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Anadromous Fish and the Lenape

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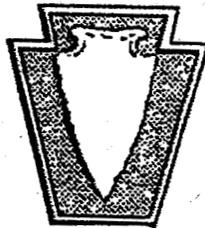
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ANADROMOUS FISH AND THE LENAPE

MARSHALL JOSEPH BECKER

ABSTRACT

The utilization of fish by the Lenape culture of the lower Delaware River Valley during the Contact period is examined and discussed. Much of this information was gathered by the author by studying early colonial documents. These historical records often include information that describes Native American lifestyles, including patterns developed during the Late Woodland period. In the case of the Lenape, it is clear that anadromous fish collecting was central to their way of life. Colonial use of fish is also briefly discussed.

INTRODUCTION

Very early in this author's research on the Native American cultures of the lower Delaware River Valley during the Contact period, it became clear that early colonial records provided vastly more information about Native Americans than could possibly be secured through archaeological excavation, and at far lower cost (Becker 1980). For the last three decades, the author has researched historical literature for references to native peoples and has developed a number of observations regarding their lifestyle. This paper focuses primarily on the Lenape culture and the fish resources that were essential to their unique way of life. These data also provide an explanation for matrilineal descent within this foraging culture.

NATIVE PEOPLES OF THE LOWER DELAWARE RIVER AT CONTACT

At the time of European contact, ca. 1600 A.D., there were four distinct Native American cultures occupying the lower Delaware River Valley. Early in the period of Contact, three of these cultures were collectively identified as "River Indians" by Europeans, reflecting the foraging lifestyles of these natives and their intimate relationship with the river (Becker 1984b). The colonists also differentiated the River Indians from the "Bay Indians" or the Ciconicin (also Sekonese; Becker 2004a). The Ciconicin had a true chiefdom, possibly supplemented by, or oriented around, a maize-based horticultural system. In this respect they were quite distinct from their foraging neighbors living upstream along the Delaware River (Becker 1983, 1986, 1987a, 1998). During a period of research lasting from 1970 to 1990, the separate identities of the Lenape, Munsee, and Lenopi gradually became clear to the author, who delineated their specific territories (Fig. 1).

The similarity of the name Lenopi, used as a self-identifier by the aboriginal peoples occupying New Jersey south of the Raritan Valley buffer zone, to the name Lenape merits a brief explanation. All of the Algonquian speaking peoples who were resident in the area from the middle Atlantic states up to northern Maine, and perhaps beyond, used some form of the root term "Lenape" to refer to "men" or "human beings." Thus, the self-referent or tribal name in each of the "Delawarean" languages (cf. Becker 1993a), that (perhaps artificial) subset of the Algonquian language family that is distributed among the coastal cultures of much of the northeast (cf. Goddard 1978, Foster 1996:98-100), must have been some variant of the term "Lenape." The similarity between the terms Lenape and Lenopi, and between the dialects used by these two cultures that diverged during the period after 1000 A.D., led the English in Pennsylvania to refer to the Lenape as "Lenape" (and sometimes as "our Indians") as distinct from the native culture on the New Jersey side of the river who were invariably identified as the "Jerseys" or as a "Jersey Indian" (e.g. Paschall 1753; see also Gartrell 1987).

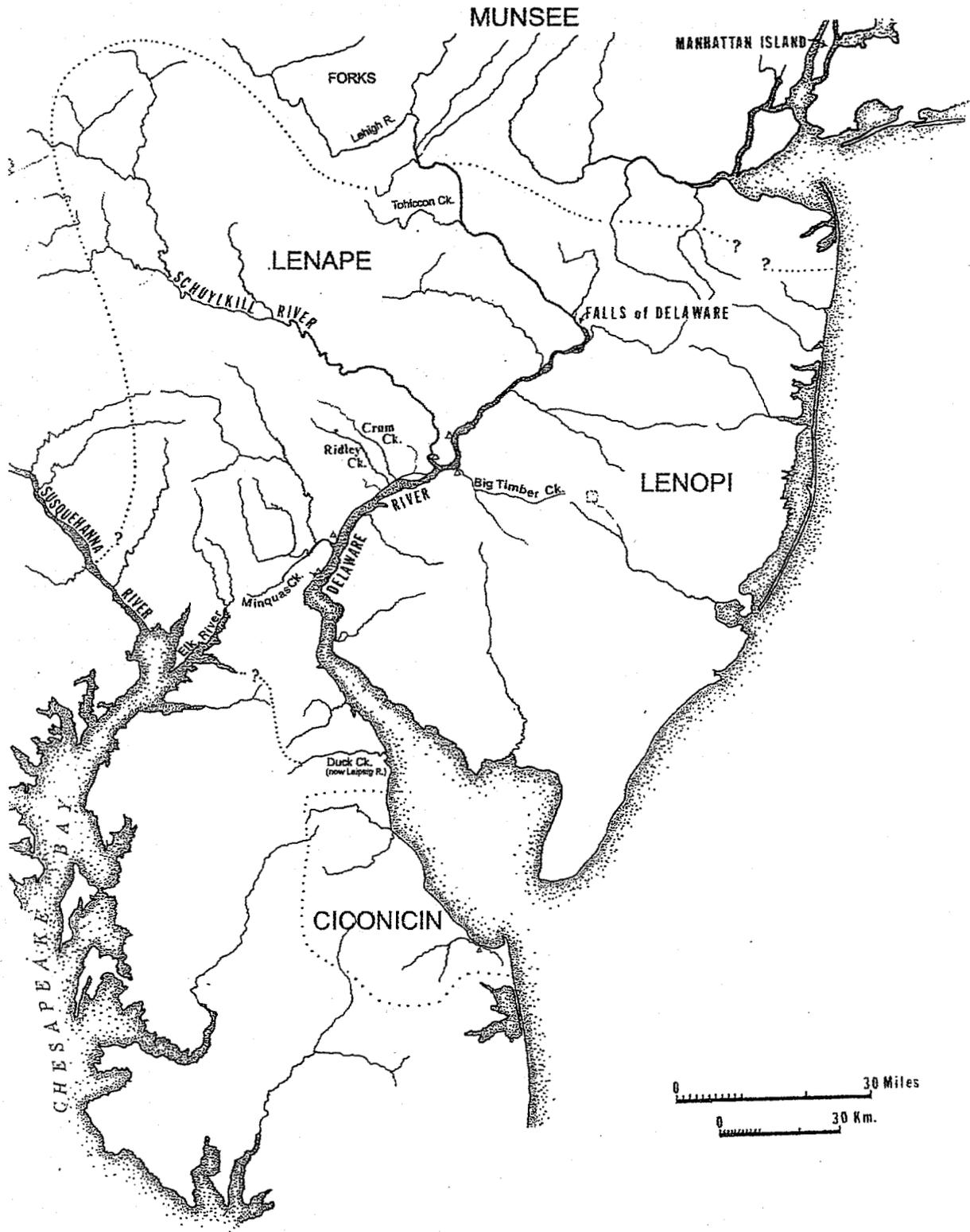


Figure 1. Map of the Lower Delaware River Valley and surrounding Areas, showing proposed tribal names and territories.

Since the Lenape kept no known written records of their territories and lifestyles, researchers must piece together what they can about these people from early colonial documents. The systematic purchase of all Lenape territory by William Penn, an effort that took some 21 years (1681-1701), is clearly recorded in the Colonial Records of Pennsylvania (1852). Previous Lenape sales of portions of these lands to Dutch, Swedes, and earlier English immigrants are also documented (Kent 1979). These deeds are basic and essential records that, with impressive numbers of other documents, provide an ethnographic picture of a Late Woodland population that had swiftly altered aspects of material culture after 1600 A.D. (see Becker 2005), but sustained traditional values and lifeways.

Many of the Lenape bands had moved west before William Penn's arrival, particularly after the Susquehannock Confederacy (or several groups indicated in documents as Susquehannock) was destroyed by the Five Nations Iroquois during the winter of 1674-1675. These Lenape shifted their operating range between 1675 and 1681 and joined others who had been moving west since at least 1661, to enter into the lucrative fur trade. With the destruction of the Susquehannock, members of these Lenape bands became the principal players in marketing pelts bought from western tribes. In addition, they were harvesting their own catch.

During William Penn's land purchase, he arranged for the acquisition of not only vacated Lenape lands, but also of Lenape foraging territories in the Delaware Valley still being used by bands of traditionalists. In 1681, most of the traditional bands of Lenape were still operating according to their centuries-old foraging patterns. These people, as well as those who had left the Delaware Valley by that date, were scrupulous in describing each band's foraging territory when they made their sales to William Penn. Thus, a study of all of these deeds (Kent 1979) provides us with an extremely accurate picture of the lands used ("owned") by the Lenape people. The map shown in Figure 1 illustrates the author's delineation of the Lenape territory, which was surrounded by a buffer zone, or "unowned" shared resource area from which pelts and other materials could be extracted by any of the people in the region.

The Lenape occupied the section of Delaware River north of Bombay (Boemptjes) **Hook**, a region of swamps that served as the buffer zone separating them from the Ciconicin territory, up to Tohiccon (also spelled Tohiccon) Creek on the north. The Munsee occupied northwestern New Jersey, far above the Raritan Valley and probably into New York State. In New Jersey, the Raritan Valley served as the buffer zone between the Munsee area and the territory of the Lenopi, the native people who occupied all of southern New Jersey (Becker 1992b, 1998, 2004b).

The deed of sale from the southernmost Lenape band indicates that they ranged along the old Duck Creek drainage area, which has since been renamed the Leipsig River. Today another stream in that area has taken the name of Duck Creek. Just to the south of old Duck Creek lie the swampy lands of Bombay Hook, which form an effective buffer zone separating the Lenape from the Ciconicin (see Becker 1993b for further discussion of the buffer zone concept). Of particular interest is the territory of the northernmost of the Lenape bands, at Tohiccon Creek, which lies to the south of the large Lehigh River. The relatively small Tohiccon Creek flows to the east into the Delaware River in a path nearly parallel to the Lehigh. That this valley is the northernmost strip of territory claimed and sold by the Lenape long puzzled the author. Why didn't these people occupy, or even claim, the area between the drainage of Tohiccon Creek and the Lehigh River, which would seem to be a perfectly reasonable natural buffer, as is the Delaware River along the eastern margin of Lenape territory? This question was answered only with the delineation of spawning runs of the anadromous fish upon which the Late Woodland foraging pattern of the emergent Lenape culture was built, as described later in this paper.

Within the range of Lenape territory along the Delaware River, the tribe operated in some 13 or more separate bands, each inhabiting a single stream feeding into the Delaware River (Becker 1997). In late February or early March, each Lenape band aggregated at a separate warm weather fishing station along the Delaware River where they fished and extracted other abundant resources for eight or nine months before dispersing into the interior as individual families for winter gathering and hunting. During the long fishing season, individuals and families could travel up and down the Delaware to visit kin in other bands, arrange marriages, and otherwise maintain cultural links.

FISH USE BY THE LENAPE

More than a century ago, Meehan (1895) recognized that the aboriginal population of the Delaware Valley was strongly tied to fish resources. His observations may have been based on the many documents published in the Colonial Records of Pennsylvania (1852) in which Lenape members petition to have immigrant mill dams opened to **allow** fish runs to reach their fishing stations, all of which were located, after *the* 1650s, upstream on Delaware feeders. The dependence of native peoples such as the Lenape on wild fish resources may have been one of the many reasons why these peoples were popularly viewed by colonists as uncivilized (cf., Becker 1992a).

The impressive range of fish available to the Lenape were not simply those resident in area streams and the Delaware River, but a number of anadromous fish species living in the north Atlantic Ocean that spawned in the fresh water streams feeding the Delaware River. The vast numbers of these many species of spawning fish literally caused the Delaware River to "boil" during the weeks of their major runs and choked the smaller streams into which they struggled for space. These fish provided an abundant protein source for Native Americans. The numbers and timing of these runs are important and the duration over which these fish are available varies considerably (Table 1). Just as the Lenape culture was evolving into its Late Woodland form at about the time of the Medieval warming (ca. 900-1100 A.D.), the behaviors of various fish populations must have altered as water temperatures changed. Variations on a regional level may reflect those changes that took place on a local level (cf., Fairchild et al. 1988).

Table 1. Fish Resources Seasonally Available to the Lenape.

Species	Months of Availability											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
American eel* <i>Anguilla rostrata</i> (C)	x	x	x	x	x	x	x					x
Alewife <i>Alosa pseudoharengus</i> (A)		x	x	x	x	x	x					
Sea lamprey <i>Petromyzon marinus</i> (A) - LR			x	x	x							
American shad <i>Alosa sapidissima</i> (A) - LR			x	x	x							
Striped bass <i>Morone saxatilis</i> (A)				x	x	x	x					
Atlantic sturgeon <i>Acipenser oxyrinchus</i> (A)				x	x	x	x					
Blueback herring <i>Alosa aestivialis</i> (A)				x	x	x						
S.N. sturgeon <i>Acipenser brevirostrum</i> (Am)						x	x	x	x			
Atlantic menhaden <i>Brevoortia tyrannus</i> (Am)						x	x	x	x			
Weakfish <i>Cynoscion regalis</i> (E)							x	x	x	x		

Abbreviations and footnotes:

A = Anadromous: Fish living in salt water but spawning in fresh water.

C = Catadromous: Fish living in fresh water but spawning in salt water.

Am = Amphidromous: Fish with a variable lifecycle

E = Estuarine: Fish living in salt water but spawning in brackish estuaries (also white perch, white catfish, etc.).

LR = Long Run: Anadromous fish that spawn in feeder streams of the Delaware River as far as the Lehigh and beyond, with some spawning in present New York State. In contrast "short run" anadromous fish spawn only as far up the Delaware as Tohiccon Creek, as discussed later in this report.

S.N. = Short Nose as in Short Nose sturgeon

X = Heaviest part of the run

x = Lighter density of the run

* The American eel (*Anguilla rostrata*), like the European eel (*A. Anguilla*) spend their pre-adulthood in freshwater streams. At maturity they migrate to the tropical mid-Atlantic to spawn, thus being a catadromous species. The larval forms somehow return to the streams from which the adults came. The incidence is not clear, but those *Anguilla* from Iceland appear to be a hybrid, or represent a stage in a cline circling the northern Atlantic (Avisé et al. 1986).

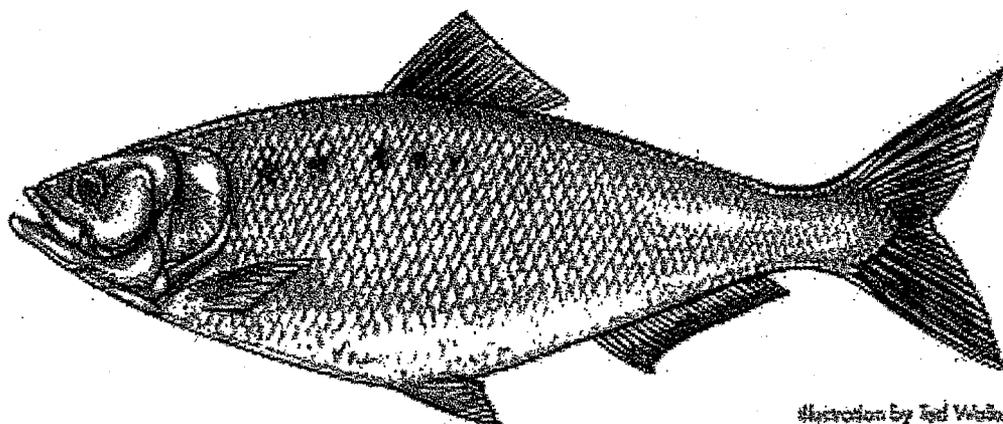


Figure 2. An American Shad (illustration by Ted Wake), one of many fish available to the Lenape.

The popular names assigned to these many species (Table 1) vary depending on location, and even the scientific identifications have been altered in many cases. Thus, the striped bass is sometimes identified as the “rockfish”, “greenhead”, or by several other names. Hildebrand and Schroeder (1928:247-249) identify them as *Roccus lineatus* (Bloch), while Brumbach (1986) identifies them as *Roccus saxatilis*. This large species, commonly reaching 35 cm or more, appears to be present in offshore waters throughout the year, from Florida to the St. Lawrence. Their principal spawning area is the Chesapeake region, with spawning runs being temperature dependent. Stripers, as they are popularly known, run in the Chesapeake in April, but their peak in those waters is in May. In the Delaware they commonly peak in late May and early June, while in the Gulf of Maine the run peaks in June. They also have considerable flexibility in spawning locations, ranging from brackish to swiftly moving fresh waters. This species remains particularly important to East coast fisheries, and was one of many critical to the Lenape.

The critical variable in Lenape lifestyle derives from the difference between short run and long run anadromous fish. Aside from the estuarine weakfish (*Cynoscion regalis*), all of the other species listed in Table 1 are present during their spawning runs, if not abundant, from the Bay all the way up the Delaware River as far as Tohiccon Creek. However, only two of these species are “long run” anadromous fish, spawning in the streams upstream from Tohiccon Creek. Thus, to live the fish-dependent Lenape life as it developed ca. 1000 to 1100 A.D., one had to live within the zone between old Duck Creek and Tohiccon Creek.

The Lehigh Valley and the adjacent region to the north of that river, generally identified as the Forks of the Delaware in Pennsylvania, not only had fewer fish resources but also included attractive jasper resources that were utilized by all the cultures of the region. The resources of that entire region were shared by the Susquehannock, Lenape, Munsee, and almost certainly by the Lenopi. These peoples entered that region to extract resources, but neither held nor made claim to the region. This lack of ownership by any native peoples is what set the stage for the confusion derived from the 1737 confirmation treaty made with the Proprietors of Pennsylvania, which has been discussed elsewhere (Becker 1987a, 1987b, 2004b).

Of further note is the finding that by 1500 A.D., the Munsee retained a foraging pattern that must have been the most similar to that which had been used throughout the area during the Middle Woodland period. William Schindler (2006) has reviewed the historical literature as well as the archaeological evidence for fish use in the Delaware Valley in order to reconstruct Middle Woodland cultural patterns. His extremely important review describes, in effect, the foraging strategies that developed into the more region specific patterns described during the Late Woodland period. The Middle Woodland pattern involved wide-ranging foraging for a variety of resources, probably including the two species of long-run anadromous fish (shad and sea lamprey). Since philopatric

rates (the rate of return of individual fish to the area in which they were hatched) among these fish may have ranged from 60 to 81% (see Thorrold et al. 2001:297), the long run fish would commonly return to their original spawning areas. The author infers that the timing of their return also was programmed. Thus populations returning to spawning grounds further from the sea would be scheduled for return at a later time than those members closer to the sea who spawned in waters that were warmer. These factors further restricted the numbers of fish available to the Munsee. The use of large mammals and other resources, consequently, were more important in the Munsee diet.

Lenopi foraging strategies focused on marine as well as riverine and estuarine resources. Those Lenopi bands in the northwestern parts of their territory, along the Delaware River, would be less likely to hunt large marine mammals and other resources available to Lenopi bands foraging along the ocean margins (see Becker 1998, 2004b). Since the members of these bands shifted residence through marriage, all males would have had to learn the various and very different skills involved in collecting marine and other resources essential to Lenopi bands resident along the Atlantic shore.

The Ciconicin, commonly identified in the early documents as the "Bay Indians", had access to more than the ten species of fish listed in Table 1, and also to whales and other marine resources. The territory of the Ciconicin also had a growing season (even during the Little Ice Age that reached its coldest point ca. 1600 A.D.) of sufficient length to provide a reliable maize crop. The period between 1587 and 1612, almost exactly overlapping the years of the earliest English attempts at colonization in the Virginias, included the driest seven years since 770 A.D., and the most extreme drought (Stahle et al. 1998). These findings confirm the accuracy of Batista de Segura's 1570 account (Stahle et al. 1998) noting six years of food shortages and deaths in the Chesapeake region. While this may have created a major crisis for economies dependent on maize and gathered plants, the effects on a fish-based system were probably minimal.

As early as 1624, Van Wassenaer (1909:71) observed that the North (Hudson) River native peoples "live in summer mostly on fish." Whether or not these peoples, such as the Esopus and numerous other cultures in that region, were as fish-oriented as the Lenape remains to be studied, but Brumbach's (1986) work gathered basic and vital ethno-archaeological data. Brumbach (1986) noted the important relationship between fish resources and the spacing of native populations, as well as in the temporal movements of those people. She pointed out the importance of fish to the settlement and subsistence systems of various native foragers. She also noted that the importance of fish has been largely overlooked by historians due to the folk tradition of "Indians" supposedly using fish as fertilizer for their maize "crops," a tale specifically addressed by Ceci (1975). The fertilizer myth, as well as the focus on foragers as supposed "hunters" (as in "hunters and gatherers"), allowed the importance of fish to be ignored despite the considerable evidence for their significance. Hans Schaper and Louis Brennan (2000:12) specifically commented on the "maritime character of the lower Hudson region" in their examination of prehistoric fishing in that area. They point out the obvious, but often unstated, inference that native populations did not forage only for plants and mammals. However, the ethnographic records do include examples of many cultures far from the northeast in which fish or specific categories of available marine and/or freshwater vertebrates and invertebrates were not consumed for various cultural reasons.

An interesting aspect of the timing and reliability of anadromous fish runs is that they apparently provided many foraging coastal peoples (as well as horticultural societies) with "calendrical" information. In New England, John Winthrop noted in 1662 (see Mood 1937:126) that some Indians planted maize when the "Aloofes" (alewives) came up river, while others timed their planting to the leafing of certain species of trees. This planting of maize reflects a traditional pattern of gardening rather than maize horticulture (cf. Becker 1995, 1999). Mention of maize gardening among the native peoples by various colonists in New England has long been used by archaeologists and ethno-historians to characterize these various peoples as village-living horticulturalists. That inference has slowly faded as the archaeological evidence grows and the relevant documents are interpreted by this author as supporting the thesis that the many New England native populations were all foragers, but that they used a wide variety of strategies such as those seen in the Delaware Valley. These ideas are incorporated in the author's current research, to be published in the near future.

NATIVE AMERICAN FISHING TECHNIQUES

The abundance of fish during their spawning runs was so great that numbers of fish could be caught in large baskets or in roughly made hand-held nets. Lenape fishing may have been so commonplace that no colonial observer thought it worthy of a description, as no description has been found in the literature. However, in 1745, a decade after the last Lenape bands had left the lower Delaware Valley, William Reichel (1872; see also Goodwin 1982:15) described natives involved in shad fishing during the month of May near the Moravian station at Bethlehem, Pennsylvania on the Lehigh River. The natives, then living in the area that Reichel identified as Bushnet or Bushnetz (Bushkill?), were apparently Lenopi immigrants from New Jersey. They may have employed fishing techniques that had been developed in New Jersey centuries before, rather than methods developed after their migration into the Forks after 1733 (Becker 1988b). Reichel notes that these natives dammed a "stream with [stone] walls" which had an opening or spillway in the center. Indians in canoes would tow a cable made of grapevines that were strung with brush down the stream to sweep the fish toward the bamer, where they would be caught by hand. Schindler (2006) describes various fishing techniques, including the possible use of "poisons" or stupificants. Complex techniques, including poisons, were unnecessary where massive fish runs provided almost limitless resources. Species such as the shad remained plentiful even during the worst periods of modern pollution, which actually began with 19th century industry (see Cronin 1986, also see Walberg and Nichols 1967). Today, modern deep sea fishing technologies may be a significant factor in reducing the numbers of these fish returning to spawn.

COLONIAL USE OF FISH

While on the topic of fish, it is worth discussing the colonists' use of this resource. The abundance of fish resources in the north Atlantic, particularly cod, became a major focus for the Late Medieval European economy. The developments in sailing technology that enabled explorers to sail around Africa also enabled fishing expeditions to cross the north Atlantic to exploit the (once) phenomenally rich Grand Banks. Fish became a valuable commodity for export from New England, and even served as a "currency" (as did tobacco in the Virginias). Fish remained so plentiful through the colonial period that variations in the many species were hardly noted in the Delaware River Valley. Aside from the Atlantic salmon, a cold water anadromous fish that spawned as far south as the Hudson River but not in the Delaware River, many of the species available in New England were also available along the mid-Atlantic coast.

In 1654, Van der Donck (1968:54-56) listed the extensive species of fish available at Manhattan Island and up into the Hudson River. His list is reproduced here, in the same apparently random order (with an asterisk indicating those species that also appeared in the Delaware River): Sheepshead (probably smelt), Blackfish (?), Striped bass*, Salmon (presumably *Salmo salar*, a cold water north Atlantic species that did not extend as south as the Delaware), Drum, Sturgeon* (Atlantic sturgeon; the family *Acipenseridae* includes two species, one of which attains weight of up to 125kg.), "Weak-fish" (possibly the fish identified as "squeteague" in the Delawarean languages), Herring, and Halibut. Brumbach (1986) notes summer and fall herring, reflecting two species, one of which may be the blueback herring and another being "shad" and other members of the family *Clupeidae*. The alewife is also called "Branch herring," further confusing this terminology. Also noted by Van der Donck are the following, again with no particular reason for the order of presentation in his account: Pollok, Tautog, Shad* (Van der Donck may have included alewives in this category), Scup, Haddock, Flatfish, Cod, Black Seabass, White Perch, Flounder (of two types, winter and summer), Yellowtail, and Mackerel (see also Klippel and Sichler 2004).

Van Der Donck's list includes many of the same species listed by the author in Table 1. Apparently "missing" from his list are alewives, eels (*Anguilla rostrata*), shortnose sturgeon, Atlantic menhaden, and sea lamprey - all of which may appear on Van der Donck's list under other names. Brumbach (1986) notes the presence of "smelt" in the Hudson, and these may be what Van der Donck called "Sheepshead."

Van der Donck's list suggests that all of these species were available as food for colonists, but Dutch and Swedish settlers were more likely to consume fish than English colonists. Apparently there was an avoidance of "excessive" fish consumption in some urban populations during the colonial period. It is unclear what fish species were being eaten by Europeans in the Delaware River Valley, as only a few historical accounts of fish utilization are recorded. William Penn's letter of 16 August 1683, written to the Free Society of Traders, offers a listing of the many "Creatur[es]" available to immigrants, with the emphasis on mammals and fowl. Toward the end of his list, Penn notes that "of fish, there is the Sturgeon [Hering] Rock, Shad, catshead, Sheeps head, [smelt] perch, Roch; & in inland Rivers Trout, some say sturgeon above the falls of Delaware" (Dunn and Dunn 1982, II:447). Meehan (1897:7) noted that herring, presumably "blueback," were always available in May, the month when their runs peaked. More significant is Meehan's (1897:7-8) early accounts of fish in the Delaware, including one in a letter by Mahlon Stacy of New Jersey written to his brother. The early accounts uniformly note the abundance of fish (see also Stewart 1999).

By the 1650s sizable numbers of English colonists from New England had become established in the Delaware River Valley and had largely mastered the farming techniques needed for success in this region. When William Penn arrived, the fundamentals of an agrarian economy were well established. By 1660, Lenape gardening of maize for sale to the Swedes had ended, as English farmers could by then compete in price (Becker 1999). Even before this time, the Lenape began shifting their attention away from farming to the much more lucrative pelt trade. By the 1680s, those Lenape remaining along the Delaware River had developed a much more complex economic strategy to obtain access to European trade goods, but the basis for their diet remained fish. While they caught deer and often sold venison to these colonists, there is no record of fish sales from the Lenape. However, the relatively close relationship between the Lenape and the Swedish immigrants in the lower Delaware River Valley may have been based on parallel or at least similar patterns of fish consumption, a foodstuff viewed by English colonists as indicating a low status diet.

ANOTHER OBSERVATION ON THE LENAPE

The more the author learned about the Lenape and their fishing activities, through reading the vast numbers of early documents referring to these activities, the more apparent it became that fish provided the chief protein and highest proportion of calories in the Lenape diet. This focus on fish is indicated by numerous petitions by the Lenape to have mill dams removed or at least opened to allow spawning runs to reach their warm weather encampment areas (Colonial Records of Pennsylvania 1852). While this paper primarily focuses on their reliance on fish, another observation regarding Lenape lifestyle is worth mentioning. When the author began these studies, the popular belief was that the Lenape lived in longhouses within large palisaded villages, just like the Five Nations Iroquois. This fiction now can be traced to historical events of the early 1800s, as the Lenape clearly were foragers grouped into a series of bands (see Becker 1989).

During the Contact period, the rudimentary ethnographic record relating to the Lenape indicates that they were matrilineal in descent. This was confirmed during the landmark studies of kinship systems made in the 1850s and 1860s by Lewis Henry Morgan (1870; see also Goddard 1973). Morgan investigated patterns of social organization among numbers of Native American groups throughout the country. Morgan's study of a group of "Delaware" in Kansas found that these people were using a matrilineal descent system. Matrilineal descent was also used by the Five Nations Iroquois, where garden plots as well as longhouses were held by the members of the matriline. The correlation between low-level horticulture, as practiced by these Iroquoians, and matrilineality was a consistent pattern, later confirmed by George Peter Murdock (1949). Long after this author had determined that the Lenape must have been foragers, and were not maize horticulturalists (Becker 1984a, 1988a, 1995, 1999), the author still could not resolve Morgan's finding that the "Delaware" (Lenape?) traced descent through the matriline with their foraging traditions (cf. Becker 2003).

The author now theorizes that the Lenape and other Middle Woodland foraging peoples must have used patrilineal descent systems commonly associated with hunting-gathering economies. As the Lenape developed an economy focusing on anadromous fish, probably around 1000 to 1100 A.D.,

their descent system began the slow process of change to a more suitable pattern. The association between matrilineality and complex foraging based on fishing is well documented from the northwestern Pacific coast (see also Cunningham 1965, for related work on Timor). Murdock (1949) demonstrates that a complete shift of this order, from patrilineal to matrilineal (or visa versa) requires approximately 300 years. Thus by 1400 to 1500 A.D., the right to use a Lenape summer station had become the right of the women of the matriline, though which this "property" was inherited. When the individual Lenape, and later Lenape bands, moved west after 1661, their economy became based on a modified foraging system within which patrilineality would be favored. By the 1740s, when all the Lenape bands had relocated and were using some form of modified foraging system based on hunting, their descent system once again began to adjust. By the 1860s when Morgan was collecting his data from Lenape then living in Kansas, this process of change was only about 120 years in operation, and a full transition to patrilineal or bilateral descent required another 100 or more years.

CONCLUSION

The question of changes in kinship patterns and their relationships to specific environments is particularly applicable to the foraging societies of the Delaware Valley. Where a human population is dependent on resources that are naturally available, some accommodations must be made between foraging strategies and targeted foods. The specific foods targeted may reflect choices that are culturally selected. Both food choices and territorial ranges may be independent of environment, but evidence for specific adaptations to preferred situations appears common not only among foragers, but among horticultural as well as agricultural populations.

While prehistoric populations across the world were faced with dietary decisions on a daily basis, interpreting the evidence they left behind in the archaeological record is challenging. However, comprehending the lifestyles of Native Americans living in eastern North America during the Contact period is enhanced by descriptions noted in early colonial records. These observations may be describing Native American economic traditions that extended back hundreds, if not thousands of years.

For the Lenape of the lower Delaware River Valley, the gathering of anadromous fish species was central to their way of life, and helped them survive when neighboring horticulturally based peoples may have been suffering from drought induced famine. Low population numbers among the nearby horticulturalists ca. 1600 A.D. (see Snow 1995) probably reflect environmental stress rather than introduced diseases, although the former would predispose a population to higher mortality rates. A significant factor in the migration of individual Lenape out of their ancestral territory after 1660 may have related to a passion for fish, some species of which were available to them in the Susquehanna and other rivers. But the many species of anadromous and other fish that provided the basis for the traditional Lenape diet and lifeways remained unique to the area that they had called home throughout the Late Woodland period.

The historical records include vast numbers of other clues about prehistoric lifeways for other cultures across the Americas. Although many of the lifestyles documented may reflect dramatic material adaptation to European influences, most of the old cultural ways inevitably survived. These non-artifactual aspects of life recorded only in the documents offer a unique glimpse into the ancient past. The author encourages other researchers to mine the old documents, as many other important insights remain to be discovered for each of these many native cultures. The documentary evidence provides one means by which we examine cultural processes that lie beyond the range of archaeology. We are fortunate to have extremely accurate records from Pennsylvania (see Merrell 2006) and throughout the early colonies, but extracting the small bits of cultural data from them is not an easy task. The inferences presented here are based on numbers of small clues that appear in the records. The conclusions can be tested by further culling of the documents, as well as by the use of recently devised methods for determining diet from the skeletal remains of individuals. Tracing dietary patterns through such tests may confirm the theories proposed here, as well as pointing out directions for the study of the equally elusive archaeological evidence.

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