

THE BULLETIN

Number 57 March 1973

CONTENTS

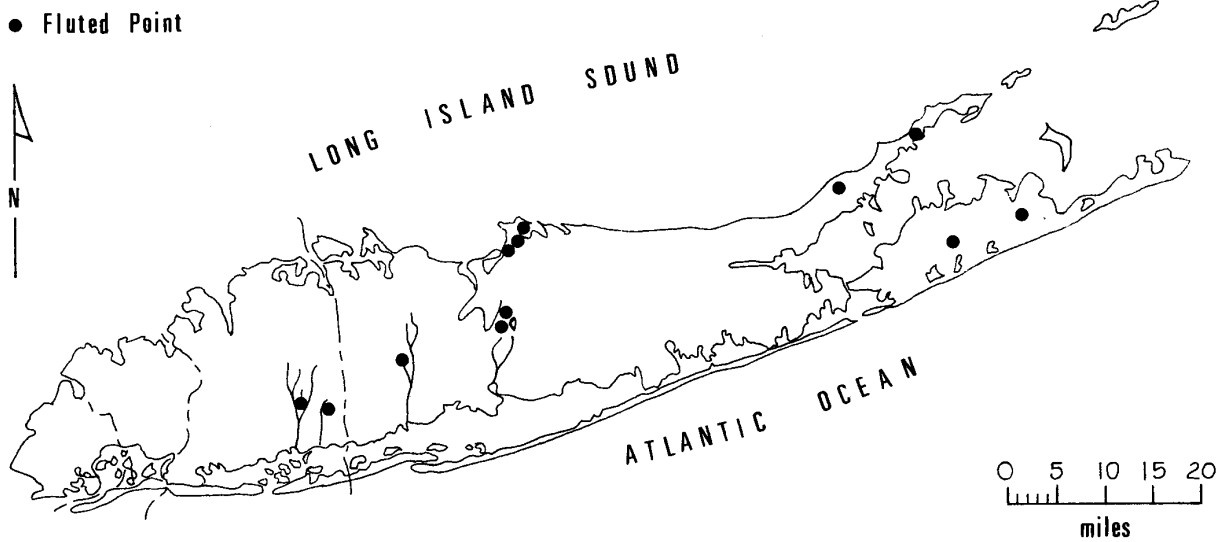
The Paleo-Indian on Long Island Walter Saxon	1
A Preliminary Cultural Framework for the Upper Susquehanna Valley Robert E. Funk, Bruce E. Rippeteau and Ralph M. Houck	11
Book Review - Prehistoric Biological Relationships in the Great Lakes Region Richard Guy Wilkinson	28
State-Supported Archeology in New York Marian E. White	29
The New York State Archaeological Site Register Lilita Bergs	30



THE BULLETIN

NUMBER 57

MARCH 1973



RS 6/72

LOCATIONS OF FLUTED POINTS ON LONG ISLAND

THE NEW YORK STATE ARCHEOLOGICAL ASSOCIATION

OFFICERS

Charles S. Pierce President
William F. Ehlers Vice President
Francia McCashion Secretary
Volkert Veeder Treasurer
Louis A. Brennan E.S.A.F. Representative

THE ACHIEVEMENT AWARD

Charles M. Knoll (1958) Louis A. Brennan (1960)
William A. Ritchie (1962) Donald M. Lenig (1963)
Thomas Grassman O.F.M. (1970) Paul L. Weinman (1971)

FELLOWS OF THE SOCIETY

Roy Latham	Richard L. McCarthy	Louis A. Brennan
William A. Ritchie	R. Arthur Johnson	Paul Weinman
Charles F. Wray	Stanley Vanderlaan	Thomas Weinman
Alfred K. Guthe	Robert E. Funk	Audrey Sublett
Julius Lopez	Edward J. Kaeser	Theodore Whitney
Marian E. White	Robert Ricklis	William S. Cornwell
Donald M. Lenig	Charles F. Hayes III	Gordon K. Wright
Thomas Grassman O.F.M.	Bert Salwen	James A. Tuck

MERITORIOUS SERVICE

Henry A. Loeb	Albert J. Hoffman	Paul and Rose Westheimer
Arthur Nahrwold	Mr. and Mrs. Lloyd Zimmerman	William H. Case

CERTIFICATE OF MERIT

Franklin J. Hesse	William F. Ehlers	Roger Ashton
Dolores N. Elliott	William D. Lipe Peter P. Pratt	George R. Walters

PUBLICATIONS

Researches and Transactions

Occasional Papers William S. Cornwell, Editor

The Bulletin

Editor	Assistant Editor	Publications Chairman
Louis A. Brennan 39 Hamilton Avenue Ossining, N.Y. 10562	Roberta Wingerson 60 Pinesbridge Rd. Ossining, N.Y. 10562	Dolores Elliott 208 Reynolds Rd. Johnson City, N.Y. 13790

Published by the New York State Archeological Association. Subscription by membership in N.Y.S.A.A. Back numbers may be obtained at \$1.50 each from Charles F. Hayes III, Rochester Museum and Science Center, 657 East Avenue, Rochester, New York 14607. Entire articles or excerpts may be reprinted upon notification to the Editor: three copies of publication issue in which reprints occur are requested. All manuscripts submitted are subject to editorial correction or excision where such correction or excision does not alter substance or intent. Printed by Braun-Brumfield, Inc. P.O. Box 1203, Ann Arbor, Michigan. 48106.

THE PALEO-INDIAN ON LONG ISLAND

Walter Saxon

Nassau County Museum of Natural History

Introduction

This article examines recently located fluted points from Long Island that have not been previously reported. Little is known about the activities of the Paleo-Indian on Long Island, although a significant amount of investigation has revealed much about the Archaic, Transitional, and Woodland stages. Almost all that is known about the prehistory of Long Island is understood in terms of these cultural stages. Only sparse evidence of Early Man's presence on the Island has been reported, although several sites and a substantial number of fluted points have turned up in the areas surrounding Long Island. Because of the evidence of Early Man's activity in the nearby areas, it seemed that Long Island should yield more remains of its earliest culture than have been reported. When the Paleo-Indian was in the area, Long Island was part of a broad, fertile coastal plain, resulting from the exposure of the continental shelf by glacially lowered sea level. This large area apparently contained abundant big game resources and provided access along the entire length of the south shore to the area that is present day Long Island. This accessibility almost surely influenced the movements of the fluted point people on and around Long Island.

The number of fluted points reported from Long Island is limited to two published specimens (Smith, 1952; Fowler, 1954; Ritchie, 1957). Rutsch (1970), in an analysis of point types and lithic materials from Long Island, lists three other fluted points, but no information or statistics accompany the mention. These specimens are included here.

It was revealed in conversation with many private collectors that some collections contained fluted points found on Long Island. It was felt that an examination of collections would uncover at least some of these specimens. The collections of individuals, libraries, and museums were searched with the aim of locating as many fluted points as was possible. Unfortunately, as is usually the case with many fluted point finds, little or no documenting information accompanied some of the specimens located. Some were in collections for many years before their antiquity was realized, while others remained unrecognized until discovered by the author. Whenever possible, the finder was contacted and every effort was made to acquire as much information as was known about proveniences and associations.

Twelve fluted points were located. Including the two previously published specimens, fourteen fluted points are now known to have been found on Long Island. Of the four counties on the island, Suffolk, Nassau, Queens, and Kings, only Kings did not yield a fluted point. The specimens were plotted on a map to reveal their distribution (cover illustration). A brief analysis and discussion considers the possibility that the locations of some specimens might indicate use of the exposed area of the continental shelf and the movements of Early Man on Long Island.

Long Island

Long Island is the unsubmerged portion of the inner edge of the continental shelf, fronting on the Westchester County and Connecticut shorelines and separated from them by the depression of Long Island Sound (Suter 1949: 155). It is approximately 120 mi. long and about 20 mi. wide at its widest point. Four counties comprise its length, Suffolk (900 sq. mi.), Nassau (275 sq. mi.), Queens (108 sq. mi.), and Kings (70 sq. mi.). The most conspicuous topographical features are the moraines of the latest advances of the Wisconsin Glacial Stage which traverse the island from end to end, with an intermorainal trough between them. The older of these advances left the Ronkonkoma terminal moraine, responsible for the southern fork of the island. The most recent advance formed the Harbor Hill terminal moraine, a ridge running the length of the northern portion of the island. It is responsible for the northern fork and heights to 400 ft. (Suter 1949: 160-161). Many streams flow from these moraines across an outwash plain which forms the southern half of the island.

The maximum extent of the last glacial advance is considered to have occurred about 19,000 years ago, a time when sea level was at its lowest (Emery and Garrison 1967: 685-686). After this date, sea level rose when continental glaciers began to melt and retreat. Evidence indicates that about 12,000 to 10,000 years ago, a time when Early Man almost certainly occupied the Atlantic Coastal region (Emery and Edwards 1966: 734), the glacier had retreated from Long Island and was in northern New England. Sea level was several hundred feet lower, exposing the continental shelf for a distance of about 100 kilometers (Emery and Edwards 1966: Fig. 1). As a result, Long Island was part of the mainland. The shoreline was far out on the continental shelf. The area between was a broad coastal plain that gradually submerged as water from the glacial ice returned to the sea (Whitmore, Emery, Cooke and Swift 1967: 1477).

Fluted Point Descriptions

Fig. 1a L. 49 mm. W. 22 mm. T. 6 mm.

This point is in the collection of Robert Worthington of Medford, Long Island. He found it near Conscience Bay, in the village of Setauket, Suffolk County. According to the owner, shell fragments on the surface of the ground, resulting from roto-tilling activities, stimulated his investigation. Digging revealed the presence of a shellfish pit. After this feature had been removed, further exploration into the subsoil below the bottom of the pit uncovered the fluted point. It was measured in situ and found to be 6 in. below the bottom of the pit, approximately 3-1/2 ft. below the surface of the ground. It lay in apparently undisturbed soil, a yellow outwash sand and gravel. No other cultural material was present with or near the point. No further excavation was undertaken. Nothing is known about the cultural affiliation of the shellfish pit, for no diagnostic artifacts were present. Archaic points and pottery sherds, said to have been found in the vicinity, suggest the presence of a multi-component site. Several chips of grayish chert, supposedly similar to the material that the fluted point was made of, were said to have been found in the site vicinity but, unfortunately, these were not saved and could not be seen by the author for comparison.

The point is an exquisite item. It is made of gray chert. The material appears to be Onondaga chert. The point is lanceolate in outline, with a base marked by stubby, ear-like projections. A small central nipple is present in a shallow basal concavity. The widest portion of the point is located about two thirds of the way up from the base. Fluting is present on both sides. Both flutes are nearly equal in length and are very long, extending almost to the tip of the point. Each seems to have been produced by the removal of only one channel flake. There is no conclusive evidence for "Enterline" fluting (Witthoft 1952: 481-483), but the presence of a basal nipple suggests that this method of channel flake removal may have been used. A basal nipple is also a characteristic feature of Folsom points, where it represents a prepared striking platform, retouched to shape for the removal of a single channel flake (Witthoft 1952: 483). One of the flutes ends in a fine example of a hinge fracture. The chipping is well controlled and the point is the product of excellent workmanship. Except for the presence of several small chips at the base, no retouch seems to have been attempted. It appears that the point was almost entirely flaked before the flutes were made. The basal portions bear no evidence of having been smoothed by grinding. Most of the features of this point fit very closely the description of the Folsom type point given by Worthington (1957: 27, 262-263).

Fig. 1b. L. 58 mm. W. 34 mm. T. 6 mm.

This point was a surface find, acquired somewhere on Strong's Neck, Suffolk County, by John W. Baker of Huntington, Long Island. A more specific location was not recorded and the date of the find is unknown. There are no known associations. This point is part of a large collection of artifacts donated to the Nassau County Museum of Natural History by Mr. Baker. Its catalog number is 63-X-9. Mr. Baker began his collecting activities in 1898. Almost all of the artifacts in his collection are from Long Island. The Long Island material was personally collected by Mr. Baker, all of it representing surface finds. He stated that he never dug for artifacts.

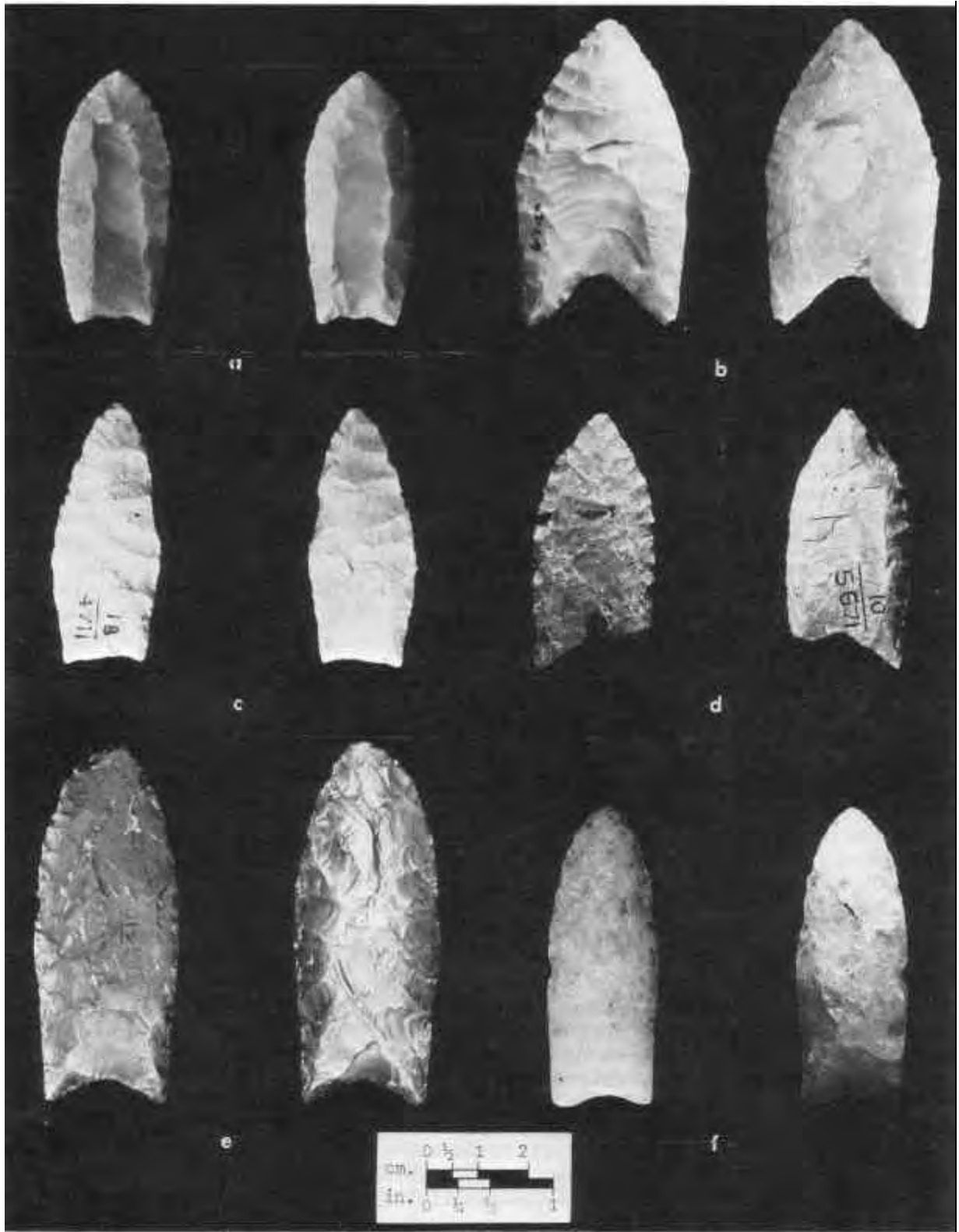


Fig. 1. Fluted Points found on Long Island.

The point is complete and is made of a fine grained gray chert which contains buff colored patches. These characteristics fit closely the description of Onondaga chert. This specimen is straight sided and has a deeply concave base. The straight sides comprise about half of the total length of the point. They are almost parallel, tapering slightly toward the base. Neat parallel flaking is present on this point. Grinding of the sides and of the base is pronounced and the entire length of both sides and the basal concavity is extremely smooth. Both of the fluting scars are wide. They cover more than half of the width of the point and seem to be the result of multiple channel flake removal. A deep hinge fracture terminates one of the fluting scars. The apex of the basal concavity is very thin and was retouched after the fluting was completed.

Fig. 1c L. 48 mm. W. 21 mm. T. 5 mm.

This point is in the collection of the Museum of the American Indian, Heye Foundation (catalog number 18/4711). It is part of a collection of artifacts donated by William H. Overton sometime prior to 1933. The point was found in the village of Stony Brook, Suffolk County. No other information about proveniences and associations was recorded.

The point is narrow and bi-convex in outline. Its maximum width occurs about mid-way up the blade. The material is weathered and is tannish-grey in color. However, an unweathered surface, exposed by a recent chip along one of the edges, reveals a granular grey chert. The fluting is shallow and multiple on both sides. One side possesses three channel flake scars, two side by side with a small narrow scar running upward between them, possibly an unsuccessful attempt at the triple channel flake removal of the "Enterline" technique. The other side has two channel flake scars, one of which terminates in a hinge fracture. Fine parallel flaking is present on the point, with one side possessing flake scars that extend beyond the mid-line, about two thirds of the way across the blade. The basal concavity is very shallow. The sides of the lower half of the point are basically straight, almost parallel, tapering slightly toward the base. A very slight constriction is present on the lower portions of the sides. All edges of the point are slightly smooth from weathering, making it difficult to ascertain conclusively if there is any grinding of the basal portions. None, however, seems to be present.

Fig. 1d L. 48 mm. W. 24 mm. T. 6 mm.

This point is in the collection of the Museum of the American Indian, Heye Foundation (catalog number 10/5671). Information listed for this specimen states that it is on loan from Daniel A. Young. It was found, sometime before 1921, in the village of Mattituck, Suffolk County. No information pertaining to provenience or associations was listed.

The point is made of dark gray chert, easily noticeable at unweathered surfaces exposed by recent chips along the edges and at a missing tang. Otherwise, the entire surface of the point is weathered. It is light brownish-gray in color, and heavily pitted. The point is lanceolate in outline with long, sharply pointed tangs and a deeply concave base that is almost triangular in shape. The sides are almost parallel below the mid-line. The one tang present is complete and flares outward slightly, resulting in a gently flaring ear just below a slight constriction in the side. Neat parallel flaking is in evidence. The channels are the product of multiple fluting, clearly seen on one side, where three shallow channel flakes, all terminating in conspicuous hinge fractures, were removed. One of these flakes was struck off in the groove of another flute, forming a hinge fracture in the center of the earlier flake scar. The flute on the other side was the product of the removal of one wide, shallow channel flake which also ends in a hinge fracture. The deepness of the basal concavity is probably a result of the striking off of multiple channel flakes. No retouch of the base is in evidence, but the basal concavity and the sides, for a distance of 16 mm., are smooth from grinding.

Fig. 1e L. 67 mm. W. 28 mm. T. 9 mm.

This point is in the collection of the Museum of the American Indian, Heye Foundation (catalog number 13/5410). It is part of a group of artifacts collected by Foster H. Saville sometime in the 1920's, from the locality of the Soak Hides site (Smith 1950; 182), situated on the west bank of Tan Bark Creek at the southern end of the village of Three Mile Harbor in eastern Suffolk County. No information pertaining to provenience or associations was recorded.

The point is lanceolate and has a blunt tip. It is basically Clovis in outline. The sides on the lower third of the point are almost parallel. The material is a black chalcedony, possibly from the Ordovician shales of the Beekmantown Formation. The thin portions of the edges appear translucent smoky gray when the point is held up to the light. The fluting is shallow and confined to the basal portion. The fluting on one side appears to be the result of the removal of two small flakes. The maximum length of these channels is 13 mm. The other flute was the product of the removal of one short (12 mm.) wide flake that extends to the edge of the left tang. Grinding is present in the basal concavity and on both sides, extending upward for about 15 mm. The point is lenticular in cross section and is finely chipped with neat parallel flaking. The basal concavity is very thin and bears evidence of a fine retouch.

Fig. 1f L. 57 mm. W. 22 mm. T. 10 mm.

This point is in the collection of the Sachem Public Library, located in the village of Holbrook. There is no catalog number for this specimen. It was donated to the library, as part of an extensive collection of artifacts, by Bassford Hawkins of the village of Lake Ronkonkoma. The collection was amassed over a forty year period, starting sometime around the turn of the century. Mr. Hawkins, a farmer, collected some of this material from his farm. However, he was an avid collector and would be present when any new construction occurred in the area. He recovered a large amount of material. The specific location that produced this point is not known, but it is definitely from somewhere in the area of the large kettle lake, Lake Ronkonkoma, since all of Mr. Hawkins' collecting activities were confined solely to this locality. The number of items in his collection is estimated to be over 4,000. The material represents almost all of the cultures known to have been on the Island, and covers a time span from the Paleo-Indian to the Lake Woodland.

The point is made of quartz and almost surely represents a fluted point made on Long Island of native Long Island materials. Quartz is one of the most difficult of lithic materials to use for point manufacture. The material used for this point is a granular, mottled, glassy and smoky quartz which has many irregularities, not the best type of quartz available on the island. Nevertheless, this point is an exquisite item and displays the fine workmanship that one often associates with the high grade lithic materials, chert and flint. It is a testimony to the craftsmanship of the Paleo-Indian. To the eye, it seems completely symmetrical in every dimension. It is lenticular in cross section and fairly thick. The thickness is probably due to the difficulty in thinning quartz, particularly the kind used for this point. It is lanceolate in outline with the lower sides almost parallel. The sides constrict very slightly at the base. Basically, this specimen is a gracile Clovis point. The fluting seems to be the result of the removal of one flake from either side. The length of the channels is about equal, 14 mm. on one side and 13 mm. on the other. The basal concavity and both sides, for a distance of 22 mm., are extremely smooth as a result of heavy grinding.

Fig. 2a L. 44 mm. W. 19 mm. T. 5 mm.

This point is also in the collection of the Sachem Public Library. All information pertaining to the previously discussed specimen is applicable here.

This point is also made of quartz. However, it is a translucent smoky quartz, a higher quality material than that used for the above specimen. It, too, was almost certainly made on Long Island, of the locally available material. Its narrow triangular shape is unusual for fluted point forms. The chipping is basically random. Fine retouch of the edges is evident, but this point seems basically crude. It is included because it is definitely fluted. When viewed edge-on from the base, it is bi-concave in cross section. Each flute is the product of the removal of one channel flake. Both channels are wide and shallow. The flute on one side is 14 mm. long and terminates in a hinge fracture. The other flute is 17 mm. in length. A prominent crack in the quartz is present in the center of the base. This should not be interpreted as a feature of the fluting. A basal concavity is conspicuously absent. The base is convex in outline and there is a complete absence of tangs. Some basal retouch is present on one side. The base and both sides, for a distance of 14 mm. were slightly smoothed by grinding.

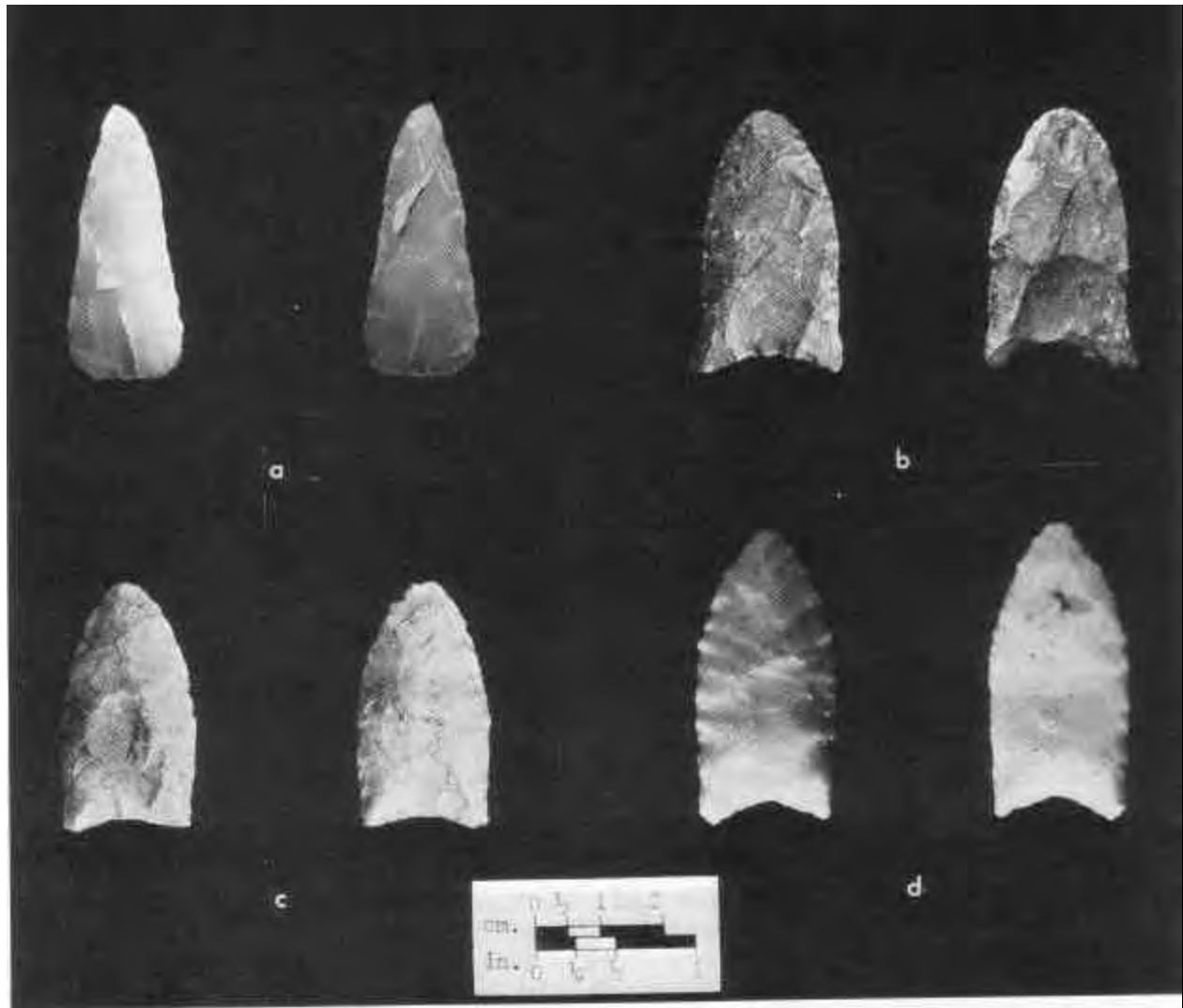


Fig. 2. Fluted points found on Long Island.

Fig. 2b L. 41 mm. W. 25 mm. T. 8 mm.

This point was found in 1966 by Richard O. Whitney in Deer Park, Suffolk County. It was recovered from top soil brought to his back yard. Mr. Whitney traced the location that produced the soil and ascertained that it had come from an area adjacent to the Carlls River, in the vicinity of Belmont Lake State Park. No other aboriginal material was present in the disturbed soil. The point is made of a tannish-gray chert. Its maximum width is at the base where prominent flaring ears extend 3 mm. beyond the widest portion of the blade. There is a slight constriction above the ears. The flaking is rough, uneven, and shallow. Retouch is present along the thick edge and it appears to have been an attempt at thinning. The fluting is shallow and not well defined. One channel flake was removed from the first side while the fluting on the other side is composed of two flake scars that extend to the edge of the point. The base is steeply beveled from both sides and it bears evidence of retouch after the channel flakes were removed. There is no grinding on any portion of the sides or base.

Fig. 2c L. 38 mm. W. 21 mm. T. ?

Found by the owner, G. Soper, on his farm in the village of Wantagh, Nassau County. It came from the part of his farm located on the west side of Wantagh Avenue and north of

Jerusalem Ave. Several streams are present nearby, flowing southward into Bellmore Creek. The point was found near the eastern branch of this system. The date of the find is unknown, for the point lay unrecognized among other points in Mr. Soper's collection for many years. He began collecting sometime before 1920. All of the items in his collection, including this specimen, had been exposed as a result of plowing. The other material represents later cultural stages, Archaic, Transitional, and Woodland.

The point is weathered and the edges and flake scars are slightly smooth. A small chip, probably removed by the plow, is missing from a portion of the base and exposes an unweathered surface. The material's characteristics, a greenish-gray color with little or no luster, are best revealed at this break. The material is almost certainly Deepkill (Coxsackie) chert. The point is stubby and has a slight constriction at the base, which causes a slight flaring at the ears. Fluting, present on both sides, appears to have been the result of the removal of multiple flakes. There is no evidence of any retouch after the channel flakes were removed. Because of the weathering, the presence or absence of grinding of the basal portions could not be determined.

10th point; not shown

The 10th point is one found by Julius Cobb of Wyandanch in 1955. It was recovered from an area west of Hicksville Road, about a third of a mile north of the Southern State Parkway in the village of Massapequa, Nassau County. This location is near the northern part of Seaford Creek where a wooded area had been cleared for farmland. The point was found after a rainstorm in a field that had been plowed for the first time. No associations were noted. Unfortunately, this point is not available for examination for, according to Mr. Cobb, it was stolen while on display with other artifacts in his collection.

The description of this specimen is based on information and sketches supplied by Mr. Cobb. The point was lanceolate and had a concave base. It was about 1 1/2 in. long and about 1 in. wide. The material of manufacture was dark brown in color, probably jasper. Fluting, present on both sides, ran a little more than half way up the point. It was not noted whether the fluting was multiple or if the basal portions were smoothed by grinding.

11th point; not shown

Rutsch (1970: 11), in an analysis by county, of projectile point types in the Museum of the American Indian, Heye Foundation's Long Island collection, lists the presence of a Clovis point from Queens County. Unfortunately, this specimen was not available for examination. Information pertaining to this point was also unavailable.

Fig. 2d L. 47 mm. W. 23 mm. T. 4 mm.

This point is in the collection of the Nassau County Museum (catalog number X-X-27). No information was listed with this specimen other than that it was found somewhere on Long Island. It is made of a milky colored quartz that has a waxy luster, a higher grade material than most of the quartz commonly found on Long Island. It almost surely represents a fluted point made on Long Island of the local material. The point is plano-convex in cross section. The blade, viewed from the side, is curved. Only the convex surface is fluted. One channel flake was removed to form the flute, which is extremely shallow. A small shallow flake was also removed from this side. It covers most of the surface of the left tang, extending upward 10 mm. from the base and merging with the flute. This may represent an attempt at multiple fluting. The base is beveled on the opposite side, probably a preparation for the striking off of the channel flake. The flute scars extend to the edge of the base, indicating that no retouch of this area was attempted. Neat parallel flaking is present on this side of the point: This specimen seems to have been made from a large curved flake, for the concave side is smooth and is basically devoid of chipping. The surface of this side is pitted with many small holes. A large hole, an irregularity in the quartz, is present near the tip of the point. Fine marginal retouch is present on only this side, covering the complete periphery and extending inward for about 3 mm. Three small shallow flake scars are also present. The basal portions show no evidence of grinding.

Comparisons

Of the twelve specimens located, eight were made of high grade lithic materials, not native to Long Island. Three, however, are made of quartz, a native Long Island material. The material of manufacture of one specimen is unknown. Onondaga chert, Deepkill chert, and possibly Pennsylvania jasper and chalcedony from the Beekmantown Formation can be identified with some degree of certainty. Normanskill chert may also be represented, but no specimen was characteristic enough of this material to allow for its inclusion. The archaeological literature often refers to many of the lithic materials mentioned here as flint. However, these materials are almost exclusively known in the geological literature, where descriptions of outcrops and beds are given, as chert. It is felt that the accepted geological terminology should be used when referring to these materials.

The following brief analysis includes ten specimens. Two points, the Cobb point and the Heye Foundation's point from Queens County are not included since the necessary information was not available. Most of the specimens exhibit many of the characteristic features of Eastern fluted points. According to Wormington (1957: 83), grooves were most commonly produced by the removal of multiple flakes that often did not extend very far up the face of the point. On seven points, multiple fluting is definitely in evidence. The fluting on most of these is short, extending only part of the way up the point. The fluting on the Worthington point may be the product of the "Enterline" technique, but this could not be positively determined. Withhoft (1952: 482) states that in many cases, the removal of a central flake obliterates all traces of earlier flake scars. However, Wormington (1957: 83) states that some examples were grooved by the removal of single flakes which sometimes extend almost to the tip of the point. It should be noted that the two specimens that do not bear evidence of multiple fluting are made of quartz. There are other features considered characteristic of Eastern fluted points. According to Wormington (1957: 83) and Ritchie (1969: 6), many points have flaring ears, a great number have deeply concave bases, and the basal concavity and lower edges are usually ground smooth. Only one point has ears that flare prominently. Several specimens have a slight constriction above the base that gives the suggestion of a slight flaring at the ears. Some degree of grinding of the basal portions is present on five specimens. Three points definitely do not exhibit any trace of edge smoothing, while two specimens were worn by weathering, making it impossible to ascertain if grinding is present. The basal concavity is shallow to moderate in seven specimens. Three possess deep basal concavities, while one point has a convex base, highly unusual for fluted point forms.

Of the 14 fluted points now known from Long Island, 12 were accompanied by sufficient information to allow their positions to be plotted on a map (front cover). The two fluted points reported by Smith (1952), Fowler (1954) and Ritchie (1957), from Greenport and Bridgehampton, Suffolk County, (the Latham and Raynor points) are included. Information was not sufficient to permit the inclusion of the specimen in the Nassau County Museum's collection and the point from Queens County, in the Museum of the American Indian collection.

One group, comprising the Worthington, Baker, and Heye Foundation's Stony Brook finds, are concentrated in an area with about 4 mi. between the stated locations of the point finds. This area, on Long Island Sound, presently contains many streams and estuaries. From the large number of multi-component sites that have been uncovered in the area, this location seems to have been a favored location of later cultural stages.

The Whitney, Soper, and Cobb points were located in an area about midway between the center of the island and the south shore. The distance between the three specimens is about 9 mi. Notable is the fact that these three points came from locations near southward flowing streams.

Another group was located in eastern Suffolk County, comprising two north fork finds, Mattituck and Greenport, and two south fork finds, Three Mile Harbor and Bridgehampton.

Two points were located near Lake Ronkonkoma, a large kettle lake about 100 ft. above present sea level in central Long Island. It is near two stream systems, the Nissequogue River drainage system that flows north to Long Island Sound, and the Connetquot River drainage system that flows southward to the Atlantic Ocean. The material in the Hawkins' collection, composed

of all the point types, in varying quantities, reported for Long Island (Ritchie 1971), probably indicates that this area was a favored location of all cultural stages on Long Island, from PaleoIndian to Late Woodland.

Discussion and Analysis

Several situations that were encountered during the search for fluted points indicate that probably other specimens have been found on Long Island, but have been lost or have never been recognized or documented. Several collectors revealed that the present location of many fine old collections are unknown. Usually, the point types that occur in private collections are not identified and little or no information about them was recorded. Collections still extant may contain other fluted points that are mixed with many different types and have not been recognized. This situation was encountered in the case of the two Hawkins' fluted points in the collection of the Sachem Public Library. A search by the author revealed their presence. The collection had been stored in the same unsorted condition in which it was received many years ago, and there was no evidence to indicate that the collector had ever realized the antiquity of some of his finds.

Compared with the yield from adjacent areas, especially Staten Island (Ritchie 1969: Fig. 2), the lone contribution made by the two westernmost counties on Long Island is conspicuous. Extensive development of the western part of the island was probably instrumental in removing any remains of the Paleo-Indian that may have been there. That almost all of the fluted points come from relatively undeveloped areas on Long Island supports this conclusion. Several fluted points and a Paleo-Indian site have been found on Staten Island (Ritchie 1969: xvii-xviii, Fig. 2), suggesting that western Long Island may have seen similar activity. Both areas are adjacent to the Hudson River, a major pathway that provided equal access to both areas. Regardless of how many specimens are found on other parts of Long Island, the information will probably always be geographically skewed by the development of the western portion.

The presence of the three fluted points made of a local quartz suggests that the Paleo-Indian utilized Long Island more than just casually. The tools of the Paleo-Indian were almost exclusively manufactured from high grade stone, chert and jasper, materials that are homogeneous in texture and are easy to control while chipping. Ritchie (1969: 6) states that the materials of fluted points vary extensively, but were usually of high grade silicious stone, seemingly carefully selected for chipping qualities. Quartz, particularly the type commonly found on Long Island as glacially transported water-worn pebbles and cobbles, cannot be considered a high grade lithic material, but because of its abundance and the lack of other appropriate materials in significant amounts, was almost exclusively used by all the later cultural stages on Long Island. Occupation of Long Island with some regularity might have forced craftsmen to adopt local materials for tool manufacture. Ten points of the 14 specimens known from Long Island are made of exotic materials. (The material of one point is unknown.) The use of a local material for three specimens might indicate that the Paleo-Indian was on the island long enough to experiment with and adopt, to some degree, the local materials and that possibly there was a real, however small, Paleo-Indian occupation on Long Island.

Paleo-Indian sites have been reported in New Jersey (Kraft 1971: 14) and on Staten Island (Ritchie 1969: xvii-xviii). The proximity of these sites further suggests that Early Man might have been quite active on the island. Possibly, the movements of the Paleo-Indian on and around Long Island might bear some relation to the large area of the then exposed continental shelf. Evidence indicates that about 100 kilometers seaward was exposed between 12,000 and 10,000 years ago, a time when Early Man almost certainly occupied the Atlantic Coastal region (Emery and Edwards 1966: 734, Fig. 1). Evidence for the presence of Early Man at that time is indicated by a possible association of a fluted point and caribou bone from Orange County, New York, which yielded a date of 10,580 B.C. \pm 370 years (Funk, Fisher and Reilly 1970). The shelf area provided a route from the south to the upland regions that are present day Long Island, at almost any point along its length. This broad coastal plain was probably utilized by Early Man, for it provided a heavy population of food animals. Teeth of mastodons and mammoths, big game animals upon which Early Man probably depended, have been found on the shelf. The number

and distribution of these remains indicate that mammoths and mastodons ranged the shelf in large numbers (Whitmore, Emery, Cooke and Swift 1967: 1480). Remains of these animals have also been found in fairly large numbers in the area surrounding Long Island, while the remains of a mastodon have been recovered from the Island (Fisher 1955). Mason (1957: 15) points out that every evidence we have from the West of Paleo-Indian subsistence patterns indicates a reliance on the Late Pleistocene big game animals and, while there is no direct evidence of the hunting of mastodons, as there is of mammoth, it is inconceivable that if such game was available, it would not have supplied an important source of food and clothing.

Many streams are present on the southern part of Long Island. They run the length of the island and flow southward across an outwash plain to the sea (Suter 1949: Plate II, III, IV). This series of drainage systems provided many pathways to the mid-island upland regions from the continental shelf area onto which they flowed in times of glacially lowered sea level. Their use is suggested by the presence of three fluted points found adjacent to what was at the time of lowered sea-level, the northern parts of streams that flowed onto the exposed shelf. Ritchie (1969: 8) states that Early Man penetrated inland from the major river valleys, following smaller tributary streams into the rough uplands. The use of these drainage systems might also be indicated by the presence of two fluted points at Lake Ronkonkoma, near the source of the southward flowing Connetquot River. It is wondered, however, if the presence of three fluted points about 2 mi. from the mouth of the Nissequogue River, a northward flowing stream with its source also near Lake Ronkonkoma, indicates continued movement from the south, or northern entry, from either west or east, along the river that probably occupied the Long Island Sound valley in times of lowered sea level.

Summary and Conclusions

The number of fluted points that have been located suggests that Early Man might have been quite active on Long Island. However, the few specimens reported here probably still offer a far from complete picture of the activities of the Paleo-Indian in this area. It is suspected that as more individuals become aware of this endeavor, there will be an increase in the number of fluted points reported from Long Island. Of the collections that are still extant, only a few were located and examined. More specimens will probably turn up as more collections are located and searched. The relative ease with which a fair number of fluted points were located strongly suggests that there may be other collections containing unrecognized specimens. Probably a systematic search of the small accumulations kept by farmers will uncover more unknown specimens.

Probably one of the factors responsible for the scarcity of Paleo-Indian material from Long Island is the lack of serious investigation. Activities on Long Island have been centered around the Archaic, Transitional, and Woodland stages. Almost all the prehistory of the island is known in terms of these three stages. It is the Paleo-Indian stage about which the least is known.

References

- Emery, K. O. and Louis E. Garrison
1967 Sea levels 7,000 to 20,000 Years Ago. *Science* 157: 684-687.
- Emery, K. O. and R. L. Edwards
1966 Archaeological Potential of the Atlantic Continental Shelf. *American Antiquity* 31: 733-737.
- Fisher, Donald W.
1955 Prehistoric Mammals of New York. *New York State Conservationist* 9 (4): 18-22.
- Fowler, William S.
1954 Massachusetts Fluted Points. *Bulletin of the Massachusetts Archaeological Society* 16: 2-8.
- Funk, Robert E., Donald W. Fisher and Edgar M. Reilly, Jr.
1970 Caribou and Paleo-Indian in New York State: a Presumed Association. *American Journal of Science* 268: 181-186.

- Kraft, Herbert
1971 A Preliminary Report on the First Paleo-Indian Occupation Sites in New Jersey. *Eastern States Archaeological Federation Bulletin* No. 30. p. 14.
- Mason, Ronald J.
1959 Indications of Paleo-Indian Occupation in the Delaware Valley. *Pennsylvania Archaeologist* 29: 1-17.
1962 The Paleo-Indian in Eastern North America. *Current Anthropology* 3: 227-246.
- Ritchie, William A.
1957 Traces of Early Man in the Northeast. *New York State Museum and Science Service Bulletin* No. 358.
1969 *The Archaeology of New York State*. (revised edition). The Natural History Press, Garden City.
1971 A Typology and Nomenclature for New York Projectile Points. *New York State Museum and Science Service Bulletin* No. 384 (revised edition).
- Rutsch, Edward S.
1970 An Analysis of the Lithic Materials Used in the Manufacture of Projectile Points in Coastal New York. *The Bulletin* No. 49, pp. 1-12.
- Smith, Arthur G.
1952 A Fluted Point From Long Island, New York. *American Antiquity* 17: 263-64.
- Smith, Carlyle S.
1950 The Archaeology of Coastal New York. *Anthropological Papers of the American Museum of Natural History*. 43: Part 2.
- Suter, Russel
1949 Mapping of Geologic Formations and Aquifers of Long Island, New York. *State of New York Department of Conservation Water Power and Control Commission Bulletin*. GW-18.
- Whitmore, Frank C. Jr., K. O. Emery, H. B. S. Cooke and Donald J. P. Swift
1967 Elephant Teeth from the Atlantic Continental Shelf. *Science*. 156: 1477-1481.
- Witthoft, John
1952 A Paleo-Indian site in Eastern Pennsylvania: an Early Hunting Culture. *Proceedings of the American Philosophical Society* 96: 464-195.
- Wormington, H. M.
1957 Ancient Man in North America. *The Denver Museum of Natural History Popular Series* 4. (4th edition, revised).

A PRELIMINARY CULTURAL FRAMEWORK FOR THE UPPER SUSQUEHANNA VALLEY*.

Robert E. Funk NYSAAF
Bruce E. Rippeteau
Ralph M. Houck

Van Epps-Hartley Chapter
Upper Susquehanna Chapter
Penn State University

In July of 1971, the Anthropological Survey, New York State Museum and Science Service, commenced the first of several planned seasons of excavations in the upper Susquehanna Valley, thus realizing a dream held for several years by William A. Ritchie and the senior author. The valley is known to be rich in archaeological remains, as attested by the numerous and sometimes large collections on record. Some very informative sites have been located by amateurs, scientifically oriented excavations have been carried out on some of them (Hesse 1968; 1971; Funk and Hoagland 1972a; 1972b), and others have been investigated by highway salvage crews, including the large and productive Engelbert site near Nichols (Elliott and Lipe 1970). Prior to our researches, little was known of early occupations, although a number of sites of the late prehistoric Owasco culture had been excavated by Ritchie and others (Ritchie 1934; 1938a; 1939; 1944; 1965;

*Published by permission of the Director, New York State Science Service, Journal Series No. 145.

1969a). Furthermore, the valley lies between two more thoroughly explored regions, the Finger Lakes and adjoining parts of central New York and the Hudson Valley of eastern New York, while at the same time connecting with the Mid-Atlantic region in Chesapeake Bay. What would be the cultural cross-ties between east and west, and what would be unique to the valley or intrusive from the south? We hoped to answer these and a host of other questions as our investigations began.

We have completed two eight-week field seasons in the region. In both summers our small crew of State Science Service aides was assisted by students enrolled in the State University at Albany field methods course. Ralph Houck was the senior author's field chief. During the 1972 season we were joined by another group taking a field course offered by Oneonta State College and directed by Bruce Rippeteau. Thus the size of our work force varied from 20 to 30 people during the six week terms of the field schools.

Our emphasis has been on the excavation of stratified flood plain sites. The results in terms of the quantity and quality of data on prehistoric occupations have been highly gratifying. In order to conserve space, we will very briefly describe the most important sites, and then present our interpretations in summary form. Projectile point types used below are described in Ritchie 1971b.

The Fortin Site

Discovered in June, 1971, by amateur archeologist Howard Hoagland, this is the most important site yet excavated in the upper Susquehanna drainage of New York State, and one of the most instructive sites in the Northeast. In two seasons of work we excavated over 4300 sq. ft. to an average depth of five feet. The site contains at least 12 discrete living floors, for which a series of 12 radiocarbon dates, an unparalleled series for one site in the Northeastern United States, has been obtained.

It is located near the city of Oneonta on the F & F Airport, adjoining the runway, at the junction of Charlotte Creek and the Susquehanna. The owners, Mr. and Mrs. Albert Fortin, generously granted permission for the excavations and backfilled them for us at the completion of work.

Locus 1 was near the hangars some 300 ft. upriver from the Charlotte's mouth. Here a sequence of occupation floors and natural geological beds was defined in terms of eight zones (a typical stratigraphic profile is shown in plate 1). The plow zone, Zone 1, was rich in artifacts and lithic debris derived from old floors disturbed by cultivation. Zone 1b, a brown silt, was one of those floors, preserved below plow sole only near the river bank. Zone 2 was a yellow-brown silt underlying plow line where Zone 1b was absent; it contained a moderate quantity of artifacts, debris, and hearths. Zone 3 was a living floor between Zone 2 and the underlying sandier, more compact silt, Zone 4. Zone 3 was the richest occupation level. Zone 4 produced moderate amounts of material. Zone 5 was a dark midden stain surrounding several features, confined to a small part of the site. Below Zone 5, or where it was lacking below Zone 4, was Zone 6, a universal gravel bed which yielded little evidence of occupancy. Zone 7 consisted of interbedded sands and silts, again poor in cultural refuse, directly overlying sterile glacial outwash. The glacial deposit was reached at an average depth of 5 ft.

Only two projectile points, both Lamoka-like in form, were found in the basal Zone 7 (plate 3, figs. 53, 54). Other items included netsinkers (figs. 55, 56) anvilstones (fig. 57), hammerstones, and bifaces in process. A hearth in this level produced charcoal dated 3970 ± 100 radio carbon years; 2020 B.C. (I-6568). Another date was run on a feature located at the west end of the grid near the river bank and believed to be in Zone 7, although all of the higher zones had pinched out or dropped off abruptly in the square. The date of 3350 ± 95 radiocarbon years; 1400 B.C. (I-6752) strongly indicates that the hearth was intrusive from Zone 2.*

*In the July 1972 issue of *The Bulletin* (p. 5) there appeared a statement of editorial policy on reporting of radiocarbon dates. The present writer is not in complete agreement with this policy, largely as a result of his own communications with Teledyne Isotopes, the laboratory which is handling his dates. In this paper, he and the Editor have agreed to compromise, employing the reporting format which appears in "Notice to Authors" on the inside front cover of *American*



PLATE 1. Profile of east wall of section W50S10 at Fortin site, Locus 1. Physical zones marked by tags. Zone 1, plow zone (mixed occupations). Zone 2, yellow-brown silt (Susquehanna level). Zone 3, living floor with Normanskill and Vestal points, showing Feature 30; note zone dips to left toward old beach as indicated by scratched lines. Vestal points were clustered in this area of site, without Normanskills. Zone 4, yellow-brown silt containing Lamoka points. Zone 5 absent from this part of grid. Zone 6, gravel containing rare artifacts including fragmentary corner-notched point. Zone 7, sands and silts which produced two Lamoka-like points. Tip of range pole rests on glacial outwash.



PLATE 2. Profile of west wall of W350 trench at Fortin site, Locus 2. Living floors are indicated by trowel-incised lines in alluvial silt. Floors are numbered from top to bottom as shown by tags; occupations are numbered in reverse order. Student points to Floor 4 (Occupation 1) just above glacial outwash. Note staining caused by fire-reddening and charcoal in Floors 1 and 2. Floor "0" (Occupation 5) not present in these squares.

Antiquity. (Ed. Note: This article included so many C-14 dates, both pertaining to the sites reported here for the first time and to previously reported sites, that the author could not have developed his synthesis without a consistent dating system. This could only be the system used since 1950. The fact remains, however, that an accurate calendar date for times B.C. cannot be arrived at by subtracting the conventional 1950 from the C-14 result unless the testing laboratory has allowed for C-14 atmospheric variations in times B.C. The dating used in this piece is valid and reliable within its system.)

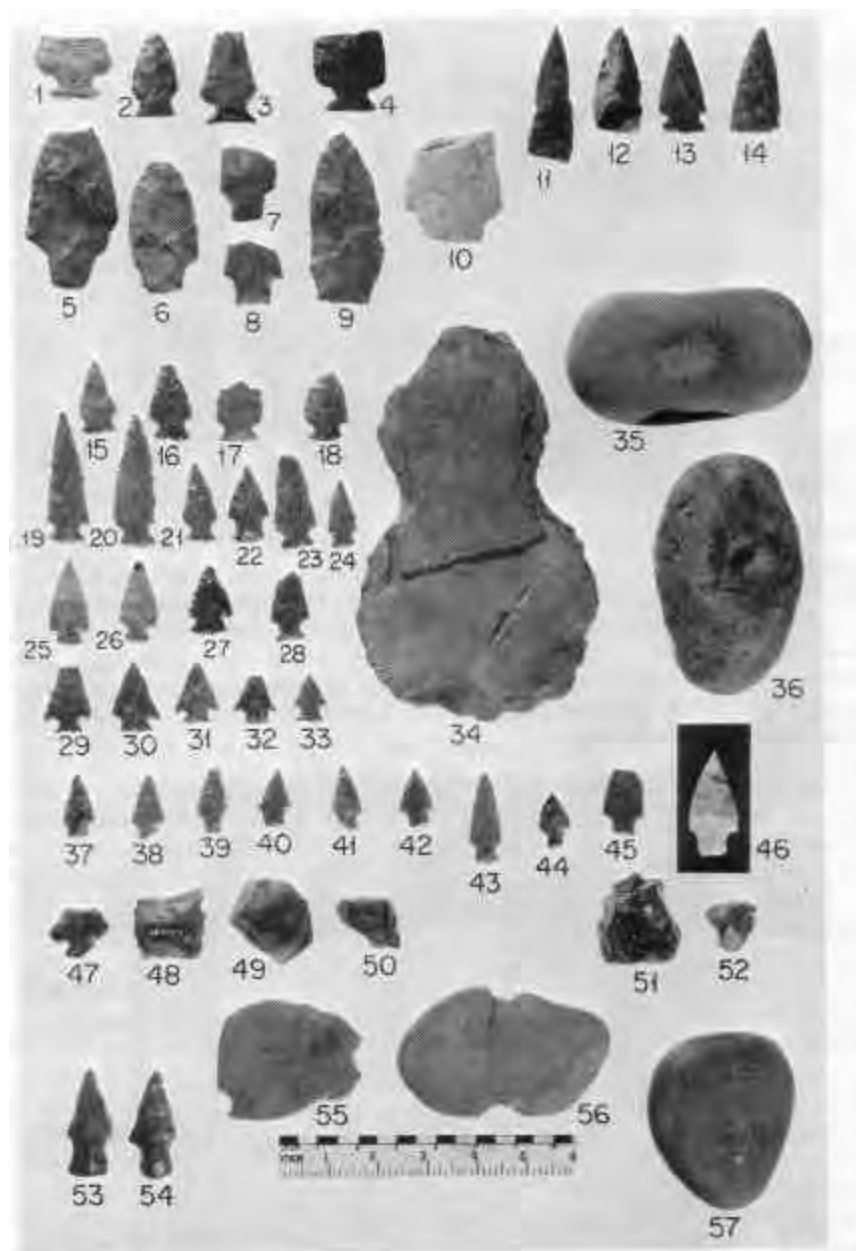


PLATE 3. Artifacts from the Fortin site, Locus 1. Figs. 53-57 from Zone 7; 53, 54, Lamoka-like points; 55, end-notched netsinker; 56, side-notched netsinker; 57, anvilstone. Figs. 47-50 from Zone 6; 47, fragmentary water-rolled corner-notched point with narrow base; 48-50, retouched flint nodules from the gravel. Figs. 51, 52 from Zone 5; both are worked flint nodules. Figs. 37-46 from Zone 4; 37-44, Lamoka type points; 45, medium broad stemmed point; 46, stemmed point of chalcedony. Figs. 15-36 from Zone 3; 29-33, Vestal Notched points; 25-28, corner notched points similar to Vestals; 19-24, Normanskill points; 15-18, medium broad side-notched points; 34, large notched hoe or grubbing tool; 35, anvilstone; 36, deeply pitted stone. Figs. 1-10 from Zone 2; 1-4, Susquehanna. Broad points; 5, 6 Snook Kill points; 7, 8, Genesee points; 9, 10 knives. Figs. 11-14 from Zone 1b; 11, 12, Meadowood cache blades; 13, whole Meadowood point; 14, Meadowood point minus base. Chipped stone materials: all except figs. 1, 6, 10, 46 of central New York Onondaga flint. 1, 10, Pennsylvania rhyolite; 6, Normanskill flint; 46, unidentified chalcedony.

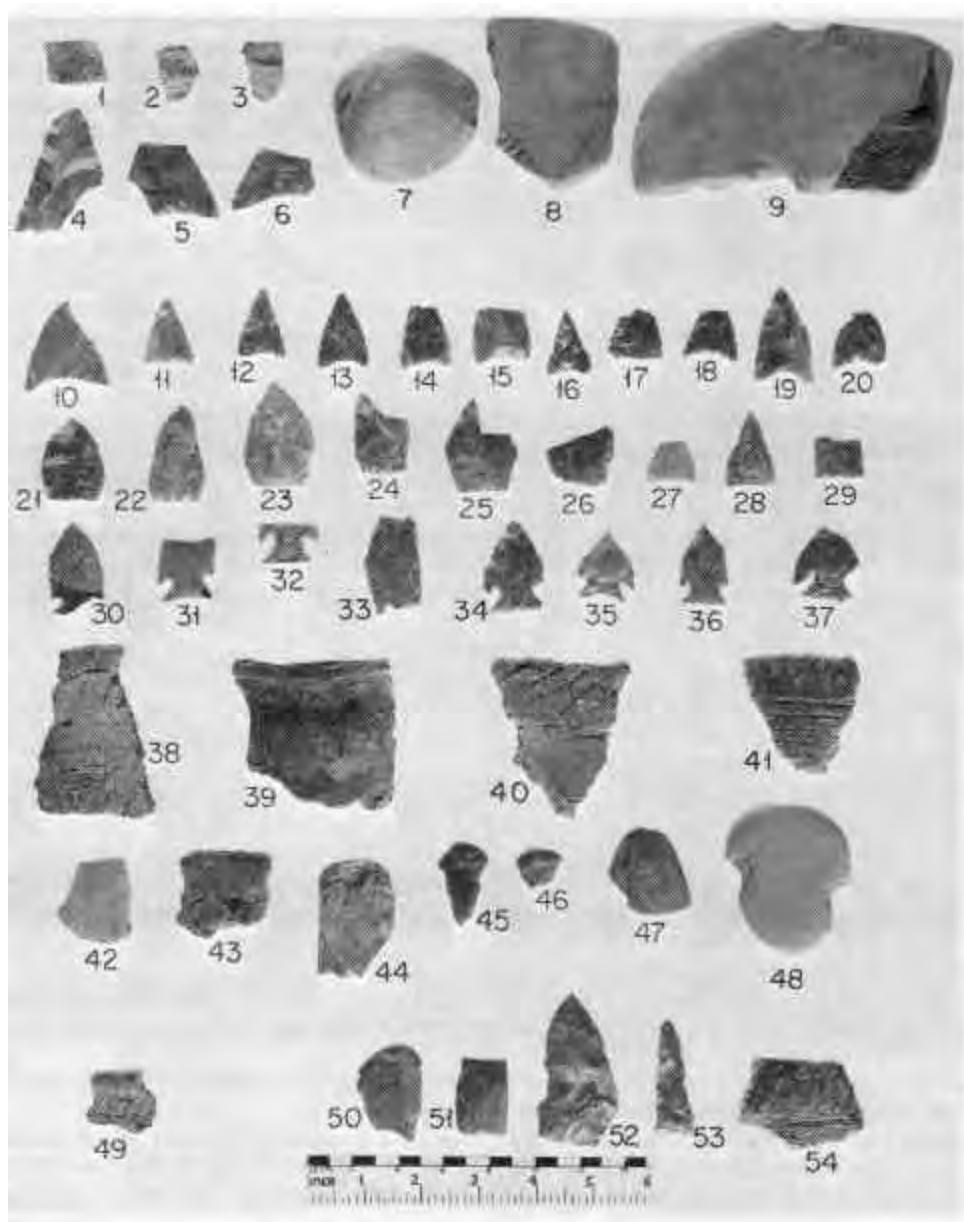


PLATE 4. Artifacts from the Fortin site, Locus 2. Figs. 1-9 from Occupation 4 (Early Owasco); 1, thin, finely corded body sherd; 2, 3, flat-lipped rim sherds from thin, plain pottery vessel; 4-6, Levanna points; 7, pebble hammer; 8, sinewstone; 9, side-notched netsinker. Figs. 10-48 from Occupation 3 (Kipp Island phase); 10, 11, Levanna-like triangular points; 12-20, triangular points with edge angles reminiscent of those on Jack's Reef Pentagonal points; 21-29, Jack's Reef Pentagonal points; 30-37, Jack's Reef Corner-Notched points; 38, punctated and wiped rim sherd; 39, rim sherd of Wickham Punctate type; 40, rim sherd of Jack's Reef Dentate Collar type; 41, rim sherd of Vinette Dentate type; 42, rim sherd of Jack's Reef Corded type; 43, rim sherd of Point Peninsula Plain type; 44, end scraper on large flake; 45, 46, trianguloid strike-alights; 47, fragment of slate pendant; 48, notched netsinker. Figs. 50-54 from Occupation 2; 50, end scraper on thin flake; 51, biface fragment; 52, knife of pentagonoid form; 53, possible drill in process; 54, rim sherd of Jack's Reef Dentate Collar type. Fig. 49, weathered Early Point Peninsula rim sherd, from Occupation 1. Chipped stone materials: all of central New York Onondaga flint.

One untyped fragmentary corner-notched point with broad, overhanging shoulders and small expanded stem (fig. 47) occurred in Zone 6, plus a few anvilstones and uniface tools, largely based on flint nodules which were present in the gravel (figs. 48-50).

Nothing diagnostic was found directly in the Zone 5 midden, which produced some crude tools on flint pebbles (figs. 51, 52), but a strong case can be made for its association with Lamoka points, two of which were in place directly on top of Zone 6, just outside the midden, and others of which were recovered in overlying and underlying zones. A hearth in zone 5 is dated 3880 ± 100 radiocarbon years; 1930 B.C. (I-6566).

Zone 4 produced a good sample of Lamoka type points (plate 3, figs. 37-44), some untyped narrow stemmed points (figs. 45, 46), one untyped, medium broad side-notched point, biface fragments, anvilstones, pitted "nutting" stones, hammerstones, and two sandstone slabs with side notches and roughly chipped edges and ends which may be digging or "grubbing" tools. There are two radiocarbon dates for the zone; 3750 ± 95 radiocarbon years; 1800 B.C. (I-6369) and 3840 ± 100 radiocarbon years; 1890 B.C. (I-6567).

An important point type from Zone 3 is the newly defined broad, thin corner-notched or side-notched Vestal Notched type (plate 3, figs. 29-33), first found below ground at the Castle Gardens site near Binghamton (Wilcox n.d.a; Ritchie 1971b). Several corner-notched specimens are similar to Vestal points in the form of notches and base but are either too thick or relatively long in the blade (figs. 25-28). A significant number of points are classified with the narrow side-notched Normanskill type (figs. 19-24). There are also a number of other side-notched points, of medium breadth, and variable in morphology, but most similar to Normanskills (figs. 15-18). Other tools include hammerstones, anvilstones (fig. 35), "nutting stones" (fig. 36), flake tools, and several of the unusual hoes or "grubbers" (fig. 34). The Vestal points tended to cluster at the west end of our excavations. Five were associated there with a hearth dated 3775 ± 115 radiocarbon years; 1825 B.C. (I-6351). Two other features, associated with Normanskill points toward the east end of the grid, were dated 3610 ± 95 radiocarbon years; 1660 B. C. (I-6368), and 3685 ± 100 radiocarbon years; 1735 B.C. (I-6739).

The next higher level, Zone 2, yielded diagnostic artifacts of the Susquehanna tradition, the great majority representing the Frost Island phase (Ritchie 1969a: 156-164). We recovered numerous Susquehanna Broad points (plate 3, figs. 1-4), typical Susquehanna knives and preforms (figs. 9, 10), and a variety of other tools including anvilstones. Confined to a small area were three Snook Kill points (figs. 5, 6) and two Genesee points (figs. 7, 8). The level has not been radiocarbon dated, unless the date of 1400 B.C. ± 95 from a hearth in section W50S10, and probably intrusive into Zone 7, can be attributed to it.

A hearth in Zone 1b contained the only diagnostic objects from this level; three Meadowood cache blades (plate 3, figs. 11, 12) and two Meadowood points (figs. 13, 14). This feature is dated 3180 ± 95 radiocarbon years; 1230 B.C. (I-6740).

In the plow zone occurred Jack's Reef Corner-Notched, Susquehanna Broad, and Snook Kill points and other items displaced from context by the plow.

Locus 2 at Fortin's was adjacent to the creek, 300 ft. west of Locus 1 and at a slightly lower level. Here five different occupation floors were well-separated by sterile silt zones (plate 2). The basal floor, just above glacial drift, yielded one diagnostic object, an Early Point Peninsula rim sherd (plate 4, fig. 49). The second floor is of uncertain cultural affiliation because of the small artifact sample, but Middle Woodland pot-sherds (fig. 54), a knife similar to the Jack's Reef Pentagonal point type (fig. 52), a possible pentagonal or triangular point in process (fig. 51), a Fox Creek Stemmed point provisionally assigned to the level, and a date of 1475 ± 90 radiocarbon years; A.D. 475 (I-6350) suggest an early Kipp Island component (Ritchie 1969a: 234-253). The third floor provided an excellent artifact sample of the Kipp Island phase, consisting of 8 Jack's Reef Corner-Notched points (figs. 30-37), 14 Jack's Reef Pentagonal points (figs. 21-29), 10 triangular points, 2 of which are Levanna-like (figs. 10, 11), the other 8 displaying some attributes of Jack's Reef Pentagonals (figs. 12-20), potsherds from a number of characteristic vessels (figs. 38-41), strike-a-lights (figs. 45, 46), scrapers (fig. 44), pitted stones, etc. This is the first Kipp Island component which has been excavated in a sealed, stratified flood plain situation. It is dated 1120 ± 90 radiocarbon years; A.D. 830 (I-6565).

Occupation 4 was an Early Owasco manifestation, as evidenced by potsherds (figs. 1-3), Levanna points (figs. 4-6), a sinewstone (fig. 8), netsinkers (fig. 9), and hammerstones (fig. 7). It is difficult to explain an anomalous date of 320 ± 100 radiocarbon years; A.D. 1630 (I-6753) on hearth charcoal from the zone, unless the feature had been disturbed by burrowing animals introducing modern carbon. Occupation 5 failed to yield diagnostic traits, but scraps of pottery indicate another Late Woodland sojourn.

The Kuhr No. 1 site

Also deeply stratified, this station is located at the junction of Flax Island Creek and the Susquehanna in Otego. It was tested by Ralph M. Houck and F. J. Hesse during a survey in the fall of 1971. The 1972 excavation was primarily the responsibility of Rippeteau, in charge of the Oneonta State group. An area of 1100 sq. ft. was excavated to an average depth of 6 ft. with the kind permission of William Kuhr, the owner. Though not rich in artifacts, the site contained numerous hearth features, 102 of which were encountered in our explorations.

There was almost incredible separation of living floors, at least 18 of which were observed though perhaps only five could be traced throughout the site (plate 6).

The water table was struck at about 6 ft. but, except where the old land surfaces dipped toward the river on the south end of the grid, no occupations were visible below the table. Our excavations will be continued next summer, but a culture sequence has clearly emerged despite limited artifact recoveries.

The site sequence apparently began with Late Archaic occupations represented so far by two Normanskill points from two widely separated floors, pitted stones, and a few other items. One of these Normanskill levels is dated 3880 ± 155 radiocarbon years; 1930 B.C. (I-6732).

Well above these horizons and just below a universal humus band was a component related to the Snook Kill phase of the Hudson Valley (Ritchie 1969a: 134-142). It is dated 3620 ± 130 radiocarbon years; 1670 B.C. (I-6733).

Above the Snook Kill level and the humus band were multiple living floors, extending to less than a foot below plow line, all of which pertained to the Frost Island phase. The materials included Susquehanna Broad points, Susquehanna knives or preforms, pitted stones, and other items. A charcoal sample from one of these levels, directly associated with diagnostic artifacts, is dated 3500 ± 105 radiocarbon years; 1550 B.C. (I-6751). An Orient Fishtail point was recovered in or just below the highest Susquehanna level, where a Susquehanna Broad also occurred.

In and just above the highest Frost Island level were found crude, friable potsherds, some of Vinette 1 ware, others apparently plain and similar to Middle Woodland varieties. No diagnostic bifaces were associated. A Levanna point and a probable Susquehanna Broad point were in the plow zone. No soapstone occurred in our excavations, though it is an established Frost Island trait.

The Camelot No. 1 site

Located near Otego on the Camelot Arabian Farm at the juncture of Mill Creek and the Susquehanna, this site was discovered by F. J. Hesse. In the spring of 1971 Hesse and the Upper Susquehanna Chapter, New York State Archeological Association, set up a small grid system and began systematic excavations with permission of Donald Leggett, the owner. In July, Hesse and chapter president Calvin Behnke invited the senior author and his crew to join the work.

The site is in a large, brushy field on the west side of Mill Creek, north of the D & H railroad bed and south of Route 7. The surface of the field is uneven, consisting of low oblong rises separated by soggy depressions. The remains of Indian occupancy are confined to the rises, as might be expected.

On the largest rise, some 500 ft. south of the road, was the chapter grid, which we designated Locus 3. Our main excavation of 1570 sq. ft. at Locus 1, was 150 ft. south of Locus 3. Locus 2 was situated on another rise west of Locus 1; there we opened 350 sq. ft. Locus 4, consisting of 300 sq. ft., was located near the chapter grid.

The stratigraphic picture was basically the same in all loci. A thin topsoil containing historic debris may be an old tilth zone from the days of the horse-drawn plow. Beneath it were



PLATE 6. East profile of section W20S10 at Kuhr No. 1 site, showing occupation floors in silt. Feature 85 and level marked "NORM" represent one of basal components, identified from Normanskill points. Level marked "SNOOK" is Snook Kill living floor. At least three Frost Island floors in higher levels are marked "FROST". Next level, "FISH", produced an Orient Fishtail point. Top level below plow line marked "WD" produced Woodland pottery.



PLATE 7. East profile of section E0N0 at Camelot No. 1 site, showing cross-section of Feature 1, associated with Frost Island component.

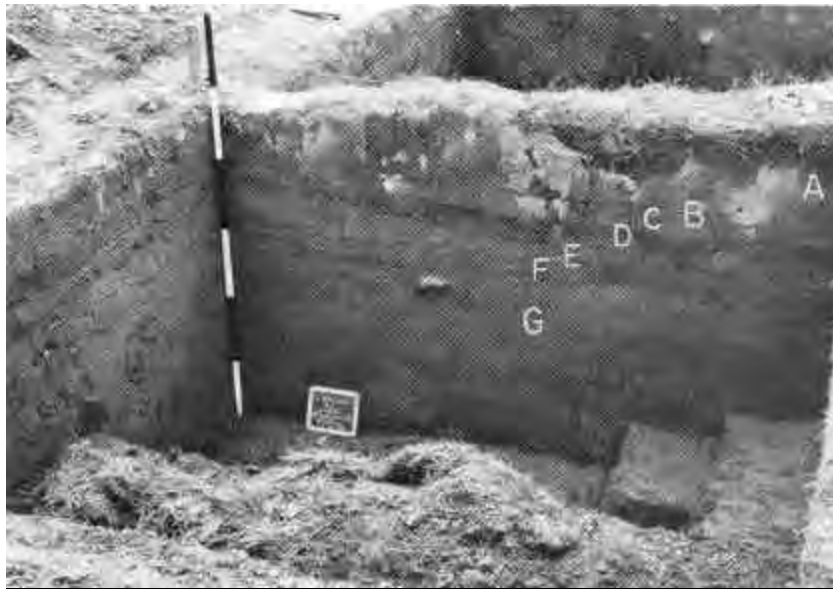


PLATE 8. South profile of section W10N0 at Camelot No. 2 site, showing stratification. Plow zone indicated by "A". Traces of Kipp Island floor at base of plow zone marked by "B". Yellow-brown silt with some Frost Island items shown as "C". The main Frost Island floor is indicated by "D". The underlying hard brown silt, "E", contains Vestal points. The level shown as "F" did not yield diagnostic materials. Just below it in the yellow-brown silt, "G", occurred Brewerton Eared Triangle points.

three intergrading alluvial zones, ranging from light yellow-brown silt at the top through a dark mottled clay-silt at 33 in. The alluvium rested on sterile gravels at the water table.

Nearly all the cultural material was found between 6 and 12 in. deep. Late Archaic to Late Woodland artifacts lay on the same level in Loci 1, 3, and 4 except for a restricted area in the chapter dig where an Archaic floor with hearths was recorded in an unusually deep silt pocket (Hesse, personal communication). Thus there was an essentially stable living floor in the field for over 2000 years, with little concurrent silt deposition.

However, our work in Locus 2 produced only artifacts of Susquehanna affiliation. Also, there was a heavy Frost Island concentration at the north end of Locus 1, where all other artifacts were rare.

Artifacts from the Locus 1 cluster include Susquehanna Broad points, some rather broad of blade (plate 9, figs. 1-11), diagnostic knives (figs. 12, 13), a drill on a reworked Susquehanna Broad point (fig. 14), bifaces in process, miscellaneous biface fragments, utilized flakes, hammerstones, anvilstones (figs. 16-18) and pitted "nutting stones" (fig. 15), all associated with features and charred butternut fragments. This cluster is interpreted as the remains of a small, seasonal (fall?) camp of Frost Island people. Surprisingly, no soapstone was recovered here or elsewhere on the site. A central hearth (plate 7) is dated 3425 ± 95 radiocarbon years; 1475 B.C. (I-6641).

Two points resembling Orient Fishtails (plate 7, figs. 24, 25) and a third resembling a Susquehanna Broad/Orient Fishtail "hybrid" or intermediate form (fig. 23) were unearthed in Locus 2. A charcoal sample from a hearth containing an Orient Fishtail point produced an unacceptably recent date for these items of 1820 ± 95 radiocarbon years; A.D. 130 (I-6745). This date falls in the range of early Middle Woodland manifestations, although no corresponding artifacts occurred in the Locus 2 excavations.

The chapter excavations will not be detailed here, as the data will be presented by Hesse and the senior writer in a final report in the near future.

The Camelot No. 2 Site

Our surveys in 1971 found a stratified site on a different part of Camelot Farm, several hundred yards from Camelot No. 1 at the west end of a large field at the confluence of Mill Creek and the river. In July 1972 a trench 60 ft. long (six 10 ft. squares) was excavated near the creek and a test square was also dug near the river bank. The stratigraphy is shown in the profile on plate 8.

In the trench, little cultural refuse was present in the plow zone. Just below plow line was a mottled brown midden remnant containing traces of occupancy by Late Point Peninsula (Kipp Island) people, denoted by two Jack's Reef Pentagonal points and various potsherds. An immediately underlying yellow-brown silt, several inches thick, contained some artifacts and flint wastage of the Frost Island phase. This silt overlay a darkly stained sheet midden, 1 to 4 in. thick, which produced much material of the Frost Island phase, concentrated in the two middle squares in the vicinity of hearth features. The total Frost Island assemblage includes some 10 Susquehanna Broad points, 7 Susquehanna knives and preforms, over 120 other bifaces, some in process, a fine drill on a Susquehanna base, 2 soapstone sherds, a celt, pitted stones, and other items. In the features were a few charred butternuts and bits of calcined bone. A hearth of Frost Island origin is C-14 dated 3240 ± 95 radiocarbon years; 1290 B.C. (I-6744).

At the base of the zone on its fringes were two Snook Kill points, and a Perkiomen Broad point.

The next stratigraphic unit was a compact brown clay-silt a few inches thick in which two Vestal Notched points were found. In yellow-brown silt at a greater depth we recovered two Brewerton Eared Triangles. There were faint signs of habitation at deeper levels, but below 3 ft. the deposits were devoid of cultural remains.

We plan further work on the site in 1973.

Discussion

In addition to the sites already described, a number of other informative sites were investigated by us and others between 1965 and 1970. They include the Castle Gardens site near Binghamton (Wilcox n.d.a.), the Cottage site, also near that city (Wilcox n.d.b), the Roundtop site in Endicott (Ritchie 1969a; Ritchie and Funk n.d.), the Fredenburg site near Otego (Hesse 1968), the Gillingham Rockshelter in the same vicinity (Hesse, personal communications), the Egli site at Sidney (Hesse 1971), the Davenport Creamery site in Davenport (Funk and Hoagland 1972a), and the McCulley No. 1 site, also near Davenport (Funk and Hoagland 1972b).

The considerable body of data now available permits the formulation of a regional cultural sequence which is moderately detailed in some segments. When our project is completed, we should have learned a great deal about the history of human adaptations in the upper Susquehanna Valley.

For the earliest periods -Paleo-Indian, Early Archaic, and Middle Archaic-we recovered nothing new. There are a few fluted points in surface collections (Ritchie 1969a: Fig. 2), but no Paleo-Indian habitation sites have been located. Projectile points which would be at home in the southeastern Early Archaic, including examples of Kirk Corner-Notched, Kirk Stemmed and bifurcated-base types, are rare in collections, and again none have been found in undisturbed context. This paucity of older Archaic remains is probably a consequence of an environment unfavorable to hunting-gathering populations due to changes in climate, flora, and fauna in early postglacial times (Fitting 1968; Ritchie 1969b: 212-213; 1971a; Ritchie and Funk 1971; n.d.).

The oldest manifestations for which we have reliable evidence are referable to a Middle-to-Late Archaic lithic tradition which, for our purposes, can be loosely called "Laurentian." The McCulley No. 1 site, on Charlotte Creek near Davenport, Delaware County (Funk and Hoagland 1972b), was a single-component hunting-gathering camp buried in alluvial silt. The small assemblage of several Otter Creek points, a Brewerton Side-Notched point, end and side scrapers, knives, and pitted stones is very reminiscent of the Vergennes phase, a Laurentian expression centered in the Lake Champlain basin and the St. Lawrence Valley (Ritchie 1968; 1969a: 83-89; 1971a). Unfortunately this assemblage, radiocarbon dated 3780 B.C. ± 110 years (I-5524), lacks other Vergennes diagnostics such as gouges and ground slates. (These elements are present in

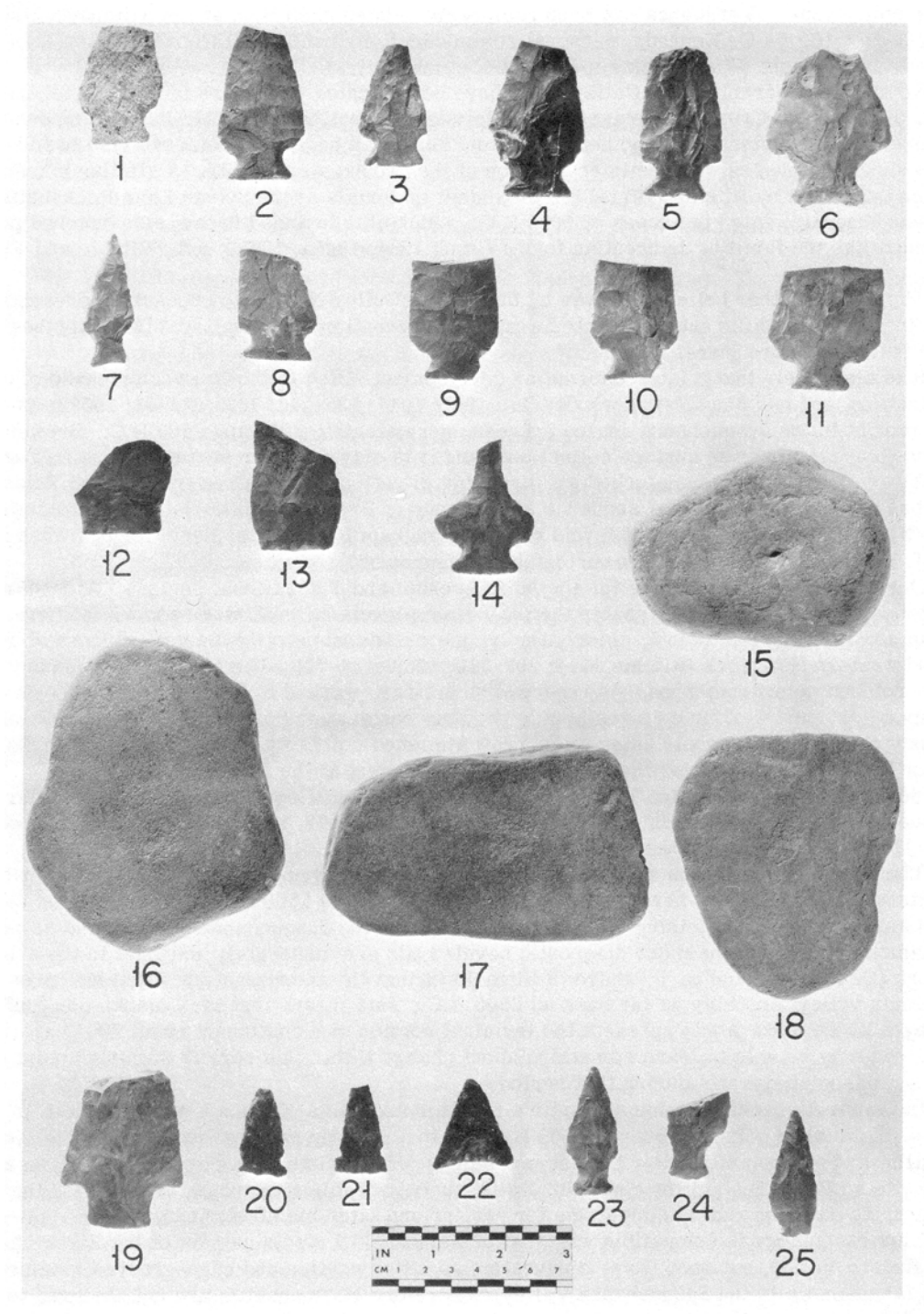


PLATE 9. Artifacts from the Camelot No. 1 site, Loci 1 and 2. Figs. 1-18 from Frost Island cluster in Locus 1. Figs. 1-11, Susquehanna Broad points; note narrow example in fig. 7, and relative width of blade vs. base in 6, 9-11; 12, 13, typical Susquehanna knives; 14, Susquehanna drill; 15, pitted "nutting" stone; 16-18, anvilstones. Figs. 19-22 outside Frost Island cluster; 19, Genesee point; 20, 21, Meadowood points; 22, Levanna point. Figs. 23-25 from Locus 2; all fishtail-like points. Chipped stone materials: 1, Pennsylvania rhyolite; all others central New York Onondaga flint except 19, of western New York Onondaga flint.

surface collections.) Vergennes has been radiocarbon-dated 3290 B.C. at the Allumette Island site in Quebec (Clyde C. Kennedy, personal communication) and 3120 B.C. at the Otter Creek No. 2 site in Vermont (W.A. Ritchie, personal communication).

No sites comparable to McCulley No. 1 have been located elsewhere in the Susquehanna Valley, though Otter Creek points are present in many collections. The McCulley component may pertain to an ancient and hypothetical proto-Laurentian horizon which gave rise to full blown Laurentian phases with the later addition of the ground stone traits. A similar placement has been suggested by Ritchie (1971a) for the oldest materials at the Sylvan Lake Rockshelter near Poughkeepsie, dated in excess of 4000 B.C., which also included broad, side-notched points very much like the familiar Laurentian forms (Funk 1965; 1966a; 1966b; n.d.; Ritchie and Funk n.d.).

The senior author believes, however, that the McCulley No. 1 site probably represents an authentic regionally differentiated early Laurentian occupation of the valley. This hypothesis will be tested in future investigations.

It is also likely that a later Laurentian development allied to the Brewerton phase of central, western, and northern New York (Ritchie 1940; 1944: 235-246; 1965:87-103; 1969a; 89-104) was dominant in the Susquehanna region between approximately 3000 and 2500 B.C. Brewerton point types are common in surface collections, and it is only a matter of time before related assemblages are found in undisturbed stratigraphic situations. Two Brewerton Eared Triangles at the base of the Camelot No. 2 sequence and a group of Brewerton Side-Notched and Brewerton Eared-Notched points from lowest levels of the Gillingham Rockshelter near Otego, investigated by F. J. Hesse, may represent Brewerton phase components.

Our most complete data are for the later Archaic and Transitional periods. At the Fortin site, Zones 4 and 7, and very probably the intervening levels as well, were associated with Lamoka and Lamoka-like points, clearly implying a relationship to the Lamoka culture of central and western New York (Ritchie 1944: 292-310; 1969a: 36-79). The unique, fragmentary corner-notched point from Zone 6 is regarded as a stray, washed in from an older deposit or possibly a souvenir of older cultures kept by a group resident at Fortin's. The total span of habitancy on the site by people using the narrow stemmed points was from about 2000 to 1800 B.C., or 200 years. A date for the Lamoka point component at the Engelbert site near Nichols is c. 1900 B.C. (Elliott and Lipe 1970; Dolores Elliott, personal communication). A similar component at the stratified Kuhr No. 2 site, tested by us in 1972, is dated 3905 ± 105 radiocarbon years; 1955 B.C. (I-6734).

These assemblages thus appear to be several centuries younger than the Lamoka phase type site at Lamoka Lake, where the average of seven dates is 2500 B.C. (Ritchie 1969a: 43). Since Lamoka Lake and adjoining Waneta Lake drain into the Susquehanna system, and since both Lamoka points and the more diagnostic beveled adz are moderately abundant in the area of our work (Ritchie 1969a: Fig. 5), there is little doubt that the Lamoka phase itself was present in the main valley, probably as far back as 2500 B.C. This means that the Lamoka point assemblages so far excavated represent the terminal portion of a continuum about 700 years in length. We may be able to learn something about change within this narrow stemmed point tradition and associated traits during that period.

In the stratigraphic column at Fortin's the Lamoka points of Zone 4 were replaced in Zone 3 by Vestal Notched points by around 1800 B.C. as indicated by radiocarbon dating. The Normanskills, and a group of similar but untyped side-notched points, are dated to about 1700 B.C. at this site and 1930 B.C. at the Kuhr No. 1 site; their probable true range, considering the stratigraphic data and radiometric dates for earlier and later manifestations, was c. 1800-1700 B.C. This chronology is compatible with that of Normanskill points as part of the River phase in the Hudson Valley, but such River diagnostics as effigy pestles and edge-grooved anvilstones are so far unknown in the Susquehanna Valley. Therefore Normanskills are not assigned to the River phase in that valley.

The Zone 3 data raise the question of whether Normanskill and Vestal points were contemporaneous and, if so, were they manufactured by one people or two different peoples? There was no stratigraphic separation of the two types within the zone. Vestals, very frequent in collections throughout the valley, were first found underground at the Castle Gardens site on the

Susquehanna flood plain (Wilcox n.d.a). There they were mixed with Lamoka points in all levels and in some of the numerous features. A feature containing both types was dated 2140 B.C. At this station Normanskill points were quite rare. As noted above, at the Fortin site Vestal and Lamoka points occurred in different stratigraphic levels, and the Vestals were in the same level as Normanskills and other side-notched points. The Normanskills and Vestals tended to cluster at different ends of Locus 1, implying that each type was made by a different cultural group, and we infer that two different periods of occupation were involved during the relatively short period-100 to 200 years-that Zone 3 was a stable living floor. In support of this, at Camelot No. 2 site, the few Vestals recovered were the only type in the compact clay-silt just below the Susquehanna zone. No Vestal Notched points were found in the lowest levels at Kuhr No. 1 site, but only two Normanskills were present, which is a very small sample. Vestals did not occur on sites of the River phase in the Mohawk and Hudson Valleys (Ritchie 1958: 34-53; 1969a: 125132; Ritchie and Funk n.d.; Funk n.d.). There appears to have been an association of Normanskill, Lamoka, and certain untyped side-notched points in features at the nonstratified Farrell Farm (Cole Gravel Pit) in the Genesee Valley, radiocarbon dated from c. 1900-2000 B.C. (Hayes and Bergs 1969). Sites with good separation or isolation of living floors usually provide evidence for the independent use of one point form by one group, but there are occasional indications of the coexistence of two or more point types, which is to be expected from theoretical considerations in the course of cultural evolution. Therefore, although it is possible that Vestal points overlapped with both Lamoka and Normanskill points in time, it seems likely that all three types occupied basically different time periods and were diagnostic of different cultural groups. This interpretation implies that the seeming association of Vestal and Lamoka points at Castle Gardens was the result of mechanical mixture; hence the precise meaning of the radiocarbon date is open to question.

Of the three types, only Vestal Notched points seem limited in distribution to the upper Susquehanna drainage.

On the slim evidence of the radiocarbon dates for Zone 3 at Fortin, it is postulated that Vestal Notched points preceded Normanskill points in time. This idea is subject to possible: revision when new data become available. These points may represent different phases, but more evidence is needed before such phases can be defined and named.

The eventual fate of Vestal and Normanskill points in the region is unknown. There was some stratigraphic suggestion of their persistence into the time that Zone 2 was deposited at Fortin's, though this does not necessarily mean that either or both were coeval with types of the Susquehanna tradition, also present and numerically preponderant in the zone.

The Susquehanna traits in Zone 2 are predominantly of Frost Island affiliation, but three Snook Kill points, clustered in a small area, are presumably from an older component. This chronological assignment is supported by the stratigraphic data from the Camelot No. 2 and Kuhr No. 1 sites, by comparative data from the Hudson Valley, and by the radiocarbon dates from Kuhr No. 1, Camelot No. 2, and Camelot No. 1. The Snook Kills are tentatively placed in a regional expression of the Snook Kill phase (Ritchie 1969a: 134-142). The Kuhr No. 1 date of 1670 B.C. \pm 130 for the Snook Kill floor overlaps within two sigmas with the date of 1470 B.C. \pm 100 years (Y-1170) for the type site in the Hudson Valley (Ritchie 1969a: 136), but probably reflects a truly greater age. It is close to dates obtained for the related Koens-Crispin and Perkiomen point types in the upper Delaware Valley (Kraft 1970; Kinsey 1972).

Of an age roughly similar to the age of Snook Kill points are Genesee type points, also found in Zone 2 at Fortin's but present in isolated contexts at the McCulley No. 2 site near Davenport (H. Hoagland, personal communications), the Winney Hill site near Otego (F. J. Hesse, personal communication), and the large Gravesen site near Norwich (Whitney 1971). These components demonstrate the independent existence of a culture featuring Genesee points, scrapers and drills on reworked points, knives, flake tools, and rough stone tools of various kinds. These assemblages are very similar to that from the Oatman site in the Batten Kill Valley of eastern New York (Ashton 1970) and referred by Funk (n.d.) to a Batten Kill Phase. The phase has not been radiocarbon dated.

Components of the Frost Island phase (Ritchie 1969a: 155-163) were excavated at the Fortin, Kuhr No. 1, Camelot No. 1 and Camelot No. 2 sites. The dates are 1475 B.C. \pm 95 years (I-6641)

for Camelot No. 1, Locus 1, 1290 B.C. \pm 95 (I-6744) from Camelot No. 2, and 1550 B.C. \pm 105 (I-6751) from Kuhr No. 1. At Fortin, Kuhr No. 1 and Camelot No. 2 sites the phase clearly followed Late Archaic occupations and preceded ceramic period (Middle and Late Woodland) groups. We will not engage in detailed comparisons of our data with Frost Island manifestations in other river valleys. The Camelot No. 1 and Kuhr No. 1 dates are considerably older than the reading of 1250 B.C. \pm 100 years (Y-1274) for the O'Neil site on the Seneca River (Ritchie 1969a: 91). The date of 1290 B.C. for Camelot No. 2 is closer to the O'Neil date. Together they indicate greater time depth for the Frost Island phase than previously suspected, and raise the possibility that we may be able to delineate internal cultural change within this period. For example, it may be significant that soapstone was found only in the youngest dated component of our series at Camelot No. 2, and Vinette 1 pottery has so far occurred only at O'Neil and in one of the most recent Frost Island floors at Kuhr No. 1. Further, there is a suggestion that some of the projectile points from Camelot No. 1, broad in the blade relative to the base, represent an initial stage in evolution from the Perkiomen type, while the points from Camelot No. 2, younger in radiocarbon years, are closer in form to the Susquehanna Broad type as defined.

Although cultural continuities have been suggested by various writers for the different phases of the Susquehanna tradition (Witthoft 1953; Ritchie 1969a: 150-178; Kraft 1970; Funk n.d.), there is little evidence for the transition from the Frost Island phase into the oldest known Early Woodland culture, the Meadowood phase (Ritchie 1969a: 180-201). Shared traits include Vinette 1 pottery (found at Kuhr No. 1 and in the Frost Island level at the O'Neil site) and soapstone, rare and reworked pieces of which are found on some Meadowood sites. A Meadowood component has been found in stratigraphic superposition to a Frost Island component at the Fortin site, and a similar situation prevailed at the Dennis site near Albany (Funk n.d.). The C-14 date of 1230 B.C. from Fortin's is rather older than the dates ranging from 998-563 B.C. reported for other Meadowood components by Ritchie (1969a: xxiii-xxiv; 181), but is so far compatible with the general chronology for the upper Susquehanna. A possible Orient-like horizon is represented by Orient Fishtail and similar points in surface collections and by subsurface components at the Frankhouser site (F. J. Hesse, personal communication) and at the Camelot No. 1 site, Locus 2. The latter component lacks a satisfactory C-14 date. This manifestation, partly contemporaneous with the Frost Island phase in the late period of its development, doubtless evolved from the phase.

Again, our data for the interval between the Meadowood occupation and the earliest known Middle Woodland groups are meager. Evidence for Adena-Middlesex manifestations is scanty, consisting of scattered finds of Adena type points and a cache of oval Adena type cache blades of Flint Ridge, Ohio, chalcedony from a spring at Bainbridge (Ritchie, personal communication)

. The oldest recorded Middle Woodland component, at the Cottage site near Binghamton, is dated 1810 \pm 100 radiocarbon years; A.D. 140 (Y-2348) (Wilcox n.d.b). This component can be assigned to the Canoe Point phase of Early Point Peninsula (Ritchie 1969a: 205-214). The ceramics include corded, dentate, and rocker-stamped types and the projectile points are relatively crude side-notched and stemmed forms. A development of a century or two later seems to be embodied in the Middle Woodland assemblage of Stratum Ib at the Davenport Creamery site on Charlotte Creek (Funk and Hoagland 1972a). This probable single-component assemblage comprises small, thin side-notched projectile points, larger and thicker side-notched points, Fox Creek Stemmed points, large lanceolate knives referred to as Petalas blades, pitted stones, and pottery in rocker-stamped, net or fabric-marked, and plain varieties. It is dated 1625 \pm 95 radiocarbon years; A.D. 325 (I-4838).

The Davenport assemblage is believed to reflect a stage of regional Middle Woodland development intermediate between the Canoe Point level and the Fox Creek phase, a Middle Woodland expression defined by Funk (1968; n.d.; Ritchie and Funk n.d.) and represented at the Fredenburg site on Mill Creek in Otsego County (Hesse 1968). The latter assemblage of Fox Creek Stemmed and Lanceolate points, a minority of other point forms, ovate knives, drills, shaft rubbers, and net-marked, dentate-stamped, and plain ceramics is radiocarbon-dated 1590 \pm 100 radiocarbon years; A.D. 360 (I-3442). This date is close to the dates of A.D. 410 and 450 for the type assemblage from the Westheimer site in the Schoharie Valley.

Small components of the Fox Creek phase were excavated at the Apl-6 site west of Binghamton (data of Murray Shapiro) and another site near Afton (data of Jesse Benton).

The next manifestation for which we have ample data is the Kipp Island phase of Late Point Peninsula (Ritchie 1969a: 234-253), a sealed component of which was excavated by us at the Fortin site, Locus 2. This component, already described, is dated A.D. 830 ± 90 years (I-6565), a determination which is wholly consistent with the chronology for other sites of the phase. We suggest that a stage of development intermediate between the Davenport Creamery assemblage and the Kipp Island phase will be found. Such a stage may have been present in the floor below the Kipp Island level at Fortin's, but the small artifact sample, dated A.D. 475 ± 90 years (I-6350), unfortunately lacks enough diagnostic elements to support this hypothesis.

There is little doubt that, as in the Finger Lakes region, the Kipp Island phase evolved into the Hunter's Home phase, which is manifested at the White Site near Norwich, dated 1045 ± 250 radiocarbon years; A.D. 905 (M-176) (Ritchie 1969a: 258-260).

This Middle Woodland evolution—from Canoe Point through Fox Creek and Kipp Island to Hunter's Home—is analogous to the scheme proposed by Funk (n.d.) for the Hudson, Mohawk, and Schoharie Valleys. The data from excavated and surface sites are interpreted by Funk to mean that the Fox Creek phase played an important and hitherto unsuspected role in the development of Middle Woodland culture across a major part of the state.

Hunter's Home can be regarded as "transitional" into Early Owasco (Ritchie 1969a: 261). Early Owasco components were excavated by us on several sites. Large village sites representing all stages of Owasco development have been reported by Ritchie (1934; 1938b; 1939; 1965; 1969a: xxiv-xxvi; 272-300; Ritchie and Funk n.d.).

The Owasco and later phases of Late Woodland development will not be discussed here, though they pose many stimulating questions for future research.

The cultural sequence and chronology outlined above is broadly congruent with that proposed for the Hudson Valley (Funk 1965; n.d.). In eastern New York, for example, it is well established that two successive Laurentian phases, Vergennes and Vosburg, were followed in time by the Sylvan Lake complex, which featured Lamoka, Bare Island, and similar narrow stemmed points, Sylvan Side-Notched points, notched bannerstones, etc. A Vergennes site in Vermont, Otter Creek No. 2, under investigation by William A. Ritchie and Richard Passino, has been dated $3120 \text{ B.C.} \pm 210$ years (I-6349), which is 660 years younger than the reading for the assemblage at McCulley No. 1. It is nearly identical with dates obtained for Otter Creek-like and Vosburg points in deep levels of the Dogan Point shell midden on the lower Hudson (Brennan 1972). But the McCulley date is compatible with the range of c. 3500-4600 B.C. for Otter Creek-like and other broad, notched points in lowest levels of the Sylvan Lake Rockshelter near Poughkeepsie (Funk 1965; 1966b; n.d.). The Vosburg phase has been dated between 2780 and 2390 B.C. on several sites. The Sylvan Lake complex is dated between 2210 B.C. and 1850 B.C. in the Hudson Valley and western Connecticut, a chronology quite consistent with dates for narrow stemmed points in lower zones at Fortin's. Sylvan Lake was followed by the River phase, with its Normanskill points, dated c. 1900-1700 B.C. Vestal Notched points have not been reported for the region.

It is predicted here that the radiocarbon chronology for the Brewerton phase in the Susquehanna Valley will prove similar to the chronology of the Vosburg phase in the Hudson Valley.

The Snook Kill and Orient phases followed the River phase in the Hudson Valley. One date of 1470 B.C. ± 100 years (Y-1170) is available for Snook Kill, indicating a later time period than that occupied by Snook Kill in the Susquehanna Valley, but as previously stated, the dates overlap within two sigmas, and more dates are obviously needed.

On some stratified sites in the Hudson Valley, Susquehanna Broad points have been recovered in the same relative positions as Orient Fishtails, but a discrete Frost Island phase remains to be isolated, just as the presence of the Orient phase has not been established for the Susquehanna drainage. Orient in the Hudson Valley is dated 1090 and 870 B.C. at the Coffin site (Funk and Lord 1972), permitting a placement compatible with the chronology of Long Island Orient (Ritchie 1969a: 165)

The successions of styles and horizons proposed for the Hudson and Susquehanna Valleys also correspond generally to the sequence and chronology established by Ritchie for other parts

of New York and for southern New England (Ritchie 1965, 1969a, 1969b). It also fits well with that recently published for the Delaware Valley (Kinsey 1972).

While we have dealt with problems of typology, sequence, and radiocarbon chronology, nothing has been said about the significance of the data with reference to the interaction of prehistoric man and his environment. Much pertinent information is inherent in the artifacts and features, settlement patterns and subsistence remains, all of which are presently undergoing intensive analysis. Unfortunately, very little research to complement the archeological data has been done on changing landforms, climate, flora and fauna, and other aspects of the postglacial environment by geographers, sedimentologists, palynologists, paleontologists, pedologists, and other specialists. In fact, it appears that the archeologist may contribute greatly to some of the allied disciplines by cross-sectioning and dating flood plain sediments, collecting pollen and soil samples, and recovering the bones of the archeofaunas preserved on some sites.

What we have presented is only a beginning. Much more field work and laboratory analysis remain to be done before we will have a reasonably complete picture of upper Susquehanna prehistory. The results and interpretations will, we anticipate, appear in monograph form in the not too distant future.

References

Brennan, Louis A.

1972. The Implications of Two Recent Radiocarbon Dates from Montrose Point on the Lower Hudson River. *Pennsylvania Archaeologist*, Vol. 42, Nos. 1-2, pp. 1-14. Washington Boro.

Elliott, Dolores, and William D. Lipe

- 1970 *The Engelbert Site*. Department of Anthropology, State University of New York at Binghamton.

Funk, Robert E.

- 1965 The Archaic of the Hudson Valley-New Evidence and New Interpretations. *Pennsylvania Archaeologist*, Vol. XXXV, Nos. 3-4, pp. 139-160. Gettysburg.

- 1966a An Archaic Framework for the Hudson Valley. Ph.D. Dissertation, Columbia University. University Microfilms, Ann Arbor.

- 1966b The Significance of Three Radiocarbon Dates from the Sylvan Lake Rockshelter. *New York State Archeological Association Bulletin*, No. 36, pp. 18-26. Ossining.

- 1968 A New Middle Woodland Complex in Eastern New York. *New York State Archeological Association Bulletin*, No. 44, pp. 1-7. Rochester.

- n.d. Recent Contributions to Hudson Valley Prehistory. *New York State Museum and Science Service Bulletin*. In press.

_____, and Howard Hoagland

- 1972a The Davenport Creamery Site, Delaware County, New York. *New York State Archeological Association Bulletin*, No. 54, pp. 1-11. Rochester.

- 1972b An Archaic Camp Site in the Upper Susquehanna Drainage. *New York State Archeological Association Bulletin*, No. 56. Rochester.

_____, and Philip Lord, Jr.

- 1972 Two Stratified Alluvial Sites in the Upper Hudson Valley. *Pennsylvania Archaeologist*, Vol. 42, Nos. 1-2, pp. 27-61. Washington Boro.

Hayes, Charles F. III, and Lilita Bergs.

- 1969 A Progress Report on an Archaic Site on the Farrell Farm: The Cole Gravel Pit 1966-1968. *New York State Archeological Association Bulletin*, No. 47, pp. 1-12. Rochester.

Hesse, Franklin J.

- 1968 The Fredenburg Site: A Single Component Site of the Fox Creek Complex. *New York State Archeological Association Bulletin*, No. 44, pp. 27-31. Rochester.

- 1971 Archaeology in Otsego. *Otsego County, New York State*, pp. 19-23, 40. Laurens.

- Kinsey, W. Fred III (ed.)
 1972 *Archeology in the Upper Delaware Valley*. Pennsylvania Historical Commission. Harrisburg.
- Kraft, Herbert C.
 1970 *The Miller Field Site, Warren County, N.J.* Part I. The Archaic and Transitional Stages. Seton Hall University Press. South Orange.
- Ritchie, William A.
 1934 An Algonkin-Iroquois Contact Site on Castle Creek, Broome County, N. Y. *Research Records* No. 2, pp. 1-58. Rochester Museum of Arts and Sciences. Rochester.
 1938a A Unique Prehistoric Workshop Site. *Museum Service*, pp. 1-6. Rochester Museum of Arts and Sciences. Rochester.
 1939 Excavations in a Prehistoric Village Site near Bainbridge, New York. *Museum Service*, April-May, pp. 86-90. Rochester Museum of Arts and Sciences. Rochester.
 1940 *Two Prehistoric Village Sites at Brewerton, New York*. Research Records of the Rochester Museum of Arts and Sciences, No. 5. Rochester
 1944 *The Pre-Iroquoian Occupations of New York State*. Rochester Museum of Arts and Sciences, Memoir 1. Rochester.
 1958 *An Introduction to Hudson Valley Prehistory*. New York State Museum and Science Service, Bulletin No. 367. Albany.
 1965 *The Archaeology of New York State*. Natural History Press, N.Y.
 1968 The KI Site, the Vergennes Phase, and the Laurentian Tradition. New York State Archeological Association *Bulletin*, No. 42, pp. 1-5. Rochester.
 1969a *The Archaeology of New York State*. Second, Revised Edition. Natural History Press, New York.
 1969b *The Archaeology of Martha's Vineyard*. Natural History Press, New York.
 1971a The Archaic in New York. New York State Archeological Association *Bulletin*, No. 52, pp. 2-12. Rochester.
 1971b *A Typology and Nomenclature for New York Projectile Points*. Revised edition. New York State Museum and Science Service Bulletin 384. Albany.
-
- _____, and Robert E. Funk
 1971 Evidence for Early Archaic Occupations on Staten Island. *Pennsylvania Archaeologist*, Vol. 41, no. 3, pp. 45-59. Washington Boro.
 n.d. *Aboriginal Settlement Patterns in the Northeast*. Memoir of New York State Museum and Science Service. In press.
- Whitney, Theodore
 1971 The Gravesen Site. Chenango Chapter (New York State Archeological Association) *Bulletin*, Vol. 12, No. 1, pp. 1-6. Norwich.
- Wilcox, David R.
 n.d.a The Castle Gardens Site. MS on file at New York State Museum and Science Service.
 n.d.b The Cottage Site. MS on file at New York State Museum and Science Service.
- Witthoft, John
 1953 Broad Spearpoints and the Transitional Period Cultures. *Pennsylvania Archaeologist*, Vol. 23, No. 1, pp. 4-31. Milton.

BOOK REVIEW

Prehistoric Biological Relationships in the Great Lakes Region, by Richard Guy Wilkinson. Anthropological Papers, Museum of Anthropology, University of Michigan, No. 43. Ann Arbor. 1971, 161 pp. \$3.50.

Wilkinson's published Ph.D. dissertation is an attempt to use osteological data to discern the possible and probable pre-historic biological affinities in the Great Lakes region. His basic premise is that physical anthropological studies using statistical analysis techniques can adequately deal with *small* skeletal samples to answer long asked questions concerning migrations, diffusion, conquest, etc.

He begins with a brief review of standard Hopewellian questions (when, where, why) and then narrows the scope of his study to mostly personally collected data from the following available collections: the Norton Mounds (his primary problem group); the Pete Klunk Mounds; the Frederick Site; the Snyders Mound Group; the Steuben Site; the Juntunen Site; the Younge Site; the Backlund Mound Group, and the Bussinger Site. For comparative purposes, he utilizes related literature from the Serpent Mounds, the Turner Site, Neumann's Lenid and Ilinid series, the Fort Wayne Mound series, and Ohio Hopewell and Kentucky Adena series.

In terms of demographic profiles, he uses only adult specimens, but there are obvious reasons for so doing. His metric observations consist of 26 absolute cranial measurements and 11 derived indices, and 18 post cranial measurements. His non-metric data are limited to 3 continuous trait variations, 8 discrete or anomalous skeletal attributes, and 2 types of dental pathology.

To estimate the biological relationship or distance between the various populations, Wilkinson computed Mahalanobis D² for differences in size, and utilized the profile pattern method for differences in shape.

Multivariate techniques require all observations on all individuals, a difficult requirement to meet in archaeologically derived skeletal material. In dealing with missing data, Wilkinson utilized regression analysis to predict missing values. There are certain limiting assumptions in this method, but he concludes that regression analysis is at least as reliable as the use of earlier published material. In the same paragraph, he questions using previously published material at all!

In terms of the discriminatory value of the various data categories, he found in his study that there is a decrease in predictive returns as one moves from the vault to the face to the mandible to the post cranial elements. (Reviewer's note: Other studies have shown a different hierarchy of value assessment, so this might be reflective of different degrees of regional response to variable selective pressures.)

Wilkinson found his Norton series seemingly isolated and unrelated to overall Illinois and Michigan Middle and Late Woodland populations. However, there does appear to be a certain similarity to the Illinois, especially the Northern Illinois groups.

A couple of very good points emerge from this study. In view of the author's backtracking through previously studied and, in some cases, previously published collections, he found several discrepancies not only in what is currently available for study but in how the original materials were sexed. He rightly raises the question of accepting as valid secondhand information. This is very disturbing, but unfortunately it is becoming more and more apparent as fresh analyses are applied to supposedly sacrosanct data.

Wilkinson concludes that any evidence of *direct* migration, so dear to the hearts of many earlier researchers, cannot be validly substantiated in his study even when using the most sophisticated techniques available today. He, very rightly, and with the reviewer's most enthusiastic endorsement, is able to discredit statistically some of the old typological contentions. He demonstrates in one instance that 2 of the plethora of "ids," as most of us have long suspected, are not valid taxonomic distinctions. (Ed. note: "ids" refers to the eight physical types described by Neumann, Otamid, Iswanid, Ashiwid, Walcolid, Lenapid, Inuid, Deneid and Lakotid.

As in almost every review, there is the other side of the coin. Both of the major objections are aimed at statements regarding method. Although the use of regression analysis in

predicting missing data is necessary and desirable, this reviewer finds the use of a minimum of only 5 intact crania for predictive purposes frightening--tenuous at best! This is particularly true when dealing with deformed crania.

The other disagreement is the dismissing of non-metric traits as having any significance when examining the problem of biological affinities. It seems to the reviewer that the problem has less to do with the small sample size than with the inadequate selection of variables. On the skull alone there are over 80 continuous and discrete traits that can be considered. Therefore, it is unreasonable to discard such criteria as having negative value when the fault lies in poor selection in the first place. There are several other studies which indicate that incidences of morphological and anomalous traits are far more diagnostic than standard metric data, particularly in cases involving micro-evolution.

Audrey J. Sublett
Florida Atlantic University
NYSAA F
Frederick M. Houghton Chapter

STATE-SUPPORTED ARCHEOLOGY IN NEW YORK

Marian E. White

SUNY/Buffalo

Readers of *Public Archeology** will be interested in and perhaps puzzled by the following statements (page 167) on the status of public support for archeology in New York:

NEW YORK State-Supported Archeological Research Programs

Principal State Agencies Involved. New York State Education Department, Anthropological Survey of the New York State Museum and Science Service, State Education Building, 31 Washington Avenue, Albany, New York 12210.

State Funds Allocated Annually for Research. Salaries equivalent to approximately two archeologists plus from approximately \$15,000 to \$20,000.

Discussion. The Anthropological Survey is directed by the state archeologist, an employee of the education department, who prepares the basic budget. The Survey is principally a research organization and is the contracting agent for the highway salvage program. It also is responsible for administering the antiquities act and serves as a central clearing house of data. The branches of the State University of New York at Buffalo, Oswego, Binghamton, and Albany also conduct some archeological research with state funds.

This information refers to 1970 or early 1971. Since that time the salaries for two archeologists have been reduced to one, that of Acting State Archeologist Robert E. Funk.

The final statement concerning branches of State University and research funds requires clarification, at least where Buffalo is concerned. SUNY at Buffalo has never provided unrestricted research funds for archeology or anything else and has no mechanism for so doing. The Summer Sessions Division of the University provides salaries and expenses for the teaching of Summer Field Schools where the primary objective is teaching rather than research. In 1972, this totaled about \$5,000 for the field school in New York State.

It is necessary to distinguish field school and other particular reimbursed projects, such as survey of a specific Highway ROW or Reservoir, from problem oriented research funds. The latter are available to any archeological researcher in open competition through a number of granting agencies such as National Science Foundation. In addition, SUNY Faculty members can

**Public Archeology* by Charles R. McGimsey III, 1972, Seminar Press.

apply to the Research Foundation of State University for competitive grants of \$14-1600 and occasionally one is awarded for an archeological project. If one rereads the above description with the reservations just noted, archeological research in New York State no longer qualifies for the category of minimal basic program (page 85) and must be included with those 23 states having less than a minimal program. Even more telling are these points: 1. The number of personnel and the amount of research funds have decreased here in recent years, in contrast to many states where programs are growing, and 2. New York, with the second largest population in the United States, spends less per capita on the public support of archeology than any other State.

Can the NYSAA help improve public support for archaeology in New York?

THE NEW YORK STATE ARCHAEOLOGICAL SITE REGISTER

Lilita Bergs

Lewis H. Morgan Chapter

When Arthur C. Parker published the *ARCHAEOLOGICAL HISTORY OF NEW YORK* in 1920 the majority of archaeological sites in New York State were in little danger of destruction. Though plowing had caused some disturbance over two centuries of settlement, the urban sprawl and extensive highway development of today were not anticipated as serious problems. Parker's book had two purposes, best expressed in his own words:

"It has been written with a dual obligation in mind, an obligation to science and to the interests of scientific men, and also to the much larger body of amateur archeologists and collectors. Archeology owes much to the local collector who has gathered his specimens with the best light that he had." (Parker 1920: 5)

The obligations Parker expressed are still very much with us but superimposed on these is the critical problem of site destruction. We are rapidly losing our source of information to fulfill these obligations. Many of the sites Parker and others recorded are now entirely destroyed but the future is not as bleak as it may seem for those sites that still remain. Increased public awareness of the qualitative aspects of human environment has created various state laws which apply to archaeological sites as well as locations of natural history value. Agencies such as the Department of Transportation and public utility companies are required by law to obtain permits for their rights-of-way. These permits are issued only after the company in question has made an intensive environmental impact statement and can show that every effort has been made to locate and if possible avoid all significant natural geological, archeological and historical features. In the case of state highway construction, some money from state and federal sources is available for actual survey work and for salvage excavations prior to construction on sites that cannot be avoided.

To fully take advantage of the laws that exist, we must be prepared to supply planning agencies with the information necessary to help save more archaeological sites and to properly salvage those to be destroyed.

In 1950 the New York State Museum and the Van Epps-Hartley Chapter of NYSAA formalized an overall site recording system for the state of New York. This system is in effect today and its continued use provides us with an essential tool for preservation.

Each site is given a number based on the fifteen minute United States Geological Survey map in which it is located. The number consists of a code abbreviation for the quadrangle map, followed by the location number, a hyphen and a number indicating the sector of the quadrangle map. Cnj 1-1 would indicate the first site recorded for the Canajoharie Quadrangle map and the fact that it is located in the NW sector of the quadrangle.

Site records are maintained in two central locations. Jurisdiction for these is divided along the 76° 15' longitude line which divides the state just west of Syracuse. The New York State

Museum in Albany now maintains all records east of that line and the Rochester Museum and Science Center maintains all those to the west. Each site is plotted on a series of site register maps, a site information sheet is filled out in duplicate and an index card by the site name is filed for easy access. Site records are considered confidential and at no time are site locations published or given out indiscriminately. Every effort is made to insure the security of the file against fire and other hazards.

A new numerical location system for site locations on a map is now being developed by Gordon DeAngelo. Based on the 10,000 grid of the USGS 72' maps, this system eliminates some of the inaccuracies and hazards of merely placing points on a map and verbally describing the location of a site. Since the site location coordinates are numerical, they could eventually be coded for use in computerized planning for state agencies without disclosing actual site locations.

We would like to urge all NYSAA members and archaeologists throughout the state to use the site register system and contribute their knowledge for preservation and salvage efforts. The public development agencies come to us for right-of-way clearance but we cannot help them if we do not know where the sites are. A similar register has now been instituted by the New York State Historic Trust for the same purposes for historical sites and standing structures of historical value.

The following information is necessary for recording your sites in the register. Please report only those sites from which you have collected material or have seen material collected by others.

Site Name: name of property owner at time of discovery or locally recognized name of site

Type of site: village, burial, ossuary, camp or traces

Location: verbal description indicating visible landmarks, mileage from named road crossings and route or street names and numbers

County _____ Township _____

Culture: known dates or estimated dates by material (Archaic, Early Woodland, Owasco, Prehistoric Iroquois, Historic Cayuga, etc.)

Reported by: your name, address Date Reported: _____

Excavated by: name, address and date

Remarks:

- a- existence of collections; who owns them and whether they are available for research
- b- destruction of site; actual or threatened
- c- bibliographical references; whether the site has ever been reported in print, name of publication, dates, location of photographs

Map Location: a- if possible give the 10,000 ft. coordinates from a USGS 7 1/2" map along with the description, or

- b- a Xerox copy of any USGS map showing the site location, or
- c- a hand-drawn map or tracing of an official map showing mileage from recognizable points, or
- d- come see us personally if it is convenient

The information should be sent to the following centers:

Prehistoric and historic Indian sites:

Syracuse and the eastern part of NYS:

Dr. Robert Funk, Archaeologist

New York State Museum and Science Service:

State Education Department

Albany, New York 12224

NYS west of Syracuse:
Anthropology Section
Rochester Museum and Science Center
657 East Ave.
Rochester, New York 14607

Historic colonial sites, standing houses and industrial buildings:

NY State Historic Trust
Office of Parks and Recreation
Building 2, State Campus
Albany, N.Y. 12226

(The Historic Trust has its own site forms. Please write to them for copies.)

Bibliography

Mohawk-Caughnawaga Museum, Fonda, N.Y. and the Van Epps-Hartley Chapter of the NYSAA, Schenectady
1950 *New York State Abbreviations for Topographic Map Names* Donaldson Press, Fultonville, N.Y.
Parker, Arthur C.
1920 *The Archeological History of New York, Part I*, New York State Museum Bulletin Nos. 235-236.
Albany, New York.
Part II, New York State Museum Bulletin Nos. 237-238.

Addendum to "The Paleo-Indian on Long Island"

Acknowledgement: The author wishes to thank U. Vincent Wilcox III, curator of the Museum of the American Indian, Heye Foundation's research annex and Leon Crain, director of the Sachem Public Library for their kind assistance with their collections; and Julius Cobb, G. Soper, Richard O. Whitney, and Robert Worthington for their cooperation and kind permission to examine and photograph the points in their collections.