* This is not the Complete Report

CULTURAL RESOURCE SURVEY
AT THE DEAL TEST SITE
TOWNSHIP OF OCEAN
MONMOUTH COUNTY, NEW JERSEY

TOWNSHIP OF OCEAN
AND
NEW JERSEY OFFICE OF GREEN ACRES

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1. INTRODUCTION

1.i. Project Background and Scope of Work :

The following technical report describes and evaluates the findings of a cultural resource survey carried out for the Deal Test Site, Ocean Township, Monmouth County, New Jersey. The survey was requested by the Township of Ocean in connection with their application to the New Jersey Office of Green Acres for state matching funds to carry out a park development scheme at the site. In this instance, identification of cultural resources in potential environmental impact areas on the site is mandated by New Jersey State Executive Order 53.

The scope of work called for determination of the presence or absence of significant historical and archaeological resources on the site, and for assessment of the impact of proposed construction on any such resources. Evaluation of historical and archaeological significance was to be performed according to the criteria for eligibility used for the National Register of Historic Places (36 CFR 60.6) and recommendations for avoidance or mitigation were to be provided if appropriate. The survey was to include background research, field investigation, analysis of cultural materials and preparation of a report.

At the present time, the Township's Green Acres application proposes construction of a recreation lake, library building, horticultural nursery and picnic, play and parking areas. The recreation lake will also serve as a retention pond and provide a measure of flood control for areas downstream. These potential areas of impact at the Test Site are very broadly delimited in the Master Plan/ Green Acres Application document (Hodnett, 1980, maps titled 'schematic', 'site plan' and 'core facilities'). Areas of <u>major</u> impact, i.e. the recreation lake, library building, parking areas and nursery, are shown on the large scale fold-out map at the back of this report (Fig. 13).

2. GEOGRAPHICAL SETTING

2.i. Project Area and Current Land Use :

The Deal Test Site consists of a 208.43 acre tract in Ocean Township, Monmouth County, New Jersey (Fig. 1). Two miles inland from Deal, the site is bounded by Deal Road on the south, Whalepond Road on the east, Dow Avenue on the north and private property on the west.

As it exists today, the site strongly reflects a half-century of experimentation in communications technology and has not yet been overwhelmed by surrounding suburban development. The dominant structures on this tract are five steel-framed antennae and the former permanent transmitting station (now the Boys Club building), all of which date to the period 1919 - c.1930 (Plates 1-3). Elsewhere on the property there are other laboratories, buildings and foundations, most of which were originally connected with the radio and satellite tracking experiments carried out at the site between 1920 and 1973 (Plates 4-7). With the exception of the two larger buildings to the west of the Boys Club, one of which houses a Township building shop and the other a Community Employment Training Act (CETA) program, all these structures are either abandoned or used for storage. More detailed information concerning these structures will be found in sections 3.iv., 4.iv. and Fig. 13. Aside from the buildings on the property, current land use includes public and quasi-public recreational areas in the east and south, an extensive zone of vacant wooded land to the west, and a sizeable community mulch heap in the north central portion of the site.

2.ii. Physiography and Geology :

The Deal Test Site is located within the northeastern sector of the Atlantic Coastal Plain physiographic province which comprises approximately 60% of New Jersey's total land mass (Fig. 2). While sharing many similar physiographic features and geological formations with the Coastal Plain areas of neighboring southern states, the New Jersey Coastal Plain is distinct because of a cuesta formed by the Upper Cretaceous sand and marl formations (Widmer, 1964, 90). This cuesta, or prominent ridge, divides the Coastal Plain into two segments. Beginning in the Atlantic Highlands north of the project area, it extends in a southwesterly direction to the Delaware River lowlands and terminates in Salem County. To the north and west of the cuesta's steep slope lie the lowlands of the Inner Coastal Plain with drainage flowing into New York Bay and the Raritan and Delaware Rivers. To the east of the cuesta's gentle slope lie the lowlands of the Outer Coastal Plain in which the project area is situated. The Outer Coastal Plain drains to the Atlantic Ocean and to the Delaware Bay.

The two segments of the Coastal Plain are geologically similar being comprised of unconsolidated sands, silts and gravels. However, soils of the Inner Coastal Plain contain a larger proportion of clay, large deposits of marl, and, in general, are more fertile. Most of the surface of the Outer Coastal Plain is covered by well-sorted, porous sand of the Cohansey Formation (Widmer, 1964, 91). Both segments were overlain during interglacial Pleistocene times by sand and gravel deposits of varying thickness.

Monmouth County is characterized by broad stretches of lowlands ranging in altitude from sea level to 184' above mean sea level. Numerous sand and gravel formations extend outward from the cuesta with one of the smaller formations extending from Freehold to just south of the project area in Asbury Park.

The project area is bisected by Poplar Brook (named for its 18th and 19th century tree cover) which flows east to the Atlantic at Deal. The Poplar Brook watershed commences at the northeastern side of a gravel finder of the Freehold/ Asbury Park cuesta formation at an elevation of 172' at the Borough of New Shrewsbury line. Its eastern boundary at the Borough of Deal line is at an elevation of 10' above mean sea level. The total land mass encompassed by the watershed is in excess of 2,200 acres (3.5 square miles) representing 31% of the total surface area of the Township of Ocean (Township of Ocean Environmental Commission, 1975, 5). Elevations within the project area range between 60 and 20' above mean sea level.

2.iii. Soils :

Eight soil types are represented within the Poplar Brook watershed of which five occur within the project area (Township of Ocean Environmental Commission, 1975, 5 and Map 3). Table 1 and Fig. 3 itemize and show the distribution of these soil types.

For reasons of security, the soils of the project area were never mapped by the US Department of Agriculture Soil Survey.

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Table 1 : Project Area Soil Types (after Poplar Brook Watershed Study Report, Township of Ocean Environmental Commission, 1975).

Type	Drainage	Composition
3	Poor	Floodplain deposits of recent alluvium ; mainly silt & sand with some clay ; organic matter near surface
4	Imperfect to good	Silt, sandy silt, silty sand and very fine sand
5	Poor to imperfect	Silty sand, sandy silt, silt & clayey sand with thick strata of silty clay and clay
6	Good to excellent	Uniform sand and silty sand with scattered gravel
7	Good to excellent	Upper part alluvial deposits - mixed gravel, sand & some silt ; lower part, at shallow depths less than 10' - marine deposits of intermixed sand and silt

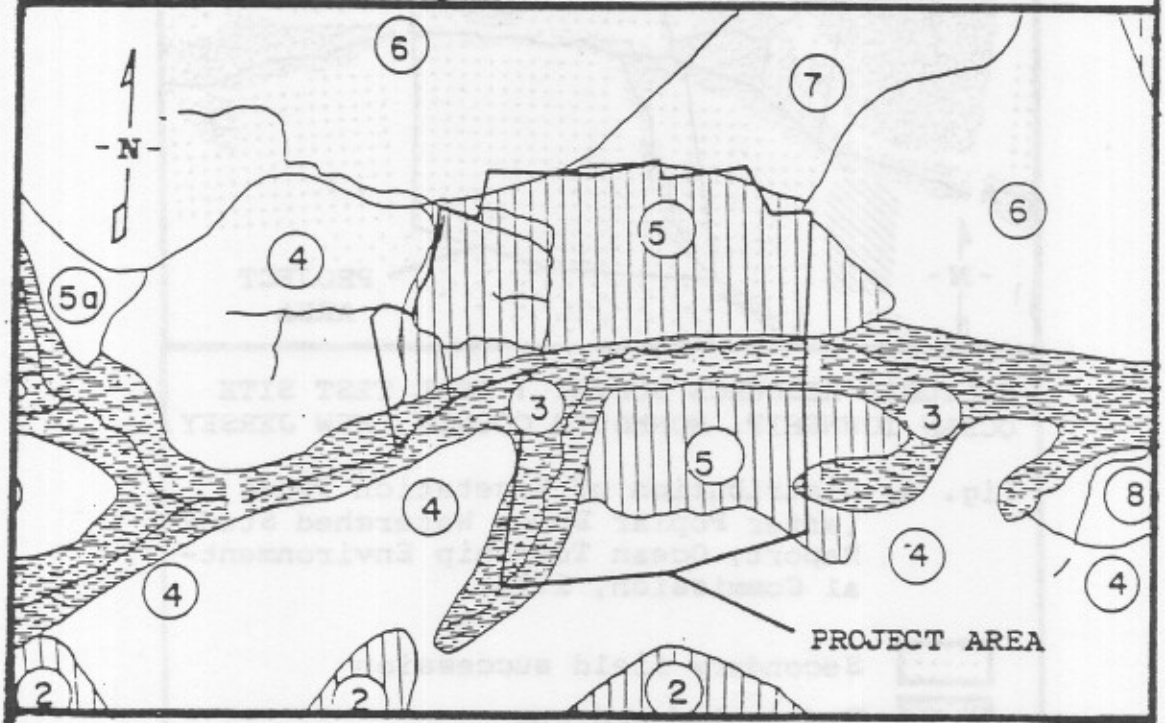

Fig. 3. Distribution of Soil Types (after Poplar Brook Watershed Study Report, Township of Ocean Environmental Commission, 1975).

See Table 1 for soil descriptions.

2.iv. Vegetation and Fauna :

Present day vegetation at the Deal Test Site is shown in Fig. 4. Much of the eastern half of the project area consists of successional meadow with areas of marsh, red maple and red gum alongside Poplar Brook. Further west, mixed deciduous woodland predominates with red maple and red gum in abundance. Several species of mammals and birds were observed during field operations. These are listed in Table 2.

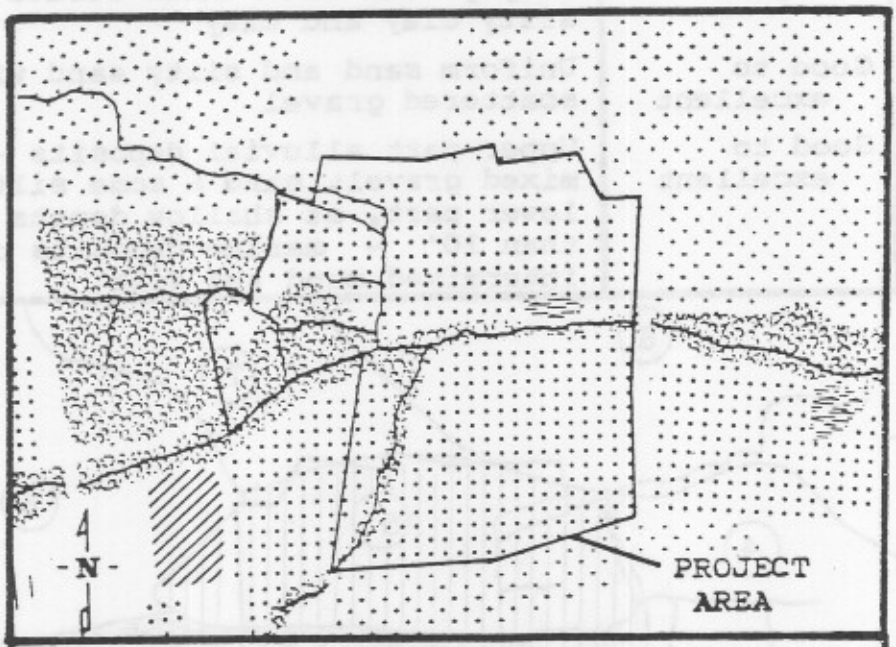

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Fig. 4. Distribution of Vegetation Types (after Poplar Brook Watershed Study Report, Ocean Township Environmental Commission, 1975).

Secondary field succession

Red maple/ red gum

Marsh

3. PREHISTORIC AND HISTORICAL BACKGROUND

3.i. Paleontology :

Background research has shown that paleontological resources have been encountered along Poplar Brook both in areas of adjacent bog and in the underlying Tertiary marls.

In June, 1824, Dr. Jeremiah Van Rensselaer presented a paper before the New York Library and Philosophical Society regarding a recent discovery of the fossil remains of a mastodon. The following is abstracted from the printed proceedings :

> " .... About three miles west of that watering place (Long Branch), is situated the farm of Poplar, occupied by Wm. Croxson, Esq. and owned by by his father, who nearly six years ago began to reclaim a marsh, about a quarter of a mile from the house. This marsh was usually covered by about two feet of water, which was much increased, however, in wet seasons .....
>
> .... Last year, in crossing this field formed by the reclaimed marsh, the attention of the proprietor was attracted by something sticking out of the ground, which proved to be a tooth. He then searched a little, and found part of the head of a large animal, partially exposed, being covered by grass only. With the assistance of a spade, he found other bones, which he took up and had removed to his house .....
>
> .... Mr. Croxson had the kindness to conduct us to the spot, where we soon found sufficient inducement to dig, and in a short time our hopes were fully realized, and our most sanguine expectations surpassed. In the course of that and the following day, we recovered all the bones of the skeleton that Mr. C. had left, with the exception of two or three unimportant bones of a foot - unimportant, because we have the corresponding bones of the other foot .....
>
> .... The head much injured, and without tusks, but with two teeth.
>
> Twenty-two vertebrae, more or less perfect, commencing with the atlas, and terminating with the os sacrum .....

.... It is observed that our skeleton was found much nearer to the ocean than any yet discovered, and is perhaps to be considered as one of the most perfect that we possess of that immense animal .....

.... Its position, corresponding with that of the skeleton found on the Wabash, was vertical, the feet resting on a stratum of sand and gravel, (mostly rolled quartz) and the head to the west-south-west. There is every reason for supposing that the animal was mired in that situation, but at what period, we have no data even to conjecture. But we have authority for believing that the mastodon was one of the last animals that has become extinct ....

.... Immediately under the surface, we found bog-iron-ore, loosely disseminated ; in other places in the field it existed in abundance. A soft black, damp earth, containing vegetable fibres, (what the Germans call geest) continued down four feet from the surface. Beneath this we found a yellowish clay, tinged perhaps from animal decomposition. Below, thin and alternate layers of sand and black earth continued, until we met a small stratum of rolled quartz pebbles, covering sand, on which rested the feet of the animal, about eight and a half feet below the surface. These layers resemble those occurring frequently in Europe, and compose the greatest part of our sea coast, from Long-Island to the Mississippi. They form part of the newer or tertiary formations, and are evidences of the last geological changes that the surface of our globe has experienced, always excepting volcanic and alluvial, still in daily operation.

Of the genus mastodon, there are two distinct species, vis. the M. giganteum and the M. Angustidens, distinguished, as the names imply, by the size and configuration of the teeth. Our animal belongs to the former species, of which, portions of many individuals have been found on our continent, and a few, comparatively in Europe. The beauty and value of these organic remains induced us to present them to the Lyceum of Natural History of New-York ...."

(Van Rensselaer, 1824, 246-250).

Deed research and the Schenck map of 1868 (Fig. 8 and section 3.iii. below), and field examination (section 4.i. below) all indicate that the mastodon find probably occurred on the south side of Poplar Brook in the eastern sector of the Deal Test Site. The current whereabouts of the mastodon remains is unknown although Columbia University and the American Museum of Natural History have been suggested as possible repositories (Parris, 1980, letter).

Although originally assigned by Van Rensselaer to the species giganteum, conversations with David Parris of the New Jersey State Museum have revealed that this species is now more commonly referred to as Mammut americanum (see Fig. 5 below).

Skeletal remains of mastodon have been recovered in substantially larger numbers than those of mammoth throughout the State of New Jersey and on the Outer Continental Shelf. Radiocarbon dates from several specimens excavated in New Jersey and southern New York State range between 10,000 and 12,000 years BP (Parris, 1980, pers. comm.). Wooded spruce environments were the preferred habitat of this browsing mammal.

It is curious that the Deal Test Site mastodon's tusks were missing but this does not necessarily imply human intervention. Another mastodon whose tusks were missing was excavated from a bog near Marshall's Creek, Monroe County, Pennsylvania. Two radiocarbon dates of c. 12,210 BP and 12,070 BP were established for this bog (Kraft, 1980, pers. comm.).

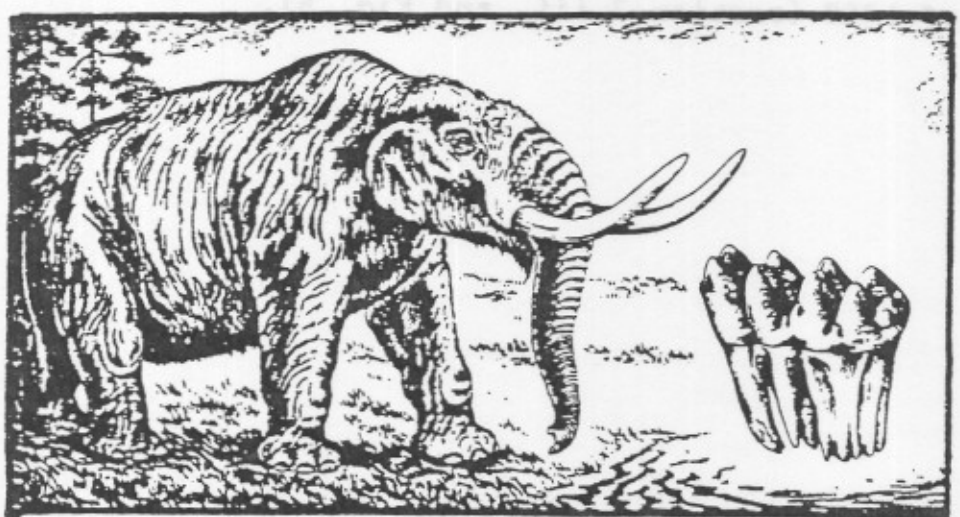

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Fig. 5. The American mastodon, 7 to 9½' high, and one of its molar teeth (Fenton & Fenton, 1958, 429).

In addition to the mastodon discovery, the Tertiary marls that underlie the Deal Test Site are also known to be fossiliferous. Correspondence with Mr. Robert Purdy of the National Museum of Natural History, Smithsonian Institution concerning paleontological resources on the Deal Test Site yielded the following :

> "After searching through my records of Monmouth County fossil localities, I did find a reference to fossil fish remains being found along Poplar Brook in the vicinity of the U.S. Military Reservation in Ocean Township and east to Monmouth Road. In the late 1800s marl was dug in this area and fossils were easy to find. Mansfield, 1923, New Jersey Geological Survey Bulletin 23, p.99, reports: 'The old marl pits .... are much overgrown, but on the north side of the creek the upper part of the Manasquan marl (probably the Shark River Formation) is exposed with the base of the Kirkwood.' Both of these formations yield fossil vertebrate remains ; this exposure may be on the Ocean Township park property. If the exposure is still accessible, it may yield fossil shark teeth, fossil fish, reptile, bird, and mammal remains ; any digging along Poplar Brook in the park area may produce more fossils, many of which may be important to science."
>
> (Purdy, 1980, letter)

The existence of 19th century marl pits along Poplar Brook is confirmed by secondary historical sources and the Schenck map of 1868 (section 3.iii. and Fig. 8).

3.ii. Prehistoric Archaeology :

Until quite recently, the prehistory of Monmouth County was poorly understood. Since 1974, investigations by the Monmouth College Archaeological Research Laboratory, Rutgers Archaeological Survey Office, Monmouth County Chapter of the Archaeological Society of New Jersey, and cultural resource surveys by a number of independent contractors have served to broaden our understanding of aboriginal settlement patterns within this part of the state.

Generally speaking, the prehistory of the project area can be best understood by reference to three major cultural periods : Paleo-Indian, Archaic, and Woodland. Each of these periods can be further subdivided into several stages or phases (e.g., Early Woodland, Middle Woodland, and Late Woodland). The temporal framework established for each period or phase is based upon radiocarbon dates from stratigraphically excavated sites or estimated relative to dated sequences elsewhere in the Eastern United States. Distinctive technologies and adaptations to dynamic or changing environments allow for more specific separation of these archaeological cultures.

Based on ethnohistorical information and archaeological evidence, the area's prehistoric and historic Native American inhabitants can be generally classified as hunter/gatherers or, in Late Woodland times, as hunter/gatherer/horticulturists. As such, they were intimately connected to elements in the natural environment such as the distribution of plant and animal populations, lithic (stone) raw materials, soils, water resources, and landforms.

A. The Paleo-Indian Period (c. 12,500 - 8,000 BP) :

The earliest recognized groups of hunter/gatherers within New Jersey and the North American continent are referred to by archaeologists as the Paleo-Indians. Their hallmark is a distinctive style of projectile point which was used to tip javelins or spears and which served a secondary function as a butchering implement. Paleo-Indian projectile points are easily distinguished from those of later periods because of the presence of single or multiple flake scars which extend vertically from the base of the artifact toward its tip. Because of this peculiar manufacturing technique (presumed to aid in hafting the point to a foreshaft), these tools are collectively referred to as 'fluted points'.

Based on data from fossil pollen remains and associated radiocarbon dates, the environment during this period can be generally characterized as periglacial. The remnants of the Wisconsin advance stretch in an irregular belt almost one mile wide from Perth Amboy at the mouth of Raritan Bay in a northwesterly direction across the state. Between 12,000 and 13,000 years ago sea levels were lowered to the extent that the shoreline was fifty miles east of its present position. River and stream systems were different as were the plant and animal communities within these environments. Peat borings from the continental shelf indicate that the fairly level plain supported an open spruce parkland or spruce woodland environment including pine, fir and other vegetation. Numerous on-shore and off-shore finds of the remains of mammoth, mastodon, musk-ox and, more recently, caribou, attest to a variety of cold-adapted animal inhabitants. The Deal Test Site mastodon is a specific find of this type from within the actual project area (section 3.i. above).

To date, approximately 208 fluted points have been identified from nineteen of New Jersey's twenty one counties (Marshall, 1980). The majority of these specimens were surface finds and therefore lack contextual association with other artifacts and datable organic materials. Until recently, attempts at locating undisturbed, subsurface Paleo-Indian sites within the state have met with disappointing results (Kraft, 1977, 270).

The only undisturbed, radiometrically dated Paleo-Indian site so far found within New Jersey is the Turkey Swamp site located southwest of the project area near Freehold, Monmouth County (Cavallo, 1978 ; Cavallo, 1980). The site is located in well-drained floodplain deposits on a tributary of the Manasquan River headwaters. Since 1977, the basal levels of the site have continued to yield a series of basally-thinned, trianguloid and lanceolate points together with unifacial and bifacial maintenance tools, manufacturing debris, and several features. A series of five radiocarbon dates were secured from wood charcoal associated with a projectile point and maintenance tools within a 30cm stratum of two contiguous excavation units. These dates range between ca. 8,000 and 8,730 BP.

Paleo-Indian projectile points have also been excavated from two other sites within the Manasquan drainage to the south of the project area (Grossman, 1977 and 1980, pers. comm.). The first point was discovered on a tributary of the Manasquan in what appears to be a stratified occupation site. The second specimen was recovered during excavations at the Squankum Archaeological Complex along the main trunk of the Manasquan River.

Closer to the study area, Ronald Mason described a

surface collected fluted point from Allenhurst, one and a

B. The Archaic Period (c. 8,000 - 3,000 BP)

The end of the Pleistocene was marked by warmer temperatures resulting in glacial melt and a subsequent rise in sea level. Traditionally it was believed that during this period New Jersey, and the rest of the northeastern United States, were covered by a broad zone of boreal forest which succeeded the previous spruce-dominated environment. New fossil pollen data indicates that this may not have been the case and that coniferous, deciduous and grassland vegetation may have grown in a mosaic (rather than zoned) pattern (Cavallo, 1980).

Many of the cold-adapted animals probably followed the retreating glaciers northward and, in the case of mammoth and mastodon, into extinction. These creatures were replaced by deer, elk, moose, bear and smaller mammals. During this period there was a change in the style of projectile points - the technique of fluting was abandoned and this has traditionally been used to mark the beginning of the Early Archaic phase. In addition, new implements such as bola stones and spear-thrower weights were introduced.

More recently it has been suggested that a change in projectile point style does not necessarily indicate a new way of life (Gardner, 1974 ; Bryan, 1977 ; Cavallo, 1980). These researchers have argued that Late Paleo-Indian populations and early Archaic peoples continued to live the same basic way of life and that the change in projectile point style merely implies a technological rather than an economic shift. This hypothesis is supported by archaeological evidence from the Thunderbird site in Virginia's Shenandoah Valley, and the Turkey Swamp site in Freehold, New Jersey.

Like the Paleo-Indian period, most of what we know about the Early Archaic phase in Monmouth County, and the state as a whole, has been based upon surface collected artifacts. The first excavated site to reveal evidence of Early to Middle Archaic occupation was the Harry's Farm site in the Upper Delaware Valley (Kraft, 1975). A small hearth containing a Kirk-like projectile point yielded a radiocarbon date of 7,430 ± 120 BP. Numerous finds of Early Archaic point forms, similar to those described by Coe (1964) from the Carolina Piedmont have been recorded from surface collections in Monmouth County (Cavallo, 1978).

Sites of Middle to Late Archaic date are abundant along the Atlantic coastal plain. This is probably due to environmental shifts which were conducive to the support of larger aboriginal populations. Milling stones and other food grinding implements attest to an increased reliance on gathered wild plants such as nuts, berries, roots and seeds. Net sinkers indicate the importance of fishing and refuse pits have yielded freshwater mussels

and other marine resources. The only dated Middle to Late Archaic site in the coastal plain of New Jersey is the Savich Farm site in Marlton which produced 41 cremated burials and accompanying grave goods (Regensburg, 1970). The site was radiocarbon dated to c. 4,300 - 3,900 BP.

As a result of changes in the environment, subsistence and settlement, new tool technologies emerged during the period between 3,750 and 3,000 BP. The hallmarks of this phase are circular and oval carved steatite (soapstone) bowls and distinctive styles of points referred to as broad points.

Close to the study area, an extensive Late Archaic component has been reported from the Turkey Swamp site (Cavallo, 1980) while approximately one mile southwest of the Deal Test Site a complete untyped Early to Middle Archaic projectile point was found during the construction of a parochial school at the corner of Deal and Poplar Roads (Espisito, 1980, pers. comm.). Oral reports also state the occurrence of stemmed points of possible Late Archaic origin along Poplar Brook to the east of the site.

C. The Woodland Period (c. 3,000 BP - AD 1700) :

This tradition is divided into three successive periods : Early, Middle and Late Woodland. The Early Woodland is separated from the previous Late Archaic period by the introduction and use of ceramic vessels, and the possible beginnings of plant domestication. Settlement pattern appears to be similar to that of the Late Archaic. The earliest ceramics are flat-bottomed, straight-sided vessels with lugs or handles of the Marcey Creek and Ware Plain types. These are thought to be followed by the Vinette I conical-based, coarse-gritted, coil-constructed vessels whose interiors and exteriors are covered with the marks of cord-wrapped paddles (Kraft, 1975, 23).

The Early Woodland Meadowood point is fairly widespread on sites of this period and a number of them have been found in collections from Ocean and Monmouth Counties. Four specimens were recently excavated at the Turkey Swamp site in association with Ware Plain and Vinette I pottery.

During the Middle Woodland period (c. 2,500 BP - AD 700) coarse cord-marked pottery was replaced by net-impressed and, at the Abbott Farm site near Trenton, zoned ceramics. Rossville, Fox Creek and Jack's Reef are the predominant projectile point styles. A collection of six Fox Creek-like stemmed points, said to have been excavated by a Mr. Grove of Farmingdale from the vicinity of Shark River near the Asbury Park Golf Course, were examined during the course of this survey. Hammerstones, anvilstones and pestles are

important processing implements during this period while netsinkers continue to show the exploitation of fish resources. Only one house pattern of this period has been excavated - a series of postmolds in an oval configuration c. 30 by 25' at the Faucett site in the Upper Delaware Valley. To date, no carbonized plant remains have been found on New Jersey Middle Woodland sites.

The Late Woodland period (c. AD 700 - AD 1700) is well represented throughout the state. The largest sites are usually located on major rivers and probably represent base camps which may have been occupied most of the year. Smaller sites are abundant on tributaries as well as near natural springs. These sites probably functioned as temporary or seasonal camps. The practice of hoe-type horticulture was well-established although hunting, gathering and fishing continued as major subsistence activities. Hickory nuts and acorns were important wild foods as were butternut and blueberries. Fresh water mussels have been found by the thousands in many of the shell pits and middens on the river terraces of the Upper Delaware (Kraft, 1976 ; Kinsey, 1972).

The historic period Indians of New Jersey called themselves 'Lenape' but were renamed the 'Delaware' by the Europeans. While their artifacts and general settlement pattern were very similar to that of the Iroquois, they differed linguistically. The Lenape were Algonquian speakers. They also differed in terms of socio-political organization. During the period of contact with Europeans, the Lenape could not be described as a tribe as they existed in loosely structured autonomous bands residing in small dispersed settlements (Kraft, 1974, 32).

Increased contact brought a breakdown of traditions and increased reliance on European trade goods in exchange for furs and land. Warfare, disease and alcoholism decimated the aboriginal population to such an extent that by 1759 it was estimated that only 300 Lenape remained in the state. By 1801 there was scarcely a Lenape left in New Jersey, and today their descendants live in Oklahoma and Canada.

Previous surface collection and archaeological investigation at the Deal Test Site has yielded artifacts of the Late Woodland period. Fifteen to twenty years ago, members of a Boy Scout Troop apparently surface collected 'triangular shaped' specimens in the vicinity of Building E, the former short wave laboratory (Brockell, 1974, pers. comm. ; see Fig, 13) and in the spring of 1975, John A. Cavallo, with members of the Monmouth County Chapter of the Archaeological Society of New Jersey, conducted test excavations in the same area. Seven 5 x 5' test units all showed signs of recent disturbance including portions of a buried copper wire grid used in the 20th century communications experiments. Although one Late Woodland triangular

point was recovered during these investigations no clear evidence was found of a stratified Late Woodland site. Other Late Woodland triangular points have been recovered along Poplar Brook and in the vicinity of Cold Indian Springs on the property of the Kepwell Springs Mineral Water Company but these artifacts were not examined during the course of this survey.

3.iii. 17th, 18th and 19th Centuries :

By 1665, European settlements had been established at Middletown and Shrewsbury in what is now northeastern Monmouth County (Wacker, 1975, 125). In the same year, Governor Nicholls of New York issued the Monmouth Patent which guaranteed its twelve signatories title and transfer rights to land in all of present day Monmouth and Ocean Counties, and parts of Mercer and Middlesex Counties (Edelman, 1974, 3). During the final quarter of the 17th century and the early 18th century settlement spread gradually southwards from the Shrewsbury/Middletown area and involved chiefly English Quakers and Baptists, and families of Dutch and Flemish extraction. Many of these early settlers were relocating from New York, Long Island, New England and the Middlesex County area (Township of Ocean Commemorative Book, 1949, 7 ; Wacker, 1975, 127, 168).

It appears that by c. 1715 a handful of English settlers had moved into the Deal/Oakhurst area. By this time, Thomas Potter (born in Deal, Kent, England), Samuel Whyte, John Wooley, John Tucker, Gavin Drummond, Francis Jeffrey and William Brinley had established farmsteads in the Great Pond (Deal Lake) vicinity and along Hog Swamp Creek, Poplar Brook and Whalepond Brook (Edelman, 1974, 5-12). By the mid-18th century the Brinley family was operating both a saw mill and a grist mill along Whalepond Brook and a Drummond saw mill was located on Hog Swamp Creek (Edelman, 1974, 13-14).

The Deal Test Site is situated on land that was originally settled and farmed by the Wooley family *. As early as 1667, Emmanuel Wooley of Newport, Rhode Island, had purchased shares in Monmouth County and by the early 1700s John Wooley, one of Emmanuel's sons, had married a daughter of Thomas Potter and settled close to Poplar Brook (Salter, 1890, appendix ; Stillwell, 1970, 425-426 ; Edelman, 1974, 9). Wooley descendants have remained prominent in Monmouth County down to the present day and the family was instrumental in founding a school at nearby Cold Indian Springs as early as 1784 (Edelman, 1974, 9). One of the early Wooley homesteads, known today as the Henderson House, is situated immediately southwest of the Deal Test Site in the northeastern angle of Route 35 and Deal Road. The smaller eastern wing of this two section frame house is reputed to date to the early 18th century, the western wing to c. 1750 (Edelman, 1974, 9-10). It is not clear whether this building was ever occupied by John Wooley himself.

The earliest detailed maps of the Poplar Brook area were drawn up during the Revolutionary War period (Hills, 1778 ; Hills, 1781). These show one major road that corresponds approximately to the present day Route 35, and a scatter

* early spelling is usually 'Wooley' ; by 19th century 'Woolley' is more common.

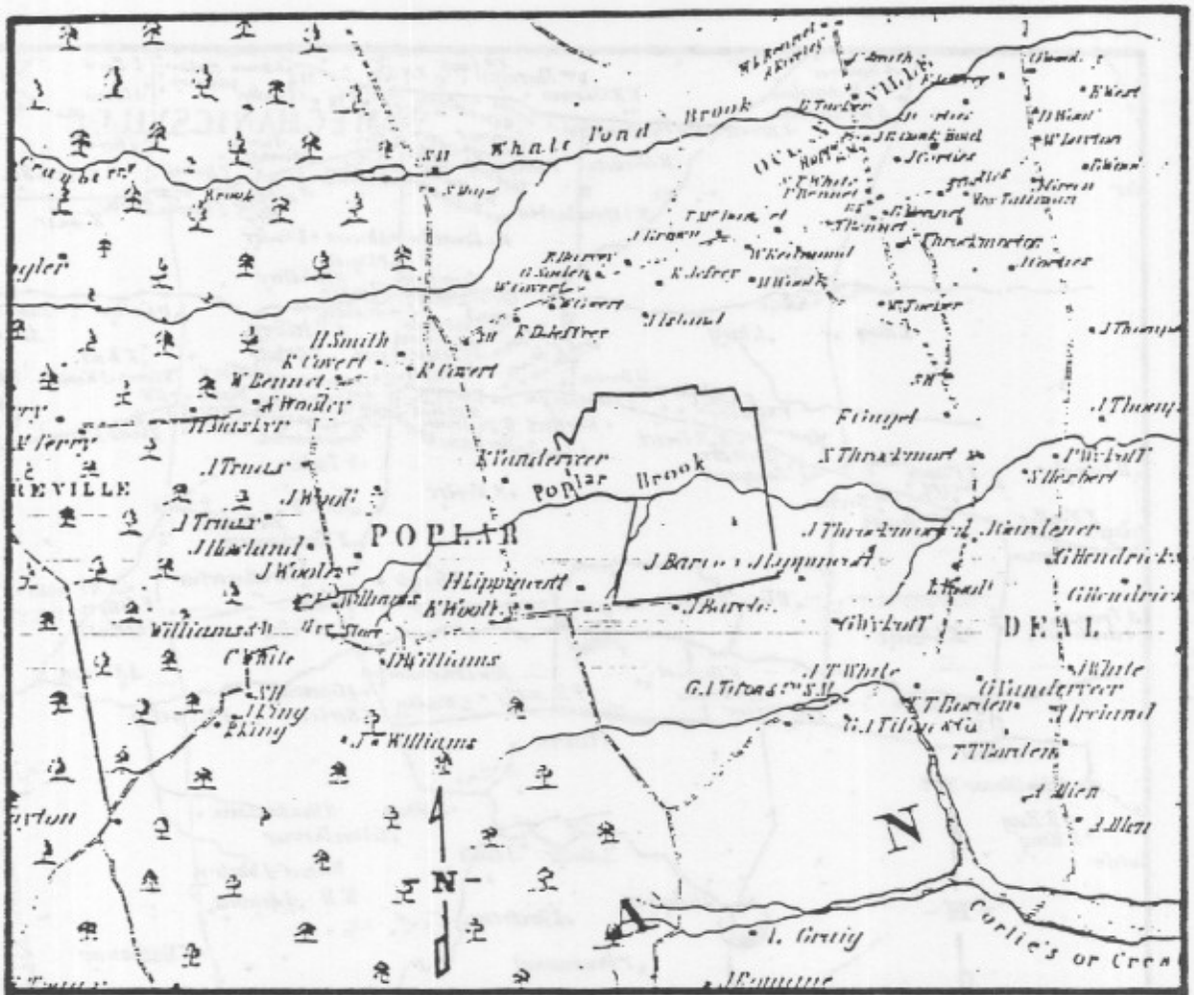
of five or six houses, probably including the Henderson House, along the length of Poplar Brook.

During the 19th century, further roads were laid out and the original Wooley farmsteads were subdivided into smaller farms. The two roads that form the southern and eastern boundaries of the project area - Deal Road and Whalepond Road - were requested by petition in 1837 and 1858 respectively (Monmouth County Archives, road returns D 113, F 135) and they are clearly shown on late 19th century maps (Lightfoot, 1851 ; Beers & Beers, 1861 ; Schenck, 1868 ; Beers, 1873 ; Wolverton, 1889 ; see Figs. 6-10).

In 1817, Jacob Croxson bought from Nathan Woolley a 204 acre tract that extended between Poplar Brook and Hog Swamp Creek, and lay east of the Henderson House (Monmouth County Archives, deed A2/109). This property included the southern half of the present day Deal Test Site, and it was on this piece of land that William Croxson, Jacob's son, encountered the mastodon remains in 1823 (see section 3.i.). William Croxson defaulted on the mortgage payments for his farm and in 1844 the sheriff transferred the property to Joseph Barclay of Shrewsbury (Monmouth County Archives, deed L4/145)*. The 1851 Lightfoot map shows Barclay living on the south side of Deal Road and this is presumed to be the location of the Croxson homestead also.

In 1854, Joseph Barclay sold 145 acres of his farm, north of Deal Road, to Henry and Charles Herbert (Monmouth County Archives, deed C6/533). Three years later, Charles Herbert sells his half share of the farm to Henry Herbert who at that time is described as living on the property (Monmouth County Archives, deed 248/312). As 'Herbert' buildings are clearly shown on the 1861 Beers & Beers map, it is therefore deduced that Henry and Charles Herbert erected this new homestead on the property between 1854 and 1857. Henry Herbert lived at this farm until at least 1873 but the 1889 map shows a Mrs. M. Degraw on the site. In 1896, the heirs of Henry Herbert sold the property to Henry Fox of Philadelphia, and a succession of owners followed until the Western Electric Company and Bell Labs acquired what was then known as Foxhurst Farm in 1919 and 1929 (Monmouth County Archives, deeds 567/83, 837/100, 837/102, 1097/292, 1361/412, 1502/80 ; Edelman, 1974, 59). As late as 1929, houses and buildings are referred to in the deeds so the farm may well have remained functional up until its conversion into an experiment station by Western Electric. The site of the Herbert farm buildings lies within the project area and was examined during the field investigation (section 4.iii).

* Although not researched in depth, it is probable that the Lippincott/Truax property was set off from Croxson's land in the 1840s also. The original Lippincott/Truax house appears to be still standing southwest of the

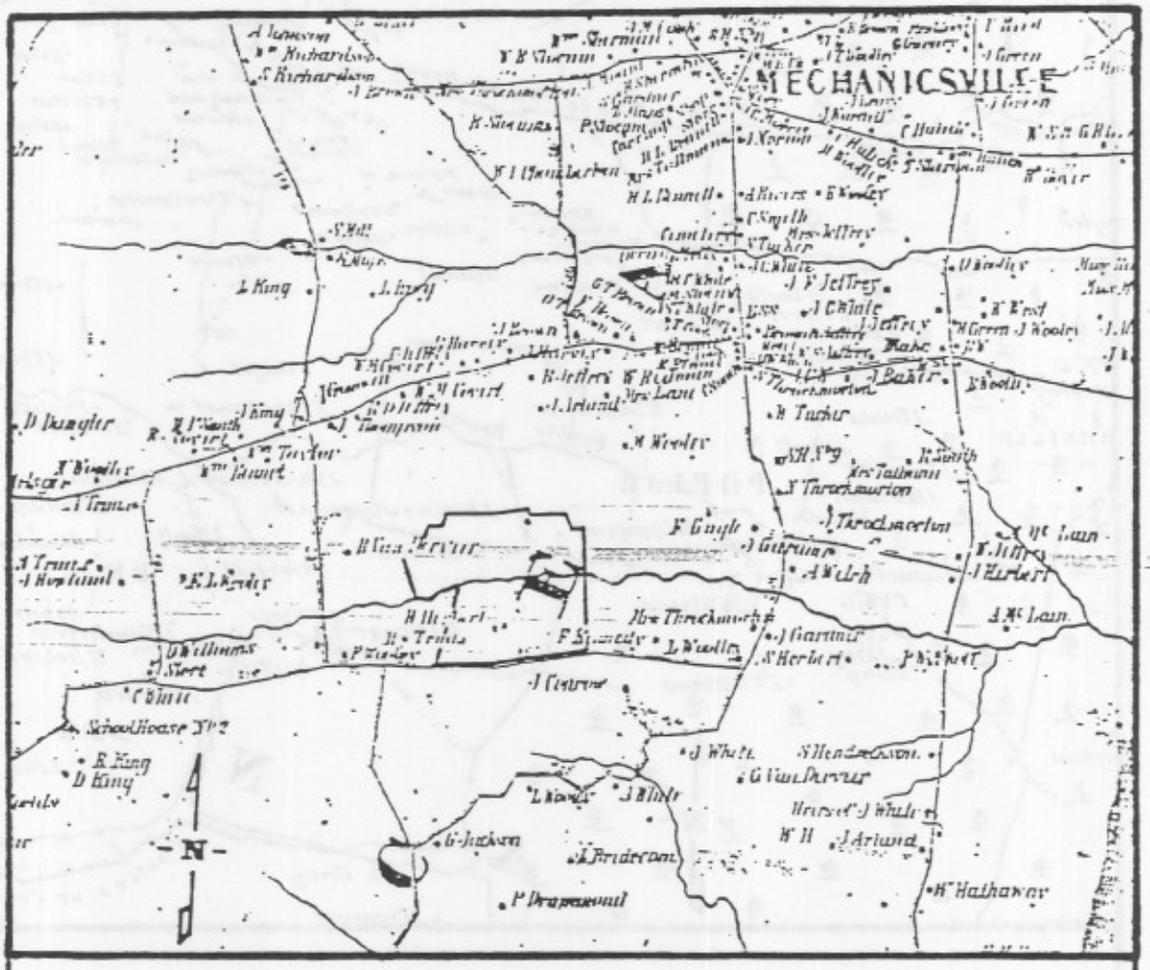


CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY.

Fig. 6. Lightfoot, Jesse. 'Map of Monmouth County.' Middletownpoint : J.B. Shields, 1851.

Scale 1" : 2/3 mile

Project area outlined

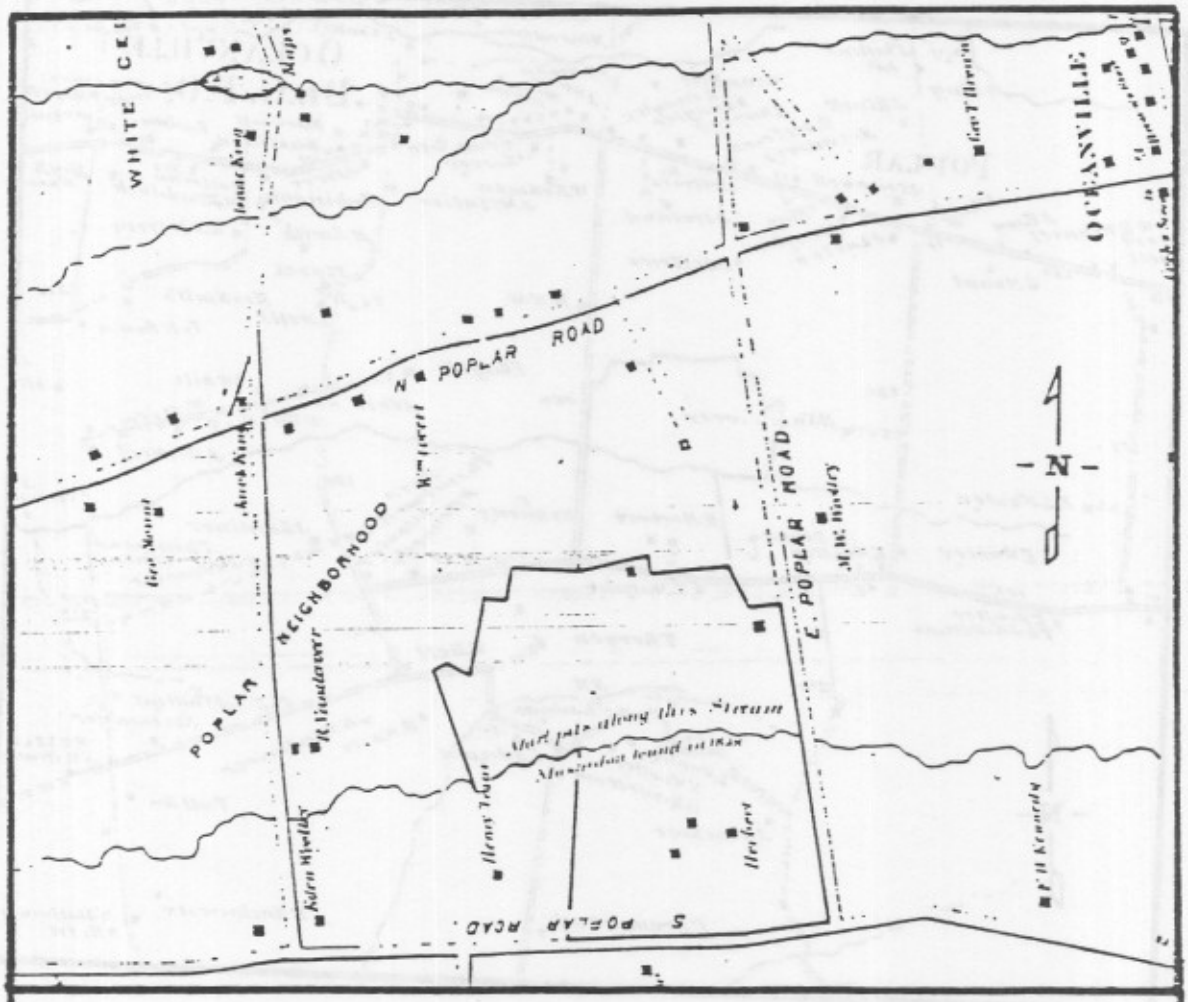


CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY.

Fig. 7. Beers, S.N and F.W. 'Map of Monmouth County.' New York : Smith, Gallup & Holt, 1861.

Scale 200 rods : 1"

Project area outlined

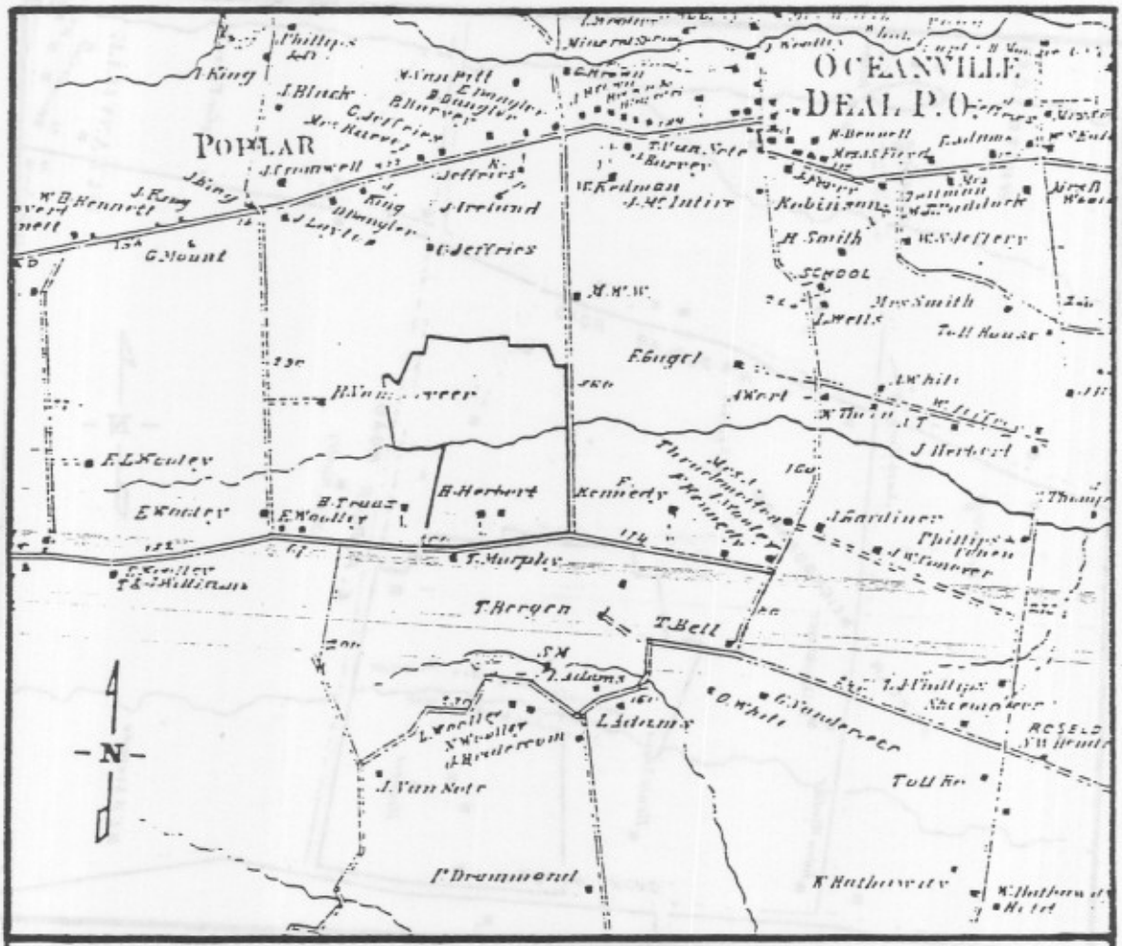


CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY.

Fig. 8. Schenck, J.H. 'Map of Long Branch and Surroundings.' 1868.

Scale 8" : ½ mile

Project area outlined
Note location of mastodon find.



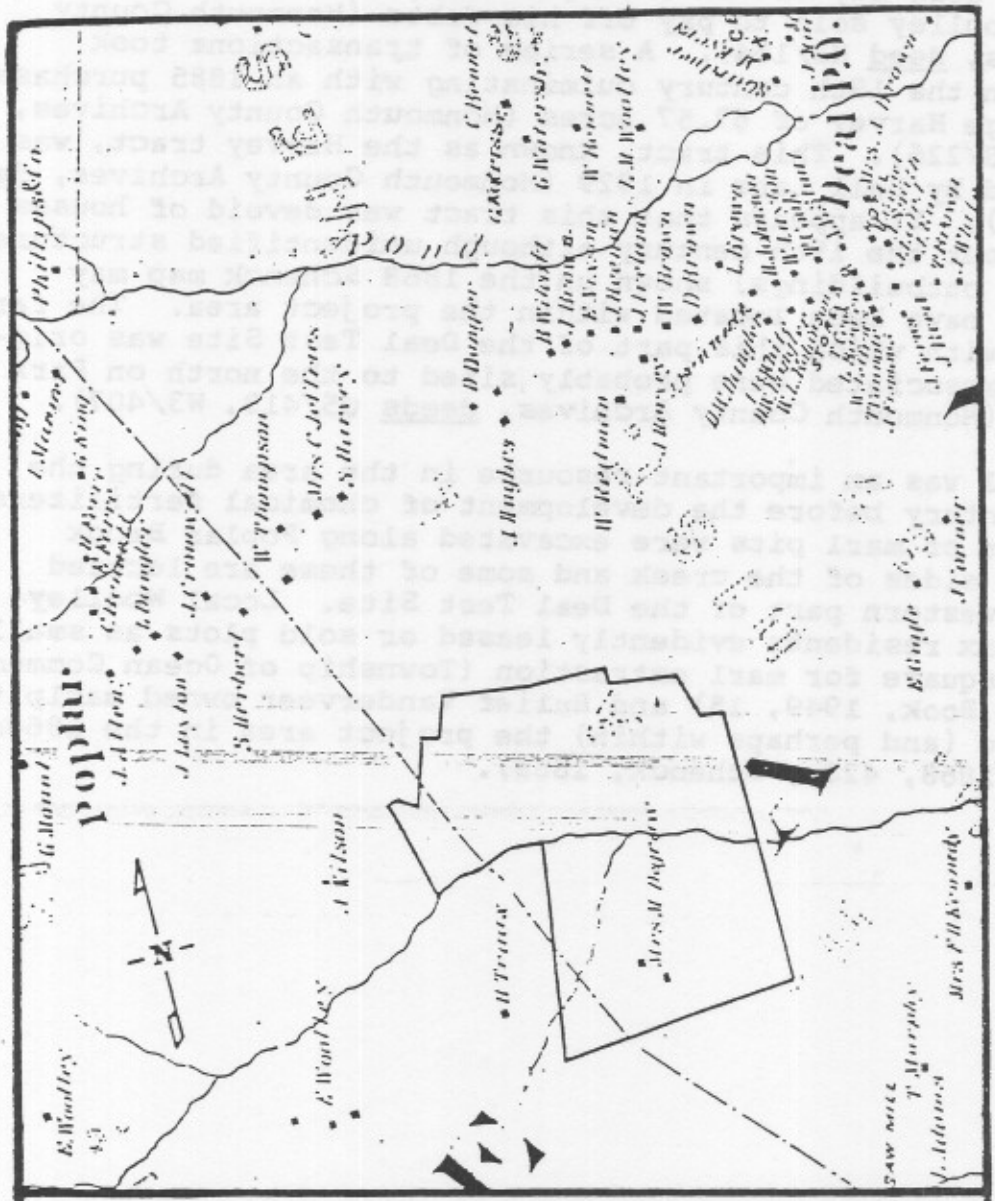
CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY.

Fig. 9. Beers, F.W. Atlas of Monmouth Co. New York : Beers, Comstock & Cline, 1873.

'Portions of Shrewsbury and Ocean Townships.'

Scale 160 rods : 1"

Project area outlined



CULTURAL RESOURCE SURVEY : DEAL TEST SITE,
OCEAN TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY.

Fig. 10. Wolverton, Chester and Forsey Breou.
Wolverton's Atlas of Monmouth County
New York : Chester Wolverton, 1889.

'Eatontown, Ocean and Neptune
Townships.'

Scale 2112' : 1"

Project area outlined

The northern portion of the Deal Test Site was also originally in Wooley hands. In 1835, this portion of the project area lay within a large 412.23 acre tract that Jacob Woolley sold to pay off his debts (Monmouth County Archives, deed H3/154). A series of transactions took place in the 19th century culminating with an 1885 purchase by George Harvey of 67.57 acres (Monmouth County Archives, deed 388/226). This tract, known as the Harvey tract, was acquired by Bell Labs in 1929 (Monmouth County Archives, deed 1506/21). It appears that this tract was devoid of houses throughout the 19th century although unidentified structures (? farm outbuildings) shown on the 1868 Schenck map may perhaps have been located within the project area. The farmhouses with which this part of the Deal Test Site was originally associated were probably sited to the north on Park Avenue (Monmouth County Archives, deeds Q5/413, W3/407).

Marl was an important resource in the area during the 19th century before the development of chemical fertilizers. A number of marl pits were excavated along Poplar Brook on both sides of the creek and some of these are located in the western part of the Deal Test Site. Local Woolley and Truax residents evidently leased or sold plots as small as 16' square for marl extraction (Township of Ocean Commemorative Book, 1949, 15) and Rulief Vanderveer owned marlpits close to (and perhaps within) the project area in the 1860s (Cook, 1868, 428 ; Schenck, 1868).

3.iv. Twentieth Century :

A. Land Ownership :

In September, 1919, the Western Electric Company of New York purchased 63.26 acres of the former Herbert farm from the Jersey Shore Realty Company of Asbury Park (Monmouth County Archives, deed 1097/292). In 1925, this tract and an additional 1.08 acre lot passed to Bell Labs who expanded their holdings in 1929 with two further acquisitions of adjacent land (Monmouth County Archives, deeds, 1295/322, 1502/80, 1506/21). Bell Labs remained on the site until October, 1953, when they sold a total of 208.43 acres to Fangmann and Scott of Jersey City (Monmouth County Archives, deed 2412/569). From 1953 to 1973, the property was leased by the US Army Signals Corps of Fort Monmouth until in the latter year Walter Scott sold the land to the Township of Ocean (Monmouth County Archives, deed 3862/742 ; Monmouth Message, October 5, 1972, 2).

B. Ship-to-shore Radio Telephony, 1920-1930 :

In the fall of 1919, following preliminary experiments at nearby Cliffwood, the Western Electric Company began construction of a permanent transmitting station on the original 63.26 acre portion of the Deal Test Site. In the period 1920-1922, this station performed an important role in early experiments on the commercial feasibility of ship-to-shore radio communication.

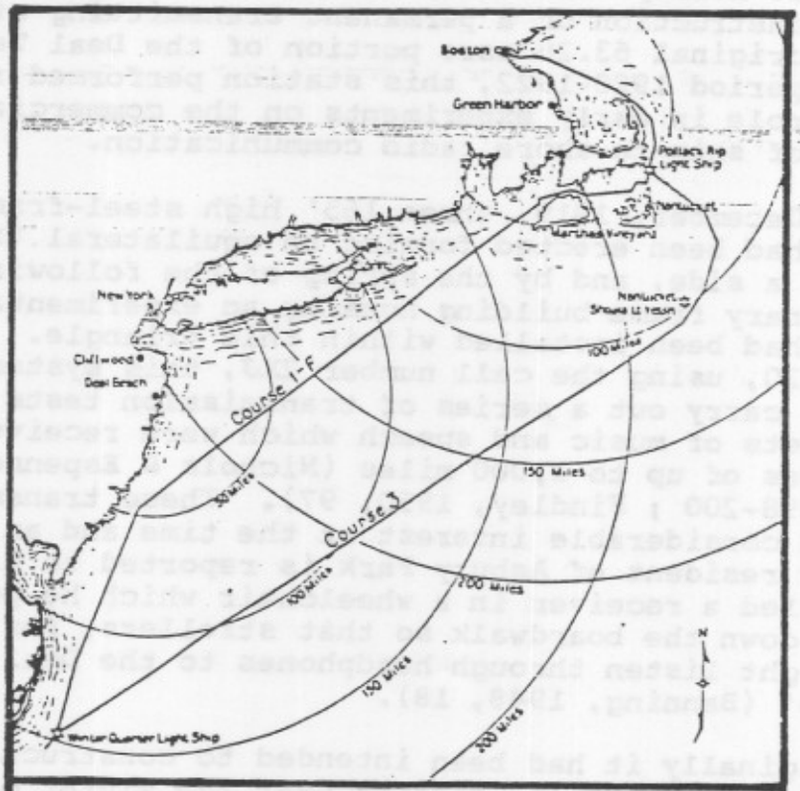
By December, 1919, three 165' high steel-framed towers had been erected forming an equilateral triangle, 500' on a side, and by the spring of the following year, a temporary frame building housing an experimental transmitter had been installed within this triangle. During May, 1920, using the call number 2XJ, this system was used to carry out a series of transmission tests involving broadcasts of music and speech which were received at distances of up to 1,000 miles (Nichols & Espenschied, 1923, 198-200 ; Findley, 1950, 97). These transmissions aroused considerable interest at the time and an enterprising resident of Asbury Park is reported to have 'installed a receiver in a wheelchair which he pushed up and down the boardwalk so that strollers, for a small fee, might listen through headphones to the Deal Beach signals' (Banning, 1948, 18).

Originally it had been intended to construct the permanent transmitting station over the winter of 1919/1920 but labor disputes and poor weather delayed these plans. This building appears to have been completed in 1921 (Findley, 1950, 99) and currently houses the Boys Club (see Fig. 13, Building A ; Plates 1-3). The permanent transmitting station was described as follows in 1923 :

.... the building is thirty by ninety feet (9.1 by 26.3m) and two stories high. The southern half comprises the operating room which rises two full stories. The other part of the building is taken up by an office, shop, power room, living and dining room and kitchen, and by six bedrooms ....

(Nichols and Espenschied, 1923, 203).

Early photographs of the site (Nichols and Espenschied, 1923, 203 ; Bell Labs Record, 1927/1928, 245 ; Blackwell, 1928, 168) give an idea of the physical appearance of the facility at this time. They show the three steel towers, the permanent transmitting station and a single storey frame structure that is presumed to have acted as the earlier temporary transmitting station. The surrounding land consists of open grassland with woods in the distance to the north and west. Further descriptive information and some interior photographs showing radio equipment are given in the 1923 journal article by Nichols and Espenschied (pages 203-208).



CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH CO., NJ

Fig. 11. Ship-to-shore Radio Experiments, 1920-1923 (Nichols & Espenschied, 1923)

Experimental work at Deal continued in 1920 and 1921 with multi-channel tests involving two ships at sea, the S.S. 'Gloucester' and the S.S. 'Ontario', a second operating shore station at Green Harbor, Massachusetts, a receiver station at Elberon, and a field experimental station at Cliffwood, New Jersey (See Fig. 11). Deal and Green Harbor were connected by wire circuits to New York and Boston respectively, and during the winter of 1920/21 ship-to-shore links were successfully connected with the trans-continental telephone line thereby providing communication between a vessel in the Atlantic and Catalina Island on the Pacific coast.

Later in 1921, tests were extended to include the General Electric Company and the Radio Corporation of America, and in January, 1922, the transatlantic steamer, the S.S. 'America', was equipped with transmitting and receiving apparatus. In February and March of 1922, simultaneous telephone-telegraph communication between Deal and the S.S. 'America' was demonstrated over distances of up to 300 miles (Nichols & Espenschied, 1923, 211-213, 232-238 ; Findley, 1950, 97).

At this point, after important technical advances, a post-war depression intervened and the steamship companies lost enthusiasm for ship-to-shore radio-telephone service. The Deal facilities were then put to other uses which included other experimental work in long wave and short wave communications. In 1929, work resumed on ship-to-shore telephony using some of the advances that had been made in the intervening period. The Deal Test Site was again prominent in these experiments, notably in those that involved the United States Lines' steamship 'Leviathan' (Heising, 1929/1930, 204-209). For a brief period after this, before the station at Ocean Gate, New Jersey, went into operation, Deal acted as a commercial ship-to-shore station for the Long Lines Department of AT & T (Findley, 1950, 99).

C. Other Radio Experiments, 1920-1953 :

Experimentation with short wave radio communications at Deal appears to date from the mid-1920s when the world's first high-power amplifiers (20 - 80 kw) operating in the range 2,700 - 22,000 kHz were constructed at the site. From 1927 to 1929, the original 20 kw transmitter at Deal was used to give the first commercial short wave radio telephone links between the United States and England while the later 80 kw transmitter provided the model for major installations at Lawrenceville and Ocean Gate, New Jersey ; Dixon, California ; and Buenos Aires (Findley, 1950, 98-99 ; Bell Labs Record 1927/1928, 246-247 ; Fultz, 1928/1929, 489).

The success of these experiments appears to be connected with the land purchases of 1929 which increased the size of the Deal Test Site from 63.26 acres to its present 208.43 acres (Bell Telephone Quarterly, 1939, 96) and it is likely that the so-called short wave and long wave laboratories, and other field laboratories, were erected shortly afterwards (see Fig. 13, Buildings E & F ; Plate 7). On the basis of architectural evidence and old photographs, Building C and the eastern portion of Building B may also have been built around this time (Plates 4 & 5).

Three new 175' high steel-framed towers, arranged in a line, appear to have been erected in the late 1920s or early 1930s to support short wave antennae (Plates 1-3). As a result, one of the three original ship-to-shore towers may have been dismantled as its location no doubt interfered with the three new towers.

During the 1930s and 1940s, the expanded facilities at Deal saw continued experimentation on short wave transmitters as well as work on ultra-short waves, microwaves and long waves. Antennae and transmitters for a 12 channel unattended system between Cape Charles and Norfolk were developed at Deal and experiments on 180 cm long distance radio transmission resulted in a forerunner of the radio relay stations which exist across the country today. A number of successful antennae arrays were developed for commercial use and important contributions were made to our knowledge of the reflective properties of the atmosphere.

During the Second World War, Deal was involved in radar research and developed several radar transmitters and antennae. The Cutler antenna feed, a standard component in airborne radars by the end of the war, was a particularly notable contribution (Findley, 1950, 99-103).

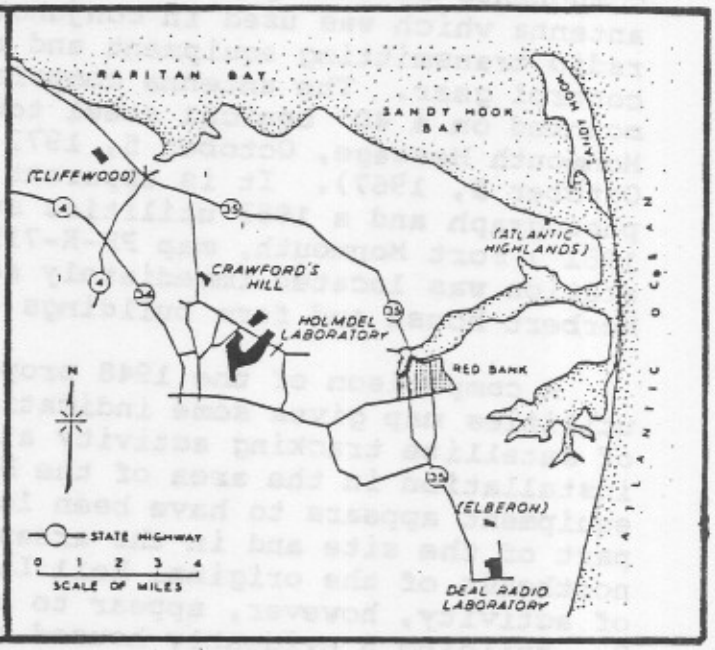
The post-World War II lay-out of the Deal facilities is indicated fairly clearly in a property may of 1948 (Bell Telephone Laboratories, 1948, NJ 148). This shows all the presently existing buildings along Poplar Brook enclosed within a 1,243 x 657' fenced compound (see Fig. 13). Locations of all six steel towers are given and it is clear that by this time the westernmost of the three original (1919) towers had been dismantled. Outside the compound, a field laboratory and storage building are shown in the far northwest corner of the property, the short wave laboratory in the northeast (Fig. 13, Building E), and the long wave laboratory in the southeast (Fig. 13, Building F). In addition, a number of field telephones and electrical outlets are distributed across the site.

However, whereas the 1920s, 1930s and early 1940s appear to have been a period of fairly steady growth at Deal, after World War II the facilities became increasingly

overshadowed by other laboratories, notably by those at nearby Holmdel (see Fig. 12). In January, 1953, Bell Labs finally sold the property and by October of that year had redistributed all personnel and equipment to other locations (Bell Labs Record, 1953, 463).

CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH CO., NJ.

Fig. 12. Bell Labs in Monmouth County, 1920-1950 (Findley, 1950, 97)



D. The US Army Signal Corps at the Deal Test Site :

The Deal Test Site was leased by the US Army Signal Corps at Fort Monmouth, New Jersey, from 1953 through 1973, and participated in various satellite tracking operations throughout that period. Specific information on this period has been difficult to obtain and a wealth of unexamined classified material is likely to exist. The following outline has been gleaned chiefly from newspaper accounts and oral sources.

Prior to 1957, the Signal Corps must certainly have been carrying out experiments at Deal in connection with US preparations for satellite launches as the facilities were in a position to monitor the launching of Russia's Sputniks I and II in October and November of that year (Zahl, 1960, 320-321 ; Fort Monmouth newspaper, October 5, 1967). Indeed, Deal is claimed as the first US government installation to pick up and record signals from both of these satellites (Monmouth Message, October 5, 1972).

In the late 1950s and 1960s, Deal, as part of the Fort Monmouth tracking network, apparently monitored and logged numerous American (e.g., Tiros I and II) and Russian satellites as well as all missiles launched from Cape Kennedy.

The site in conjunction with the Salinas, Puerto Rico, facilities played an important role in the Courier communication satellite experiment and the Deal ground station relayed the first-ever photographs by facsimile to and from this early large capacity satellite. The major components of this ground station consisted of a tracking antenna which was used in conjunction with trailer-mounted radio transmitting equipment and message processing and c control gear. The antenna comprised a 28' parabolic dish mounted on a 40' conical steel tower (Mottley et al, 1961 ; Monmouth Message, October 5, 1972 ; Fort Monmouth newspaper, October 5, 1967). It is apparent from a contemporary photograph and a 1963 utilities survey (Mottley et al, 1961 ; Fort Monmouth, map PF-K-715, 1963) that this ground station was located immediately south of the site of the Herbert house and farm buildings (see Fig. 13).

A comparison of the 1948 property map and the 1963 utilities map gives some indication of the major areas of satellite tracking activity at Deal. Apart from the installation in the area of the Herbert Farm, tracking equipment appears to have been located in the northwestern part of the site and in the areas immediately north and northeast of the original Bell Labs compound. The foci of activity, however, appear to have been Buildings B and C. Building B evidently housed a considerable quantity of satellite tracking equipment and included sound-proofed rooms. Building A, the former transmitting station, was an administrative office during the Signal Corps tenancy and the former short wave laboratory, Building E, apparently acted as a firehouse (Hannish, 1980, pers. comm.).

Other activities at Deal included acoustic experiments in connection with the solar eclipse of March, 1970, using four infrasonic microphones arranged at the corners of a 1,500 x 1,500' square (Monmouth Message, March 12, 1970). This square is defined on the 1963 utilities map by four octagonal concrete foundations with a fifth one at the center point. No further documentary evidence has been found to substantiate the claim (Hodnett, 1980) that the moon's surface was mapped at Deal to a resolution of less than 10'.

The US Army Signal Corps vacated the property in 1973 and in the same year the Township of Ocean acquired the s site. The Township Board of Education and Environmental Commission briefly used Building A (the present Boys Club) as an administrative office, and buildings B and C have been used by the Township for maintenance, building shop and storage purposes (Hannish, 1980, pers. comm.).

3.v. Summary :

i. Paleontology : In 1823/1824, a Late Pleistocene/ early Holocene mastodon was excavated from a peat bog on the south side of Poplar Brook at the Deal Test Site. Fossil vertebrate remains have also been recovered from the Tertiary marls along Poplar Brook within the project area.

ii. Prehistory : Background research has indicated that Late Archaic and Late Woodland projectile points have been recovered in the vicinity of the Deal Test Site. Subsurface testing at Deal during 1975 yielded a further Late Woodland point. The important multi-component site of Turkey Swamp and two other Paleo-Indian sites are located less than 15 miles to the southwest in the Manasquan drainage system.

iii. 17th, 18th and 19th Centuries : With the exception of the 19th and 20th century marlpits along Poplar Brook, the Deal Test Site remained farmland throughout this period. Although the land was originally owned by the Woolley family until the early 19th century, it was not until the mid-1850s that a farmhouse was erected within the project area by Henry and Charles Herbert.

iv. 20th Century : In 1919, the Western Electric Company began setting up an experimental station at Deal for work on ship-to-shore radio telephony. Between 1920 and 1953, extensive experiments on radio communications and radar were carried out at Deal by the Western Electric Company and Bell Laboratories. From 1953 until 1973, the testing facility was used for satellite tracking experiments by the US Army Signal Corps at Fort Monmouth. The property has been under Township of Ocean ownership since 1973.

4. FIELD SURVEY AND SITE ANALYSIS

4.i. Paleontology :

Paleontological field investigation concentrated on determining the locations of peat bogs and marl formations within the Deal Test Site property. No attempt was made to recover paleontological specimens from the peat or from the underlying Tertiary marls.

During discussions in the field, Mr. W.T. Bell, environmental consultant to the Township of Ocean and a co-author of the Poplar Brook Watershed Study Report (1975), indicated two possible peat bog locations. One lay on the north side of Poplar Brook immediately northeast of the present Boys Club ; the other, an area of almost an acre, lay to the south of the brook and downstream of the Boys Club. Mr. Bell suggested these locations on the basis of characteristic vegetation (thickets of arrow wood and red gum) rather than on core samples.

Subsequent subsurface testing by the archaeological field team verified Mr. Bell's hypothesis, and postholes 109-111, 113, 114, 121, 123 & 131, and 12, 14-16, confirmed the existence of the southerly and northerly bogs respectively (Fig. 13 ; Table 4). Because of ground water close to the surface, no test units were dug.

The field investigation data combined with the background research data (section 3.i. above) strongly suggests that the southern bog is the source of the 1823/1824 mastodon find.

No subsurface testing of marl pits was attempted but surface indications of at least one pit occur due north of the Boys Club.

4.iv. Standing Buildings and Above-ground Remains (Fig. 13 ; Plates 1-9)

Background research and field inspection show that all standing buildings and above-ground remains on the Deal Test Site date to 1919 or later. Locations of major structures are shown in Fig. 13 and some basic details are given in Table 5. Other buildings also existed on the site but are no longer standing (e.g., the field laboratory and storage building in the northwestern corner of the site) while numerous concrete pads, tower foundations and traces of other test facilities are distributed about the site. Time constraints and the fact that many of these features are shown on the 1948 property map, the 1962 topographical map, the 1963 utilities map and recent air photographs, precluded detailed survey of every item and investigation concentrated chiefly on the fully extant structures.

The earliest remaining structures on the site are ship-to-shore towers 1 and 2, and Building D, all erected over the winter of 1919/1920. A third ship-to-shore tower (#3) formerly existed but appears to have been taken down when short wave towers 4-6 were erected. All three ship-to-shore towers were 165' high and steel-framed, and they were used as radio antennae during the 1920s ship-to-shore experiments. Building D is almost certainly the original temporary transmitting station shown in early photographs of the site. This structure may have been moved twice. It presumably first stood on the site of Building A, the permanent transmitting station, centrally placed between towers 1-3. The earliest photographs show the structure in what is likely to be its second location : south of Poplar Brook and Building A, i.e. off-centrally located between towers 1-3. Today the building is situated some 700 to 800' upstream from this second location.

Building A, the permanent transmitting station, and probably Building G, the associated 2-car garage, were erected during 1920 and 1921. Hollow tile blocks were used in the construction of both buildings and this material can be regarded as a precursor of modern cinder blocks which first become widely used during the 1920s (Hannish, 1980, pers. comm.). Both buildings have stuccoed exteriors but a section of the tile blocks are exposed on the northwest corner of the garage.

Buildings C, E, F and H ; the east wing of Building B ; possibly the two structures that formerly stood in the far northwest corner of the site ; and Towers 4-6, were all probably erected c. 1929 when the site was expanded and short wave experimentation was intensified. Building C and the east wing of Building B amy be the earliest of this group of structures and could even be contemporary with Building A, the permanent transmitting station *.

* Building C and the east wing of Building B do not appear to be standing in photographs of the mid-1920s (Nichols & Espenschied, 1923 ; Bell Labs Record, 1927/1928 ; Blackwell, 1928).

CULTURAL RESOURCE SURVEY : DEAL TEST SITE, OCEAN TOWNSHIP, MONMOUTH COUNTY, NJ.

Table 5. Summary of Major 20th Century Structures (see Fig. 13 for locations).

Structure	Description	Function	Date constructed	Plates
Building A	2 storey, hollow tile blocks, stuccoed, hipped roof ; 30 x 90' with two wings	Permanent transmitting station c. 1921-1953 Admin. Building, Signal Corps 1953-1973 Township Offices & Boys Club 1973- present	1920/1921	1-3
Building B	1 storey east wing, ? cinder block, stuccoed, hipped roof ; 62 x 32' & 40 x 32' ; 1 storey west wing, cinder block, flat roof ; 62 x 32' & 38 x 24'	Microwave & high power lab until 1953 Satellite tracking, 1953-1973 Shop, storage, CETA program 1973- present	east wing, 1920s/early 1930s west wing, pre-1948	4
Building C	1 storey, ? cinder block, stuccoed, hipped roof ; 62 x 32' & 40 x 32'	Building shop	1920s/early 1930s	5
Building D	1 storey frame on cinder block, with porch, not on original site ; 34 x 20'	? Temporary transmitting station 1919-1921	1919/1920	6
Building E	1 storey frame on cinder block, hipped roof, two wings ; 68 x 30' & 33 x 20'	Short wave laboratory until 1953 ? firehouse, 1953-1973	1929 or early 1930s	7
Building F	1 storey frame on cinderblock ; 34 x 20'	Long wave laboratory until 1953	1920s or early 1930s	
Building G	1 storey, hollow tile blocks, stuccoed ; 21 x 21'	2 car garage	? 1920/1921	2
Building H	1 storey, cinder block, stuccoed ; 51 x 31'	5 car garage	1920s/early 1930s	
Towers 1-3	165' steel frame ; 2 standing, one removed	Ship-to-shore antennae, 1919-?1929	1919 ; one removed ? 1929	1
Towers 4-6	175' steel frame, horizontal assembly at top ; all standing	Short wave antennae, ? 1929- ?1953	? 1929	1-3, 8

They were certainly conceived and built as a pair as they have almost identical exterior dimensions and are positioned symmetrically about the roadway that divides them. Both buildings have hipped roofs (a feature of Buildings A and E also) and are constructed of stuccoed cinder block or hollow tile block. Building E, the short wave laboratory, is of similar style but of frame construction on cinder block foundations and with copper roof cladding. Building F, the long wave laboratory, in fact resembles the 1919 temporary transmitting station, Building D, in dimensions and style of construction. It is possible that this structure dates to the 1919/1921 phase of building on the site, and was moved from its original location to its present site in 1929 or the early 1930s. Building F does not have a porch and is therefore unlikely to have been the temporary transmitting station which clearly did have a porch in the early 1920s. The three short wave towers, 4-6, are clearly distinguished from the earlier ship-to-shore towers by the horizontal assemblies on their apices.

The west wing of Building B differs stylistically from all other buildings on the site with its flat roof and relatively open interior. It is probably a later 1930s or 1940s addition.

5. EVALUATION, DETERMINATION OF IMPACT & RECOMMENDATIONS

5.i. Paleontology :

Evaluation :

1. As important paleontological resources have already been found at the Deal Test Site in areas of bog and in the underlying Tertiary marls, it is likely that further resources of this nature will be found in these deposits.
2. Good preservation of organic materials has been observed and the potential for radiocarbon dating, pollen analysis, and microscopic and macroscopic examination of these remains should be noted.

Determination of Impact :

1. Construction of the parking areas to the north and south of Building A, the Boys Club, and construction of the proposed library building are likely to impact portions of the bog areas and to a lesser extent the underlying marls.
2. Construction of the recreation lake and earth dyke will impact the Tertiary marls.

Recommendations :

1. Impacts in areas of paleontological potential should be monitored by a professional paleontologist and, if necessary, botanical, faunal and sedimentological samples should be recoevered.
2. If appropriate from an engineering standpoint, the potential impact of parking area construction could be lessened by depositing fill on top of the bog areas rather than by excavating into them.
3. Bearing in mind the educational aims of the park development scheme, consideration could be given to the location, acquisition, preservation and display (at Deal) of the excavated remains of the Deal Test Site mastodon.

5.ii. Prehistoric Archaeology :

Evaluation :

1. Despite sporadic finds of prehistoric cultural materials in the northeastern part of the Deal Test Site, there is no evidence of stratified archaeological deposits.
2. If such deposits formerly existed, they have now been largely obliterated by historical period land use activities.
3. There are no significant prehistoric archaeological resources in the areas of potential impact at the Deal Test Site.

5.iii. Historical Archaeology :

Evaluation :

1. The only potential historical archaeological site on the Deal Test Site, the Herbert Farm, has been severely disturbed by 20th century land use.

2. Subsurface remains of 20th century activities on the Deal Test Site do exist but cannot be considered as significant resources.

3. There are no significant historical archaeological resources at the Deal Test Site.

5.iv. Twentieth Century Standing Buildings and Above-ground Remains :

Evaluation :

1. General Historical Significance :

The development of communications technology is an exceedingly complex web of experimentation, invention, testing for commercial feasibility, and mass production. The history of communications is frequently reduced to a manageable series of historical figures and their outstanding individual contributions - Samuel Morse and the electric telegraph (1832), James Maxwell and the theory of electromagnetic waves (1864), Alexander Bell and the telephone (1875/1876), Heinrich Hertz and the radio wave (1888), Guglielmo Marconi and the first transatlantic radio message (1901), etc. etc. It is equally realistic, however, to view advances in communications technology since the mid-19th century as having involved groups of researchers working closely together, and in many cases significant developments have resulted under corporate, and also military, sponsorship.

The Deal Test Site has contributed significantly to this broader continuum of technological development in communications. A series of important experiments on ship-to-shore radio telephony and short wave communication were carried out at the site by the Western Electric Company and Bell Labs, and more recently, the facility played a useful role in radar and satellite tracking experimentation.

Two-way ship-to-shore radio communication was first demonstrated in May, 1916, by the U.S.S. 'New Hampshire' and a shore station at Arlington, Virginia (Archer, 1939, 152 ; Fagen, 1975, vol. 1, 370), and the Western Electric Company subsequently manufactured as many as 2,000 telephone transmitting and receiving apparatuses for the U.S. Navy during World War I. The Deal Test Site, however,

was one of the first large scale experiment stations set up to examine the commercial feasibility of peace-time ship-to-shore communication. The Deal experiments of 1920-1922 did much to bring the possibilities of ship-to-shore radio to the notice of steamship companies and the general public.

In later experiments on short wave communication, Deal developed the first high power amplifiers for short wave transmitters and provided the first commercial short wave radio telephone links with England. Numerous advances in transmitter and antenna systems were achieved at Deal, and in many cases, these improvements were applied within the communications industry as a whole. The Cutler antenna feed, a major contribution to airborne radar during World War II, was also developed at Deal.

In the 1950s and 1960s, Deal participated in satellite tracking experiments and is reputed to have been the first U.S. government installation to record signals from the Russian Sputnik satellites. The site also relayed the first photographs by facsimile to and from a satellite during the Courier communication experiment.

Thus, although Deal's technological 'firsts' may be of a rather minor status, it is apparent that the site remained at the forefront of communications experimentation for over half a century. This almost continuous involvement in the development of radio technology is therefore one major facet of the historical significance of the Deal Test Site.

2. Site Integrity :

Perhaps the most historically significant aspect of the Deal Test Site is the extent to which the property still physically reflects its 1920s and 1930s period of usage. Although some of the lesser buildings have been demolished and sections of the site are now somewhat overgrown, the exterior appearance of the core area remains relatively unchanged. Buildings A - D, G and H, and the five remaining towers still give a strong impression of how the Deal Test Site appeared during its heyday. The relative openness of the rest of the property adds to this integrity of setting. Not surprisingly, the building interiors contain little of significance in the form of old transmitting equipment. Most experimental apparatus has long since been removed and the buildings have been put to other uses.

To put the Deal Test Site into a clearer general perpsective, it is instructive to consider briefly other similar sites of the same period. Green Harbor, Massachusetts, Deal's sister site in the 1922 ship-to-shore experiments, retains little of its original fabric. This facility is now fully automated and possesses no structures that are earlier than the 1930s (Merriam, 1980, pers. comm).

The transmitting installations at Lawrenceville and New Brunswick, New Jersey, and Molinas, California, which were roughly contemporary with Deal, now display little trace of their original appearance (Sivowitch, 1980, pers. comm ; Morris, 1980, pers. comm). The same is also true of Bell Labs' Holmdel facilities in Monmouth County, New Jersey.

The Radio Central station at Rocky Point, New York, is also in a state of partial survival. 42 acres of this site, however, including the main operating/administrative building which dates to 1921-1931, an auxiliary building and service road, were recently accepted on to the National Register of Historic Places (Kuwick, 1980, pers. comm ; National Register Inventory-Nomination Form, 1980). This site is notable for the first successful transatlantic transmission of the human voice (Archer, 1939, 153). In comparison with all these sites, Deal has a higher proportion of surviving remains and as a result is fairly representative of a type of experimental radio facility now rarely seen on the landscape.

Physical remains of the 1950s and 1960s satellite tracking experiments are, by comparison, negligible. There are no surviving standing structures that were built specifically for satellite tracking purposes although a number of concrete pads and foundations still remain. It is interesting to note that the neighboring Project DIANA site, Marconi Road, Wall, New Jersey, another 1950s radar station with a similar dearth of physical evidence, was rejected by the National Register of Historic Places although included on the State Register (National Register Inventory-Nomination Form, 1976).

In conclusion, therefore, the Deal Test Site contains significant physical integrity for the period 1919 to 1953 but lacks such integrity for the post-1953 period.

3. Eligibility :

The Deal Test Site is potentially eligible for inclusion on the State and National Registers of Historic Places on the basis of its contributions to the development of radio technology, and the survival of much of its 1920s and 1930s physical character. The site possesses the quality of significance in American history which is present in buildings and structures that possess integrity of location, design, setting, materials, feeling and association. The Deal Test Site is of local, regional and national importance and warrants consideration under the following areas of significance : communications ; engineering ; industry ; invention ; and science.

The full 208 acre property should be considered for inclusion on the State and National Registers as an historic site containing a complex of historically significant structures - specifically, Buildings A, C, D, E and G, the

eastern portion of Building B, and Towers 1 & 2, and 4-6. Building F and the western portion of Building B are of somewhat marginal significance, the former being located some distance from the core area of buildings, and the latter being a later accretion.

Determination of Impact :

For the most part, the park development scheme includes preservation and/or adaptive re-use of the significant 20th century structures. Potential impact is therefore fairly slight. Construction of the library building will cause only minor visual impact on the core area as this structure is to be sited some 200 to 300' south of Poplar Brook. Establishment of picnic areas, meadows, and ecologic and wildlife preserves will satisfactorily complement the original setting.

Recommendations :

1. The exterior appearance and present locations of significant structures should be maintained so far as possible.

2. Removal of non-significant above-ground structures within the Test Site should be kept to a minimum and be preceded by careful recording of location, materials and other attributes.

3. Location and design of new buildings should visually impact the overall setting as little as possible.

4. As the history of radio technology at Deal appears to be an educational theme of the proposed park, additional documentary and oral historical research would be beneficial.

6. SUMMARY

i. Cultural resource examination of the Deal Test Site addressed four major areas - paleontology ; prehistoric archaeology ; historical archaeology ; and the 20th century radio and satellite tracking experiment station.

ii. Important paleontological resources have been recovered from the site in the past. Recommendations are made for dealing with future paleontological discoveries which may result during implementation of the park development scheme.

iii. No significant prehistoric or historical archaeological resources exist in the areas of potential impact at the Deal Test Site.

iv. The 20th century remains of the Deal radio experiment station are judged historically significant and potentially eligible for inclusion on the State and National Registers of Historic Places. It is suggested that the property be regarded as an historic site containing a complex of significant structures. Determination of impact and recommendations are given for these 20th century remains.

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New Jersey Department of Environmental Protection :
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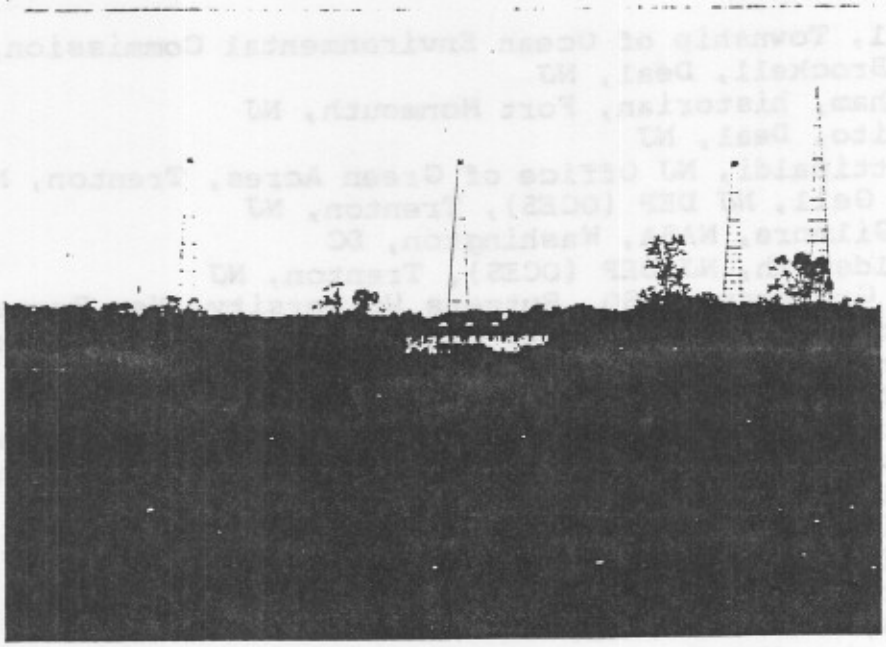

Plate 1 : Deal Test Site, general view - Building A : permanent transmitting station (Boys Club) from northeast ; ship-to-shore tower on right ; short wave towers to left.

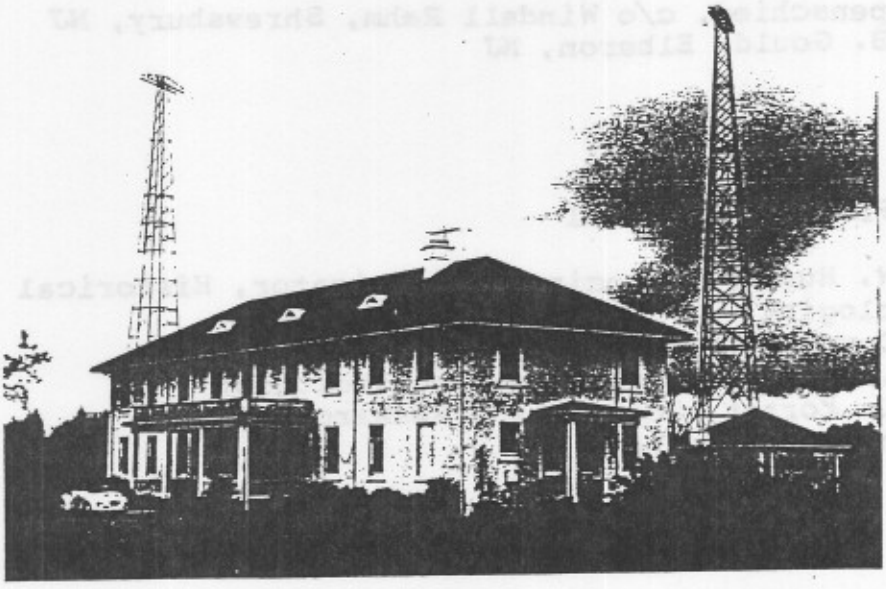

Plate 2 : Deal Test Site - Building A : permanent transmitting station (Boys Club) from northeast ; short wave towers and 2-car garage (Building G) behind. Scale in feet.

Plate 5 : Deal Test Site - Building C : building shop from northeast. Scale in feet.

Plate 6 : Deal Test Site - Building D : temporary transmitting station (not on original site) from south west. Scale in feet.

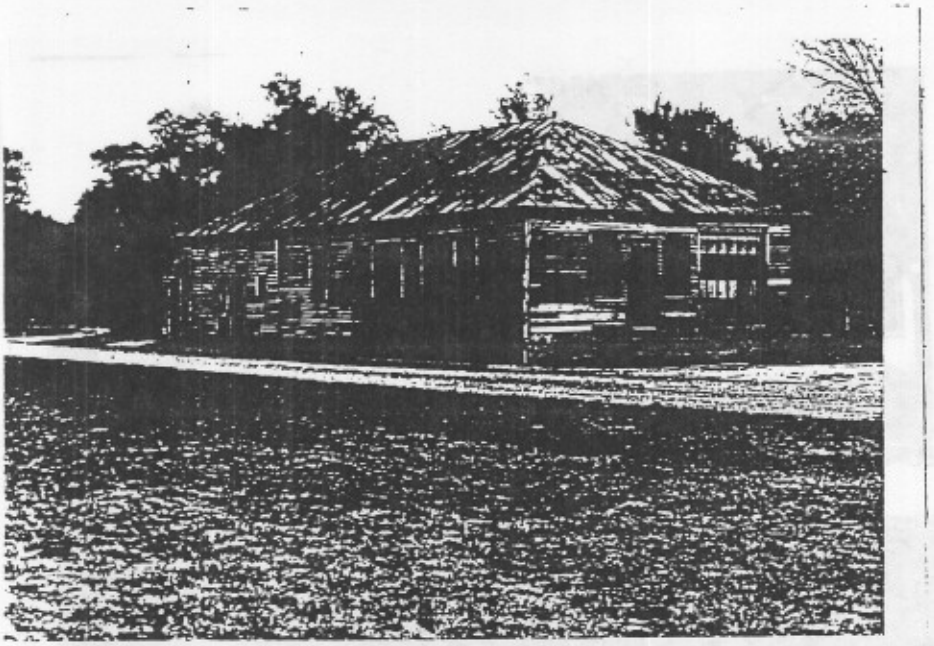

Plate 7 : Deal Test Site - Building E : short wave laboratory/firehouse from northwest. Scale in feet.

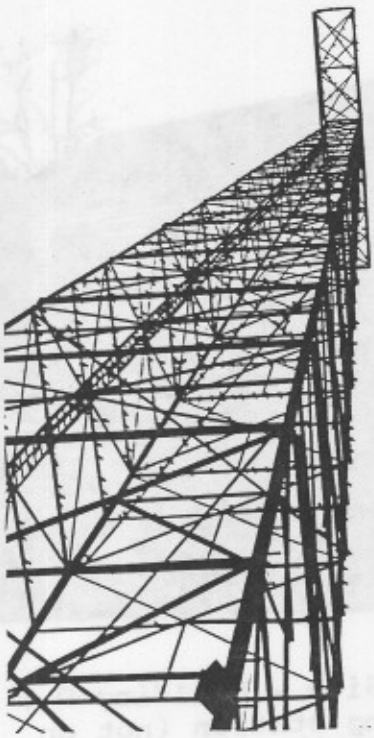

Plate 8 : Deal Test Site - short wave tower, worm's eye view.