CONTENTS

Twin Rivers: Four Culture Sequence at a Rhode Island Site
William S. Fowler .......................................................... 1

Geology of the Site
J. P. Schafer ................................................................. 2
TWIN RIVERS: FOUR CULTURE SEQUENCE AT A RHODE ISLAND SITE

William S. Fowler*

PREFACE

Occasionally in the course of archaeological research conditions are such as to reveal evidence of an outstanding nature; evidence that tends to prove new facts concerning man's migratory movements and their source. Excavations at Twin Rivers seem to claim the right to this distinction, as they have produced what appear to be well defined manifestations of an early migration that may antedate known archaic movements into coastal New England. While archaeological investigation cannot be expected to supply positive proof at any time, it frequently furnishes sufficient evidence to justify well established beliefs. This report deals with such hypotheses, which appear to shed new light on the pristine settlement of New England.

Twin Rivers is a hunting site, and although small in size with a limited number of artifacts, shows relatively undisturbed concentrations during at least four successive occupations. The identification of these stages of settlement together with an interpretation of their relationships is the purpose of this report. For with a better understanding of culture sequence in this area, there should result more accurate knowledge of man's struggle to survive and of his efforts to create that have attended his occupation of the land.

Karl S. Dodge is due a debt of gratitude for his alertness in detecting early occupational evidence at the site during preliminary testing, and for his wisdom in seeking the cooperation of the Narragansett Archaeological Society of Rhode Island to institute a scientific investigation of it. During the excavation that followed assistance was gratefully received from Mr. Dodge and other members of the Society; and especially from John English, who gave of his time and energy unsparring during the entire extent of the dig.

Acknowledgment should also be made of the permission generously granted the Narragansett Archaeological Society by the Wenscott Reservoir Corporation to excavate the area and to retain title to all recovered artifacts.

Finally, attention should be called to the geologic survey of the site made to determine possible chronology to which archaeological evidence could be tied. Grateful thanks go to John P. Schafer, Glacial Geologist of Brown University, who, realizing the importance of the problem, generously gave of his time and effort to study and relate the geologic background of the area in respect to its bearing upon the site's early post glacial availability for occupation. His contribution consists in writing the geology of the site; a chapter of great importance in an attempted evaluation of man's primal entry into these regions.

THE SITE

About three miles northwest of the upper end of Narragansett Bay in Lincoln, Rhode Island, lies a small body of water now known as Wenscott Reservoir. Two streams drain into it of which the larger one is called West River. For many years this area has been referred to as Twin Rivers from which the site derives its name. It is located on the northern shore of the reservoir in the form of a point of land that is directly bordered on the west by West River. Here was a ready source of fresh drinking water for occupants of the site that contributed toward making the plot a desirable camping place in all ages.

In Colonial days the reservoir was but a pond impounded by a low dam for the purpose of supplying water power to a small mill; presumably was a smaller body of water in aboriginal days with a lower water level caused only by natural impounding. In 1880 the Waterman Engineering Company constructed the present dam in place of the small Colonial structure, thereby, raising the water level a total of 12 feet above the bed of West River.

The site (Fig. 1) has an elevation of approximately another 12 feet above the present high water caused by the Waterman dam. Therefore, in prehistoric times it probably lay about 24 feet above the level of West River and pond. It may be seen from this that in early days the site undoubtedly commanded a good view of the surrounding territory, and apparently has always rested far above possible inundation from river floods. As a matter of fact, the stream is more of a brook than a river today, and even though it might have been twice as large in early days, probably would not have risen more than 5 or 6 feet at flood times, which would have been far below the site's elevation. After passing through a series of small ponds, West River flows into the Mosassuck River, thence into the Providence River that empties into Narragansett Bay. Now assuming that early man navigated this water course to reach Twin Rivers, he would have had but two, or at the most, three easy portages, which evidently did not prevent him from reaching the site in his quest for food.

*Illustrations are by the author
The main excavated area approximates 2,800 square feet: an elongated plot that extends over a more or less flat space at the top of the site (Fig. 1). It is terminated at the northern end by a cumulation of granite rocks apparently deposited as the result of glacial action. Besides the main site, excavations were made in and about seven small exposed stone cumulations that resembled stone hearths. They were situated several hundred yards north of the site in an old tote-road along the east bank of West River. The combined area is covered with small second growth trees that presented little difficulty in the work of excavation; is spotted here and there with rotting stumps of large trees, the remains of former forestation. No evidence appeared to indicate previous disturbance from plowing or cultivation of any kind. Consequently, excavated evidence probably can be relied on to reveal undisturbed relationships except for minor disturbances that will be referred to in a subsequent paragraph.

**GEOLOGY OF THE SITE**

**J. P. Schafer**

INTRODUCTION. A recent paper in this Bulletin (Hartshorn, 1951) has discussed some of the problems of geological study of archaeological sites. The present paper reports an attempt to use geologic information in archaeological dating. The results are somewhat inconclusive, because the Twin Rivers site does not completely fulfill the necessary conditions for close geological dating, as the site gives a maximum limit but not a minimum limit for the age of archaeological Zone I.

WENSCOTT RESERVOIR AREA. Wenscott Reservoir is shown on the Providence and Pawtucket topographic quadrangle maps of the U. S. Geological Survey. The north end of the reservoir and the adjacent Twin Rivers site are in the Pawtucket quadrangle, for which detailed geological information is available (Chute, 1949; Quinn and others, 1948 and 1949).

Wenscott Reservoir lies at an elevation of about 200 feet. It is 50 to 150 feet above the valleys to east and west, and about the same distance below the hill tops of the area. Bedrock ledges occur at numerous places in
the area, and it is clear that the major features of the landscape reflect the form of the bedrock surface. However, the details of topography, soils, and drainage were produced principally by the discontinuous mantle of unconsolidated deposits left by the last ice sheet which covered the region.

The glacial deposits are of two main types: sorted and unsorted. The unsorted materials, called glacial till, contain rock debris ranging from great boulders to fine clay particles, dropped directly from the ice without being sorted, and therefore lacking layering or stratification. Till covers most of the upland slopes around the reservoir. It underlies the bouldery area at the north edge of the archaeological site (the glacial rock pile of Fig. 1), and may well be buried at some depth beneath the site itself.

The sorted deposits consist of material which was carried away from its source in the melting ice sheet by streams of meltwater. The action of streams and of lake currents sorted the rock and mineral particles by sizes, and deposited them in layers of gravel, sand, silt, and clay. Much of this sorted and stratified material accumulated around the last ice remnants, thin and motionless. Along valley sides, the disappearance of the ice then left flat-topped masses of sand and gravel whose outer slopes record the position of the margin of the stagnant ice against which they were deposited. Such ice-contact bodies are called kame terraces, and there are several small ones around Wenscott Reservoir. On that terrace which forms the promontory at the north end of the reservoir lies the Twin Rivers site. The site has several natural advantages which seem to have caused it to be used by successive inhabitants of the area: a smooth surface free of boulders; good drainage through the gravel; and a relatively commanding position.

TWIN RIVERS SITE. Any human occupation of the Twin Rivers site must, of course, be more recent than the time of deposition of the glacial materials described above. The glaciation during which they were deposited quite certainly occurred in the Wisconsin age, the last of the four ages of glaciation within the "Ice Age" or Pleistocene epoch. Correlation of New England glaciation with one or more of the four sub-ages into which the Wisconsin age has been divided in the upper Mississippi valley has not yet been achieved. However, regional relations suggest that the last glaciation of southern New England took place during the earlier part of the Wisconsin age, perhaps during the Tazewell or second sub-age (Flint, 1947, p.p. 269-272). The date of this is not certain, but was probably 30,000 years ago, more or less.

The possible age of the site may be further restricted by a consideration of the results of strong frost-heaving. The climate of a time of major glacial advance was much more rigorous than that of the present. There are numerous evidences of former strong frost-heaving affecting surface materials to a depth of three to five feet. Most of this disturbance dates from the time of retreat of the Tazewell ice sheet. However, at a few places there is unmistakable evidence of a still later time of strong frost-heaving, presumably related to an ice advance which did not reach this area. This time of cold climate may well correspond to the Mankato sub-age, the last in the Wisconsin age (compare Deevey, 1951, p.p. 106-107). The climax of the Mankato ice advance has been dated by the radiocarbon method at about 11,000 years ago (Flint and Deevey, 1951, p 263). The relatively undisturbed condition of the oldest hearths at the Twin Rivers site, archaeological Zone I, shows that they have not passed through a time of strong frost-heaving. They were most probably not built until after the rigorous Mankato climate had ameliorated considerably, and they are therefore somewhat less than 11,000 years old. How much less, it is not possible to say on geological grounds.

The hearths and artifacts at the Twin Rivers site occur entirely in surface material overlying the gravel. This material, which ranges in thickness from 6 to 21 inches, is divided into two zones (Fig. 1): sandy soil, and humus. The sandy soil zone, which is virtually absent where the gravel surface is higest, consists of unstratified silty sand with scattered pebbles. The pebbles are most abundant in the lower part of the zone, and are clearly derived from the gravel. The overlying humus zone, which is very uniformly six inches thick, is not a layer in the geological sense. Rather, it consists of pebbly, silty sand like that of the sand soil zone, with some chemical change and admixture of much organic matter as a result of soilforming processes. The humus zone is actually the "A" horizon of the soil, in the terminology of soil science.

The pebbly sand (sandy soil and humus zones) is a complex layer: a mixture of silty sand with pebbles of different origin. Such silty sand is ubiquitous in much of southern New England, and there is no reason to doubt that it is wind-blown material (Smith and Fraser, 1935; Denny, 1936, p. p. 333-337). The relation of the sand to glacial deposits, together with the evidence of frost action, suggests that the sand was carried from the bare surface of freshly deposited glacial materials, under conditions of glacial climate. This would mean that the ground surface was built up to essentially its present level by wind deposition of Tazewell age, with disturbance by contemporaneous frost-heaving and also by frost-heaving of Mankato age (hypothesis #1). This conclusion is supported by the available geological evidence, and has important implications concerning the history of the site.

The possibility that some deposition occurred later (hypothesis #2), causing building up of the ground surface in post-Mankato time, should also be considered. Washing or creeping of material on slopes could not cause significant deposition here; the surface at the site is nearly flat, and there is only a very small higher area to supply such material. Wind deposition may be considered as a source, but there is no known evidence of significant post-Mankato wind deposits in southern
New England. If such wind deposition took place, the problem of the intermixing of pebbles would arise; this is unlikely to take place by strong frost-heaving without disrupting the buried hearths. Lateral movement of pebbles from the high points of the gravel into the sand is possible, but it is not easy to explain the distribution of the pebbles in this way, on the basis of present geological knowledge.

**EXCAVATION METHODS**

The grid system was employed at the main site: 6 foot squares were marked off from a base line that ran roughly parallel to West River and more or less followed longitudinally the westerly border of the plot's tableland (Fig. 1). Excavation was carefully done by troweling on a horizontal plane with the vertical face of the entire depth of strata exposed to view at all times. Only a narrow shelf of about a foot from the exposed vertical face was excavated at any given time, so that vertical measurements were easily taken as desired from the artifact to any point in the profile.

Since the junction line where humus meets subsoil was found to be well defined and surprisingly uniform throughout the area, it was decided to consider it the base line from which all artifacts should be measured. Back of this lies the reason that since this junction was formed by natural forces while artifacts were being deposited, it tended to level off in a natural way in relation to the deposition of evidence. Therefore, tying artifacts to this junction seems more apt to express their true relationships than tying them to an arbitrary base line. Furthermore, recording the distance of artifacts to the junction gives their relative position within the stratum in which they appear without need of subsequent reference to profile recordings, and with less chance of error in placement. Using this system of tabulation, all artifacts were carefully documented by linear measure to the nearest inch.

**STRATIGRAPHY**

An artifact bearing overburden covers glacial gravel. It consists of two well defined strata: humus, and sandy subsoil. The humus extends to a depth of from 5 to 7 inches, measured from the bottom of the leaf mold. This is underlaid by a stratum of sandy soil interspersed with some gravel. However, unlike the humus, this sandy stratum has a wide variation in depth of from nil to 22 inches. This is caused by virtue of the hummocky condition of the underlying gravel floor (Fig. 1). Right here it might be well to state the archaeological position of this report with reference to the geologic evaluation of the site as already presented.

Because of the archaeological evidence from Twin Rivers, this paper supports (hypothesis #2) of soil accumulation as set forth in the geologic report. It (hypothesis #1) is untenable from an archaeological point of view. It insists that geologic evidences from other parts of Rhode Island indicate that the soil overburden that covers the gravel floor of the site essentially as it exists today was laid down by wind action and strong frost heaving some time prior to about 11,000 years age - the Mankato age. But it further holds that man's first occupation of the site took place after this time, since its Zone I hearths - to be described further on - exhibit displacement laterally and not vertically; are not therefore believed to have been subjected to strong frost heaving of the pre-Mankato age. Now if this later supposition is accepted - and recent carbon-14 dating seems to support it - then man would have been obliged to dig pits into the pre-deposited overburden in which to sink his hearths. That is, to build his stone hearths not only at the full 20 inch depth of the gravel floor where Zone I hearths appear, but at all other lesser depths of later culture levels. Furthermore, if this is accepted as a possibility then the presence of all smaller artifacts in the overburden must be accounted for similarly: to have been dropped into prepared holes dug to prearranged culture levels. Since such human behavior is inconceivable and wholly without precedent, hypothesis #1 must be ruled out as unworkable.

On the other hand, hypothesis #2, while not supported by known geologic evidence, offers the better synthesis; presents a challenge to further research to discover a more workable geologic approach to man's occupation of the land. In this hypothesis, possibility of some deposition of the site's overburden by wind action subsequent to the Mankato age and during occupation of the area is considered. The pebble admixture is accredited to lateral movement of gravel due to normal frost action - not to strong pre-Mankato frost action. This thesis will be expanded as the report develops to show how it is inexorably connected with archaeological facts.

Now it is interesting - and it seems important - to speculate as to what effect if any the hummock gravel base has had upon the deposition of cultural evidence over the centuries through which the site has been occupied. Some time after the glacial retreat had formed the gravel terrace on which the site rests, periodic high winds deposited sand over the gravel in small amounts during the periods of human occupation; there was no abundant source of sand in the uplands such as would have been furnished by a glacial lake bed. But the gravel floor was hummocky, so the sand first caught in the depressions and filled them full before it covered the crests. Hence, the higher crests that now approach or touch the humus presumably were left exposed until vegetation took control and built humus over all the area. Therefore, it seems probable that some gravel elevations were exposed during more than one period of occupation. Consequently, artifacts deposited by earlier occupants on some hummock crests might well have remained uncovered and subject to possible molestation or use by later arrivals. In considering this condition, it will be remembered from the geologic report that the plot lies well above possible river floods or erosion from higher land, and is believed to have received its sandy fill from wind action alone. Undoubtedly, there has been limited wind deposition of sand, and without other sources of fill, the overburden is restricted and has confined stratigraphy to relatively narrow limits.
In early times wind was the leveling agent, but as flora began to take root, vegetative action of growth and decay asserted itself and in time, formed the uniform humus covering of today. Thus, the junction of humus and subsoil, already referred to as the base line for vertical measurements, represents the terminal of surface leveling by natural forces. It is evident from this that only a limited covering of soil has been deposited over the gravel floor, so that today, stratigraphy is variably good or bad depending upon whether the reading is made over a gravel hummock trough or crest. Fortunately, no diagnostic artifacts have appeared in such thin stratum as to make delineation of their location difficult or impossible.

DISTURBANCES

The main site on the point of land, as well as the surrounding territory, apparently has never been disturbed by cultivation. This belief is partly supported by frequent appearance above the humus of undisturbed stone cumulations. Subsequent excavation has shown them to be hearths of the last two occupations. Further, there appeared in the upper humus of the main site an undisturbed cache of clam shells in which occurred a broken white clay pipe of early make. Perhaps the most convincing proof is the complete absence of plowshare scars in the top of the subsoil, and the heavy vegetative content of the humus.

However, there have been some minor disturbances confined to limited areas of which a few have interfered with stratigraphic measurements. Artifacts recovered under such conditions cannot be considered diagnostic of the level in which they appear, and accordingly have been classified typologically. Disturbances consist of several ancient animal lairs, now completely filled with mixed humus and subsoil. Then there are a few man made refuse pits so small and indistinct as to have no significance. However, three well defined pits and a dog burial have caused some displacement of evidence that has had to be discounted. Perhaps the most prevalent disturbing agent from earliest days has been frost action. Consequently it seems important to consider what effect, if any, frost heaving has had upon the evidence, and to what extent it has interfered with chronological evaluations.

The question arises: Can stratigraphic measurements be relied upon at a site like this where artifacts are confined to a relatively thin deposit of wind-blown sand held down by vegetative admixture, and subjected to intermittent natural frost action? The answer may be found in a logical evaluation of related natural phenomena.

The geologic analysis has already explained how frost has heaved some pebbles off the gravel floor into the overlying sand; and how pebbles continued to be introduced in irregular quantities, as sand accumulation grew deeper, by lateral frost-water-wash action off gravel hummock crests (geologic hypothesis #2). While this soil formation was taking place, artifacts were being successively deposited and buried. As time passed, frost action as it is known today tended to heave them slightly upward with some degree of uniformity, since all received more or less similar frost pressure. Hence, artifacts on different levels after once deposited might be expected to have kept their respective distance from each other with the passage of time. Notwithstanding this, a long interval between two periods of deposition, such as between the earliest and the succeeding one, might have placed artifacts of the former close to those of the latter by virtue of the previous long exposure of former artifacts to frost heaving. Apparently, such frost as penetrated to the hearths did not carry enough force to heave their stones upward, although it did move them laterally. From this it may be seen that frost disturbance has been relative and has not prevented reliable stratigraphic measurements.

Finally, excavation of exposed stone cumulations above the main site on the east bank of West River encountered another kind of disturbance. Here, an early logging road has apparently followed the line of aboriginal settlement and had run its course over many stone hearths that are now exposed as a result of erosion. Waggon wheels and draft animals have disturbed the position of artifacts, while some appear to have been fractured as a result. Consequently, it has been deemed advisable to classify typologically all artifacts recovered from this location.

CULTURE HORIZONS

Since steatite bowl fragments and clay potsherds are absent, and as there are no well defined stratified lines of demarcation between culture zones separating trait changes, it has been necessary to establish arbitrary zone limits. Consequently, unavoidable errors concerning respective positions of some border line or transitional traits may have resulted. If such is the case, the worst that may be contemplated is trait overlapping, which in the normal course of events may have occurred anyway. Four zones have been identified on a typological basis after making a comparison of traits with those of two other well documented sites in the same drainage area: Potter Pond, and Nunkatessel. Limits of each zone have been measured from the junction base line to which previous reference has been made: Zone I - from gravel floor to 4" below junction (sandy soil); Zone II - from 3 to 2" below junction (sandy soil); Zone III - from 1" below junction (sandy soil) to 2" above junction (humus); Zone IV - from 3" above junction to top of humus.

In determining these horizons, projectile points of which there are 105 all told (Chart 1), have served as the best zone indicators since they exhibit greater type diversification than any other class of artifacts. Through all ages much thought has been expended in effecting modifications to improve their productive capabilities.

1. Fowler-Luther, 1950
2. Engstrom, 1951
in the procurement of food. This has resulted in the development of many different types of points, some of which represent period changes as a result of migratory innovations, while others are traceable to independent invention. The relative position at the site of projectile points, their frequency, and vertical distribution are shown in graph form (Chart 2). Twelve types are represented, and they carry names largely derived from a recent classification by the Massachusetts archaeological Society. The four zones have been given names to connote the most significant factor of each period: Late Pleistocene, Early Archaic, Stone Bowl, and Ceramic; terms that will be discussed and explained further on in the report.

### OCCUPATIONAL EVIDENCE

**Stone Hearths.** While fire stones from demolished hearths were scattered throughout all zones, nine well preserved hearths were located in situ. Of these, three appeared in Zone I resting on the gravel floor in hummock troughs, while remains of two other demolished hearths also occurred at this level. These early hearths (Fig. 2) were relatively small and were composed of small fire burned cobbles, some cracked and fire split. The hearths' maximum overall size measured about 15 x 18" with fire pits as small as 5 x 6". An opening was indicated in one side that had been somewhat closed by stone shifting due to frost action. Buried in the fire pit of the largest was a well made small gouge (fractured)

---

### Chart 1. Trait Frequency; showing artifact vertical distribution among the four culture zones. Note. * indicates overlapping; not considered diagnostic.

<table>
<thead>
<tr>
<th>TRAITS</th>
<th>ZONE I</th>
<th>ZONE II</th>
<th>ZONE III</th>
<th>ZONE IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>LARGE TRIANGULAR POINT</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORNER-NOTCHED</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIDE-NOTCHED</td>
<td>10</td>
<td>6*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORNER-REMOVED #3</td>
<td>8</td>
<td>5*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMALL STEMMED</td>
<td>15</td>
<td>7*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMALL TRIANGULAR</td>
<td>5</td>
<td>1*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARED #2-4</td>
<td>12</td>
<td>2*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORNER-REMOVED #7</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAPERED STEM</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORNER-REMOVED #9</td>
<td>3</td>
<td>1*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORNER-REMOVED #5</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONCAVE &amp; FLUTED</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEAF KNIFE</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMMED KNIFE</td>
<td>1</td>
<td>8*</td>
<td>7*</td>
<td></td>
</tr>
<tr>
<td>STEMLESS KNIFE</td>
<td></td>
<td>8</td>
<td>7*</td>
<td></td>
</tr>
<tr>
<td>STEMMED SCRAPER</td>
<td>1</td>
<td>2*</td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>OVAL SCRAPER</td>
<td>1</td>
<td>10*</td>
<td>5*</td>
<td></td>
</tr>
<tr>
<td>STEEPEDGED SCRAPER</td>
<td>4</td>
<td>4*</td>
<td>15*</td>
<td>7*</td>
</tr>
<tr>
<td>GOUGE (grooved type)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOUGE (high ridged poll)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADZ</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ATLATL WT. (lanternstone)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHIPPED CELT</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROOVED AX</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHIPPED HATCHET</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRONGED CLUB</td>
<td>2</td>
<td>2</td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>TRIANGULAR SOIL BREAKER</td>
<td>2</td>
<td>3*</td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>HAND SPADE</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOODWORKING TOOLS</td>
<td>1</td>
<td>3*</td>
<td>3*</td>
<td>1*</td>
</tr>
<tr>
<td>DRILL (indefinite base)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HAMMERSTONE</td>
<td>1</td>
<td>3*</td>
<td>13*</td>
<td>2*</td>
</tr>
<tr>
<td>TURTLEBACK</td>
<td>1</td>
<td>7*</td>
<td>5*</td>
<td></td>
</tr>
</tbody>
</table>

**Chart 2. Projectal Point Classification and Frequency.** Graph shows vertical distribution of points in four culture zones.

---

3. Smith, 1950
GEOLOGY OF THE SITE

FIGURE 2. Stone Hearth, resting on gravel of late Pleistocene age.

with a high ridged poll, while lying beside another appeared a worn out adz (Fig. 3 #1, 4). At the opening of the third rested a large flat faced cobbles presumably used as an anvilstone. Careful examination of the sand content surrounding one of these hearths revealed a high frequency of pebbles, which may have been more or less prevalent for all. Such a condition leads to the belief that gravel and sand may have been pushed up around hearth stones to form, in effect, gravel-sand hearths with reinforced stone walls, instead of stone hearths as they are currently conceived to have been.

In Zone II appeared three well preserved hearths, while in the case of a fourth the stones were scattered. Of the three undisturbed hearths, two were relatively small with a 12" outside diameter but with no side opening. The third was larger, measuring 30 x 31" outside and 9 x 15" inside with a 3" thick flat hearthstone completely filling the fire pit. As compared with those of Zone I, these hearths were made for the most part of flat sided stones, unlike cobbles and presumably with a different origin.

Zone III contained three hearths. However, they were without definition: irregular groups of fire burned stones that were relatively small, usually with flat sides. Of particular significance was the appearance beside one hearth of a thin flat granite stone 9 x 14" in size. Both ends had been roughly flaked, suggesting shaping for some intended use. Its similarity to stone plates of the Stone Bowl horizon at the Ragged Mountain site is quite noticeable. Therefore, this related evidence seems to support the belief that Twin Rivers' hearths at junction level are contemporaneous with the Stone Bowl age, and

FIGURE 3. Zone I Lithic Traits. 1, Gouge with steep ridged poll; 2, Shaft abrader; 3, Hammerstone; 4, Adz; 5, Club prong; 6, Hand club; 7, Fluted point (Folsom-like); 8, Concave point.

4. Fowler, 1951a
implies similar coexistence for all evidence from this horizon. This also applies to some of the exposed stone cumulations above the site on the east band of West River believed to have been hearths. Most of these stone deposits rested at junction level; contained in part, eared, and broad bladed side-notched projectile points, some workshop chip refuse, grooved ax, winged atlatl weight (bannerstone), triangular soil breakers, and another granite plate, traits that are diagnostic of the Stone Bowl age at other well known sites. Other stone cumulations appeared at a higher level; were more exposed to view; contained more stones, and probably belonged to the last occupation of the area coincident with Zone IV at the main site.

Zone IV at the main site yielded no well defined hearths in situ. Nevertheless, it did expose quantities of unrelated fire stones that were strewn about. Obviously, hearths had once existed but apparently had become scattered due to some kind of hard usage or neglect.

Refuse Pits and Dog Burial. Only three well defined refuse pits were encountered, and these contained nothing but charcoal and calcined bone matter. One was in a gravel trough in close association with a unique hearth of Zone I. Another belongs to Zone II, and extended to the gravel floor. The third belongs to Zone III, for it appeared at the junction.

A dog burial was discovered with its grave shaft extending from upper humus to the gravel, indicating probable interment in protohistoric times. The skeleton has been examined in the laboratories of Brown University and the Smithsonian. It is believed to be that of a wolf-dog of which the bones are in a fair state of preservation indicating no great age. This grave is presumed to be the work of aborigines in contact time rather than of Colonial origin since the deep interment of 20" indicates more care than is usually shown for Colonial dog burials of that day. Since this interment is part of the late stage of Zone IV, it gives its upper level a protohistoric connotation. In noting statements of an early explorer who tried to discover the origin of Indian dogs, the finding of a wolf-dog on a hunting site such as the one at Twin Rivers seems quite understandable. Josselyn, reporting on Indians of southern Maine, says: "Indian Dog (was) a creature begotten betwixt the Wolf and a Fox, which the Indians lighting upon" had brought up "to hunt the Deer with." Other reports of early commentators mention smaller dog types at times; but frequently throughout these writings reference to a wolf-like dog is also noted: Wolley tells of seeing the "wolf-like dogs of the Indians following them in the same way that the white man's dog followed him. Dr. Speck, referring to the St. Lawrence region, says that Mahikan stum, "wolf-dog," is the term by which they are known among the Indians; are considered the real Indian dogs; represent the original strain; and are excellent hunters.

1. Fluted and Concave (Fig.3,#7,8). This classification includes 2 quartzite points from Zone I with concave bases, one of which is fluted with a channel extending from the base on both faces (Fig. 4). Length of channeling equals 3/4" on one face, and 3/8" on the other where flute is terminated abruptly by a fault in the stone. In spite of quartzite's poor reaction to conchoidal fracturing, the flutes are well defined though shallow; are skillfully placed between two well formed basal barbs. Width of point is 1/3d. its length, and its breadth is relatively thick; intentionally so, no doubt, to compensate for its narrow proportions. Of further significance is its parallel sided shank, whose sides are carefully straightened by reworking for a distance of 3/4". The fluted specimen rested about 3" above the gravel floor from which it may have worked by frost action.

2. Corner-removed #5 (Fig.5,#11-17). Among corner-removed points this is one of several styles that stand out as generic types. Actually, it also embraces Massachusetts type #4, which appears to be synonomous though slightly in variance. All 8 specimens in this class are of quartzite; have overall triangular shapes
FIGURE 5. Zone II Lithic Traits (Early Archaic). 1, Pronged club; 2,3, Shaft abraders; 4, Oval scraper; 5,6, Steepedged scrapers; 7, Hand drill; 9, Shaft scraper; 8,10, Ovate knives; 11-17, Corner-removed #5 points; 18,19, Corner-removed #9 points; 20, Hammerstone.

with basal corners removed to form more or less sloping shoulders. Stems are reduced to relatively narrow proportions, and are slightly bifurcated by virtue of a chip taken out of their base. These points appear only in Zone II, and are considered to be among its chief determinants.

3. Corner-removed #9 (Fig.5,#18,19). This class contains 4 specimens that are made of argillite and quartzite. They have overall triangular shapes, often elongated, with basal corners removed to form sloping shoulders that converge into sharply rounded bases. This type is also a diagnostic trait of Zone II; has one point overlapping into Zone III, whether by actual deposition or as a result of some disturbance cannot now be determined.

4. Tapered-stem (Fig.6,#36). In this category are 5 specimens of quartz and quartzite measuring more than 1 1/2" in length. Beginning about half way between ends, basal sides converge to form a tapered stem that is usually truncated. This type appears only in Zone III, of which it is considered diagnostic; is sometimes called pentagonal, or truncated.

5. Corner-removed #7 (Fig.6,#30-33). Included in this class are 7 specimens ranging from 1 1/2 - 3" in length with relatively wide blades. Basal corners are removed to form broad truncated stems with shoulders nearly at right angles. Argillite is preferred, although one specimen is of felsite. All recoveries are from Zone III and are held to be important determinants of the period.

6. Eared (Fig.6,#17-20). This group of 14 points embraces three variations omitting the long eared variant. Basal points appear as ears by virtue of slight side notching, and a concave base that usually is relatively broad. Stone materials used are quartz, quartzite, felsite, red shale, and argillite. This type is mostly from Zone III of which it is considered especially diagnostic. Two specimens appear in Zone IV, and may be there either from disturbance or from actual deposition. However, since more than one point is involved the latter possibility seems tenable with trait overlapping a probability.

7. Small triangular (Fig.6,#23,24; Fig.7,#25). This classification embraces 6 small sized triangular quartz and quartzite points of less than 1" in width, of which one is medium in size. They are somewhat equilateral, and are heart shaped with concave bases; appear in
FIGURE 6. Zone III Lithic Traits (Stone Bowl Age). 1, Pronged club; 2, Chipped celt; 3,4, Hammerstones; 5,6 Shaft scrapers; 7,8 Oval scrapers; 9, Steepedged scraper; 10,11, Stemmed knives; 12-14, Stemless knives; 15,16, Atlatl weights (bannerstones); 17-20, Eared #4 points; 21,22, Corner-removed #3 points; 23,24, Small triangular points; 25-29, Side-notched points; 30-33, Corner-removed #7 points; 34,35, Small stemmed points; 36, Tapered stem point.
Zone III and overlap by one specimen into Zone IV; are probably more diagnostic of the former than of the latter. Together with small stemmed points, they seem to indicate the introduction of bow and arrow in Zone III.

8. Corner-removed #3 (Fig.6, #21, 22; Fig.7, #0, 11). In this category are 12 specimens having lengths of 1 1/2" or more, with relatively narrow proportions. Basal corners are irregularly removed to form thick uneven stems with bases seldom thinned. Stone materials used are quartz, quartzite, red shale, and argillite. This type is about equally divided between Zones III and IV; is probably no more diagnostic of one zone than of the other.

9. Small stemmed (Fig.6, #34, 35; Fig.7, #15, 16). This class includes 22 quartz, quartzite, and argillite points of less than 1 1/2" in length. They are relatively narrow; have irregularly shaped stems, sometimes slightly side notched, but usually with roughly chipped sides that often taper to a thick base; are found in Zones III and IV. They are considered significant indicators of both zones.

10. Side-notched (Fig.6, #25-29; Fig.7, #12-14). This classification embraces 16 points from 1 1/2 - 4 3/4" in length; are made of quartz, quartzite, argillite, felsite, and one of banded white flint. The latter may be an importation. These points include broad and narrow specimens with wide side notching. When they are broad, stems become undercut to narrow proportions with side notching well defined; when narrow, notching is slight, often scarcely discernible. They are present in Zones III and IV; are attributable to both ages although broad forms are usually confined to Zone III.

11. Corner-notched (Fig.7, #17). Only one felsite specimen belongs in this class. It is broad based with clear cut notches extending diagonally from basal corners; is from Zone IV of which it is probably diagnostic.

12. Large triangular (Fig.7, #18-24). There are 7 specimens in this group 1" or more in width, of which four are equilateral, while three are isosceles with somewhat convex sides. All have more or less concave bases; are made of quartz, quartzite, felsite, and one of black flint; appear only in Zone IV, and are important determinants of the period.

FIGURE 7. Zone IV Lithic Traits (Ceramic Age). 1, 2, Clubs (straight blade); 3, Shaft abrader; 4, Stemmed scraper; 5, Steepedged scraper; 6, Oval scraper; 7, Stemmed knife; 8, 9, Hand drills; 10, 11, Corner-removed #3 points; 12-14, Side-notched points; 15, 16, Small stemmed points; 17, Corner-notched point; 18-24, Large triangular points; 25, Small triangular point.
Knives. There are three main types of knives: ovate forms from Zone II; stemmed; and stemless blades distributed throughout Zones III and IV. Ovate forms, of which there are 3, are relatively large and flat; are nicely cerated on both edges; are made of felsite and quartzite. Stemmed knives with 16 specimens have definite shanks; occasionally have triangular shapes; are made of argillite and quartzite; are found mostly in Zone III. Stemless knives with 15 specimens have expanded bases; are reworked, and sometimes are oval but with only one well worked cutting edge; are made of quartz and quartzite, and are from Zones III and IV.

One central fragment of a large ground slate ulu (Fig. 8) is from the humus in Zone III. It lay in an oblique position; apparently had been disturbed, and no doubt was out of place. Although its missing sections were not recovered, the trait is presumed to belong to Zone II, since it occurs in a contemporary horizon at Nunkatasset.

Scrapers. Represented in this congeries are three types of skin scrapers: stemmed; oval; and steepedged. Stemmed shapes, of which there are 4, are small scrapers with one beveled convex edge, terminated by a protruding shank. Oval forms with 16 specimens may be medium or large in size, and have chipped edges without bevel around more or less oval shapes. The most numerous are steepedged scrapers with 30 specimens. They have no stems; are irregularly oval in various sizes; usually have only one steep beveled convex edge. Quartz, quartzite, and felsite are the stone materials used for all but large oval blades, which generally are of granite. Specimens of the first two appear in the last three zones, while steepedged scrapers occur in all zones.

Drills (Fig.5,#7; Fig.7,#8,9). Three drills appear that have only generalized bases. They seem to have been made for hand use without need of hafting. The largest one, rudely made, is from Zone II, while both the medium and small sized specimens are from Zone IV.

Atlatl Weights (Bannerstones) (Fig.6,#15,16). There are 2 specimens in this class of implements, one notched, the other perforated. The former is shaped like a bow tie 4 1/2" long with widely notched center; is made of banded green argillite, and comes from Zone III at the main site. The latter (fractured) has a butterfly shape 7 1/8" long with 1/2" diam. perforation slightly tapered; is made of dappled dark green stone beautifully polished, and is from the disturbed logging road where it was associated with Zone III hearths.

Grooved Ax, and Gouge. A rudely made ax, partly grooved, with tapering bit and other grooved ax traits comes from the same location as the perforated atlatl weight, and is presumed to have Zone III affinity. Also, from Zone III, but at the main site, comes a semifinished gouge with grooved gouge proportions.

Gouge with high ridged poll, and Adz (Fig.3,#1,4). This deeply channeled gouge is 3 1/4" long; is shaped by pecking; has a well ground blade; is made of dark green igneous stone; has a deep transversal groove on its poll, bordered by high ridges; is from the fire pit of gravel hearth #2, Zone I. The adz blade is worn-out; comes from Zone I where it was associated with gravel hearth #1.

Clubs and Hatchets (Fig.3,#5,6; Figs.5,6,#1,2; Fig.7,#1,2). This congeries contains implements, some of which were probably hafted and used as clubs in dispatching game. In Zone I appear 2 quartz pronged clubs of which the larger one is obviously for hand use, while the smaller may have been hafted. From Zones II and III come 3 pronged clubs of argillite and quartz with side notching indicating hafting; exhibit #2 may be a Celt. In Zone IV appear 2 chipped hatchets with broad straight blades; are made of pegmatite and granite.

Triangular Soil Breakers. In this class are 5 medium and large sized implements of pegmatite, triangular in shape with pointed bits and heavy bases that have an oblique tilt. Similar implements were first identified by the author at the Westfield and Wilbraham steatite quarries of western Massachusetts where they are thought to have been hafted and used for breaking up the tailings. They are from Zone III and IV and display definite trait overlapping.

Woodworking Tools. In this category are 18 implements of two kinds: wood shaft scrapers; and wood shaft abraders. The former are roughly chipped quartz or quartzite fragments of which one edge is slightly concave and sharp. The latter are similar except that instead of a sharp edge they have a roughened concave face made by pecking or chipping that serves as the abrading surface. These tools come from every horizon, and a few are illustrated. Hammerstones and worked implement blanks, sometimes called turtlebacks, are also from all levels.

6. Fowler, 1948
DISCUSSION

Geological combined with archaeological evidence at Twin Rivers suggests for Zone I, its lowest horizon, an early post glacial era; so it has seemed fitting to designate it as Late Pleistocene, and its inhabitants as Paleo-Americans. This title seems more appropriate than Paleo-Indians (a name in general use), since, as immigrants to America from the Old World, they have as much right to be called Americans as those who followed from Europe thousands of years later. The Late Pleistocene age is believed to have been at a time when modified arctic weather prevailed; when wide areas of barren uplands were unforested, and when sparse tundra growth prevailed. In support of this hypothesis are the gravel-stone hearths appearing in Zone I and resting in gravel hummock troughs. Their small fire pits appear to have been designed to accommodate fuel as small sticks or grass: limited charcoal residue of what appears to be burnt grass was caught beneath a fire stone in one hearth. Furthermore, these fire pits are too small to have held large sticks without threatening destruction of their stone walls. Therefore, it seems unlikely that hearths of this design would have been constructed if large sticks had been available. Consequently, trees probably were absent, which suggests an age ante dating forestation of the region. If this is accepted as a logical deduction, then the gouge from one of the hearths may suggest a southerly provenance of a warmer clime where large trees grew, if gouges were used in hollowing logs for dugout construction as is currently believed. Certainly, there would have been no good reason for manufacture or use of the gouge at Twin Rivers, as it would seem, at a time when trees are presumed to have been absent. From this it would seem to follow that Zone I Paleo-Americans came in dugouts from wooded regions, probably to the south, where depth of soil and climatic conditions were suitable for tree growth to the required size for dugout manufacture.

Contributing evidence to an early post glacial age for Zone I lies in the fact that its hearths are resting on glacial gravel and must have been built before early winds had covered the gravel with sand to any great extent. The theory that these hearths were constructed inside pits sunk in sand of previous deposition has no more foundation in sound thinking than has the hypothesis that hearths of all ages were built inside holes dug in the ground, which is an unreasonable premise based on ignorance of human behavior. Another significant indicator of this early age is the prevalence of cobbles-stones in Zone I hearths as compared with that of flat faced stones in all hearths of other zones. Hence, it may be argued that Zone I cobbles came from glacial till in the late Pleistocene before it had been covered with silt or sand that may have prevented later inhabitants from procuring stones from the same source.

Finally, appearance of a fluted point in Zone I helps place it in the late Pleistocene. The site’s fluted specimen has already been described in detail with particular reference to its fluted faces. If it is indeed a fluted point, it should be classified as Folsom-like, for it possesses modified Folsom traits: more or less parallel sides; stubby tip; concave base between well defined barbs; and flutes that seem to be made by specialized, not generalized flaking. Critics of the specimen have argued that it is too thick for this classification, but no one has refused to admit the presence of flutes and other Folsom-like traits. As has been pointed out, its over-thickness may be necessary to give its narrow proportions their required strength. At any rate, much skill must have been required to make fluted channels between well formed barbs. This indicates a specialized technique. Since other Folsom-like characteristics are present except that of thickness, class inclusion as a variant would seem preferable to exclusion. This is considered an important issue, for if this fluted point is what the name implies - and it is difficult to review its characteristics and think otherwise - it is the first fluted point known to the author to have been recovered by excavation in situ associated with the earliest horizon at any site in the Northeast. Being a fluted point, it carries a connotation of considerable antiquity, since presumably it should not be too far removed in time from its Folsom source to provide inherent skill for its manufacture.

Zone II that overlies late Pleistocene evidence suggests an age that occupies a place in culture sequence of respectable antiquity; accordingly it has been named Early Archaic. It is substantiated by the equation of its corner-removed #5 and #9 projectile points with those of similar types appearing at Nunkatusset in that site’s lowest horizon: counterpart of Twin Rivers’ Zone II in culture sequence. Therefore, it may be argued that this horizon should include other diagnostic traits as at Nunkatusset: ulu; plummet; and oval perforated atlatl weight. This would then explain the presence of the ground slate ulu fragment at Twin Rivers that now seems out of place in Zone III where it appears; presumably belongs in Zone II. Assuming this association of ulu and Zone II to be probable, then it may be contended that the people of this horizon had Eskimo affinity since they used Eskimo-like ulus, although direct racial connection is not believed to apply. Probably, arriving from the north at an early date they may have been part of an advanced migratory wave out of Asia having a similar Asiatic source to that of the Eskimo who came at a much later time. Of interest is the expanded base hand drill of this horizon that seems linked with hafting the narrow stemmed corner-removed points of the age. Since its bit approximates width of point stems, it is believed suitable for reaming a hole in the end of spear shafts preparatory for hafting. Insertion of point might then have been possible after a slot had been cut in the spear butt with a “notcher”.

Zone III contains several diagnostic lithic traits of the steatite industrial period, when household vessels

7. Ritchie, 1951a
8. Fowler, 1946
were made, not only of steatite, but of chlorite, serpen-
tine, and granite as well; so appropriately it has been
named Stone Bowl, and its industrialists, Stone Bowl
Makers. While no bowl fragments have occurred at
the site, other known period traits have: stone plate;
grooved ax; atlatl weight (winged bannerstone); stemmed
and stemless knife styles; tapered stem, corner-removed
shaft, eared broad based, small triangular, small stemmed,
and broad bladed side-notched projectile point types.
Most of these period indices with steatite bowl fragments
are present at Potter Pond, Nankachusetts, and Ragged
Mountain with grooved gouge instead of grooved ax at
the latter site. Small stemmed and small triangular
points first appear in this zone and seem to be sufficient
evidence to indicate the introduction of bows and arrows.
However, appearance of broad based points supported
by presence of atlatl weights indicates the persistence
of spears. Whether the two bannerstone specimens are
atlatl weights is debatable, but since they appear on a
hunting site it seems inconceivable that they would have
been brought there as bannerstones for ceremonial
rites, presumably reserved for large gatherings at vil-
lages. On the other hand, as atlatl weights, they would
have filled a real need in the procurement of food.
While the bow tie form lacks an excavated counter-
part from another site, the winged specimen may be
compared to a similar artifact from the steatite indus-
trial horizon Ragged Mountain. At that steatite quarry-
site this winged object is thought to have been used
as an atlatl weight for the same reason as that advanced
at Twin Rivers. By the same token, the bow tie form
may now be added to this evidence as a probable atlatl
weight. This horizon shows no well defined overlapping
of important traits from Zone III. Instead, it displays
14 new lithic traits that replace all that went before.
Now, since the replacements are well developed artifacts
without apparent connection with an elementary begin-
ing in the previous period, migratory resettlement may
be contemplated. Further, since stone pipes are first
encountered associated with stone bowl making at stea-
tite quarries and in this horizon at the Potter Pond
coastal site, it has been argued that the new comers
were from the Great Lakes region.9

Zone IV, representing the final period of occupation,
is identified by lithic traits that are associated with
clay potsherds at other sites in the same drainage basin.
Therefore, it has been named Ceramic. While no pot-
sherd has occurred at the site, other diagnostic period
traits have: chipped broad bladed hatchet; widely
side-notched, corner-notched, and large triangular pro-
jectile point types. In Zones III and IV frequency of
arrow over spear points is nearly two to one. This
preference for bow and arrow might suggest that this
method of hunting had been in use for some time as a
part of a migratory culture that introduced it in the
Stone Bowl age. However, it should be observed that the
use of spears persisted in the age of Ceramics that fol-
lowed and was never completely abandoned. The most
outstanding thing to note in Zone IV is the evident tendi-
cy to continue the use of traits from Zone III. There are
8 significant traits that overlap, while only 3 new ones
are added. Here, for the first time in the course of
cultural growth appears strong evidence to support pos-
tulation of racial continuity from a preceding age. Hence,
it may be concluded that Ceramic people of Zone IV
were lineal descendants of Stone Bowl Makers of the
preceding age.

CORRELATIONS

Since culture nomenclature used in this report has
been developed as a result of recent excavations in cen-
tral coastal New England and does not follow previous
nor existing systems, it seems advisable to show, so
far as possible, wherein culture traits equate or differ.

In 1935 Charles C. Willoughby offered an attempted
culture delineation of New England's prehistoric peoples.10
However, it should be pointed out that, while
Willoughby presents some non controvertial evidence,
his tenets are now open to question as a result of recent
research. For his earliest culture he calls attention to
the Bolyston Street Fishweir people of Boston with a
possible age of 2,000 to 3,000 years. Through carbon-
14 analysis, dating for this culture has now been pushed
back to about 4,800 years B.P. (before the present),11
but Twin Rivers’ Zone I with its small gravel hearths
is believed to represent a much older cultural level.
Its Paleo-Americans appear to have used smaller sticks
for fire wood than those required for fish weirs; prob-
ably lived long before trees grew thick enough to sup-
ply a weir fishing industry such as that at Boston.
Furthermore, its fluted point with a probable Folsom
tradition would seem to suggest a much earlier dating.
As a matter of fact, the Early Archaic culture that
followed is now found to have a probable carbon-14
dating coincident with that of the Boston Fishweir and
therefore is presumed by this author to be synonymous;
the latter has no lithic traits with which to make com-
parisons. By way of age computation, consider the car-
bon-14 measurement of the Folsom horizon at Lubbock,
Texas: the most reliable Folsom date so far.12 This
is placed at 9,883 ± 350 yrs. B.P., which approxi-
mates the geologic estimated date for Folsom in the
Southwest of 10,000 yrs. that has been prevalent for
some time. Therefore, if the Twin Rivers’ fluted point
is a later modification of Folsom, its Paleo-American
fabrication should not have been too far removed to have
permitted retention of the knowledge and specialized
skill required for its manufacture. While the exact in-
terval that elapsed before fluted points ceased to be
made is debatable, 1,500 years would not seem unre-
sorable. Consequently, logical speculation might place
man in central coastal New England as early as 8,500
yrs. B.P.

Willoughby’s Pre-Algonquian Group probably repres-
sents a similar period to that of Twin Rivers’ Early
Archaic, if the stray slate ulu fragment at the site is
9. Fowler, 1951b
10. Willoughby, 1935
11. Johnson, 1951, p.p.11,12
12. Johnson, 1951, p.16
considered to belong to Zone II. However, Willoughby is short on projectile point evidence, and his period traits do not emphasize points as culture determinants. Therefore, it is not surprising that Zone II corner-removed #5 and #9 points are found to be absent among Willoughby's traits.

Partial agreement is reached with Willoughby's Old Algonquian Group by Zone III evidence, postulated as representing traits of an industrial period of stone bowl manufacture. Accord with Willoughby is also found in his belief that the Great Lakes area was the source of the Stone Bowl migration that brought with it the custom of pipe smoking. However, Willoughby places the grooved axe in his succeeding agricultural period, a trait that is from Zone III at Twin Rivers. Further, the winged bannerstone trait is pushed back into his Pre-Algonquian Group where it is absent at Twin Rivers. From this it appears that one thing that was with such evidence as was available in 1935, Willoughby was unable to properly delineate Stone Bowl period traits from those of other ages. However, he does detect evidence of racial continuity between his last two epochs, as is now postulated in this report between Zones III and IV.

William A. Ritchie has developed probable chronology and culture sequence for peoples living west of New England in New York State. While there may be some relationship between his groups and those of New England, evidence of it will probably always be fragmentary due to partial isolation of coastal peoples from those lying over the Berkshire-Green Mountain divide to the west. While some lithic traits equate in kind, culture relationships seem somewhat at variance. Carbon-14 analysis now dates Ritchie's Early Woodland II at 3,000 yrs. B.P.; Archaic III before Transitional at 5,000 yrs. B.P.; and Archaic I at 5,500 yrs. B.P. (approx. dates). These time measures are helpful in estimating tentative dating for Twin Rivers culture periods are found in the "Conclusion". Without reviewing specifically all trait discrepancies, perhaps a few observations will suffice to indicate wherein major differences occur between New York, and New England coastal cultures.

Ritchie's Transitional stage between his Late Archaic (Archaic II and III) and Woodland periods reveals for the first time the presence of broad bladed tapered stem points and knives, also steatite vessels presumed to have been derived from southeastern Pennsylvania. This seems to equate with New England's Stone Bowl age. However, when it is further disclosed that a recognized marker of this horizon is Vinette I pottery, similarity ceases, for pottery is definitely not a part of the northeastern Stone Bowl era. Therefore, it may be said that New York's Transitional span between its Archaic and Woodland periods is just what its name implies: an age of change when the making of steatite vessels is being replaced by ceramic art. Based on this hypothesis, a comparable period in New York to the Stone Bowl industrial era should probably extend back into Ritchie's Archaic periods allowing time enough to account for its long years of development. Since carbon-14 measurements are considered reliable, it seems reasonable to postulate this period as 1,500 - 1,000 B.C. in New York State. However, allowing for a time lag between there and New England for the diffusion of ceramics, the period might have lasted until 800 B.C. on coastal sites of the Northeast. From this it seems clear that Ritchie's Archaic periods probably hold trait elements of Zones II and III at Twin Rivers; and although the Stone Bowl age is a definite culture period in New England, because of the apparent absence of steatite quarries in New York State, it seems to be only slightly discernible in culture patterns of that territory.

So far as the fluted point and other Zone I traits of the Late Pleistocene occupation are concerned, there appears no comparable excavated evidence in New York State nor in fact in any other northeastern region, so far as the writer is informed. For example, Ritchie's earliest culture, Lamoka Focus, Archaic I, contains no lithic traits even remotely similar; evidently is a later intrusive culture that never reached the coast. Hence, Twin Rivers' fluted point, small gravel hearths, and other Zone I traits await verification through the appearance of similar evidence on other northeastern sites.

A recent report from Ritchie" tells of fluted points, rude scrapers, knives, and a fluted pendant that have been recovered from the Reagen site: about an acre of wind blown sand lying 300 feet above the Missisquoi River in northern Vermont. No stratigraphy is evident today, and wind erosion has exposed the artifacts from time to time on the surface of the drifting sand. Here is good camp site evidence of early man having typological affinity by virtue of fluted points with Twin Rivers Late Pleistocene horizon, except that Reagen specimens are pentagonal or with tapered stems. They are made of flint that has some resemblance to certain New York State deposits. While this Vermont site might have been reached by water from the north, it could equally as well have received its occupants from the south via the Hudson River-Lake George-Lake Champlain thoroughfare, especially since New York State flints may have been used. Such a migratory course would better fit this paper's source hypothesis.

There have also been surface finds of fluted points from the Seneca River Valley of New York State and certain places in Pennsylvania, as well as from Vermont, Massachusetts, Rhode Island, Connecticut, and Long Island. Future research may settle the question as to their migratory source, whether from southern coastal regions or from the Middle West. However, for coastal New England there is every reason to believe that Paleo-Americans came up the coast from southern climes bringing certain implement traits including fluted points of various shapes, to which may now be added: small pecked-ground gouge with steep ridged poll; adz; rude pronged hand club; and woodworking shaft abrader.

13. Ritchie, 1951b

14. Ritchie, 1952
Excavated evidence from northeastern Massachusetts, as presented by Ripley P. Bullen, appears to equate somewhat better. At the Hofmann site, a non-ceramic lower zone characterized by large corner-removed projectile points, superimposed by a zone containing pottery and small triangular points has its counterpart at Twin Rivers with corner-removed #7 points in Zone III, and overlapping of the small triangular point type into Zone IV, the Ceramic age. Furthermore, Bullen’s Fosters Cove’s three zones seem comparable, with but a few minor discrepancies, to Zones II, III, and IV at Twin Rivers. Fosters Cove’s culture horizons consist of a non-ceramic zone with corner-removed points; a non-ceramic zone with small triangular and small stemmed points; and a ceramic level producing medium and large triangular and a few side-notched points.

In Pennsylvania John Witthoft has delineated probable culture stages that have some aspects of similarity with those at Twin Rivers. His concept is of three major periods: preceramic, composed of Early and Late Archaic; Transitional of 100 years; and ceramic, consisting of Early, Middle, and Late Woodland. Pennsylvania’s projectile point types have some similarity to those of New England; are found in substantially the same sequence. For example, Witthoft’s Late Archaic in which stone bowl evidence first appears has eared, and broad bladed side-notched points, similar to that of Twin Rivers’ Zone III. This is followed by his Transitional with increased stone bowl evidence and the coming of pottery; followed by Woodland ceramic periods with widely side-notched, corner-notched, and triangular points; all found in Zone IV. However, Witthoft puts the grooved ax in his ceramic Woodland category contrary to Twin Rivers and other New England sites where it appears in the Stone Bowl age. Further, his Transitional period of 100 years seems too short a span for the flowering of the steatite industry, which according to Rhode Island evidence existed for more than 500 years before the introduction of ceramics.

CONCLUSION

After careful evaluation of the foregoing evidence, Twin Rivers site seems to suggest a series of events that bear directly upon occupation of the Narragansett Bay uplands from earliest times down through the last cultural advance before Colonial supplantation. Conclusions reached cannot of course be considered as positive truths, since archaeology is not an exact science. However, they are highly provocative in the portrayal of what may have happened. Therefore, the following statements should not be taken as accomplished facts, but should be considered only as probabilities based upon excavated evidence.

Some time after the Mankato age and the retreat of the fourth and last glaciation from New England vegetation began to appear in the form of tundra; modified

15. Bullen, 1949
16. Witthoft, 1949
Evidence is available to link it to New England's Stone Bowl age, in which household eating vessels of all kinds were made from stone. For example, the site's Stone Bowl Makers sometimes used stone plates at their hearths; a custom not associated with preceding cultures, and believed to be an innovation of the period. Inspired by this first industrial effort in New England, people rose to new heights of resourcefulness, which must have been reflected in the home with the resultant abandonment of some savage customs in use among the indigenous peoples of the region.

Finally, the last cultural epoch arrived associated with large triangular points, a lithic trait that is in fact the hallmark of the period. The occupants are none other than Stone Bowl Makers transformed into ceramic artisans through diffusion of the art of pottery making. This is the Ceramic age, otherwise known as Woodland period, which is associate with ceramic as well as agricultural evidence on village sites. The triangular soil breakers of the previous age are adopted in various sizes as cultivating implements and become the preferred agricultural hoes of the day. Their popularity over other kinds of hoes spreads throughout New England and up the Hudson and Mohawk Valleys as well. It now seems clear that this last period is an outgrowth of the Stone Bowl age; a time when its enlightened people are receptive to outside cultural influence; accept the change from stone bowl making to ceramics, and adopt agriculture as a means to a more stable economy.

As far as chronology is concerned, at present it is only possible to speculate and suggest approximate dates for the start of each of the four periods dealt with in this report. Estimates are based on Ritchie's culture periods that have been dated by carbon-14 analysis and projected into New England's coastal area, allowing for a probable time lag between New York territory and coastal regions in the diffusion of ceramics. So, until carbon-14 measurements of coastal cultures become available, the following estimates are offered as a guide to probable chronology in New England: Late Pleistocene - 6,500 B.C.; Early Archaic - 3,000 B.C.; Stone Bowl - 1,500 B.C.; Ceramic - 800 B.C.

REFERENCES

Bullen, Ripley P.

Butler, Eva M. and Wendell S. Hadlock

Chute, N. E.

Deevey, E. S., Jr.

Denny, C. S.

Engstrom, Roland E.

Flint, R. F.

Flint, R. F. and E. S. Deevey, Jr.

Fowler, William S.


Fowler, William S. and Herbert A. Luther
Hartshorn, J. H.

Johnson, Frederick

Ritchie, William A.
1952. Notes concerning a Paleo-Indian site in Vermont.

Quinn, A. W. and others

Smith, Benjamin L.

Smith, H. T. U. and H. J. Fraser

Willoughby, Charles C.

Witthoft, John