone which rapidly removed the living surface from the plow's reach, while in the second instance the accumulation of sheet midden protected the lowermost living surface by its added thickness. It is important to note that: (1) the 20-30 cm. level includes both of these unusual stratigraphic situations; and (2) these unusual situations contribute the bulk of all the material originating in the 20-30 cm. level.

Table 17 presents quantitative data on the vertical distribution of the four categories of material that make up the general midden, and Table 18 presents quantitative data on the composition of the three arbitrary levels in terms of the four materials. In Table 17 there is close agreement between the percentages based upon count and those based upon weight, and, with the exception of shell, there is close agreement in the distribution by vertical unit with roughly 60 per cent of each of the categories originating in the 0-20 cm. level, 25 to 30 per cent originating in the 20-30 cm. level, and about 10 per cent originating in the 30-40 cm. level. The gradual decrease from top to bottom is a function of the arbitrary levels, in particular, the fact that the bulk of the 20-30 cm. level material originates in the midden concentrations of the southwestern area. Had the arbitrary levels more closely matched the stratigraphic circumstances, a much sharper break in density would have been seen between the 0-20 cm. and 20-30 cm. levels, with the density of the latter approaching the density of the 30-40 cm. level. The disparity in distribution between shell and other categories has already been touched upon in considering shell artifacts and Table 17 graphically demonstrates the fragility of shell. The substantial deficiency in frequency in the plow-disturbed 0-20 cm. level and an increase in the 20-30 cm. level are due to both the protection afforded by depth and to the high frequency of

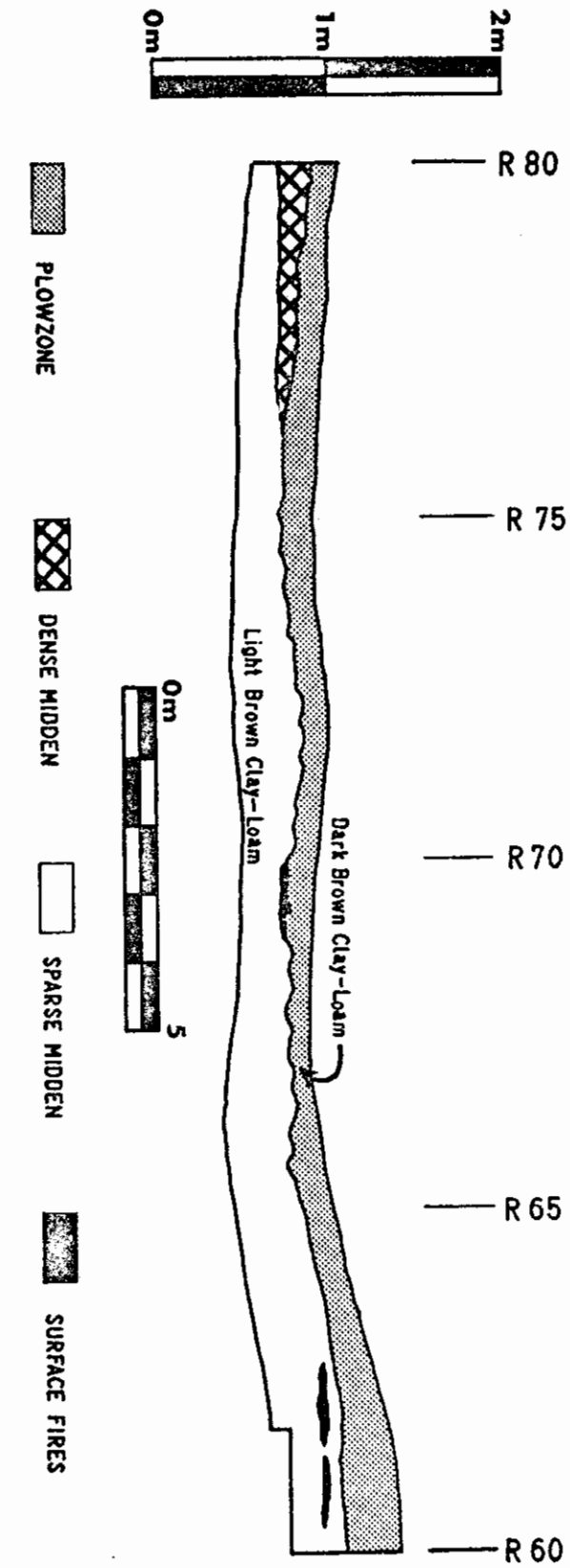

FIGURE 49

Schematic profile of the 34 line.

TABLE 17

Vertical Distribution of Midden Constituents

		Frequency			Percentages		
		0-20	20-30	30-40	0-20	20-30	30-40
Pottery	1*	12,914	5,010	1,648	65.88	25.60	8.42
	2*	63,684.9	26,058.5	10,027.3	63.83	26.12	10.05
	3*	30,765.6	12,588.6	4,844.1	-----	-----	-----
Shell	1	7,736	9,566	2,855	38.38	47.46	14.16
	2	12,825.5	16,903.0	3,603.5	38.48	50.71	10.81
	3	4,392.3	5,788.7	1,234.1	-----	-----	-----
Bone	1	10,081	6,624	413	58.89	38.70	2.41
	2	36,139.0	16,489.7	4,560.7	63.19	28.83	7.98
	3	25,450.0	11,612.5	3,211.8	-----	-----	-----
Stone	1	1,125	468	216	62.19	25.87	11.94
	2	1,907.0	731.6	339.1	64.04	24.57	11.39
	3	759.8	291.5	133.0	-----	-----	-----

* 1, 2, and 3 represent count, weight, and corrected weight respectively.

TABLE 18

Vertical Unit Composition
by Corrected Weights of Midden Constituents

	Per cent of Level			
	0-20	20-30	30-40	Total
Pottery	49.21	41.57	51.41	47.15
Shell	7.03	19.12	13.10	11.17
Bone	40.71	38.35	34.08	39.40
Stone	3.05	0.96	1.41	2.28
	100.00	100.00	100.00	100.00

shell in the midden concentrations of the southwestern section which constitute the source for most of the 20-30 cm. level midden. Using the corrected weight statistic for inter-material comparison, Table 18 indicates that with the exception of the deficiency of shell in the upper disturbed level, the composition of the general midden does not vary with depth. The distribution for the 20-30 cm. level is probably most nearly representative of the composition at the time of deposition.

TABLE 19

Distribution of Non-ceramic Manufactures and Waste by Count

Material	0-20		20-30		30-40		Total	
	no.	%*	no.	%	no.	%	no.	%
Shell								
manufacture	3	04	0	0.00	0	0.00	3	.01
waste	7,733		9,566		2,855		20,154	
Stone								
manufacture	457	36.16	202	37.34	96	37.50	755	36.63
waste	807		339		160		1,306	
Bone								
manufacture	41	.41	33	.49	16	3.87	90	.53
waste	10,043		6,591		397		17,031	
Total								
manufacture	501	2.63	235	1.40	112	3.19	848	2.16
waste	18,583		16,496		3,412		38,491	

* per cent of category worn or manufactured only, waste is this figure from 100.00.

Table 19 represents the results of the last analysis attempted for the general midden as a whole in terms of the vertical dimension. In this table the distribution of tools, both worn and manufactured items but termed simply manufactures in the table, has been tabulated, along with that of waste, unworn, and unmodified items. Since all ceramics are tools in this sense, pottery is considered in this distribution. These distributions confirm the previous ones: there is a change in intensity in the vertical dimension, but there is no significant change in composition. With the single exception of bone in the lowest level, the percentage of tools within each category is remarkably constant from level to level. There is virtually no worked shell; less than one per cent of all bone has been converted to tools, and about 37 per cent of the stone has either been manufactured as tools or used.

In summary, the several analyses indicate no radical change in the composition of the general midden vertically; however, there is important change in density of this midden. The 0-20 cm. level contains over half of

all the recovered material, and Table 17 shows a marked but gradual increase in density to the 30-40 cm. level. It has been pointed out, however, that this gradual character to the density distribution is a function of the lack of correlation between stratigraphic zones, arbitrary levels, and living surfaces, and that all of the Woodside debris can be regarded as having its origin relatively high within the site, in most areas of the site within the plowzone. Also of importance in evaluating the more detailed considerations that follow is the underrepresentation of shell in the 0-20 cm. level through the agency of plowing. Vertically, the general midden is a relatively homogeneous band high in the profile of the site which has subsequently been churned by plowing and with an apparent downward dispersion largely as a result of excavation techniques applied to the partially plow-disturbed deposit.

Ceramics

Pottery is the largest constituent, both in terms of count and weight, of the general midden at Slone, accounting for 57.15 per cent of the general midden calculated from corrected weights (Table 18). In addition to its frequency of occurrence, its value in an examination of the general midden is greatly inhanced by the fact that it is the one category of material that was regularly collected during both the 1963 and 1964 seasons, making horizontal distribution study possible. Although pottery was generally distributed over the entirety of the site's surface, its density within this distribution varied considerably. At the time of investigation the site was heavily vegetated in a variety of crops and fallows which effectively prevented any systematic surface collection attempts.

Figure 50 graphically presents ceramic density of the top 20 centimeters of the site with the aid of a concentration index (Willey and McGimsey 1954: 44). A normed numerical value for each 16 square meter section was calculated by dividing the number of sherds for each section by the excavated volume of that section. Insofar as collection techniques are comparable between sections, the values so obtained are comparable measures of the density of occurrence. The northernmost three sections and the western group of sections excluding its northernmost member all represent comparable collection techniques and thus the concentration index values within this set are accurate representations of relative density. The eastern sections, and the northernmost section in the western group excluding the northern three included above, do not represent the products of comparable controlled collection techniques and thus are neither internally comparable nor comparable to the other set of sections. Here the concentration index values are only rough and uncontrolled indicators of density.

From Figure 50 it will be noted that the highest values (50.0 and above indicated by darkest shading) fall in the refuse zone posited earlier. Since it has been demonstrated that plowing has had little effect in the spatial distribution of artifacts, this correlation is to be expected. Beyond this feature, however, little can be said of the distribution because of the lack of comparability of collection technique. The larger number of high values obtained for the southwestern area may be, for example, a function of more refuse being deposited in this area coupled with the better preservation of the living surface; however, since these values are not comparable to those in the eastern section, inferences of this sort are speculative.

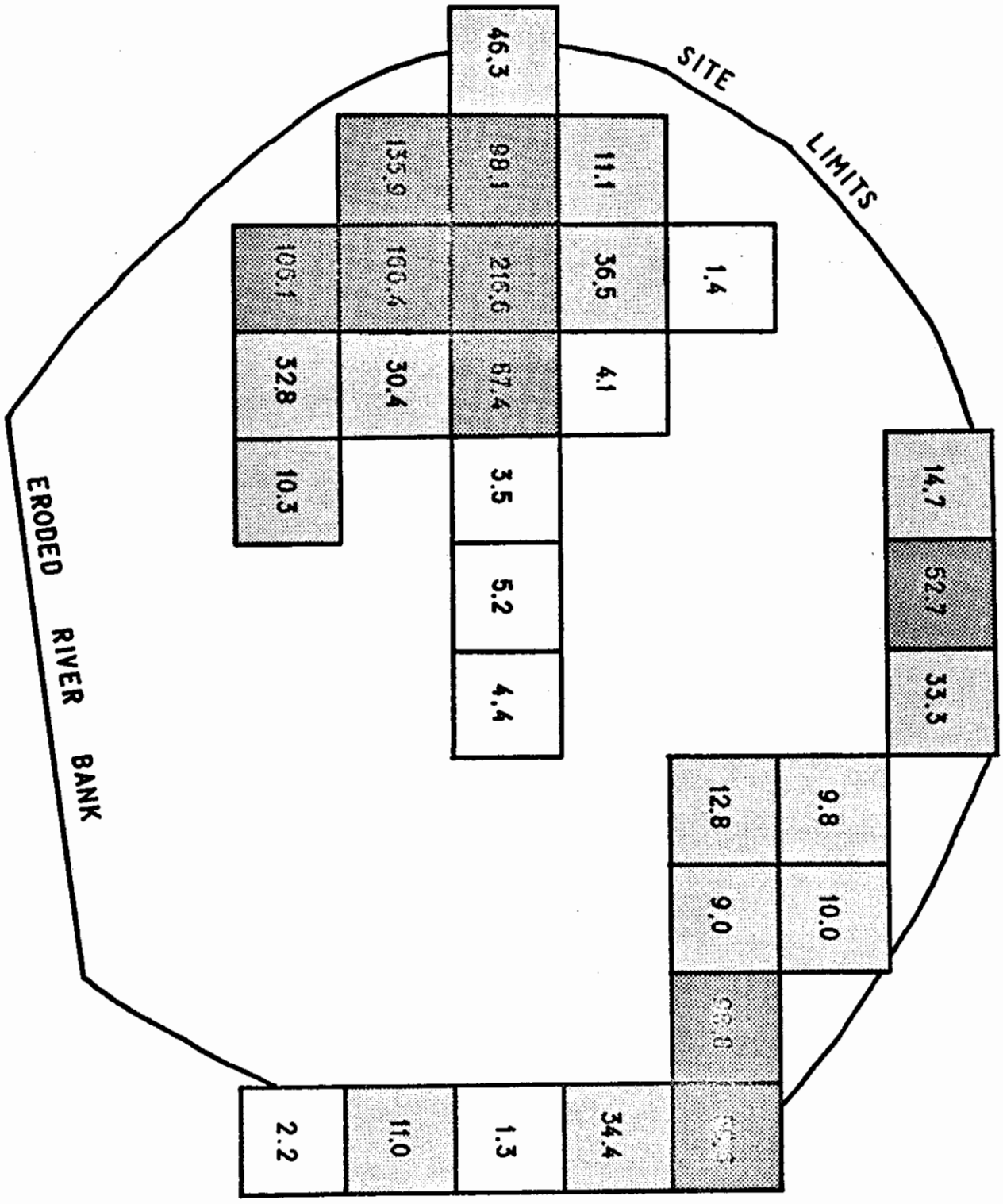

FIGURE 50

Spatial Configuration of Ceramic Density in the Upper Level
(heavy shading indicates highest densities).

Mollusks

Shell debris constitutes 11.17 per cent of the Slone general midden by corrected weight (Table 18), though by counts and raw weights substantially more (Table 17). As has been indicated, the plow-disturbed upper 20 centimeters is deficient in shell debris as a result of its fragility. The bulk of the molluscan fauna is comprised by fresh-water mussels, all referable to the family Unionidae (Table 20). While no careful investigation was undertaken for the nearly 20,000 specimens recovered to determine the genera and species represented, at least seven genera are present in the collection: Actinonaias, Amblema, Cyclonais, Fusconaia, Quadrula, Lasmigona, and Lampsilis. This list is undoubtedly incomplete; however, it is worth noting that the vast majority of the mussels probably belong to Lasmigona and Lampsilis. These animals were undoubtedly obtained locally from Levisa Fork which today still supports a molluscan fauna, though much impoverished in comparison to archaeological assemblages.

TABLE 20

Molluscan Fauna Composition and Distribution by Count and Weight

Level	Type	Frequency		% of Shell Type		% by Level	
		Count	Weight	Count	Weight	Count	Weight
0-20 cm.	Mussel	7,687	12,773.5	38.8	38.5	99.4	99.3
	Snail	49	92.0	14.2	35.0	.6	.7
20-30 cm.	Mussel	9,347	16,775.4	47.2	50.7	97.7	99.3
	Snail	219	127.6	63.5	48.5	2.3	.7
30-40 cm.	Mussel	2,778	3,560.2	14.0	10.8	97.3	98.8
	Snail	77	43.3	22.3	16.5	2.7	1.2
Total	Mussel	19,812	33,069.1	100.0	100.0	98.3	99.2
	Snail	345	262.9	100.0	100.0	1.7	.8

Gastropods are represented by both terrestrial and aquatic types with the terrestrial snails being far more common than the aquatic snails. All of the snails found in the general midden are of local origin, though as noted in the description of artifacts, marine snails were extensively used for making ornaments. The aquatic snails most likely represent food remains, whereas the terrestrial snails most likely appear in the deposit as resident garbage scavengers, and in fact some may post-date the occupation of the site. As Table 20 demonstrates, snails, regardless of their origin, are an insignificant contributor to the molluscan fauna dominated by fresh-water mussels.

Analysis of the spatial distribution of shell debris is not possible because shell was not retained during the 1963 excavation (encompassing the eastern half of the site). Impressionistically, mussels are more restricted

in distribution than ceramics, being concentrated only in the refuse areas. They are important constituents of the lens-like deposits termed midden concentrations, and this suggests unit deposition.

Bone

Bone refuse at the Slone Site constituted 39.40 per cent of the general midden by corrected weight (Table 18) and is the second most important constituent of the general midden. As was the case with shell debris, bone scrap was not regularly recovered during 1963 and thus spatial analysis is precluded. The majority of the bone scrap was fragmented to such an extent that identification of the animals involved could be ascertained for less than 20 per cent of the remains. Table 21 presents the results of species' identification by arbitrary level, both in counts and percentages.

A few words of explanation are necessary for Table 21. The identifications made can be regarded as relatively accurate since a large, locally derived, comparative collection was available at the Museum of Anthropology, University of Kentucky, and all of the assignments were checked by Prof. Roger Barbour, zoologist at the University of Kentucky. The counts and percentages reflect not only the composition of the fauna recovered but also the ease of identification. In particular Terrapene carolina is grossly overrepresented since small fragments of carapace, plastron, and limb bones could be identified, whereas joint ends of long bones, crania, or teeth were necessary to identify most other species. Small mammals are generally underrepresented because their frail bones were fragmented to such an extent as to make identification impossible. Further, fragmentation serves to increase the representation of those species whose skeletons break into a large number of identifiable fragments. While no attempt has been made to estimate the number of individuals of each species present, it is apparent that the main sources of meat were deer (Odocoileus virginianus) and black bear (Euarctos americanus). While raw counts of identified bones leave much to be desired in evaluating the exploitation of the local fauna, Table 21 does present data that are directly comparable to similar compilations from other localities and would permit an assessment of change in exploitation of faunal resources even though it does not permit a direct statement of the relative importance of the various faunal elements.

In addition to the material identified in Table 21, it was possible to isolate 37 bird bones not belonging to either of the birds listed in that table, 31 fish bones, and 31 small rodent bones. These could not be further identified for lack of comparative material; however, almost all of the small rodent bones were either mandibles or maxilae and are probably referable to Oryzomys, rice rat. The majority of the fish bones may represent a single genus as well, Ictalurus, cat fish.

All of the species listed are part of the local fauna today or are known from the area in the recent past with the single exception of the porcupine (Erethizon dorsatum) which is not listed by Barbour (1957) as an element of any modern Kentucky fauna. This identification is based upon a cranial fragment that includes both maxillae so that it would appear accurate. Of some interest, especially in view of the extensive range of small mammals occasionally taken by the Slone inhabitants, is the absence of rabbit. Rabbits (Sylvilagus spp.) are common in the area today and their absence in the

TABLE 21

Distribution of Identified Animal Bone

Species*	0-20		20-30		30-40		Total	
	no.	%	no.	%	no.	%	no.	%
Odocoileus virginianus	949	54.89	557	47.77	219	50.23	1,725	51.77
Cervus canadensis	8	.41	4	.34	3	.69	15	.45
Euarctos americanus	50	2.89	75	6.43	45	10.32	170	5.11
Procyon lotor	27	1.56	15	1.29	10	2.29	52	1.56
Canis lupus	0	0.00	0	0.00	1	.23	1	.03
Canis familiaris	11	.64	3	.26	1	.23	15	.45
Urocyon cinereoargenteus	7	.41	8	.69	1	.23	16	.48
Lynx rufus	7	.41	3	.26	2	.46	12	.36
Mephitis mephitis	5	.28	2	.17	2	.46	9	.27
Mustela spp.	1	.06	0	0.00	0	0.00	1	.03
Erethizon dorsatum	0	0.00	1	.09	0	0.00	1	.03
Castor canadensis	5	.28	4	.34	0	0.00	9	.27
Marmota monax	35	2.03	15	1.29	7	1.60	57	1.71
Sciurus spp.	28	1.62	43	3.69	12	2.75	83	2.49
Ondatra zibethicus	1	.06	1	.09	0	0.00	2	.06
Didelphis marsupialis	4	.23	5	.43	1	.23	10	.30
Meleagris gallopavo	18	1.04	31	2.66	5	1.15	54	1.62
Coragyps atratus	1	.06	0	0.00	3	.69	4	.12
Terrapene carolina	572	33.08	399	34.22	219	28.44	1,095	32.88
Totals	1,729	100.00	1,166	100.00	436	100.00	3,331	100.00
Percent of bone identified	17.15		17.6		20.08		17.65	

* terminology follows Barbour 1957

Slone fauna may reflect a lack of extensive second growth areas with herbacious plants in the Levisa Valley. This in turn may indicate the magnitude and/or duration of environmental modification wrought by Woodside Phase peoples who, presumably using swidden agricultural techniques, would have been producing second growth areas as fallow.

Stone

Crypto-crystalline rock chips are a minor component of the general midden, accounting for only 2.28 per cent by corrected weights (Table 18). The distribution of stone waste and manufactures follows the general pattern in the vertical dimension (Table 17), and, like shell and bone, faulty recovery procedures during the first season prevent any spatial analysis.

Four basic lithic types of crypto-crystalline rock are present in the collection: a light-colored, banded, nodular chert of local origin; a high-gloss, dark gray, nodular chert of local origin; a low-gloss, pebble chert of apparent foreign origin; and a reddish-brown local tabular siltstone. Minor amounts of quartz and quartzite are present, but with the relative abundance of cherts these poorer materials were not much used.

Maximum lengths were taken on each chip and frequencies by levels were plotted against 1 mm. length classes in order to determine the nature of chip size distribution. Unworked chips in all levels, except the 30-40 cm. level, are normally distributed, peaking at approximately 1.7-1.8 cm. The lowest level is skewed toward smaller sizes, showing a peak at approximately 1.4-1.5 cm. The used flakes are normally distributed at all levels, thus 90 percent of all flakes produced fall within the range of 1.3 cm. to 2.2 cm. for both worked and unworked flakes in the upper two levels. The significance of the deviation in the lowest level is obscure. Following Coon (1951), the total number of chips per level was compared with the total number of chipped stone implements per level and a ratio of chips to implements calculated (Table 22).

TABLE 22

Flake-Chipped Stone Implement Ratios by Level.

Level	Number of Chipped Stone Implements (a)	Number of Crypto-crystalline Flakes (b)	Ratio (b/a)
0-20 cm.	139	1,125	1:8.1
20-30 cm.	73	468	1:6.4
30-40 cm.	40	216	1:5.4

There is apparently a trend toward a larger number of chips per tool from bottom to top. This may represent changes in manufacture, differential settling of material within the site, or most likely, the effects of occasional surface collecting by the local inhabitants prior to the time of investigation.

Similar calculations were made for used and unused flakes, comparing the total used flakes per level with the total unused flakes per level. A slight increase in used flakes is noted toward the top of the site with ratios of 2.9, 2.6, and 2.5 for the lower, middle, and upper levels, respectively. Given the slight magnitude, this difference is of little significance. It does, however, compliment the implement-flake comparison since it can be assumed that local collectors' efforts would not effect this ratio, and argues in favor of the differences noted in the implement/flake ratio being attributable to such collecting.

5

SUMMARY

Throughout we have tried to emphasize the shortcomings of the field investigation and consequent limitations upon the kinds of analyses possible and their plausibility. This should not be taken to mean that the excavation of the Slone Site was a "bad job," for given its salvage nature and the kinds of problems current at the time, it was by no means sub-standard. Thus our emphasis on limitations is as much a function of current archaeological recovery procedures as it is a function of the actual Slone excavation. It would have been easier to have glossed over these shortcomings, but this attitude is contravened by our desire to provide from the Slone data parameters that are useful for current problems and hopefully for future problems.

The general objective from the beginning of the Slone investigation was to obtain a full spectrum of Woodside remains, and in the 1964 season this objective was coupled with that of obtaining, at least in a gross sense, the community plan of the Slone Site. Both of these objectives have been met. Further, it has been possible to specify some important parameters pertaining to the temporal dimension of the Woodside occupation at the locality and the kind of diversity that existed within a relatively small farming community in the Cumberland Plateau. Finally, a number of statistics of general economic relevance have been provided which, because of the lack of control in collection techniques and the authors' inability to restudy the Slone data indefinitely, cannot be used to make direct and detailed economic inferences but which ought to form the basis for comparing the Slone settlement to similar settlements once comparable descriptions are available.

The extensive excavations revealed three stockades and a series of rectangular post-wall houses paralleling the stockades to the interior. The center of the community is occupied by an open plaza. On the basis of structural data alone it is not possible to state the number of occupations represented or to determine whether simple rebuilding within a single occupation can account for the structural evidence. Stratigraphically, the smallest stockade preceded the outer two. While this permits the inference of growth in size through time it does not resolve the matter of rebuilding versus reoccupation; either interpretation is compatable with, in fact demands, a substantial temporal duration of the Slone settlement.

Using the stockade, house, and plaza units as a template, analysis of the non-structural features permitted the delineation of four concentric activity zones: the Plaza; Culinary Zone; Dwelling Zone; Refuse Deposition Zone. Each of these zones has a characteristic composition in terms of structures, other features, and artifacts. The Plaza, occupying the center of the community, characteristically lacks evidence of activity, there being no structures, features, and a very low density of portable objects. The Culinary Zone incorporates porticos as the only important structures and is the locus of most surface fires, storage pits, and earth ovens. Artifact density is still quite modest. The Dwelling Zone is the locus of all houses and fire basins and has an artifact density comparable to that of the Culinary Zone.

The outermost zone, the Refuse Deposition Zone, incorporates as its characteristic structure the stockade near its periphery. Within it are found all the midden concentrations, garbage pits, and all of the graves and burials. The artifact density here is several times that of the other zones and differs in composition in that food wastes, bone and mussel shell, are prominent constituents in contrast to the ceramic-dominated debris in the other zones.

The gradual expansion of the Slone settlement through time has acted to blur these zones as each tends to move toward the periphery of the settlement as its size increased. As a result it has been possible only to illustrate these zones in schematic fashion, especially since the bulk of all the living surfaces have been disturbed by plowing, frustrating exact plotting. It may well be that all or many stockaded circular communities in the East have concentric activity zones of this sort; however, until activity zones are regularly delineated in descriptive reports from the region, the Slone community stands unique.

Analysis of the non-structural features suggested other sources of variation, variation around the circumference of the town attributable to contemporary variation among groups within the community. The graves and burials, closely linked in terms of style and function, display a distribution clearly not a function of time. The Compound Pit type with extended interment dominates the western section of the town, whereas all three types are found in the northern section in some numbers, and the Slanting Roof type predominates in the eastern area. Preliminary ceramic analyses show that pottery types display similar tendencies to cluster around the circumference, though the more sophisticated PROGRAM SERIATE analysis demonstrates that the primary source of variation in the spatial distribution of ceramics is temporal. That contemporary variation within an archaeological community should be indicated is to be expected from out knowledge of modern "primitive" agricultural communities and the growing body of archaeological literature focused upon such variation in other regions. What is more surprising is that such differences have not been noted in similar kinds of communities elsewhere in the East where reasonably large-scale excavations have been undertaken. The demonstration that contemporary variation can be of considerable magnitude in even a few categories of remains does have considerable bearing upon the design of future recovery programs. Small intensive excavations into larger communities may be radically skewed in terms of the percentages, even the presence and absence, of types relative to the community as a whole. Statistically planned sampling of such communities is necessary to evaluate anything other than surface collections from such sites.

It has not been possible to link such contemporary variation with individual houses or sets of houses for a number of reasons. Primary among these is the general lack of heavy midden directly associated with dwellings; garbage and burials, the two categories in which this kind of variation can be attested, are redeposited in the Refuse Deposition Zone. Secondly, with few exceptions, the houses at Slone are represented by their foundations, the actual living surfaces having been churned up by plowing. Finally, there are no surface indications of house location, and thus the system of arbitrary grid units tends to homogenize the deposit. Thus, while one might speculate upon the correlation of contemporary variation clusters with residential units, the Slone data cannot support anything beyond the demonstration that such variation is present.

None of the portable objects recovered are unique to the Slone Site. The ceramics, projectile points, and other kinds of artifacts as well as the kinds of features encountered have been previously reported in adjacent areas. The particular configuration of these widely shared elements does appear to be unique for the Levisa drainage and is the rationale for the definition of the Woodside Phase to which the Slone Site is assigned (Dunnell 1966, 1967). In particular, the prominence of New River Knot Roughened and Net-Impressed pottery in the otherwise Ohio Valley Fort Ancient ceramic assemblage and the overall configuration of the burial pattern are quite distinctive. Inter and intra-areal comparisons are not justifiable. While a number of other Woodside settlements are known from the Fishtrap region (ibid.) as well as further downstream in Pike and Johnson counties (Dunnell 1961), their investigation, with the single exception of the Mayo Site which is as of yet unpublished, has been limited to surface reconnaissance or small scale excavation.

Comparison with other areas is further negated by the fact that the Woodside Phase appears in the Levisa Valley, at least in the Fishtrap area, as the result of migration and substantial adaptation to the area is involved. Thus, while many commonalities may obtain between Slone and other areas, the functional context and certainly the overall sociocultural organization in which they occur is greatly altered and the meaning of such commonalities is thus problematical.

Many lines of evidence bear upon the temporal dimension of the Slone settlement. The evidence provided by the major structures has already been touched upon and permits the inference that the Slone community grew through time in size. The strongest expression of temporal difference is found in the spatial arrangement of the homostats for pottery types derived through PROGRAM SERIATE. Their radial disposition reflects the outward expansion of the periphery of the town through time, i.e., the later a given deposition of ceramic refuse the nearer the periphery of the site it will be located. PROGRAM SERIATE, however, lumps all sources of variation. An independent evaluation of the vertical distribution of ceramic types likewise showed significant change in frequency of pottery types from the lowest to uppermost levels that precisely parallels the pattern in change from center to periphery in space. Thus both the distribution of ceramic types considered in several contexts and the structural evidence support the growth through time hypothesis. No empirical evidence is available to resolve the reoccupation or rebuilding accounts of this temporal duration, though one might speculate that the reoccupation hypothesis could involve only two occupations, one coincident with the smallest stockade and one with the larger two stockades, without streatching the structural data.

Analysis of the general midden is consistent with the other analyses. The Woodside component at Slone was established at that locality after the terrace had become geomorphologically stable. Temporal variation is restricted to stylistic change, for each of the analyses of the general midden independently confirms the same functional composition of the site from level to level. In fact, the high degree of consistency of composition from level to level is somewhat surprising in view of the differing density of material and variation in collecting techniques, both of which might have acted to skew these analyses. From these analyses it was possible to build up a statistical picture of the Slone Site which can be compared with other locations once comparable data are established. The shortcomings in our work prevent non-

speculative reconstruction of the economy from these data beyond the restriction imposed upon such reconstruction in any archaeological circumstance. It is clear, however, that whatever the economic system when Slone first was occupied, this system continued throughout the occupation with only growth in the size of the town and change in stylistic elements of the lifeway.

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