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PROCEEDINGS OF THE

THIRTIETH SOUTHEASTERN ARCHAEOLOGICAL CONFERENCE

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OCTOBER 5-6, 1973

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FLORIDA STATE MUSEUM
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PREFACE

The Thirtieth Southeastern Archaeological Conference was held in Memphis, Tennessee on October 5-6, 1973. Drexel Peterson served as chairman for the program. Forty-eight papers were presented along with a special symposium on computerizing data from archaeological sites.

Originally, 29 papers were submitted for publication in the preceedings of the conference. Tom Hemmings sent all of the papers to me in January, 1980, and I sent them back to the authors in order to give them an opportunity to revise, update, or withdraw. Most of the authors chose to withdraw, since much of the data was either very out-of-date or had been published elsewhere. Seven authors, whose papers are reproduced here, opted to publish them in Bulletin 17. Several authors did not respond and I assumed that they had also chosen to withdraw. Richard Faust, Chief of the Southeast Center of the National Park Service, aided in contacting the authors of some of the National Park Service symposia. It is sad to note that two of the conference participants, Joseph Caldwell and Hale Smith, have died in the intervening years since the conference.

Some authors exhibited disbelieve that their papers might finally make it into print. Steve Cumbaa passed along a simple "WOW!" and Bruce Smith offered a more spectacular good time in Between, Georgia.

In preparing this Bulletin I have had the expert help of Vernon J. Knight, a graduate student in anthropology at the University of Florida, and Diane Coupe, of the Florida State Museum. I am grateful to both of them for their contributions.

J.T. Milanich
Florida State Museum

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MAN-ANIMAL INTERACTIONS WITH A SUBSTANTIVE EXAMPLE: MAN AND DOG IN THE PREHISTORIC SOUTHEAST

E. Thomas Hemmings
with a note by Clarence H. Webb

There is a prevalent, or at least strongly advocated, view in archaeology today that past human cultures operated within ecosystems and were themselves orgainized as intercommunicating subsystems. This rationale states further that under the proper conditions of inquiry significant features of a past ecosystem--human, biotic, and abiotic--and the interactions of these features through some interval of time can be understood. The stimulus for this paper and, in part, for papers which follow is just such a view on the part of an ecological anthropologist, Kent Flannery (especially his paper "Archaeological Systems Theory and Early Mesoamerica", 1972). In my view Flannery has been particularly aware of both possibilities and limitations in the systems approach to human ecology.

One outcome of this approach is a focus on procurement systems, the interactions between human cultures and selected plant and animal food resources. As Flannery (1972:222) and others have noted, "primitive peoples rarely adapt to whole environmental zones [nor even to] microenvironments within a zone, but [may be basically adapted] to a small series of plant and animal genera whose ranges crosscut several environments." Even if we could do so, and we cannot, it serves little purpose to enumerate all the organisms and physical features of a past environment. No known human group has had so "diffuse" an economy as to exploit the total range of available food organisms (Cleland 1966). If we can fully characterize the interactions of human populations with their staple resources (specified plant and animal populations) we move toward fuller understanding of culture as an adaptive system. This approach has its corollary in the life sciences--the study of single interactions precedes an understanding of ecosystems and the biosphere as a whole (Abraham et al. 1970).

At this point we should examine the concept of "interaction." Interactions mean, quite simply, all the ways organisms affect each other and their abiotic environment, and are in turn affected by environment. The most obtrusive interactions in an ecosystem, which is an energy dissipating structure, are food-getting and feeding, or, as we said for man as the dominant organism, procurement systems. These are not, however, the full range of significant interactions which maintain ecosystems--at least not stated precisely in this way. A variety of interactions among individuals of the same species (e.g. cooperation) and others between species (e.g. symbiosis), are not at all closely related to feeding, but contribute to stability or change in ecosystems. Some striking examples of such interactions among human beings and disease, vector, or host organisms, in particular cultural and environmental settings, can be drawn from medical anthropology and epidemiology (Alland 1969). The point is that not all interactions are strictly exploitative, and some that are not may be equally basic to cultural adaptation and to processes of change in cultural systems.

Man and Dog in the Prehistoric Southeast:

The foregoing remarks can be usefully illustrated by dealing with one substantive example from the prehistoric Southeast--the interaction or series of interactions between men and dogs. We can begin with the observation that dogs are"domesticated" animals, conserved by Southeastern Indians within their settlements, and distinguished by morphological differences from any wild canid populations (Berry 1969).

This man-dog association appears to be truly persistent over thousands of years. The earliest known North American domestic dogs are those from Jaguar Cave in Idaho dated at about 10,400 years B.P. (Lawrence 1967, 1968). A single dog has been dated in northern Minnesota at about 7500 years B.P., another in western Missouri at the same date, and a third in western Illinois at 7100 years B.P. (McMillan 1970; Shay 1971; Hill 1972). These three eastern dogs are all interpreted as intentional burials. Whether these earliest finds will stand future scrutiny (as Canis familiaris) is still a questionable matter in light of the diverse interpretations of Old World dogs in early farming communities (e.g. in Pre-Pottery Jericho, Clutton-Brock 1969). The earliest record in the Southeast appears to be loose dog bones in early Middle Archaic levels, dated about 7200 years B.P., at the Eva Site in western Tennessee (Lewis and Lewis 1961). A number of dog burials wre present in later Archaic levels at Eva. At any rate we can now say with some certainty that domestic dogs were present in the central states 7500 years ago and certainly in the interior of the Southeast by 7200 years ago.

In addition to these isolated finds, Haag's (1948) excellent study of aboriginal dogs shows their not-altogether rare occurrence as burials in Middle Archaic shell middens of Alabama and Kentucky. In fact, he can distinguish sub-populations of dogs in these areas on the basis of size characters. He shows further that dogs occur sporadically as burials in excavated Woodland and Mississippi Tradition settlements, and seem to increase in size from the small Archaic Indian dog. In Florida dog remains are widely dispersed in Late Archaic and early ceramic middens of the St. Johns River and at South Indian Field (Neill et al. 1956; Gross 1971) There are indications of both large and small dogs in South Indian Field deposits which date about 500 B.C.

The great time depth and the little data available for differentiation in Southeastern dogs are of interest in this respect. An average dog generation is two years, and 7200 years represents about 3600 generations. The genetic consequence of selective breeding in modern dogs has produced extraordinary polymorphism and differentiation in behavior (Scott and Fuller 1965). Great Danes may weigh 40 times as much as Chihuahuas--compare the behavior of Dobermans and Bassets--all this in a few centuries of scientific breeding from a few native stocks. Remains of aboriginal dogs in the Southeast and the few incomplete ethnohistoric accounts indicate no such polymorphism or specialization in behavior, although diversity is moderately well documented for late prehistoric and early historic dogs in Mexico (Wing 1970). The nature of interaction between Southeastern Indian cultures and their dogs must lie behind this relative uniformity.

The associations between primitive or non-literate peoples and domestic dogs in all areas and times can be summarized in several categories and examined against the Southeastern record as follows:

1. The dog as "a parasitic hanger-on, a shy, tolerated, uncared-for scavenger" (Kroeber 1923:412). It is doubtful whether this association could apply to any but the earliest sites of domestication in the Old World range of ancestral wolves.

2. Dogs as "useful disposers of rubbish" (Cole 1967:21). Undeniably dogs have near-omnivorous feeding capability, scavenged the refuse of settlements where allowed to do so, and promoted sanitation (Reed 1969). Some cultures, our own for example and Eskimo, exercise great care in feeding their dogs. I would assume that the dog in a scavenging niche was significantly interacting with early, if not all, Southeastern Indian cultures.

3. The dog as "watchdog" (Washburn and Lancaster 1968). Even without selective breeding or training, historic Indian dogs functioned as watchdogs. They must certainly have done so in the past, but without conferring survival value on particular cultures. Presumably, the watchdog was ubiquitous in the Southeast after 6000 years ago.

4. Dogs as domesticated food animals (Coe 1962:128). Ethnohistoric accounts and the Colima figurines attest to this practice in Mexico. Scattered dog remains in middens are widespread in the Southeast, but are not proportionally great in any food bone sample. Most Southeastern archaeologists who have interpreted such occurrences, infer little use of dogs as food animals. However, the potential productivity of dogs was fairly great. A single bitch can produce 50 living offspring by the time she is six years old. Even in the case of small Indian dogs a consistent protein food supply was obtainable with little energy expenditure on the part of man. In times of real food stress we can assume that the man-animal interaction expediently shifted from competition with to exploitation of dogs.

5. Dogs used in hunting "for locating, tracking, bringing to bay, and even killing" (Washburn and Lancaster 1978:295). Dogs were important adjuncts to hunting societies on nearly every continent. They were, in fact, employed in hunting by Creeks in historic times (Swanton 1946). The dogs occurring in European Mesolithic sites, generally ascribed a role in hunting (Piggott 1965; Clark 1969), suggest this possibility for the forested Southeast (Caldwell 1958). Here, however, the predominant technique may have been the stalk or ambush by solitary hunters. Until a cross-cultural comparison indicates in detail the cultural ecological settings, the specific procurement systems, associated with use of hunting dogs, we cannot easily define this interaction for the prehistoric Southeast.

6. The dog as a draught animal (Driver 1961). Large dogs have been used to draw sleds by Eskimo and travois in the Plains, including northwestern Louisiana. This is clearly an important interaction, limited by open terrain as well as the availability of large robust dogs.

7. The dog as social companion (Haag 1948; Lewis and Lewis 1961). Dogs interred in prepared graves or associated with human burials in Archaic cemeteries, and occasionally in later burial mounds, are commonly taken to indicate the affection lavished on pets in our own culture. At Indian Knoll in Kentucky and Eva in Tennessee dogs were associated with adult males, females, and children without apparent preference. Some of these animals must have been sacrificed in accordance with religious attitudes or as personal or contributed property. A more careful analysis of these grave associations should lead to refined hypotheses about the interaction of men and dogs in specified cultural settings.

8. Dogs as transmitters of disease in human populations (Scott and Fuller 1965). Almost all important constitutional diseases have counterparts in dogs, hence their usefulness in medical studies. I have not been able to ascertain the role of dogs in transmitting parasitic disease to humans (or vice versa), but suggest that this mechanism may be significant in regulating small semi-isolated human populations. David Chase (1972) has reported the interesting case of a thousand-year-old dog burial in central Alabama in which hyperpulmonary osteoarthropathy (Marie Bamberger's Disease) was diagnosed. The dog had been killed by crushing the skull. According to Chase, the highest incidence of this disease in the United States today is among residents of this central Alabama area.

Conclusions:

This list is not intended to exhaust the possible associations between men and dogs, and I have intentionally omitted some which seem to be of little consequence. It appears that there are interactions directed by man to his own benefit, and others undirected, which may or may not be immediately advantageous. No single category of man-dog association has been satisfactorily examined for the prehistoric Southeast, either for particular cultures or for Southeastern culture in general. We have in hand, however, an approach to these questions and to larger considerations. Man-animal interaction systems may be characterized from archeological evidence in sites and in regions, just as a variety of procurement systems for plant and animal resources.

Note: by Clarence H. Webb

With respect to the question raised of potential danger to man from infections acquired from the domestic dog, I have been interested in infections shared by dogs and children. There is presently a large dog population in the United States, estimated at 35 million. On the basis of recent studies and reports, dogs do not seem to offer a significant health hazard.

Certain infections can be acquired from dogs. Streptococcal and viral respiratory infections are possible, but are not deemed significant. Ringworm of the skin offers no health problem. Dogs, like many animals, have salmonella infections but do not offer the danger to humans that infected poultry, eggs, and meats do--this is a market and kitchen problem. Dogs, like humans, can acquire rabies from the wild animal reservoir (bats and skunks, especially). The dog can acquire and transmit tularemia, and the dog tick can transmit Rocky Mountain Spotted Fever and tick paralysis, but wild animals and wood ticks are much more likely sources.

Dog parasites do not complete their cycle in other species, including man. The only parasitic infection of the dog which offers a problem of significance is the ascaris or roundworm (Toxocara canis). The young child does not acquire this infestation by contact with the animal, only by eating dirt contaminated with dog feces and containing ascaris ova. If ingested, the larvae pass through the child's intestinal wall into the bloodstream, but are sequestered in the liver or lung. Human tissue reacts to produce an illness that is usually mild, rarely fatal; the canine ascaris larva cannot complete its life cycle and rarely is deposited in areas that would be dangerous.

In summary, the domestication of the dog and the close relationship to man seems unlikely to have offered a significant health hazard to prehistoric man.

Addendum by Author:

A variety of articles and several books pertaining to the domestication of canids have come to my attention since this paper was written in 1973. In general these do not provide new data or interpretations for the interaction of men and dogs in the prehistoric Southeast. Since I have touched briefly on Old World dogs, I would like to make note of the evidence and discussion presented by Olsen and Olsen (1977; references therein) regarding Asian dogs and their presumed ancestry.

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ABORIGINAL USE OF MARINE MAMMALS IN THE SOUTHEASTERN UNITED STATES

Stephen L. Cumbaa

The marine mammals which are now or have been present in the historic past along the coastal southeastern United States include the various whales and porpoises (dolphins) of the order Cetacea, the West Indian seal (Monachus tropicalis Gray) and the manatee [Trichechus manatus latirostris (Harlan)]. These animals were hunted through time by a number of Indian groups, primarily along the Gulf and Atlantic coasts of Florida and at scattered sites elsewhere along the coast of the southeastern United States (Figure 1). This report will attempt to summarize the archeological occurrence of these marine mammals in the Southeast, pertinent ethnohistorical and ecological data relevant to their capture and use, and will conclude with a discussion of the importance of the various marine mammals in the subsistence base of the peoples involved. Data presented are current only to early 1973.

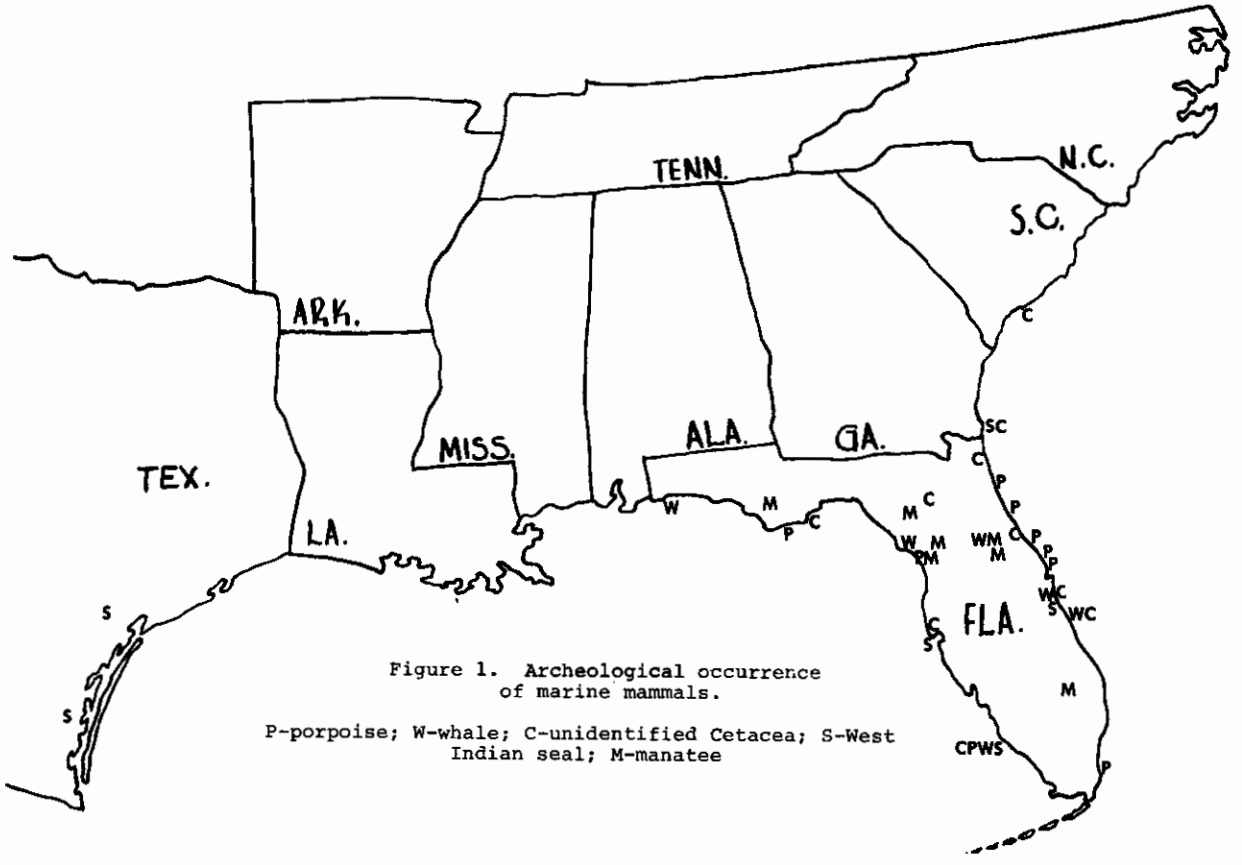

Figure 1. Archeological occurrence of marine mammals.

P-porpoise; W-whale; C-unidentified Cetacea; S-West Indian seal; M-manatee

Porpoise:

Perhaps the earliest published account of cetacean remains in a southeastern archeological site was C. B. Moore's description (1902:269) of 76 teeth of the Atlantic bottlenosed dolphin (Tursiops truncatus), drilled and in situ around the wrist of an early Santa Rosa-Swift Creek, or Yent Complex (Sears 1962:17), burial in the Yent Mound on the Gulf coast in Franklin County, Florida. Other Florida Gulf coast sites containing identified porpoise remains are the famous Crystal River site in Citrus County, which produced vertebrae identified as those of the bottlenosed dolphin (FSM; FSM indicates specimens in the collections of the Zooarchaeology Range, Florida State Museum, Gainesville), and a Glades I period site (8Cr107x2) on Marco Island, Collier County, which also contained vertebrae of this species. Another Glades I site (8Cr107x1) produced the auditory bulla of the short-finned pilot whale (Globiocephala macrorhynca) (Cumbaa ms.a.). This "whale" is actually a member of the porpoise and dolphin family, Delphinidae.

The majority of sites containing porpoise remains are on the Atlantic Coast of Florida. The Surfside site (Willey 1949:83) in Dade County contained remains of the common dolphin (Delphinus delphis). Atlantic sites from which bottlenosed dolphin remains have been identified include the Castle Windy midden (Bullen and Sleight 1959:20) and Green Mound (Bullen and Sleight 1960:31) in Volusia County. The former site appears to date from the St. Johns II period while the latter encompasses both St. Johns I and II. Vertebrae from the Ragin Midden (FSM) in Brevard County and the Mabry Mound (FSM) in St. Johns County are also probably bottlenosed dolphin, although identification is not positive. Summer Haven in St. Johns County yielded bones identified to the family level as Delphinidae (Wing ms.a.).

Whale:

Whale remains are somewhat more scarce. A baleen whale jaw has been reported from the Gulf Breeze III site in Santa Rosa County in an early Swift Creek context (Daniel Penton, personal communication). An unidentified, fragmentary whale vertebra, similar at least in size and gross features to the goose-beaked whale (Ziphius cavirostris, which attains a length of 28 ft) was recovered from the Beetree Slough site in Levy County about a mile inland from the Gulf. The site is apparently of the Weeden Island II period (E. Thomas Hemmings, personal communication). Other sites from which whale remains have been identified are the McLarty site on the Atlantic coast in Brevard County (Wing 1978) and the Jungerman site, also in Brevard County, which contained an auditory bulla identified as being from the pygmy sperm whale (Kogia breviceps) (Wing 1963:53). An unidentified whale jaw fragment was apparently picked up recently in a surface collection of a Marco Island shell midden (Curtiss E. Peterson, personal communication). The only additional archeological record of a whale noted is a single, non-fossil tooth from the huge inland freshwater shell midden at Bluffton on the St. Johns River in Volusia County, Florida.

Other Cetacea:

Fragmentary and other non-distinctive remains identified only as cetacean have come from the Gulf coast at the Refuge Tower site in Wakulla County in a middle-late Swift Creek context (Daniel Penton, personal communication), from the Bayshore Homes site in Pinellas County (Wing ms.a), and from both the proto-historic Cushing site (Wing 1965:25) and several Glades I sites on Marco Island in Collier County (Cumbaa ms.a.). Atlantic coast sites include the Jungerman and McLarty sites in Brevard County (Wing 1963:53, 1978); the Cotten site in Volusia County (FSM), and the proto-historic and early historic period Goodman Mound in Duval County (Wing 1963:56). Additional Atlantic coast sites are the Table Point site, a Deptford house site on Cumberland Island in Camden County, Georgia (Milanich 1971:195), and the Fig Island shell ring, an early ceramic site in Charleston County, South Carolina (E. Thomas Hemmings, personal communication). A single drilled cetacean tooth has been reported from the Melton site (8A-169) in Alachua County, Florida (Cumbaa 1972:71). This inland site apparently has both early Weeden Island and St. Johns I influences.

Cetacea: Hunting Techniques:

Larson (1969) has done an excellent job of gathering together ethnohistorical data on the capture of whales by the Indians of southeast Florida. It is convincing that several independent accounts from the Tequesta area (e.g., Acosta 1962, Monardes 1589, and others quoted in Larson 1969: 217-222) are so consistent in describing the method of hunting these large marine mammals. Briefly, the hunting took place in winter, presumably when the whales were more abundant. When one or more whales, usually a cow and her calf, were spotted coming along in reasonably shallow water close to shore, a group of Indians would paddle out in dugout canoes to surround or impound the whales, getting close enough so that one man could jump on the back of the chosen beast. He would then pound a wooden stake into each blowhole. The whale would sound immediately, but in shallow water and with a limited supply of oxygen, would soon return to the surface to breathe. The wooden plugs would render breathing impossible and the huge mammal would suffocate in a few moments. The Indians would then attach ropes and tow the dead whale to shore where it would be butchered and the meat and blubber cut into strips to dry. The heavy bones, not being very useful, would be left on the beach.

In 1593 Friar Andres San Miguel described whale bones lying on the beach as a result of a recent Indian whale kill (Garcia 1902:209 quoted in Larson 1969.220). This presents a problem to zooarchaeologists in that no bones are left behind in the middens to identify. Unless the bones were used for tool making or the habitation site happened to be immediately adjacent to the kill site, the presence of whale bones in middens would seem to be unlikely. Other aboriginal techniques for the hunting of cetaceans in the Southeast have not as yet been reported.

Larson notes that of the 18 species of whales and porpoises present at times off the Florida coast (Moore 1953:122-152), only five occur with any frequency and number. These five species are the pygmy sperm whale (Kogia breviceps), the North Atlantic right whale (Balaena glacialis), the sperm whale (Physeter catodon), the Atlantic bottlenosed dolphin (Tursiops truncatus) and the pilot whale (Globiocephala macrorhynca).

After reviewing the habitat, social organization, habits and other pertinent factors relating to these species, Larson concludes that the whale referred to in these early documents was the Atlantic right whale (1969:226). These whales are 40-55 ft in length and attain a weight of some 30 tons. They migrate to Florida waters in winter, traveling as adult and calf or in larger groups where food is plentiful. There have been many sightings from 50-300 yards offshore in southern Florida, and these slow-moving whales can be approached by non-powered craft. When they sound they come back up near the same spot, and perhaps most importantly, float when killed (Larson 1969:226). The Atlantic right whale certainly appears to fit the ethnohistorical descriptions, even to the fact that it has two narial openings. The fact that this particular whale occurs only very rarely on the Gulf Coast of Florida (Layne 1965:134) may help explain why there are no ethnographic accounts of the Calusa hunting whales in this manner.

As noted earlier there seems to be little chance of confirming this type of whale hunting archeologically, as the bones are not in the habitation areas and there is no specialized artifactual inventory to provide secondary confirmation. However, right whale baleen plates could easily have been cut away and used in the manufacture of artifacts, and would preserve under good conditions. Still, the fact remains that we have at least five other cetacean species that were hunted or collected to at least some extent. These are confirmed archeologically in generally datable stratigraphic context.

It is well known that many species of whales and porpoises are at least occasionally found stranded in low water or washed up on a beach (Moore 1953, Layne 1965). These strandings could presumably account for many of the cetacean remains from Southeastern aboriginal sites. However, the most frequently stranded marine mammel, the pilot whale (Layne 1965:148) is represented archeologically by only one individual, from Marco Island on the Gulf Coast. These animals, often stranded in numbers greater than 50, can range in weight from calves of 100 lbs to adult males of 2000 lbs (Layne 1965:148) and would seem to have presented, at least occasionally, a fortuitous resource. However, unless they too were stripped of flesh at the beach and the bones are not preserved, they were not eaten in large numbers.

Strandings of the Atlantic bottlenosed dolphin are relatively infrequent considering that it is the most abundant marine mammal on the Gulf and Atlantic coasts (Layne 1965.158), yet the remains of these animals show up in archeological sites with by far the greatest frequency. They are almost as large as the pilot whales (adults are 9-12 ft long) and weigh over 1000 lbs. Why would these animals not be treated in the same manner, by butchering at the beach? I am not certain this question can be answered satisfactorily. However, it does seem sure, particularly at sites such as Green Mound on the Atlantic coast and Marco Island on the Gulf where several individuals are represented, that the bottlenosed dolphin was hunted or collected as a somewhat regular food resource. The relatively concentrated archeological distribution of this porpoise along the northern half of the east coast of Florida, and perhaps the lower Gulf coast as well, may point toward some manner of specialized hunting.

These porpoises do frequent tidal waterways, lagoons, and estuaries year round in Florida and seasonally farther north, often in social groups. They are powerful swimmers and can clear the water, but could possibly be trapped or temporarily restrained by a tidal weir or a net. These porpoises are probably too fast to be harpooned with any degree of success unless their movements were somehow restricted. We know from the Cushing site on Marco Island that the Calusa had a sophisticated netting technology (Cushing 1897, Wing 1965). By way of analogy, coastal middens throughout Florida and perhaps somewhat in the sea islands of Georgia and South Carolina are often replete with shark vertebrae representing several species. Vertebrae from sharks over 10 ft long are not uncommon, and those of this size must have presented somewhat similar problems of capture and of the butchering of a very large carcass.

West Indian Seal:

The remains of the West Indian seal (Monachus tropicalis) are rare in archeological sites. Rouse (1951.83) noted the presence of seal bones at South Indian Field in Brevard County, Florida. Further excavation and collections at the site by A. T. Anderson and Robert Gross have produced a rich faunal assemblage (Smollek ms.) which includes at least three other individual seals (Cumbaa ms.b.). These seal bones were associated with fiber-tempered ceramics of the Orange period (Robert Gross, personal communication). The only other site to be represented by more than one individual seal is a large shell midden (8Cr107) on Marco Island, Collier County, Florida, excavated within the last few years by the Bureau of Historic Sites and Properties of the State of Florida (Cockrell 1970). The excavations, primarily in a Glades I period context, have yielded at least three individuals (Cumbaa ms.b.).

Clayton E. Ray has reported the find of a West Indian seal maxilla dredged up along with Indian artifacts at Long Bayou in Pinellas County off the Gulf Coast (Ray 1961:113). He notes that the seal maxilla and the artifacts are not necessarily contemporaneous. Curtiss Peterson has identified West Indian seal remains in faunal material from the Table Point site on Cumberland Island, Georgia (Milanich 1971:195). This find, in a Deptford period context, apparently extends the known former range of the species, as a previous fossil record from near Charleston, South Carolina has proved to be erroneous (Clayton E. Ray to Elizabeth Wing, personal communication).

The only other archeological sites which have recorded seal remains are in Texas. One, represented by a single canine tooth, was at Rancho Diermero in Nueces County, a Spanish ranch headquarters in the early 1800s and the location of a somewhat earlier Indian campsite. The other site is the mission Nuestra Senora del Espiritu Santo de Zuniga at Goliad. This site was represented by five unmodified teeth (Raun 1964:191).

Seal Hunting Techniques:

There are no published descriptions of an aboriginal seal hunt in the Southeast. However, seals were discovered quite early by Europeans in the Caribbean area. In fact, as early as 1494, during the second voyage of Columbus, some of his crew members killed eight seals at Alta Vela, just off the south coast of Hispaniola (Scheffer 1958:114, King 1964:73; Rice 1972:8). In 1513 the crew of Juan Ponce de Leon killed 14 seals in addition to 170 turtles and 5000 pelicans and other birds during a brief stop in the Tortugas (Herrerra 1935:324). The pace appears to have picked up after that with intensive efforts to hunt the seal for oil from at least the 17th to nearly the end of the 19th century (Allen 1880:708-710). The seals were on the verge of extinction by the late 19th century and were never adequately studied by biologists. What we do know about the West Indian seal has been pieced together from occasional sightings over the years. The West Indian seal is now considered to be an extinct species (Scheffer 1958:5).

The aboriginal method of hunting the West Indian seal was probably much like that of the Europeans, which was to quietly approach a hauling ground or nesting site (usually a protected sandy beach near rock outcroppings), then when within range, attack a small group of seals with clubs. Many historic accounts describe similar measures (Gosse 1851:311-312; Ward 1887:261-262). The seals apparently only roused when individually attacked or when an intruder came too close for the individual seal's tolerance. This is a quite different situation from that of another species of the same genus, the Hawaiian monk seal (Monachus schauinslandi) which appears to be very timid and is declining in numbers due to disruption of breeding areas by the presence of man and dogs (Kenyon 1972:687-696).

The seals apparently haul out more frequently during the winter breeding and pupping season (Rice 1972:19). This would have been the optimum time to hunt the seals, but even then they were probably available at very few locations as far north in their range as Florida and Texas. It is suggested that a small section of the Atlantic coast near South Indian Field and perhaps one of the Gulf Islands near Marco were, at their respective points in time, two such favorable breeding and pupping locations. The agility and speed of the seals in the water would almost certainly preclude their capture away from such an area.

Manatee:

The remains of manatee appear with one exception to be restricted to inland and coastal riverine sites. The exception is the Belle Glade site near Lake Okeechobee in Palm Beach County, Florida (Willey 1949:61). A shell midden in Citrus County Florida, downriver from the famous Crystal River site, has also produced manatee rib fragments (FSM) as have the Bluffton and Tick Island middens on the St. Johns River in Volusia County (FSM).

The remaining "sites" I have labeled on the map (Figure 1) only as the Chipola River, Gulf County, Florida; the Santa Fe River, Gilchrist County, and the Withlacoochee River, Citrus County, Florida, although they perhaps each in turn contain several sites (Ben Waller, personal communication). Each of the three rivers has several bottom locations in which are concentrated Paleo-Indian and later projectile points and cutting, scraping and hammering tools in addition to large quantities of cut and worked manatee and other animal bones (Waller 1970:131-134).

Manatee: Hunting Techniques:

Waller suggests that the bones and artifacts from these river bottom sites are the residue accumulated from years of using the rivers at these points as kill sites. The accumulations are almost invariably just below a shallow ford or stream crossing between high banks. He suggests that the animals were attacked and killed while negotiating these shallows, and that heavy bones and useless parts of the carcass were discarded in the river in the act of butchering the animal after the kill. Many animal species are represented, but the most prevalent bones are those of the manatee. Ribs, skull fragments, jaws and teeth are found in abundance, but bones representing the fleshy parts of the animal appear to be missing (Waller 1970:133). The fact that artifacts of several periods are present in these sites is seen as continued use through time of a productive hunting technique (Waller 1970.134). It should be noted that the ability of even relatively swift-running streams in Florida to move cultural and other bottom debris any significant distance is extremely limited and would tend to support Waller's hypothesis. It also seems clear that the material is not washing in from the banks.

In other areas of the manatee's range there are historical descriptions of hunting techniques. In Jamaica one manatee was rendered helpless after becoming entangled in a seine (Gosse 1851:341). Oviedo noted the practice of shooting the beasts with an arrow to which was attached a tarred line and a float which could be spotted and pulled in when the animal tired (Stoudemire 1959:113 quoted in Wing ms.a). A Similar method was described by Landa in Yucatan where the Indians would harpoon a manatee in tidal creeks or shallow water and follow its progress in their canoes by watching their buoys and the animal's dying struggles, which roiled the bottom sediments and discolored the water with blood (Tozzer 1941:191 as quoted in Wing ms.b).

Perhaps the most opportune time to hunt manatee would be in the winter. They cannot tolerate cold water (Moore 1951b:18, Layne 1965:166) and will gather around the flow of constant-temperature freshwater springs when surface runoff drops the river temperature below about 72°. Severe cold can in fact kill them (Moore 1951a:35; Layne 1965:166). At other times they avoid clear water (Larson 1969:214) and are seldom seen in groups (Harrison and King 1965:167). The naturalist William Bartram, in his travels in Florida in the 1770s, noted the bones of a manatee killed by the Indians for food the previous winter at what is now known as Manatee Springs off the Suwannee River (Harper 1958:146). There is no particular reproductive season to key on, as the females seem to have one calf per year without regard to any species-wide breeding or calving season (Harrison and King 1965:167).

Summary:

In summary we should relate the importance of these marine mammals to the subsistence base of the peoples involved. We know from Landa (Tozzer 1941:191) that the manatee was a very profitable catch; in his words, "...for these are all flesh and fat" and Gosse (1851:345) raves about the delicicus taste of manatee steaks. Larson notes that a small adult weighed 450 lbs (1969:214) and animals twice that size are not at all unusual. Certainly manatee would have been a worthwhile catch, but with the possible exception of the Paleo-Indian riverine sites, manatee use in the southeast appears negligible and probably formed no more than a local abundance at infrequent times. There were never enough manatee in any one area to constitute a harvestable, renewable resource.

The same can be said of the West Indian seal. Seals were scarce enough in areas inhabited by aboriginal peoples that Fontaneda, in his travels over south Florida as a captive of various Indian groups, noted that (at least in the Keys) only individuals of high status ate seal (True 1944:26). No doubt seals were an appreciated and sought-after resource when they were in an area. An adult was 6 to 7 ft in length, weighed 200 lbs, and had nice fur and teeth for possible trade (as perhaps in the two Texas records). The oil was certainly valuable; Gosse reports that a specimen 4 ft, 2 in long yielded 4 gallons of oil (1851: 309-310). Nevertheless, the scarcity of West Indian seals in the Southeast made their capture infrequent in prehistoric times and only of temporary local importance. An example is the Marco site (8Cr107) where there were only three individual seals in some 2150 vertebrate individuals identified (Cumbaa ms.a.)

The cetaceans, particularly the whales in south Florida, remain as the really important group of marine mammals. It is unusual, but understandable in this case, that their importance is not always directly reflected in the archeological record. An exception is the presence of bones representing what may be a specialization on the Florida east coast north of Cape Canaveral on the Atlantic bottlenosed dolphin. The trading of teeth or other artifactual or non-subsistence utilization of these mammals is a minor factor here, and almost certainly accounts for the Bluffton and Melton site records, as well as the Yent Mound porpoise tooth bracelet.

It is not until we look at the ethnohistorical data that we get an idea of the importance of whale hunting in South Florida. Fontaneda, writing again of the Keys, notes that the common foods are fish and whale (True 1944:26). A January 1568 letter from Villareal to Father Rojel states that neighboring villages gather to show respect to the cacique, and to eat whale and fish (Zubillaga 1946:236 quoted in Larson 1969:234). Similar, although not localized ethnographic descriptions of whale hunting and the use of the whale as a food source in south Florida prompted Goggin and Sturtevant (1964:184-185) to consider whale hunting as a Calusa subsistence technique.

The independent accounts of whale hunting, remarkable in the lack of necessity for complex equipment, leave no doubt as to the importance of these large marine mammals. There are important social ramifications in the cooperative group effort necessary for the spotting, capture, butchering, distribution and redistribution of the tremendous amounts of meat and blubber present in even one large individual. A 30 ton whale (the size of the North Atlantic right whale) may have up to 45% of its body weight as usuable blubber (Harrison and King 1965:66). The meat and blubber, rich in animal protein and fats and storable when dried, would generate a significant energy surplus to see the group through possible lean times and would enable them to trade with other peoples for desirable inland resources.

The use of marine mammals in the Southeast appears to have been restricted almost entirely to Florida. Scattered use occurred over a great area of the state at various time periods. We have records to the historic present of the use of manatee from possibly the Paleo-Indian period, of the West Indian seal from about 1500 B.C., and of various cetaceans from at least 500 B.C. It is likely that winter was the season of exploitation of marine mammals, and that at least in south Florida where whales may have made up a great percentage of the diet, systematic hunting at certain locales made winter residence on the coastal strand a necessity.

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MIDDLE MISSISSIPPI EXPLOITATION OF THE WHITE-TAILED DEER[1]

Bruce D. Smith

The white-tailed deer (Odocoileus virginianus) was an important source of animal protein for human populations in the eastern United States throughout much of the prehistoric period, and the abundance with which its skeletal elements are recovered from Middle Mississippi sites attests to its significant utilization by these agricultural groups.

As is the case with any other animal species utilized by prehistoric human populations, five of the most important questions to be asked concerning the utilization of the white-tailed deer by Middle Mississippi populations are:

1) the contribution of the species to the diet of the human populations in question, expressed in terms of percent of the total estimated meat yields,

2) the extent to which exploitation was selective: was the species exploited more intensively than other species/species groups in relation to their relative abundance (biomass levels),

3) seasonality of exploitation: what would be the most advantageous time of year to exploit the species, judging from its seasonal behavior, and is there any ethnohistorical information and/or direct archaeological evidence available concerning the seasonal nature of exploitation,

4) similarly, is there any ethnohistorical information and/or direct archaeological evidence available concerning possible techniques of hunting/capturing, and

5) what was the predation profile: what was the age composition and sex ratio of the deer harvest, and what was the impact of human predation on the prey population and non-human predator populations?

Before considering these questions, however, it is necessary to consider the seasonal habits of the white-tailed deer within the central section of the Mississippi Valley.

The seasonal habits of deer vary in a given region very little from year to year. The rutting period, the fawning period, the seasonal groupings, and the periods during which antlers are grown and shed are reasonably consistent from year to year, as are seasonal food preferences and seasonal movements.

The peak of the fawning period in the southeast Missouri area is approximately the first of June, with most births occurring in late May and after the first two weeks of June (Dunkenson 1958).

Antler growth in males begins around the middle of May, full growth is attained by August first, but antlers are not fully hardened until the beginning of September. Antlers are dropped by January or early February.

The rutting season lasts from late September through November, with the peak occurring during the first two weeks of November.

The white-tailed deer quite probably has the smallest home range of any member of the deer family in North America. The average minimum home range of deer in an area of central Missouri was found to be 695 acres, or a little more than 1 mi^2 (Progulske and Baskett 1958). This figure of 1 mi^2 seems to hold true for much of the eastern United States (Severinghaus and Cheatum 1956:154). This home range is in no sense a defended territory, but rather the area utilized by a single individual. Obviously a great amount of overlap of individual home ranges exists. There is some seasonal variation in the size of home ranges, with increases especially noted during the fall rutting season.

The theoretical maximum growth rate of a species, which occurs only when a species reproduces under ideal conditions and in the absence of mortality, is termed the biotic potential of a species. The white-tailed deer has a fairly high biotic potential, which has been estimated at over 60% per year. If this maximum growth rate continues for any period of time, it would produce a larger deer population than the plant-food base of an area could support. This critical level above which the available food resources cannot support the growing population can be loosely termed the carrying capacity of the specific area.

As a result of the existence of a number of different interpretations of the meaning of "carrying capacity", however, wildlife ecologists have developed a number of concepts concerning the relative density of animal populations, and have strictly defined a number of different density levels, 3 of which apply to deer populations. These three density levels are subsistence density, optimum density, and security density.

White-tailed deer usually inhabit brushy or wooded edge areas during most of the year. Hunting pressure elicts highly effective avoidance behavior which includes prolonged hiding and a shift to nighttime feeding. For these and other reasons the white-tailed deer is considered a "resistant species" by wildlife ecologists. This means that given suitable habitat conditions, it is almost impossible to remove high percentages of white-tailed deer populations by shooting.

When a white-tailed deer population is reduced to a certain density level of modern hunting, it is theoretically impossible to further harvest the population. This density level at which the population is invulnerable to further predation is termed the security density level.

Given the excellent cover conditions that must have existed in the Mississippi Valley during the Mississippi period, there is little doubt that this security density concept can be applied to predation of white-tailed deer populations by Middle Mississippi hunters. No matter how great the predation pressure by Middle Mississippi hunters, they could not harvest enough deer each year to endanger the ultimate survival of the deer population.

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[1]This paper, presented at the 1973 SEAC meeting in Memphis, Tennessee, was submitted for publication in the SEAC Bulletin in October of 1973. After seven years, this paper is finally appearing in print. During this long period many articles have appeared which deal with the general topic of prehistoric exploitation of the white-tailed deer. This paper has not been updated to incorporate these recent studies. It appears in its original form, and reflects the author's position in 1973.

The upper limit that a deer population can reach in a given environment is termed the subsistence density level. A population at such a high level "obtains enough food for bare survival, but not enough to maintain good health, optimum growth, optimum body size, or peak birth rates" (Dasmann 1964:183). Subsistence density has been aptly described as a disaster level. Deer populations at such high levels are more vulnerable to such factors as disease and predation, and when a deer population at a subsistence density level is faced with a sudden reduction of the carrying capacity of an area, widespread starvation and a subsequent rapid decline in population will result. Paradoxically enough, an insufficient deer harvest by Middle Mississippi hunters can be seen to have been a greater threat to the continued existence of their primary animal food source than extreme predation pressure on their part.

An optimum density level is located between the security density and subsistence density levels. It corresponds to the meaning ascribed to "carrying capacity" in range management studies. At this density, maximum health, growth, and productivity will be realized. Mortality due to shortages of food, water, and shelter do not occur.

Having briefly discussed selected aspects of the seasonal behavior and population dynamics of the white-tailed deer, we can now turn to the five questions raised earlier. While the data presented herein come from a series of seven Middle Mississippi sites (Chucalissa, Banks, Lilbourn, Snodgrass, Turner, Powers Fort, and Gooseneck), most of the conclusions I will offer will hold true for Middle Mississippi sites in general, with a few notable exceptions such as Cahokia. The white-tailed deer contributed from 50% to 91% of the estimated total meat yield at this sample of seven sites (Table 1). While part of the intra-site variation in the importance of the white-tailed deer is a function of biased samples at some sites (poor preservation of skeletal elements of smaller species resulting in overestimating the importance of larger species), it is also apparent from the faunal samples that there is a real variation in the importance of the deer from zone to zone, with fish and migratory waterfowl being exploited, not surprisingly, much more intensively at meander belt sites than at sites in other zones.

Table 1. Percent of total projected meat yield at seven Middle Mississippi sites represented by the white-tailed deer.

Site	Percent of total meat yield
Chucalissa	Village 83.4% Mound 67.1%
Banks Village	80.5%
Lilbourn Structure 9	49.6%
Lilbourn Structure 12	63.0%
Lilbourn Structure 25	61.6%
Turner	82.8%
Snodgrass	89.6%
Powers Fort	76.3%
Gooseneck	91.0%

The second question to be considered is the extent to which exploitation of the white-tailed deer was selective in nature. Since this topic is covered in some detail in another article (Smith 1974b), I will simply state here that the white-tailed deer along with several other species were selectively exploited. That is, if a large group of terrestrial species, including squirrels, rabbits, black bear, raccoon, turkey, opossum, etc., are considered, and the fall-winter biomass levels and potential annual productivity of each species is estimated, the white-tailed deer was exploited more intensively than any other species, based on their relative abundance.

The third and fourth questions I would like to consider refer to the extent to which exploitation of white-tailed deer populations by Middle Mississippi groups was seasonally oriented, and possible techniques of exploitation that may have been employed. Since these questions have been covered elsewhere (Smith 1974a, 1974b, 1975), only the main points of the argument will be presented herein.

Although it is difficult to show conclusively the relative extent to which deer hunting was a seasonal, as opposed to a year-round subsistence activity for Middle Mississippi hunters, a strong argument can be presented to support the hypothesis that deer were most intensively exploited during the late fall and early winter at these seven sites, with some hunting going on throughout the winter months.

The seasonal occurrence of a high availability of a prime food source (acorns) within upland hardwood and bottomland hardwood areas produces a higher density of deer for several months (September-October-November), and with this higher density of deer within known zones, the probability of a hunter-prey encounter is substantially increased. The increase in the probability of a hunter encountering deer is both a matter of simple higher prey density and the fact that hunters could depend upon this seasonal concentration, and would quite probably take advantage of it. In terms of the feeding habits and seasonal movements of the prey, the fall and early winter would be the most advantageous period to hunt. It is also during this late fall and early winter period that deer attain their maximum yearly weight. A further factor which should be considered in the first bottoms areas around the Banks and Lilbourn sites is the late winter and spring floods, which would function to maintain high deer densities on the hardwood first bottom ridges throughout the early spring, and would facilitate deer hunting during the early spring flood period.

Perhaps the greatest problem presented to a hunter armed only with a bow and arrow is getting near enough for a shot at the prey without being detected. But from the time a buck's antlers drop their velvet (the first week in September) until the end of the rutting season in late November, a behavioral change occurs which greatly increases the hunter's chances. During this period the "personality" of the male deer changes radically from being ready to flee to being both overly curious and belligerent, as he avidly seeks out individuals of both sexes.

This personality change seems to have been exploited in early historical times. Swanton cites nine ethnographic references to individual stalking of white-tailed deer by Indians in the southeast United States (Swanton 1946). Of these nine references, eight made specific, detailed references to the use of deer skins and/or heads both for concealment and to attract the deer. This sometimes involved violent rustling of bushes and trees with stuffed deer heads held in the hunter's hand. Such a method closely parallels the way in which deer attack trees and bushes immediately prior to and during the rutting season. This hunting strategy is one of slow stalking, concealment, and attraction of the deer prior to shooting.

Judging from seasonal movements, feeding habits, maximum seasonal weights, rut induced behavioral changes, and the seasonal flood stages of the Mississippi River, the period from September through November was the most advantageous time of year to hunt deer in more upland areas, while the winter-spring flood stage of the Mississippi River would have extended this optimal period through the early spring in the first bottom areas. It was also a widespread practice during the early historical period to take advantage of these openings for exploitation.

Archaeological evidence for the seasonality of deer hunting can be obtained by analysis of both the growth and shedding of deer antlers, and the eruption and wear patterns of mandibular dentition. While the presence or absence of deer antlers on skulls gives a rough indication of season of death, it is possible to determine the season of death of white-tailed deer within finer limits by analysis of deer mandibles from archaeological sites. The eruption of permanent dentition, and the replacement dentition, and the replacement of deciduous pre-molars in Odocoileus virginianus during the first 20 months of life proceeds at a relatively reliable rate. This allows mandibles of individuals of less than 20 months of age to be accurately aged within a 2 or 3 month range (Severinghaus 1949).

By taking June 1st (the peak of the fawn-dropping period) as the birth date of each deer, an estimate of the date of death can be computed for each. Each deer mandible recovered from the sites that was complete enough to be aged and represented an individual less than 20 months of age, was aged within a 2 to 3 month range. Histograms of the computed range of death for these juvenile deer are shown in Figure 1 (black areas represent individuals less than 12 months of age).

The histograms of seasonality for each site (except for the small sample from the Lilbourn site) are quite similar, with the peaks corresponding closely to the availability of acorns in the hardwood areas, and to the rutting period. It is not possible, however, to determine from the archaeological evidence if deer hunting peaked during the "acornrutting" period, and then continued at a lesser intensity through the winter months, or if it was a constant level through the late fall and winter.

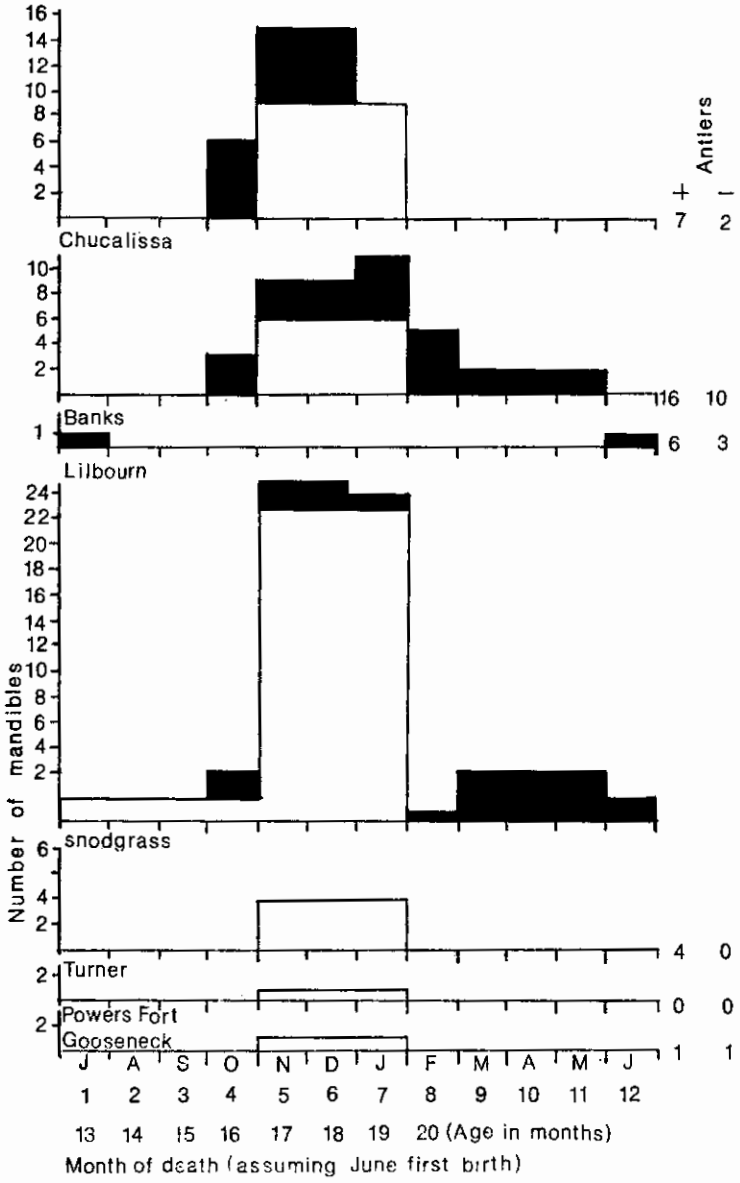

Figure 1. Archaeological evidence from seven Middle Mississippi sites indicating seasonality of the exploitation of white-tailed deer populations.

The low mortality levels through the rest of the year suggest that although deer hunting was not solely a late fall-winter activity, this was indeed the period of most intensive exploitation.

The fifth question to be considered is what the predation profile was like. What was the sex ratio and age composition of the deer harvest at these sites, and what was the effect of human predation on the prey population and on non-human predator populations.

Two skeletal indicators of sex were employed to estimate the sex ratio of the deer kill at these 7 sites, these being the presence or absence of antlers on skull fragments, and morphological characteristics of the pelvis (Taber 1956). Table 2 shows the sex ratio of the deer harvests suggested by each of these two methods. There exists an obvious discrepancy between the results obtained from the 2 sets of data. Judging from the pelvis morphology the sex ratio of the deer kill was fairly evenly balanced. The presence or absence of antlers on skull fragments suggests a definite selection of male vs. female individuals by Middle Mississippi hunters. This seeming selection for male animals is most likely not a result of hunter preference, but rather a bias introduced by two factors: 1) female skulls are less likely to be preserved in recognizable condition, and 2) because of the attached antlers, which were used in a variety of ways, male skulls and skull fragments would be more likely to be brought back to the villages. The pelvic data, therefore, is believed to more accurately represent the sex ratio of the deer kill, and strongly suggests a sexually balanced kill. Hopefully closer attention will be paid to this problem in the future. Since sexing deer pelvic fragments depends on almost complete elements, and is no simple task even then, samples will be small, even when large amounts of bone are recovered from sites (pelvic elements were quite often shattered during the butchering process).

Table 2. Sex ratio of the deer kill from seven Middle Mississippian sites, based on two osteological sexing criteria.

Site	Sexing Criteria	Estimated Sex	
		Male	Female
Chucalissa	Antlers	3	0
	Pelvis	14	17
Banks	Antlers	41	14
	Pelvis	10	12
Lilbourn	Antlers	1	0
	Pelvis	7	5
Snodgrass	Antlers	5	1
	Pelvis	2	4
Turner	Antlers	4	0
	Pelvis	3	2
Powers Fort	Antlers	0	0
	Pelvis	1	3
Gooseneck	Antlers	2	0
	Pelvis	1	0
TOTAL	Antlers	56	15
	Pelvis	38	43

The age composition of the deer kill at these seven sites is shown in Figure 2. Deer mandibles recovered from the sites were aged according to the eruption pattern of permanent dentition and relative amount of tooth wear (Severinghaus 1949). These age composition curves can be seen to be generally similar in form, except for the Banks site curve. There is a low representation of the zero age class (0 - 10% of the harvest) while the first, second, and third age classes represent the bulk of the sample. The older age classes are represented in lower percentages, with all but the two smallest samples including relatively old individuals (7½ years plus). This general pattern compares favorably with that obtained by Elder (1965) from three prehistoric sites in Missouri. One of the most interesting characteristics of the Middle Mississippi harvests is the low percentage of fawns (zero age class) represented in the kill. This is the most unusual in that young of the year are a very large, vulnerable section of the deer population. In attempting to determine the most probable explanation for the characteristic low percentage of young of the year in the prehistoric deer kills, Elder considered the possible influence of non-human predators such as Canis lupus and/or Canis rufus but rejected their possible impact on the deer population in favor of the hypothesis that prehistoric cultures were practicing "A voluntary and effective conservation measure - sparing the fawns to grow into better hides and more meat" (Elder 1965:369). A closer look at the selective nature of predation by wolves on deer populations, however, strongly suggests that it was the impact of wolves, rather than any conscious conservation measure by human predators, that was producing the low percentage of young of the year in the Middle Mississippi deer kills.

The age distribution curve of wolf predation of white-tailed deer obtained by Pimlott at Algonquin Park, Ontario is shown on Figure 2. (Pimlott et al. 1969). A comparison of these two age distribution curves provides a partial answer to the last question raised earlier: the relationship that existed between these two predator populations. The very high negative correlation between the two curves strongly suggests that there was very little direct competition between the two predator populations. Predation by wolves and Middle Mississippi hunters concentrated on almost mutually exclusive portions of the deer population.

Man's role as a predator in the ecosystem can most accurately be viewed as being complementary to the wolf. This complementary predation would be an important inhibitory factor that would function to maintain the deer population below subsistence density. Obviously it would have been advantageous for Middle Mississippi groups if the deer population was stabilized at close to optimum density. This would allow a maximum harvest from the deer population on a consistent basis, and would maintain the deer population at a healthy level. If, on the other hand, the deer population was allowed to increase toward subsistence density, the general health of the deer herd would be reduced, and the possibility of a rapid decline in the deer population would be greatly increased. By keeping the prey population from reaching a subsistence density level, the predator populations not only provide for their own survival, but ensure a future source of food, and protect both the prey population from crashing due to starvation and the plant food supply from being overbrowsed (see Smith 1974a for a complete discussion).

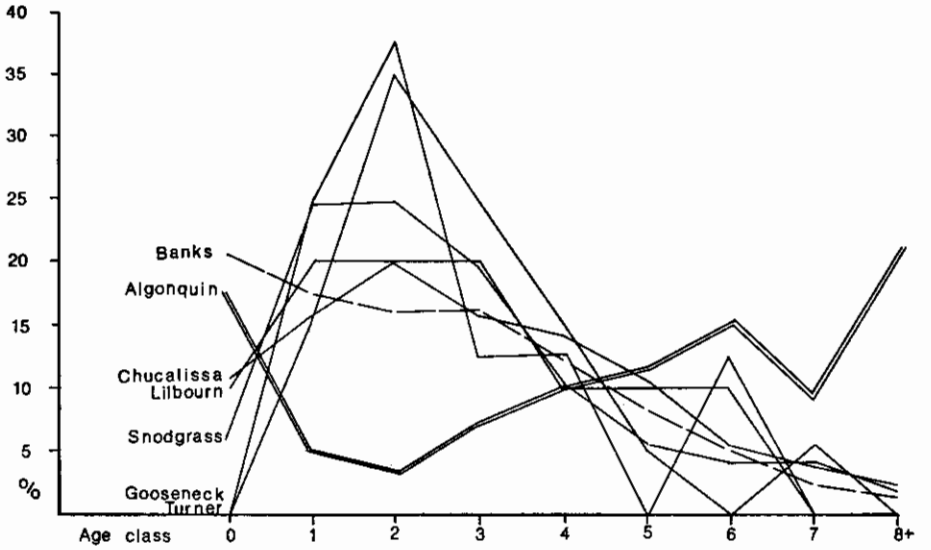

Figure 2. Age composition of the deer kill from six Middle Mississippi sites, compared with the age composition of the deer kill due to wolf predation at Algonquin Park, Ontario.

While it is difficult if not impossible to measure the degree to which human and non-human predators were harvesting the deer population, the relatively high representation of older individuals (7½ years plus) in the harvests suggests that the turnover rate of the deer population was slower than that which modern day populations experience.

Similarly, if the total number of deer represented at two completely excavated Middle Mississippi sites (Turner and Snodgrass) that are believed to have been occupied for only from 5 to 10 years represents the total deer harvest for the two sites, it still represents less than 10% of the total projected potential yield from the deer population within a ten square mile area. Thus while the evidence is limited, it suggests that harvesting of deer populations during the Mississippi period was not intensive.

Acknowledgment:

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AN AMERINDIAN POPULATION FROM MISSISSIPPI

R. C. Dailey

This report describes the analysis of a skeletal population from the Mangum site (MCl 9). a Plaquemine necropolis located in the Natchez Trace Parkway, Claiborne County, Mississippi. The human skeletal collection from this site represents one of four now being processed by the Department of Anthropology, Florida State University, under contract with the Southeast Archeological Center, National Park Service. The other sites are Ackia (MLe 56), Gordon (MJe 1) and Bynum (MCe 16), the former containing historic Chickasaw burials.

Under the terms of the contract the human remains are to be cleaned, preserved, accessioned, and restored. Each skeleton is then measured using standard anthropometric techniques, and a gross analysis performed to determine any pathological changes as well as identifying the presence of non-metrical variations. The completed report includes all the specific numerical data, standard indices of the cranial and post-cranial skeleton, radiographs and photographs, and a general description of the population including estimates of sex, age, and stature.

The Mangum site, named after its owner, was first noted in an official document for the Works Progress Administration by A. C. Spaulding (1941). Jesse Jennings (1942) listed it in the following year in his survey of the Natchez Trace Parkway, and John Cotter systematically tested the site and uncovered several burials in 1951 (Cotter 1952). Twelve years later Charles F. Bohannon excavated the Mangum Site for the National Park Service and removed 24 burials (Bohannon n.d.). Cotter's burials are not included in the collection under consideration here.

According to Bohannon, the site lies on the top of an isolated knoll with the burials concentrated in a small area near its apex. Bohannon found the burials generally scattered at random but in some instances they had been placed close together. There was, he says, no consistent orientation with points of the compass. He describes the burials as follows: 8 individual primary interments, 3 individual bundle placements, 12 multiple burials and 1 consisting of 2 isolated crania. Bohannon also notes that several of the burials which he found contained only the remains of articulated arms and legs. These he suggests occurred when a previous burial was encountered and partially removed to make way for the placement of a subsequent one. The presence of headless skeletons which I found to be seven in number he attributed to the activities of a local amateur who had a penchant for collecting skulls. The isolated crania Bohannon thought might best be explained as trophy burials.

My investigation of this skeletal population indicates that a minimum of 68 individuals are represented. Bohannon reported 61. These 68 contain the remains of both the cranial and post-cranial skeletons. In addition I found another 10 crania which had been separately packed in the field but had no information to indicate with which burial they were to be associated. Since two of these--which two I do not know--are most likely the ones thought to be trophies, this would increase the total number of skeletons to 70. The other 8 separate crania also probably belong but I was unable to associate any of them with the headless post-cranial skeletons in the collection.

Though most of the bones were in a good state of preservation not one skeleton was found to be complete. Indeed some contained only the largest bones and parts of these were often missing. Also many of the small or irregular bones such as carpals, tarsals, phalanges, vertebrae, and the like were simply non-existent.

Again with one exception no crania were undamaged and usually considerable restoration was required before even the cranial index could be determined. Upon completion of the restoration phase of the project it was found that all but 4 crania were faceless, and in only one of these was the basilar part present. Thus because of the general incompleteness of the crania I am not able to provide the kind of metrical profile which could be used to compare this Indian population with others in the same area.

Of the measurable cranial vaults most were either brachycranic or hyperbrachycranic. The fact that virtually every skull exhibited some degree of occipital flattening undoubtedly contributed to this condition. The ratio of the height of the vault to its length was found to be high or hypsicranic and where it could be taken, the height-breadth index was found to be average or metriocranic, but there was no suggestion of pathology in the latter. The medio-lateral flatness of the tibiae was also found to be average or platycnemic.

Using either the method of Stewart and McKern or the less reliable pattern of suture closure, it was found that 19 males and 19 females in the population were adults. In addition there were 2 adults for which no reliable age estimation could be obtained. The ages of infants and sub-adults were estimated on the basis of tooth eruption and length of long bones. The mean age at death for the entire population was 19 years. Stature estimates were obtained using the system of Trotter and Gleser for 14 adult males and 12 adult females. This mean stature for the males was 168.95 cm and for the females 151.19 cm.

Since life expectancy was not great this suggests that the Mangum population was not a particularly healthy one. And while, except in one case, the causes of death are unknown, the condition of the skeletons indicated that whatever the cause, the skeletal system was not involved. Periostitis was rare and in only one skeleton was there evidence of inflammed long bones. Rather surprisingly I found one case of multiple myeloma, a seldom reported fatal malignancy in prehistoric Indian populations and two instances of exostoses of the external auditory meatus. Two cases of fractures were found: one involved the right third and fourth metacarpals of an adult female; the other a traumatic arthritis in the right hip of a 22 year old male, undoubtedly the consequence of a fracture to the neck of the femur. Mild osteopytic formations were observed in the vertebrae and joints of seven individuals. There were also several instances of osteophytosis.

Periodontal disease was quite prevalent. There was considerable resorption of the alveolar borders often with root exposure. Caries were found in the dentition of about half of the skeletons. Apical obscesses were also quite frequent. Considering that this is a young population, attrition of the occlusal surfaces of the molars had not progressed much beyond a slight exposure of the dentin. All of the upper incisors in the collection were found to be shovel-shaped, though there was a very great post-mortem loss.

Though this part of the report is incomplete the kinds of non-metrical variations identified thus far has proven to be somewhat dissappointing. To date I have observed one perforated sternum, one case of incomplete closure of the transverse foramina in two cervical vertebra, two enamel pearls, and a number of skeletons, mostly female, with septal apertures in the distal ends of their humeri. Undoubtedly the incompleteness of the collection is a contributing factor to this low frequency.

In summary, the nature of my contractual relationship with the Southeast Archeological Center, National Park Service, has been described, as have some of the problems and preliminary results of the analysis. Data have been presented correcting the size of the population as well as providing estimates of sex, age and stature. Examples of pathological changes in the skeletons and the presence of non-metrical variations were also noted.

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ARCHAEOLOGICAL PROTEST BY URBAN INDIANS: A CASE STUDY

Joseph E. Granger

This paper attempts to document a protest by urban Indians directed against excavations carried out by the University of Louisville Archaeological Survey (ULAS). We shall describe the chronology and form of this protest, its elements, and possibly some reasons behind its occurrence. Obviously, there are errors in judgment in any confrontation and perhaps a participant is not an adequate person to present the situation objectively. Be that as it may, we can only hope to be moderately objective and basically analytical in this report.

During the summer field season of 1973 the University of Louisville Archaeological Survey conducted rescue excavations with a field program on a Late Archaic habitation component located within the confines of the local airport, Standiford Field. This station, the Kentucky Air National Guard (KYANG) site 15Jf267 yielded a large and varied assemblage of lithic and bone tools, and over fifty human burials. These interments were sterile of grave goods with one exception and some were very casually interred. Several of the burials also displayed post-interment disturbance by time-successive intrusive burials or other features. The site was also significant because of the excellent bone preservation which allowed accumulation of a very large sample of faunal remains from a midden which displayed several stratified living floors (Figure 1).

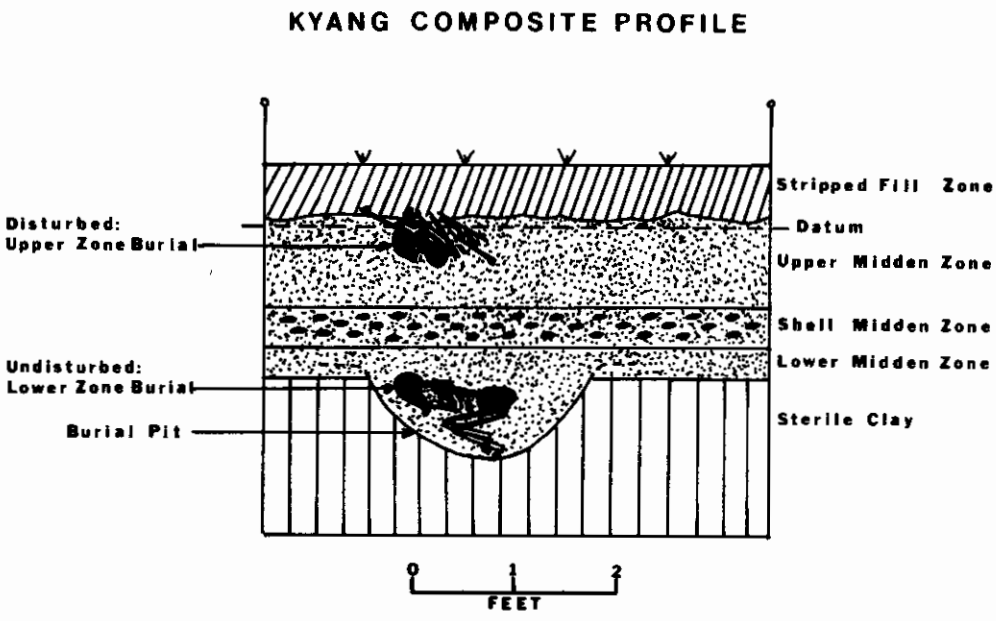

Figure 1.

Funding for the KYANG site excavations was derived from several cooperating local and state agencies. During excavations the Air National Guard provided "on base" security. All agencies were concerned that the site not be carted away for fill to build a jet warm-up pad but before archaeologists were able to suggest that alternate sources of fill be used, a small portion of the site had been totally extirpated. The site was placed on the National Register of Historic Places on an emergency basis (McGimsey 1972:18-19).

Confrontation:

When the excavations were all but concluded a news conference was held to acknowledge contributions from the funding agencies and their public spirited endeavors in conserving the community's prehistoric heritage. Unfortunately, some news photographers deviated from the planned activities and photographed some exposed burials which were still in situ, but in the the process of removal. These were disturbed upper zone burials (Figure 1) and the most obvious impression to non-archaeologists was that there was no pattern to the material which appeared to be a scatter of bone.

The next day a call from an extremely upset Native American was received. This Indian, a Louisville resident, said that he had seen the news stories and photographs. He ordered the Archaeological Survey to stop "desecrating the graves of his ancestors" and stipulated that "all bones and other materials must be put back immediately." He further indicated that he was the newly elected President of the American Indian Club of Kentuckiana (AICK) which allegedly consisted of approximately 40 Indians in the Louisville Metropolitan area. This Club had held a recently reported (July 1973) pow-wow in the city.

Immediately a private meeting with the club officers was requested by the University; however, not before a move to organize an institutional response had taken place. The Academic Vice President of the University of Louisville, when informed of the nature and gravity of the situation, ordered that all communications be directed to his office which would negotiate for the University in consultation with the legal officers and the Director of the University of Louisville Archaeological Survey.

The Club President abruptly called off the pre-arranged meeting but not before holding forth to the news media, consisting of the press and TV, that "archaeologists were desecrators and grave-robbers." The University was subsequently contacted by attorneys for the Native American Rights Fund (NARF) of Boulder, Colorado, who requested an outline of the situation and the University's position. They had, up to that

time, only an emotional assessment of the "desecration" from AICK which had contacted them for assistance to their cause. They requested that meetings be held to resolve the situation possibly by reburial of the excavated remains. They indicated, however, that the legal position of AICK was not good and further that they probably would not take the case.

One week later the situation had become more solidified. The University, in consultation with the State Archaeologist, had adopted a firm position of "no reburial" and supported it with a statement (Appendix 1). The AICK President held several press conferences, each expressing more virulent demands than the last. Finally, after NARF's refusal to enter the case, the American Indian Movement, Illinois Chapter, (AIM) was called to AICK's assistance (Appendix 2). The Director of the Archaeological Survey and his staff began to receive telephone calls which were overtly threatening in tone, several of which, placed to the Director's home phone, mandated that he should immediately comply with AIM's wishes in lieu of bodily harm to himself or his crews. It was at this point that a meeting was held.

The Club Officers and representatives of AIM, attended the first meeting with the University Negotiating Team consisting of the Academic Vice President, Chairman of the Anthropology Department, the Director of the Archaeological Survey, and two legal officers. The Indians were represented by a Legal Aid Counsel and a legal assistant. The newspaper photographs referred to were discussed as demonstrating "wanton looting with no care for bones" and a demand was presented that all cultural and human remains be returned by ULAS for reburial by Indian medicine men immediately. Further the Indians maintained that they had been prevented from viewing the site by the Air Guard--overtly due to on-base safety procedures, in reality because the University of Louisville Archaeological Survey had requested that access be denied. This was true to the extent that ULAS had been reliably informed that a ritual was to be held by AICK and AIM on the site for publicity purposes in which coercive measures were to be taken against archaeologists and the site rendered a "sacred precinct." Scientific justifications for archaeology and regulations for the safety of the site and persons on it were presented by the University officials but the demand for visitation rights and "reburial now" was voiced again. The AIM representatives demanded to know who had the right to allow such desecration. He was informed that the state had issued the necessary permits, and that even though the site was on the National Register of Historic Places, the State Antiquity Law pertained and had priority. All the Indian Representatives flatly refused to accept this, stating that only Federal Law applied to Indians and anything which was Indian. The Indians informed the meeting that they had additionally learned of other ULAS excavation activities and threatened to shut them down by force if necessary. After this encounter the AIM representatives left the room. University Officials offered to take positive steps toward a policy of Indian opportunity at the Universtiy but these suggestions were rejected by those Indians (AICK) remaining. At this point the allegation that archaeological study did little to alleviate injustices to the Indian was made as general closing by the AICK president. The meeting then broke up with neither side moved from its position and both sides calling for a court test.

After more press coverage, threats and demands, a period of quiet ensued for a week, when the Indians once again demanded to be allowed on the site with a medicine man of their chosing to "bless and consecrate" their "holy burial ground." This person, affiliated with the Chippawa tribe, was quite reasonable and although he had publicly put a curse on the University, privately he tried to adopt an arbitrator's position between that of the University and AICK/AIM's. He asked for reburial after two months' study. This position was neither rejected nor was it accepted by the University but it was placed under active consideration. A group of archaeologists of the Ohio Valley Archaeological Conference, then meeting in Louisville (September 1973), recommended on behalf of the organization that the offer be rejected and that the University wait out the Indians. No further contacts from the Indians were received. NARF, AIM, and ultimately the Legal Aid Society, all rejected AICK's case.

Assessment:

The Indian in today's urban society is as Deloria states "in a very real sense unreal and ahistorical" (1969:2). He is in many cases atribal. The situation in the AICK President's case is typical. He is of Mohawk Iroquois descent but lived on the Tuscarora Reservation in western New York. He spent 22 years in the United States Army and had recently moved to Louisville (February, 1973) from his last duty station, Fort Knox. Quite soon he advertised formation of an American Indian Club to establish "ties" with other Indians in the vicinity, and held the poorly attended initial pow-wow. Hertzberg (1971.235) suggests that "the activities of these various clubs tend to be quite similar being fraternal, social and educational. Often dances and pow-wows are featured... and better education in Indian traditions is a perennial theme." The apparent rational behind the formation of the Kentuckiana Indian Club is primarily the establishment of these "ties" with some form of organization since:

> A person who is on the roll of a tribe and lives on a reservation clearly is an Indian; if he moves from a reservation but remains on the roll, he continues to be an Indian. If he receives a clear title to allotted reservation land, he may or may not subsequently remain an Indian, depending on the circumstances. It would appear that one's status as an Indian is lost by disassociating oneself voluntarily from other Indians and becoming identified with some other social segment of society (Oswalt 1973:6).

The Club is substituted as a "social tribe" (Deloria 1969:231). While the Club does not provide a tribal history it does reassert Indianness and offers a degree of corporateness to tribally disaffiliated urban Indian families.

Indianness is ahistorical in that ethnic affiliation with all Indians of whatever area, prehistoric age or tribe is claimed. The AICK president often states that "my parents told me and their parents told them all the history I need to know." This statement reflects an attitude that is significantly anti-archaeological. Indian prehistory is made meaningless within an ahistorical context. This position is adopted to remove the urban Indian, involved in movements for social justice, from the white man's concept of the "historical Indian" (Garbarino, cited in Waddell and Watson 1971). The archaeologist is trapped, in that by demonstrating time depth for Indian cultures he is forced, for instance, to refer to 3000 or 5000 year old burials as "Indian." Such references are tailor-made for the reassertion of ahistoric Indianness by militants who claim all Indians are brothers. This attitude leaves the urban Indians free to adopt any relevant social or cultural values for the promotion of their Indianness (Boissevain, cited in Walker 1972). Retention of the Chippewa medicine man functioned to reassert the Indian identity, not Chippewa culture, since none of the local Indians were of that tribe. Blessing of the archaeological site was to provide the newly formed organization with a sacred precinct within the urban setting.

Clearly the archaeologist who excavates "Indian sites" is to the militant Indian a desecrator of the dead. If the archaeologist admits that the excavated burials are Indians, he also admits that not only the grave goods but that all materials from the site are Indian (McGimsey 1971). To the urban Indian,

then, archaeology on any Indian site is desecration and excavation of a site with burials, an Indian Burial Ground, is the worst form of sacriledge, because it views his ancestors as objects of scientific study. Currently even antiquities laws refer to these burials as "objects of antiquity" (Kentucky Revised Statutes 164.705).

Indians who wish to sue for injunctive relief against archaeologists, whom they assume to be desecrators, must show that they have some legal standing. Most states interpret demonstrated historic tribal affiliation as conferring such standing (Winfree 1973; King 1972). Urban Indians who cannot demonstrate such association attempt to blur the difference between tribal and Indian identity in marshalling public opinion. They rely upon a collective emotional guilt in the white's perception of past injustices to the Indian. Therefore public outcry and their Indianness are advanced as a claim to legal standing. If the situation is not quickly resolved by capitulation of the offending institution, however, the effort to obfuscate the legal definitions soon collapses under legal pressure.

The politics of confrontation govern much of the most militant urban Indian protest. The American Indian Movement is primarily an urban protest group. Its tactic in negotiation is the threat of violence, not violence itself. This was demonstrated by the threats in the meeting and the angry walkout of the AIM people with the Club President becoming the party who wished to temper threats with reason.

Aside from their distaste for the federal government's paternalism on reservations, urban protest leaders are very conversant with federal law governing antiquities and archaeology and appear ready to use them to override any state or local involvement. To them, states have no rights to make laws concerning lands which they conceive to have been unlawfully alienated by the federal government. The militant's pan-Indianism is, however, directed against no single state or institution (Thomas, cited in Walker 1972). In order not to dilute their endeavors they use the Federal law to present the case for injustice to Indians as a whole.

Johnson (1971) has indicated that monies spent for archaeology are thought by Indians to be wasted or at least better employed to alleviate Indian suffering on reservations. Although this goal of alleviating suffering is often expressed, it has little programmatic backing. The structure below protest is usually undirected and unfocused except by emotion. Appeals to reason are therefore seen as justifications for injustice, and offers to aid as patronization.

Conclusion:

In conclusion we have not yet been able to meet with the Louisville urban Indians on a level of mutual acceptance. The University has its scientific and legal responsibilities and must abide by them. The Indians, who have apparently exhausted their resources, have let the matter drop, but, we assume, have not forgotten it. Re-interment or storage of the human remains is subject to strict guidelines and Kentucky coroner's laws which provide for stringent controls.

Our attitude as archaeologists is that in situations of rescue archaeology we will have to protect the heritage of the urban Indians until they understand that their Indianness can be better defined in the time perspective provided by prehistory. Recognition and adoption of a firm legal position and a determination to adhere to it may be the only way the archaeologist has to confront similar situations of protest. To expect rational negotiation over an emotion-charged issue in full public view is wishful thinking. Still the archaeologist must assume a flexible stance when the point is made. One cannot simplistically wait out the issue as opposed to the indivuduals involved. Humane treatment of both is mandatory. Display for thrill value of human remains of whatever derivation is a gross insult to the remains and to the profession. A failure to understand that the Indians have a legitimate role in the disposition of their heritage is as great a mistake.

Much of the urban Indian's frustration is his awareness that he is not consulted about tribal affairs, or because of his usually low socioeconomic status, about urban politics. To him communication is everything - without it, he is frustrated - with it, he may become a willing partner in archaeological conservation. If the protest at Louisville has accomplished anything, it has caused a concerted effort at planning a dialogue with an Indian population we didn't even know existed and establishment of clear and specific guidelines for the treatment of all prehistoric human remains.

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Appendix 1

STATEMENT

UNIVERSITY OF LOUISVILLE ARCHAEOLOGICAL SURVEY

August 9, 1973

The KYANG Site 15 JF 267 was discovered August 4, 1972 by workmen engaged in construction of additional facilities for Shewmaker Air Base. The University of Louisville Archaeological Survey was contacted immediately by the Kentucky Air National Guard Command and arrangements were made to preserve the site from imminent total destruction by bulldozer stripping, erosional effects, looters and vandals. Air Guard personnel have cooperated fully in 1) providing security and 2) halting construction of the additional facilities until a professional evaluation of the site could be made by archaeologists from the University of Louisville, who hold a valid permit under the provisions of Kentucky Revised Statute section 164.720.

University officials have acted with deliberate speed to accomplish the scholarly objectives as quickly as possible, despite handicaps posed by 1) the site's situation within the operational area of the airport and 2) a lack of immediate funding for the project.

After one year of intensive activity, both at the site and working with governmental and community agencies, the University of Louisville Archaeological Survey concluded its scheduled work and issued a preliminary report to representatives of co-operating agencies and to the public on Monday, August 6, 1973. Activities at the site during the past week have been the "closing-out" operation normally associated with ending any such project. The University has received a great deal of co-operation from all agencies involved in the project and is keenly aware of its responsibility to act with deliberate speed to allow airport and National Guard officials to proceed with their construction and to be relieved of the onerous task of providing special security arrangements for the site.

The Archaeological Survey's specific positions are:

Point 1 Human remains that represent historic populations will be re-interred by the University of Louisville Archaeological Survey only if specific tribal associations are demonstrated by a legally qualified spokesman.

Point 2 The remains referred to in Point 1 will be thoroughly analyzed before re-interment.

Point 3 No legally undocumented remains will be re-interred nor will grave goods or artifacts associated with these undocumented remains be re-interred.

Point 4 In University of Louisville Archaeological Survey excavations all human remains and associated artifacts will continue to be treated with the respect normally due human beings, no matter of what affiliation.

Point 5 University of Louisville Archaeological Survey artifacts and cultural materials will continue to be displayed on a selective basis for educational purposes.

Point 6 Human remains retained in the University of Louisville Archaeological Survey collections will continue to be available for study by qualified scientists.

Point 7 Any materials held in the University of Louisville Archaeological Survey collections are not now nor will they in the future be displayed for purposes of shock value or merely to satisfy public curiosity.

Point 8 Publicity attendant upon University of Louisville Archaeological Survey projects will continue to be presented in such a way that reflects no discredit upon the materials or cultures being excavated.

Point 9 No intrusion, interruption, or demonstration will be tolerated on any site or project being investigated by the University of Louisville Archaeological Survey.

Point 10 Scientific data resulting from archaeological activities will continue to be made public in conformity to publication policies of the University of Louisville and the Society for American Archaeology.

Point 11 Other information on site locations, projects being developed, operations, employees and collections will continue to be confidential and available only to qualified persons.

Appendix 2

AMERICAN INDIAN MOVEMENT

Illinois Chapter

BROTHERHOOD

FOR IMMEDIATE RELEASE:*

It has been called to the attention of the American Indian Movement, that an Indian burial ground was discovered and excavated, next to a runway at Standiford Field near Louisville, Kentucky. It has been further brought to our attention that photographs were printed in the local newspapers, showing the bones stacked and classified as to their anatomical type....

It is our feeling that the desecration of our ancestral burial ground cannot be of any real value to anyone.

If we tried to dig up a white man's grave, we would be arrested and incarcerated for disturbing someone's final resting place. Grave robbing and body snatching for the purpose of scientific study was outlawed in the early 18th Century. By those same laws, white men should be prevented from digging up ours.

The American Indian Movement supports the American Indian Club of Kentuckiana in their demand that these bones be returned to their original resting place and the area be restored to its original state. If this is not feasible, we demand that the remains be buried in a suitable alternative location. We will not tolerate, under any circumstance, the disturbance of our ancestral burial grounds. We believe that no moral or scientific purpose can justify the destruction of these most holy grounds. Our beliefs, as do yours, state that no one has the right to disturb the final resting place of our ancestors....

The American Indian Movement will do everything necessary to prevent future excavations, unless we can get permission to dig one of your cemeteries for our own study of physical anthropology....

AIM HAS SPOKEN!

*Note: This copy contains the text of two statements: one prepared to be issued in case the site was still being excavated; the other in case the site excavation had been concluded. We have omitted the temporal references only in combining these two releases.

METHODS FOR THE PATHOLOGICAL EXAMINATION OF HUMAN SKELETONS

Dan Morse, M.D.

At the present time there are three principal methods in conducting a pathological survey of a skeletal population. The future will undoubtedly add many more. These three are: Gross examination of the bones, use of the x-ray and use of the microscope.

Before discussing these in some detail, your attention is called to a fact that those of us who have attempted to analyze skeletons, both physically and pathologically, are well aware of - that the amount of information obtained is directly related to the skill of the excavator when he removes the bones and prepares them for transportation to the laboratory.

With this in mind, it is recommended that every archaeological excavation should have as a member of the team a physical anthropologist. If the project is small, then, at least, a physical anthropologist should be available as a consultant, preferably to periodically visit the excavation. The physical anthropologist should be able to examine the burials in situ, conduct a simple on-the-spot bone inventory and supervise the removal of the skeletal material, the labeling, the boxing and transportation to the laboratory. The late Dr. Georg Neumann said that it should take at least as much time in removing the skeleton as it does to excavate it in the first place. A few extra minutes in the field can save many hours of work in the laboratory. It is important to get all the bones-hence the necessity of the bone inventory. This inventory does not need to be recorded and it is not advisable to make an extensive description of the bones as they are removed. This can be done more accurately in the laboratory. Frequently pathological bones are more fragile and consequently more care is necessary in their removal.

If a physical anthropologist is not used, then the archaeologist in charge should assume these additional responsibilities and should be qualified to perform this preliminary bone work. Unfortunately this is not always true. For example, Dr. Robert Dailey and I recently conducted a survey of a skeletal population for the National Park Service. This material had been excavated, under contract, several years ago. Of the seventy individuals represented, none of the skeletons were complete. Many of the larger bones were missing. Less than 5% of the finger and toe bones were present and only one coccyx was recovered and it was fused to the sacrum. In addition the bones were mixed up in the boxes, making it difficult to impossible to separate the individual skeletons. The field notes reported that a few bundle burials were found and these are never complete. There also can be major root and rodent disturbances but these deficiencies should not be compounded by the excavator. In collections like this, such things as non-metrical variation, population comparison and incidence of disease are of very little value.

Gross Examination of the Bones:

Gross examination of skeletons need no detailed explanation. Experience will pay off in determining what is pathology and what is pseudopathology caused by post-mortem changes. Liberal use of the magnifying glass is important.

Use of the X-ray:

The x-ray machine must be enclosed in a lead-lined box. The equipment should be inspected by a radiation safety inspector and the box should be constantly monitored so that the occupants of the room will not be exposed to radiation. Before the machine is turned on, the door to the box must be closed and secured.

The ideal situation would be to x-ray every bone in every skeleton, but the results obtained would hardly justify the time and expense. However, in selected cases, it would be imperative that the skeleton should be x-rayed in its entirety. One such case is illustrated in Figures 6, 7, and 8.

There are two specialized x-ray methods that are sometimes used in the study of archaeological bones: planigrams and microradiography. Planigrams or body section x-rays are produced by a simultaneous movement of the x-ray tube and the film so that only one plane of the object is in focus during the exposure. This has the effect of x-raying a slice of the object. Additional slices can be obtained by varying the distance from the tube to the object. Microradiography usually requires a specialized machine which uses low kilovoltage and long exposure time. High resolution film is necessary in order to permit the visualization of tiny details that can be seen only through a microscope. A thin section of bone is required.

Use of the Microscope:

The method used in medical laboratories for examining bone microscopically is to demineralize fresh bone by soaking in an acid solution until it is soft enough to be cut with the microtone knife. This does not give uniformly good results with archaeological bone because demineralization just adds to the rotting process that the bone has already experienced while in the ground. One solution to this problem is polished thin sections which utilize the diamond saw, grinder and polisher (Figure 1). The thin section should be 25 to 50 m in thickness and the surface must be microscopically smooth. Another solution, which will probably be the accepted method of the future for examination of dried bone, is the scanning electromicrograph. All one needs is a bone surface or a break in the bone. Transmitted light is not used and the depth of field is tremendous.

Specimens of Particular Interest:

Variability, both genetic and acquired, is a prominent characteristic of man. It seems that every skeletal collection contains several unusual and interesting abnormalities.

Recently Dr. Robert Dailey and the author examined 14 skeletons from the Virgin Islands for the National Park Service. These burials had been recovered by park rangers from the Virgin Island National Park at Cinnamon Bay, St. Johns. The bones had been exposed by surf erosion and were thought to be from an unmarked cemetery probably dating back into the slave period. All 14 were negro. One male, who was 60 to 65 years of age at time of death showed a diamond-shaped defect involving the upper right canines and first premolars. This is a pipe stem attrition (Figure 2). Another individual, a female, aged 40 to 45 years, demonstrated a pronounced osteitis of the frontal bone. The evidence for antemortem existence of this lesion was the presence of boney nodules surrounding the areas of erosion. The most likely diagnosis would be a treponema infection such as syphilis (Figure 3).

Another collection belonging to the National Park Service was examined by Dr. Dailey and myself. Some 70 fragmentary skeletons had been excavated in 1963 from the Mangum mound in Claiborne County, Mississippi, on the Natchez Trace Parkway, and were identified as belonging to the Late Mississippi Period, ca A.D. 1300. One male, (catalogue #6695) age about 22 years, had a severe osteoarthritis of the right hip joint (Figure 4). As no other joints were involved, it was thought that this was a traumatic arthritis. Gross examination and x-ray confirmed this impression as there was shortening and distortion of the neck of the femur, indicating a healed fracture. In the same collection there was a 35 year old female (catalogue #6692). The post cranial portion consisted of 21 vertebrae, 34 rib fragments, the pelvis, all the long bones and some of the bones of hands and feet. The greatest involvement was in the seventh cervical vertebra. On the surface of the body of the vertebra were seven distinct punched out areas from 2 to 7 mm in diameter (Figure 5). X-ray showed several additional radiolucent areas which had not yet reached the bone surface (Figure 6). Gross and roentgenographic examinations of the entire skeleton reveal similar involvement of 17 vertebrae, 11 rib fragments, the right and left illium and the right scapula. The long bones were not involved (Figure 7). Unfortunately four skulls were in the same box, all marked with the same number. All four skulls were x-rayed. Two of the skulls, assigned letters A and C were males. B and D were probably female. An x-ray of B (Figure 8) showed pathology similar to that seen on the diseased bones in the post-cranial skeleton, and it is assumed that skull B belongs to the diseased skeleton. This case will be reported in greater detail in a future issue of the Bulletin of the New York Academy of Medicine. The most likely diagnosis is multiple myeloma, which is a malignant tumor of the bone marrow.

Suggestions:

Following are some suggestions for the paleopathologist when he attempts a survey of a skeletal population:

1. Examine in situ whenever possible.
2. Consider the entire skeleton, because distribution of disease is important in arriving at a diagnosis.
3. Take special care in bone removal, labeling, boxing and transporting to the laboratory.
4. Preserve for the future so that new techniques can be applied if and when they are developed.
5. Get help from others such as the roentgenologist, the orthopedic surgeon and the pathologist.

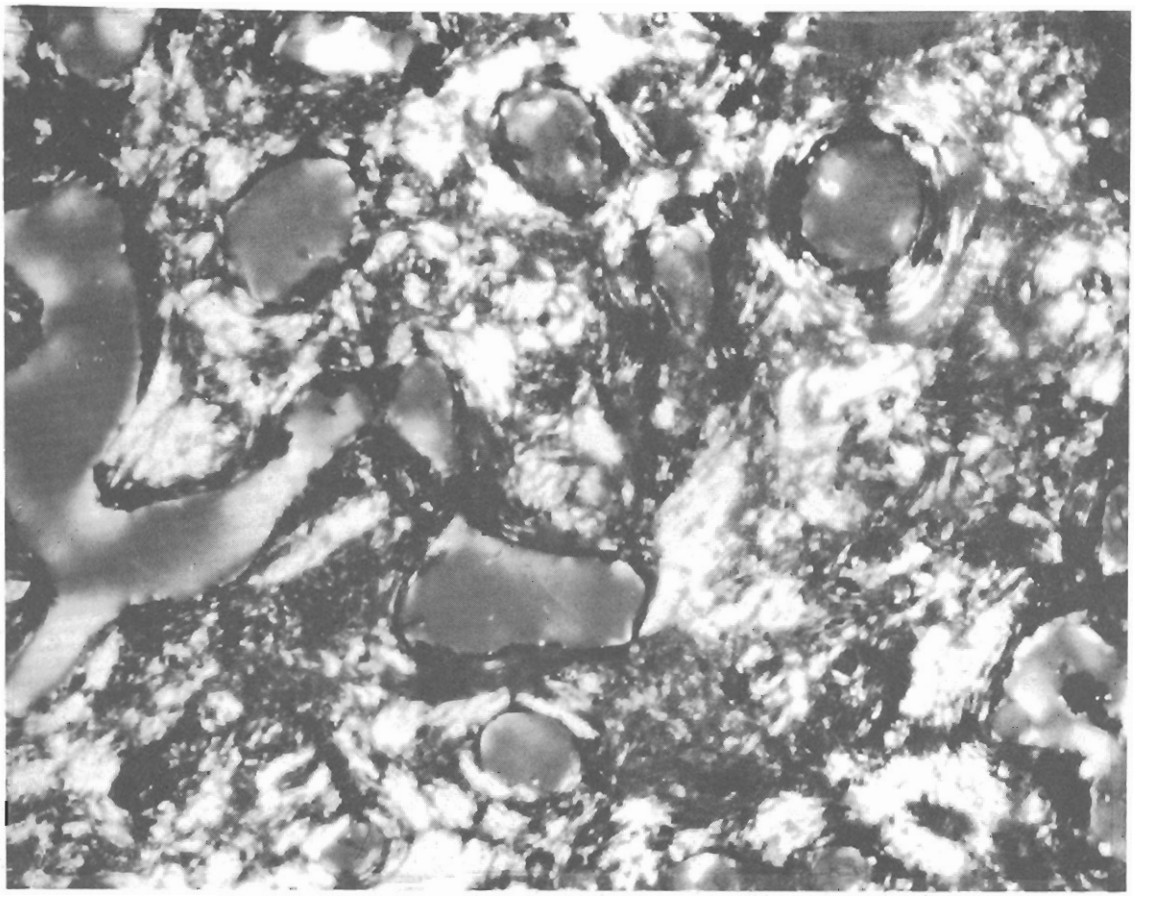

Figure 1. An example of thin section microscopy. Photomicrograph of a diseased archeological tibia from the Sowell Mound, near Panama City, Florida. In the upper right portion is a normal osteone. The distortion of the remainder is due to a sclerotic osteomyelitis.

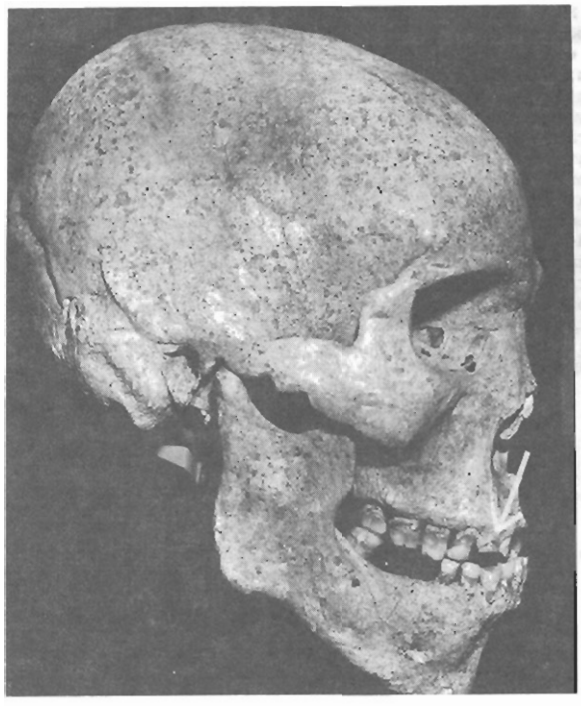

Figure 2. Pipe stem attrition in an elderly male from the Virgin Islands National Park.

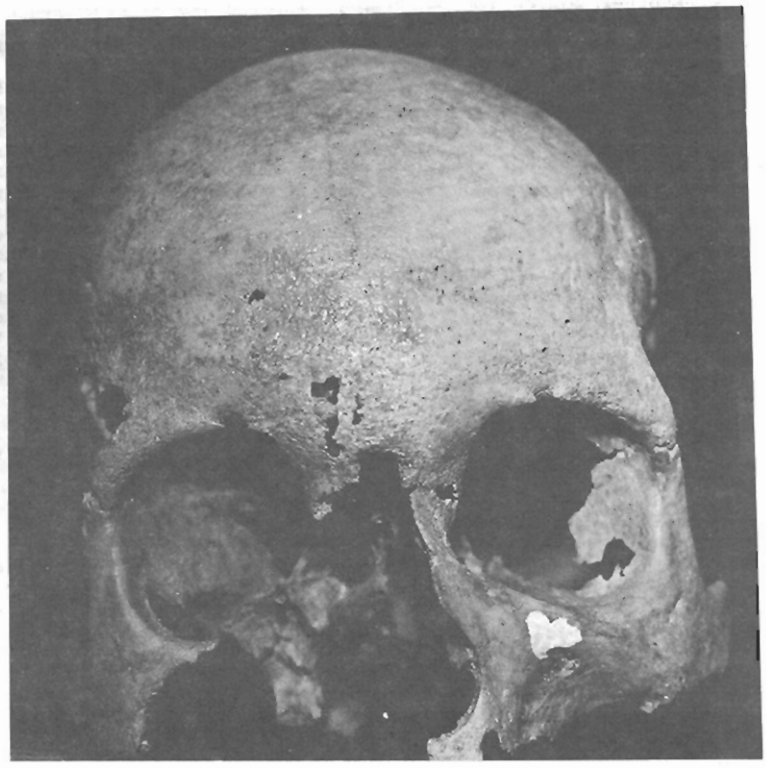

Figure 3. Pronounced osteitis of the frontal bone (Virgin Islands National Park).

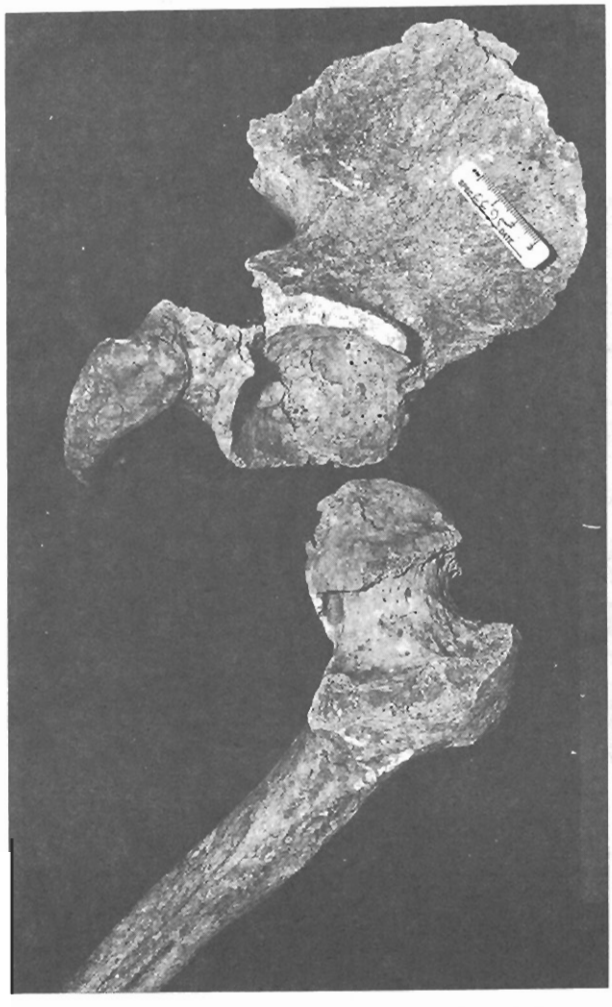

Figure 4. Traumatic arthritis of the right hip joint in a 22-year old male found in the Magnum Mound, Claiborne County, Mississippi.

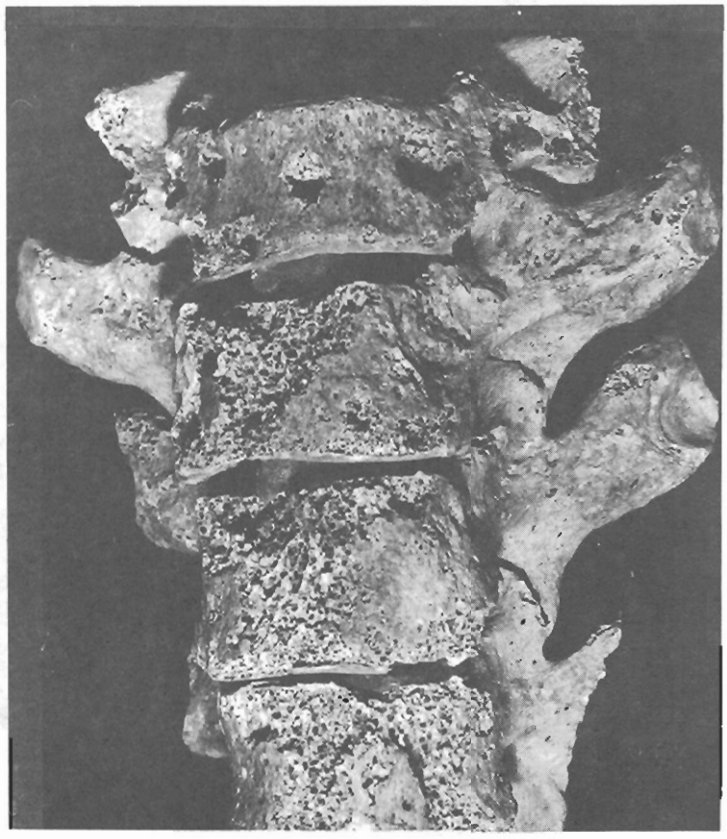

Figure 5. Photograph of the seventh cervical vertebra and the first, second, and third thoracics in a 35-year old female skeleton from the Magnum Mound. The discrete punched-out lesions are typical of a multiple myeloma.

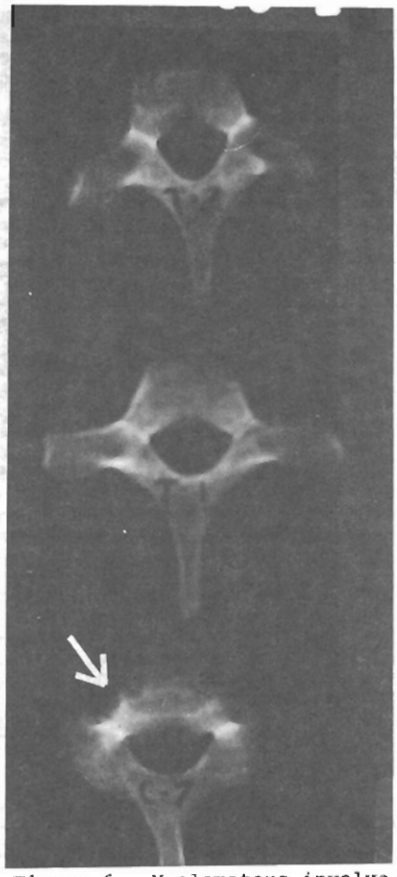

Figure 6. Myelomatous involvement of several vertebrae from the Magnum Mound skeleton. The disease was most pronounced in the seventh cervical (arrow).

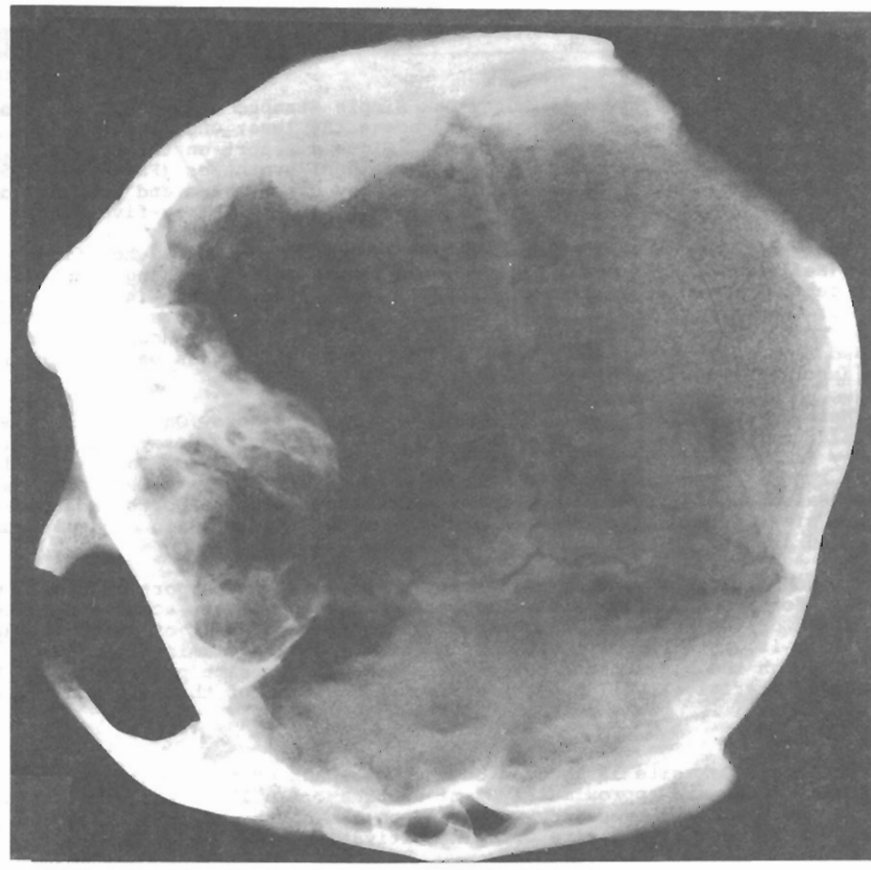

Figure 8. Enlarged view of skull showing lesions compatible with multiple myeloma.

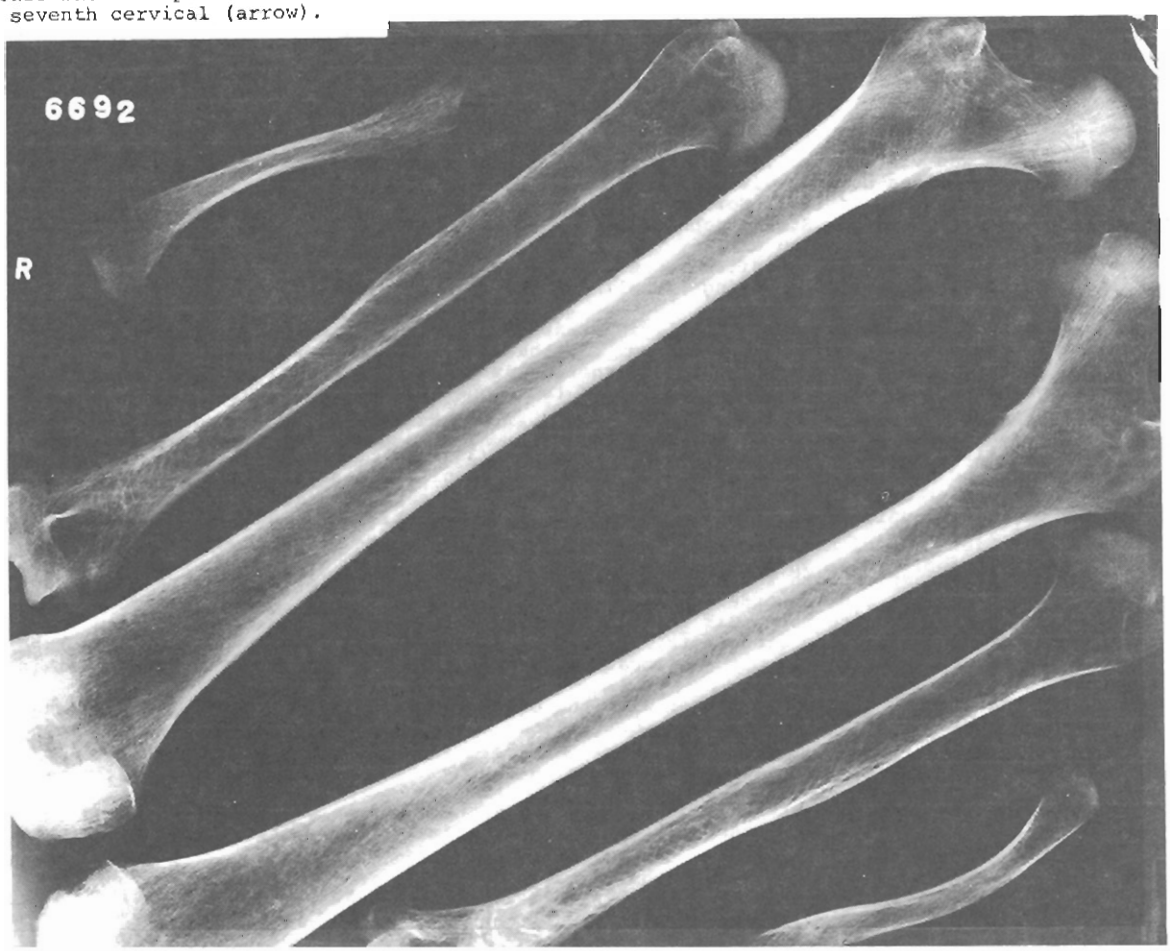

Figure 7. X-rays of the long bones of skeleton 6692 are normal.

SOME OBSERVATIONS ON MOSSY OAK

Thomas J. Padgett

Although the pottery type Mossy Oak Simple Stamped has been known since the WPA era, the cultural and temporal relationships of Mossy Oak are among the least understood in the Southeast. Sears (1956:3) referred to it as the "mysterious Mossy Oak." Since a report on the type site was never published, what is generally known of Mossy Oak is found in regional syntheses (Fairbanks 1952, 1956; Willey 1966). The purpose of this brief paper is to review the Mossy Oak problem and present additional data from the fieldnotes and the artifacts which have been in storage for thirty-five years.

Mossy Oak Simple Stamped pottery was labled "Sigma Ware" when first encountered in the excavations at Macon (Kelly 1938:31). For a brief period it was called "Vining Simple Stamped," after the Vining site in north central Georgia (Fairbanks 1952:287; Kelly 1938). The Vining site is one of several rock mound sites (some of them effigy mounds) which have produced small amounts of Mossy Oak Simple Stamped pottery. Waring (1945) reported on some Hopewellian artifacts from the Shaw Mound, a rock mound near Cartersville that yielded several simple stamped sherds. Fairbanks (1952) has used this evidence to postulate an Adena complex associated with Mossy Oak ceramics.

Warning and Holder (1968:143) mentioned finding Mossy Oak sherds in association with Deptford ceramics at a site north of Atlanta. Wauchope (1966:226) reported Mossy Oak associated with Dunlap Fabric Marked pottery in his north Georgia survey. A small amount of Mossy Oak material was found in the submound levels of the Funeral Mound (Mound C) at Macon Plateau, with Dunlap, Deptford, Macon Plateau, and fiber-tempered wares (Fairbanks 1956:38). Of course, since these early reports, Mossy Oak sherds have been found on Georgia sites from Cartersville to Macon. At the type site in central Georgia, the Mossy Oak component was described as "pure" (Fairbanks 1952:286).

It would be presumptuous to attempt a complete site report on a site which has been discussed (however briefly) for many years by archaeologists much more closely acquainted with it. However, since another generation of southeastern archaeologists has emerged, most of whom have never seen the site or the collections from it, this review may be of interest. I have examined the surviving fieldnotes and collections, and, although the collections suffer from some of the same problems which Hale Smith detailed in regard to the Lamar material, I will present a brief discussion of the site and the excavations.

Description:

The Mossy Oak site is located on the west bank of the Ocmulgee River 4 mi south of Macon, Georgia. The Lamar mounds are approximately 2 mi upstream. In 1937, the site was described as a flat field, bordered on the south by swampy woods and on the north and east by a bend in the river (Figure 1). The fields to the west of the site were in cultivation.

The site was subject to periodic flooding, and at the time of excavation was covered by alluvial deposits over 1m thick in some places. Below the midden strata was more alluvial soil of a different color.

Like many sites along the Ocmulgee, dark, organic midden strata were exposed by bank-cutting erosion. The fact that there were two middens present at the site was not discovered until a close examination of the river bank detritus revealed what appeared to be a pure Mossy Oak component underlying a Lamar phase occupation.

Excavations:

The Mossy Oak site was visited by A. R. Kelly in 1935, and some test pits were excavated at that time. No records of these excavations have survived at the Southeast Archeological Center. Apparently these excavations were not extensive. In 1937, Gordon R. Willey directed a Civilian Conservation Corps (CCC) project known as the Central Georgia Stratigraphic Survey. Through excavations at a number of sites in the Macon vicinity, the project hoped to clarify the stratigraphic sequence that Kelly found so elusive at Macon Plateau. Mossy Oak was one of the sites chosen for excavation in this project. Others included Cowarts Landing, Napier Village, Tuff's Springs, Shell Rock Cave, and Stubbs Mound.

Willey did a considerable amount of methodological experimentation during the course of his sojourn in Georgia. He tried to establish a dendrochronology for the area, and also experimented with procedures such as the "stratigraphic block" technique that DeJarnette was using in north Alabama (Webb and DeJarnette 1942), and the "dog leash" controlled surface collection technique that Binford (1964) reinvented a quarter-century later.

At the Mossy Oak site, Willey began with eight 10 x 10 ft (3 x 3 m) test pits using 3 in (7.6 cm) arbitrary levels below the plowzone, which was shoveled out as a unit. These first pits were placed randomly (i.e. nonuniformly) over the site, but three later pits were placed along the riverbank. Upon completion of the excavation unit a soil profile was drawn, and the arbitrary levels were superimposed over this profile.

Most of the test pits sampled both the Lamar midden and the Mossy Oak midden deposits. Pits 9, 10, and 11 were excavated along the bank in order to sample the Mossy Oak component more thoroughly. These pits concentrated exclusively on the Mossy Oak strata, although it was noted that some of the upper midden would be sampled in Pit 9. Unlike the other pits, Pit 11 was apparently dug in levels that conformed to the 30° slope of the riverbank where the pit was located. Very little material was collected in this unit.

Unfortunately, the transit data are no longer with the other records, and no topographic map was made of the site. Some photographs are included in the collections, but few of them survive in good shape.

Materials Recovered:

Although a few burials were encountered, there are little surviving data pertaining to them. Apparently they were all Lamar burials. There is a small collection of lithic material, but the vast majority of the artifacts consists of ceramics.

I have examined all of the potsherds from four of the 11 Willey pits at the Mossy Oak site. After examining several thousand sherds from Pits 7, 9, 10, and 11, it was apparent that the Mossy Oak ceramic assemblage included a plain, sand-tempered ware as well as the better known simple stamped type. The plain

ware is identical to the stamped variety in paste characteristics and form. Fairbanks (1956:41) referred to a similar ware as "Woodland Plain." I have used the designation "Mossy Oak Plain" in referring to this material, since it is so closely associated with Mossy Oak Simple Stamped in the collection from the type site. In the lower midden levels excavated in Pit 11, the plain ware comprised 28% of the ceramics. In the corresponding levels in Pit 10, it was 33% of the total. Although no whole vessels of the plain ware are known, the undecorated surface apparently does not represent simply an unstamped portion of simple stamped pots, but was an alternative surface treatment.

The Lamar occupation is represented by the types Lamar Bold Incised, Lamar Complicated Stamped (both clear pattern and obliterated stamping), and Lamar Plain. A few Etowah and Macon Plateau sherds are in the collection, along with very small amounts of earlier types such as Napier Complicated Stamped, Swift Creek Complicated Stamped, and Dunlap Fabric Marked. There are no features that were directly associated with any of these minority types.

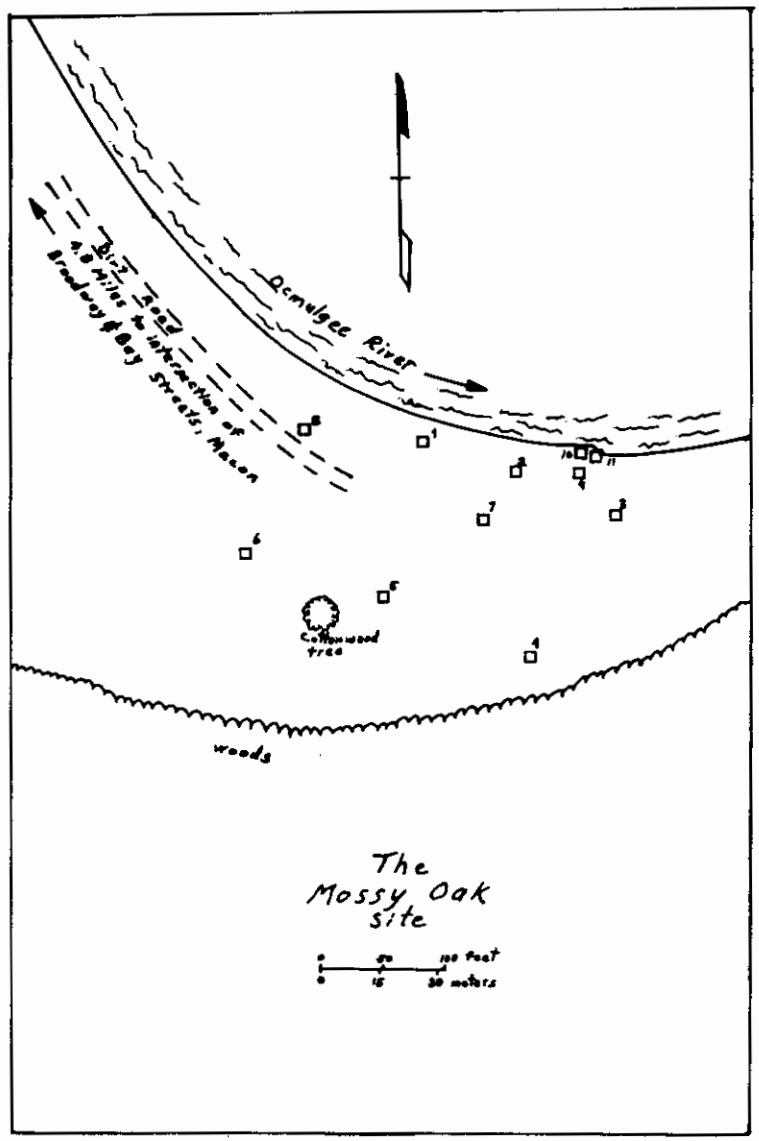

Figure 1. Mossy Oak site taken from map by Tamplin in Willey's fieldnotes (1937).

The Two Middens:

Willey's field notes indicate that the Lamar and Mossy Oak middens were separated by a layer of alluvial sand. Both Willey and Kelly (personal communications) remember the stratum as being quite distinct. The ceramic analysis demonstrates the separation of the Lamar and Mossy Oak Assemblages fairly well. Figure 2 shows the relative percentages of Lamar and Mossy Oak pottery by excavated level in Pit 7.

Pit 7 should offer the best stratigraphic picture of the site. According to the field notes, this centrally located pit had only 17.8 cm (7 in) of primary riverine deposit (plowzone) overburden. The cultural deposits extended to a depth of 127 cm (50 in) in this pit. No burials or other intrusions were noted in this unit during the excavation.

The sterile layer does not show up in Figure 2 or in the sherd counts for Pit 7 (Table 1). The ceramic totals decline in levels 5, 6, and 7, which, according to the generalized profile drawings in the notes, represent the center portion of the "yellow sand alluvial deposit." Ceramics never quite drop out entirely. In fact, the Lamar ceramics persist below the "sterile" layer and comprise 80% of the total in Level 8, and 35% in Level 9. The persistence of Lamar materials in the collection units from what should be "pure" Mossy Oak strata can be found in the other test pits. In those instances it can be accounted for by the presence of intrusive features, bank slumping redeposition, and incongruous natural and arbitrary levels.

In the case of Pit 7, the Lamar ceramics below the "sterile" stratum cannot be easily accounted for. There may have been intrusions or other disturbances which were not noted in the field that would account for the Lamar presence. This is a possibility since Willey was without archaeologically trained assistants to help direct the CCC laborers who were working on several pits simultaneously. Contamination of the artifact collection since its removal from the field is another possibility which cannot be overlooked. Flooding and hydrological migration and redeposition may be a factor, but would be difficult to test. It may even be that the flooding responsible for depositing an alluvial layer interrupted the Lamar occupation at the site.

This last possibility leaves open the question of how much time elapsed between the termination of the Mossy Oak occupation and the beginning of the Lamar occupation. The evidence for an Early Woodland assignation of Mossy Oak is based upon association with other ceramic types and the formal similarities with other "early" ceramic attributes. Is that evidence enough?

Is should be fairly easy to put the question to rest by additional controlled excavations at the type site. It may seem almost anachronistic to suggest revisiting a site to settle a minor detail of cultural history. However, I think there is much to be gained by such a visit. In addition to checking the ceramic stratigraphy and the natural soil stratification, additional data on diet and subsistence, non-ceramic industries, and any number of other topics might be obtained.

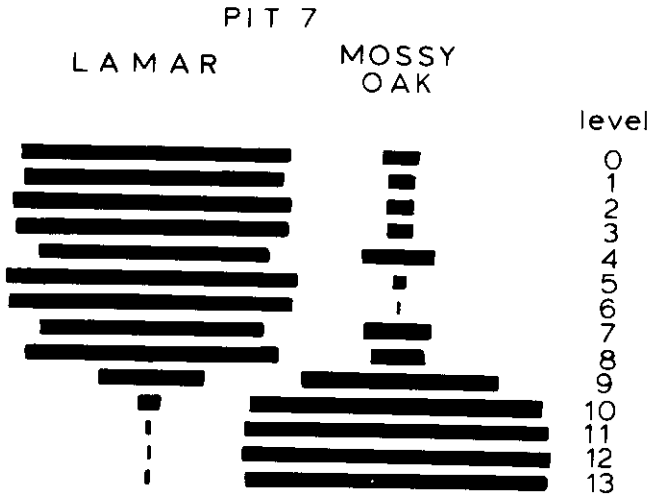

Figure 2. Percentages of Lamar versus Mossy Oak ceramics by excavation level.

Table 1. Sherd analysis of pit 7, Mossy Oak Site (11 Bi 17).

	Mossy Oak Smp. Stmp.		Mossy Oak Plain		Lamar Bld. Inc.		Lamar Com. Stmp.		Lamar Ob. Stmp.		Lamar Plain		Misc.		Total
Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
0	8	4.6	14	8.0	21	12.0	20	11.4	42	23.9	72	40.3	0	0	176
1	3	3.4	7	7.9	9	10.1	4	4.5	23	25.8	40	44.9	3	3.4	89
2	5	7.9	2	3.2	1	1.5	12	19.1	19	30.2	24	38.1	0	0	63
3	7	4.8	9	6.2	10	6.9	23	15.9	32	22.1	63	43.5	1	.7	145
4	14	10.1	19	13.7	9	6.5	28	20.1	16	11.5	50	36.0	3	2.2	139
5	0	0	2	2.4	5	6.0	16	19.4	22	26.5	35	42.2	3	3.6	83
6	0	0	0	0	1	4.0	10	40.0	4	16.0	8	32.0	2	8.0	25
7	5	11.6	4	9.3	3	7.0	8	18.6	3	7.0	19	44.2	1	2.3	43
8	9	8.3	10	9.3	5	4.6	24	22.2	16	14.2	43	39.8	1	.9	108
9	56	44.8	25	20.0	3	2.4	13	9.6	4	3.2	25	20.0	0	0	125
10	93	82.3	14	12.4	0	0	3	2.7	0	0	3	2.7	0	0	113
11	16	72.7	4	18.2	0	0	0	0	0	0	2	9.1	0	0	22
12	10	90.9	1	9.1	0	0	0	0	0	0	0	0	0	0	11
13	3	75.0	0	0	1	25.0	0	0	0	0	0	0	0	0	4
14															0
15	2	100.													2
16													1	100.	1

Mossy Oak has been casually linked to too many things -- Hopewell, Copena, Adena, Deptford, Dunlap, Swift Creek. We can only proceed to grander questions of cultural process when the cultural historical foundation has been laid. Until that is accomplished we continue to be stuck with problems that we either ignore or relegate to the realm of the "mysterious."

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