FAUNAL REMAINS

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Introduction

The vertebrate faunal collection from the Fish Haul site analyzed for this study consists of more than 4471 bone elements and fragments that weigh 11.7 pounds (5297.1 grams). The faunal material is from two components at the site, the prehistoric Stallings component and the late nineteenth century historic component associated with the town of Mitchelville. The prehistoric Stallings component possessed faunal remains in both the thin midden and the features it had associated with it. The historic component, associated with the town of Mitchelville, produced faunal material in both features and midden zones associated with former houses that formed part of the town. The faunal collection was obtained from the prehistoric midden and house midden zones by screening soil through 1/4 inch (0.6 centimeter) mesh screen. The bone samples from the features were recovered by water flotation and screening soil through 1/16-inch (0.2 centimeter) mesh screen. This report provides a description of the animal species found in these bone samples, the results of the zooarchaeological analysis of the remains, and a comparison of the data obtained from the two components with that for other sites of the appropriate time period from the coast of the Carolina Province.

The Carolina Province, the transitional zone between the tropical fauna of the southern Atlantic and the temperate fauna of the northern Atlantic, lies between Cape Hatteras, North Carolina and Cape Canaveral, Florida (Briggs 1974; Ekman 1953). Hilton Head Island, on which the Fish Haul site is found, is part of the Sea Island section of the coast that lies south of the Santee River into northern Florida. With the area north to Cape Fear, North Carolina forming the northern embayed section (Emery and Uchupi 1972). Along the edge of the Continental Shelf, the warm Florida Current flows northward bringing tropical marine species north as far as Cape Hatteras. Closer inshore, the cold Labrador Current flows southward, and temperate marine species may be found in these cool waters as far south as Cape Canaveral.

The Sea Islands possess a relatively uniform temperature, rainfall, topography, and vegetation cover. The seaward side of each of the Sea Islands is usually lined with coastal beaches, and dunes which sometime reach a height of seven or eight meters (Johnson et al. 1974; Mathews et al. 1980). Maritime oak forests and some pine forests grow behind the dunes. Freshwater creeks and ponds are occasionally found on these islands. The fringes and sometimes the interiors of the Sea Islands often possess extensive salt marsh systems. The mainland side of the typical Sea Island also has extensive salt marshes cut by tidal creeks that drain into large sounds, which in turn flow into the ocean between the Sea Islands. The maritime forests, freshwater creeks, salt marshes, and sound define a number of diverse habitats that were exploited by both the Prehistoric and Historic inhabitants of the area.

Analytical Techniques

The faunal collection from the Fish Haul site was studied by the authors using standard zooarchaeological procedures and the comparative faunal collections housed at the Historic Sites Section, Department of Cultural Resources and the Museum of Natural History in Raleigh, North Carolina. The bone material was sorted to class, suborder, or species, and individual bone elements were identified. The bones of all taxa and other analytical categories were also weighed and counted. The Minimum Number of Individuals (MNI) for each animal category was determined by using paired bone elements and age (mature/immature) as criteria. A minimum distinction method (Grayson 1973:438) was used to determine the MNI for each of the two archaeological components at Fish Haul Creek. This method provides a conservative MNI estimate based on the total faunal assemblage from each cultural component (Stallings and historic late nineteenth century in this case) at a site.

As a measure of zooarchaeological quantification, MNI has a number of problems (Grayson 1973:438; 1984:28-92; Klein and Cruz-Uribe 1984:26-32). How one aggregates the MNI will affect the number of individuals calculated. If MNI is calculated based on the entire site, the number will be smaller than if it is calculated for each excavation unit and totaled for the site. Use of MNI emphasizes small species over large ones. For example, a collection may have only a few large mammals, such as deer, and scores of fish, yet, the amount of meat contributed by one deer may be many times greater than that contributed by a score or two of fish.

Given the problems associated with MNI as a zooarchaeological measure, an estimate of biomass contributed by each taxa to the total available for use by the inhabitants of a site is also calculated. The method used here to determine biomass is based on allometry, or the biological relationship between soft tissue and bone mass. Biomass is determined using the least squares analysis of logarithmic data in which bone weight is used to predict the amount of soft tissue that might have been supported by the bone (Casteel 1978; Reitz 1982, 1985; Reitz and Cordier 1982; Reitz and Scarry 1986; Wing and Brown 1979). The relationship between body weight and skeletal weight is expressed by the allometric equation $Y = aX^b$, which can also be written as $\text{Log } Y = \text{Log } a + b (\text{Log } X)$ (Simpson et al.

1960:397). In this equation, Y is the biomass in kilograms, X is the bone weight in kilograms, a is the Y-intercept for a log-log plot using the method of least squares regression and the best fit line, and b is the constant of allometry, or the slope of the line defined by the least squares regression and the best fit line. Table 29 details the constants for a and b used to solve the allometric formula for a given bone weight X for each taxa identified in the archaeological record.

Biomass was used to identify the 10 species/taxa which probably contributed the greater part of the total meat available for consumption by the inhabitants of each archaeological component. Likewise, the identified species for both the Stallings and the Mitchelville faunal collections were summarized into faunal categories based upon vertebrate class and gross habitat preference. Other studies conducted include examination of the selected mammal bone elements for evidence of butchering (saw, cut, and chop marks, and burning); and analysis of the distribution of selected mamamal bone elements by location as part of the skeleton.

Identified Fauna

Before considering the results of the zooarchaeological study of the faunal remains recovered from the Stallings and Mitchelville components, the general use and habitat preference for each identified species will be considered.

Domestic Mammals

Two animal species, cow (*Bos taurus*) and pig (*Sus scrofa*), are the only domestic mammals identified in the collection. No dog (*Canis familaris*) remains were noted in either the prehistoric or historic faunal collections, nor were the remains of any domestic Caprines, either goat (*Capra hirca*) or sheep (*Ovis aries*), present in the historic faunal sample.

Pigs are one of the most important domestic mammals used for food in the southeastern United States (see Reitz 1987; Reitz and Scarry 1986:69-70). Pigs require little care, as they can be allowed to roam free, or they can be penned. Their diet can consist of a variety of food resources, including seeds, roots, fruits, nuts, mushrooms, snakes, larvae, worms, eggs, carrion, mice, small mammals, kitchen refuse, feces, and grain. Pigs store about 35% of the calories they consume, and can gain about 2 pounds (0.7 kilograms) for every 15 to 25 pounds (5.6 to 9.3 kilograms) of feed (Towne and Wentworth 1950:7-8). Within 18 months, a pig can gain up to 200 pounds (74.6 kilograms), of which about 120 pounds (44.8 kilograms) can be consumed. Dressed, a pig carcass can yield up to 65 to 80% meat. An idea of the

FAUNAL CATEGORY	log a	b	r^2
Mammal	1.12	0.90	0.94
Bird	1.04	0.91	0.97
Turtle	0.51	0.67	0.55
Snake	1.17	1.01	0.97
Chondrichthyes (Shark)	1.68	0.86	0.85
Osteichthyes (Boney Fish)	0.90	0.81	0.80
Non-Perciformes	0.85	0.79	0.88
Siluriformes (Catfish)	1.15	0.95	0.87
Perciformes (Sea Bass, Bluefish, etc.)	0.93	0.83	0.76
Sparidae (Porgy)	0.96	0.92	0.98
Sciaenidae (Drum)	0.81	0.74	0.73
Pleuronectiformes (Flounder)	1.09	0.89	0.95

Derived from Table 4 in Reitz (1985: 44).

These variables are used to solve the formula $Y = aX^b$ or $\log Y = \log a + b(\log X)$; where Y is the biomass in kilograms, X is the bone weight in kilograms, a is the Y-intercept, b is the slope, and r^2 is the proportion of total variance explained by the regression model (cf. Reitz 1985:44; Reitz and Scarry 1986:67).

Table 29. List of allometric values used in this study to determine biomass in kilograms based on bone weight expressed in kilograms.

possible size of the pigs that were avaiable to the inhabitants of Mitchelville can be gained from the average weight of 140 pounds (52.2 kilograms) for 4,000 southern pigs slaughtered in 1860 (Fogel 1965:206 in Reitz and Scarry 1986:70). Pork preserves very well, is satisfying due to its high fat content, and is a good source of thiamin (Towne and Wentworth 1950:249).

Although cattle (Bos taurus) has been an important meat source during the history of the southeastern United States, it is in many ways a more burdensome meat resource (Reitz and Scarry 1986:70). Cows give less of a return for the energy input provided to raise them (Towne and Wentworth 1950:7-8). Cows feed on grain and grasses, and will not produce good weight gains without quality and quantity sources of either. Also, cattle store only 11% of the calories they consume and yield only 50 to 60% dressed meat. Balanced against the greater labor required to raise cattle above that required for swine and the fact that beef does not preserve as well as pork (Tomhave 1925:275), there is a demand for fresh beef and for cattle hides (Rouse 1977:32). Also, a number of other foods, such as milk, cheese, butter, and buttermilk, can be obtained from cattle.

Wild Mammals

The most numerous of the wild mammals in both assemblages is the white-tailed deer (Odocoileus virginianus). A variety of uses exist for the different parts of this animal, so that almost all of a deer was utilized prehistorically by the Indians in some manner (Runquist 1979:169; Swanton 1946:249). Deer metatarsals were used as beamers and split to make needles; ulnae were used as awls; and antlers were made flakers, projectile points, and fish hooks (Swanton 1946:249; see also Trinkley 1980c). Rattles, flutes, bracelets, and beads were also made from deer bone (Swanton 1946:249). Sinew and entrails were manufactured into bow strings, rawhide, throngs, and "thread" (Swanton 1946:249). Deer brains were combined with green corn to tan leather (Lawson 1967:217). The skins, hooves, and antlers were rendered into glue. Heads, skins, and antlers were used as decoys in hunting and as status/ clan indicators. Hides were sewn into clothing, and used as coverings for houses/doors (Swanton 1946:249). Presumably, the only use that the occupants of Mitchelville had for deer was as a food resource, and perhaps for hides. In general, the deer's preferred habitat is the edge of deciduous forests and open forests, although they will move to mudflats around marshes to feed on the grasses found there.

Two rabbit species are common to the study area, the eastern cottontail (Sylvilagus floridanus) and the marsh rabbit (Sylvilagus palustris). Besides being used by the Indians for food, the skins of rabbits were made into robes (Swanton 1946:250). Rabbit innominates and scapulae were used as beads by the Indians (Wilson 1984:519). Probably, the historic inhabitants of Fish Haul Creek used rabbits for food. Rabbits occupy a number of different habitats, but are usually found in thickets, in overgrown fields, and along the edge of forest clearings and forest edges. Important to rabbits in their choice of habitats is access to escape cover offered by thickets, weed patches, and dense high grass. The marsh rabbit generally prefers damper ground than does the eastern cottontail, and is somewhat more likely to be found in locations near marshes.

Raccoon (Procyon lotor) bones are present in small numbers in both the Stallings and nineteenth century historic faunal assemblages. Raccoons served as a food resource for the Indians, the furry skin was used for clothing, and claws were utilized as ornaments (Swanton 1946:250). The raccoon remains found in the historic faunal assemblage presumably served as a food resource. This mammal is able to adapt to a variety of habitats, although they prefer wooded areas near water.

The fox squirrel (Sciurus niger) is present only in the prehistoric Stallings faunal material. The fox squirrel prefers heavily forested habitats, or forests with mature hardwoods and an understory of smaller trees and shrubs, although they can sometimes be found in more open forest and among large trees at forest edges. During prehistoric times squirrels were used as food, the skins as clothing, the entrails for bowstrings, and the claws for ornaments (Swanton 1946:250).

Remains of the opossum (Didelphis virginiana) are present in small quantities in the nineteenth century Mitchelville bone sample from Fish Haul. The opossum was probably used as a food resource. The preferred habitat of the opossum, a nocturnal animal, is wooded areas near water, but they are often found in and around human settlements.

Domestic Birds

Chickens (Gallus gallus) are the most abundant bird identified at the site. The only other possible domesticated birds present are the turkey and Canadian goose, which are discussed below. Chickens, like pigs, can be raised either by letting them run loose or by penning them. Besides serving as a meat resource, chickens also supplied eggs that could be consumed.

The Canada goose (Branta canadensis), as a wild species, winters along the Carolina coast (Potter et al. 1980:79).

The Canada goose was also domesticated during the late 1800s, and by the end of the century standards of excellence for Canada geese as a poultry breed had been established (America Poultry Association 1874; Johnson and Brown 1903). Although it could not be determined by examining the bone elements if the specimen was wild or domesticated, the Canada goose remains present in the historic faunal sample at Fish Haul were placed in the domesticated bird category based on a reference in the historical records concerning the presence of domesticated geese and turkey on Hilton Head Island during the 1860s (Todd 1886:104-105).

Wild Birds

Several species of wild birds are present in the Fish Haul faunal assemblage, but only ducks (Anas spp.) and the turkey (Meleagris gallopavo) are present in both the prehistoric and historic bone samples. During the prehistoric era, the turkey was almost as useful to the Indians as the deer. The animal was used as a food resource, and its bones were fashioned into tools such as awls, beamers, and spoons. Beads and other ornaments were made from various skeletal elements, primarily the phalanx of the wing and the long bones. Feathers were prized for making headdresses and cloaks, and in the manufacture of arrows (Swanton 1946:250). Lawson (1967:17, 25, 31, 153, 216, 227) noted that the Carolina Indians used turkeys as a food resource, that turkey feathers were made into garments, and that "the soft down on a Turkey's rump" was used to treat open sores. Wild turkeys are able to survive in a number of different habitats, but they generally prefer forested areas.

The turkey remains found in the Mitchelville faunal sample are assigned to a domestic species, although wild species of turkey could be represented. By the late 1800s, standards of excellence for turkeys as a poultry breed had been established (Johnson and Brown 1903). The turkey utilized during the historic period probably served primarily as a food resource.

The only other birds present in both faunal assemblages at Fish Haul are unidentified migratory waterfowl, ducks (Anas spp.). The waterfowl would have been used as a food resource, and for its feathers during the prehistoric era, and primarily as a food resource in historic times. A number of duck species, including the mallard (Anas platrhynchos), black duck (Anas rubripes), common teal (Anas crecca), blue-winged teal (Anas discors), American wigeon (Anas americana), and northern shoveler (Anas clypeata), commonly winter along the Carolina coast and a small number may live year-round on the coast (Potter et al. 1980:83-90).

The common loon (Gavia immer) is also a migratory waterfowl that is a common winter resident in Carolina coastal waters from October until May (Potter et al. 1980:39-40). Loons obtain their food, primarily fish, by diving and pursuing their prey underwater. They move on land only with great difficulty, and can only take flight by pattering along the surface of open water for a considerable distance. Remains of the common loon were found only in the prehistoric Stallings faunal sample, and undoubtedly represent a food resource.

One bone element from a tern (Sterna spp.) was recoverd in the nineteenth century historic faunal assemblage at Fish Haul. A number of terns inhabit the coast of Carolina during all or part of the year, including Foster's tern (Sterna forsteri), common tern (Sterna hirundo), roseate tern (Sterna dougallii), sooty tern (Sterna albifrons), bridled tern (Sterna anaethetus), least tern (Sterna albifrons), royal tern ^C(Sterna maxima), sandwich tern (Sterna sandvicensis), and caspian tern (Sterna caspia) (Potter et al. 1980: 176-183). Terns are slender birds that inhabit beach and dune areas, and that feed by diving from the air upon insects and small fish. The specimen from Fish Haul may represent a food resource or a source of feathers. The least tern, a common summer resident of the Carolina coast, was once nearly exterminated by plummage hunters (Potter et al. 1980:179).

The last bird species positively identified in the bone samples from the site is the rock dove (Columbia livia). This introduced species is found in all but the remote parts of the Carolinas, and are most numerous in urban habitats (Potter et al. 1980:188). The rock dove is included with the Wild Birds because there is no evidence that the bird was eaten by humans. Rock doves were probably domesticated at one time, but they have since gone wild and become a commensal (Elizabeth Reitz, personal communication 1986).

Aquatic Reptiles: Turtles

The diamondback terrapin (Malaclemys terrapin) is a turtle found in an esturine setting that feeds on marine molluscs (Obst 1986:113). The subspecies Carolina diamondback terrapin (Malaclemys terrapin centrata), which inhabits the Atlantic Coast from North Carolina to Florida (Obst 1986:214), is probably the turtle represented in the prehistoric and historic faunal collections at Fish Haul Creek. The diamondback terrapin was an important food resource in the southeast that became an accepted delicacy throughout the United States during the nineteenth and early twentieth centures (Obst 1986:113, 183). The taste of diamondback terrapin flesh is considered to lie between that of chicken and fish. It was only the enactment of protective legislation 60 years ago that prevented the extinction of the diamondback terrapin (Obst 1986:113).

Another turtle present in small quantities in the historic faunal collection is the mud turtle (Kinosternon spp.). This turtle also dwells in the water, although it is usually found in fresh water (Obst 1986:109). Mud turtles were possibly used for food.

Pisces

Remains of fish are an important part of both faunal assemblages at Fish Haul. The only predominately freshwater fish identified are the bullhead catfish (Ictalurus spp.), with one species, the yellow bullhead catfish (Ictalurus natalis), being positively identified in the Mitchelville bone sample. The yellow bullhead is found in pools and backwaters of sluggish streams, usually in areas of heavy vegetation (Lee et al. 1980:442). The most common freshwater catfish found in the sluggish waters and low salinity areas of South Carolina estuaries is the white catfish (Ictalurus catus) (Wenner et al. 1981).

The remaining fishes identified in the collection are primarily marine species that either spawn in the estuary or use the area as a nursery (Boschung et al. 1983). The most abundant family in the prehistoric and historic collections are drums (Sciaenidae). The only drum species positively identified is the black drum (Pogonias cromis). This species is commonly found over sand or sandy mud in bays and estuaries (Boschung et al. 1983:623). Other members of the drum family include silver perch (Bairdiella chrysoura), seatrout (Cynoscion spp.), spots (Leiostomus xanthurus), red drum (Sciaenops ocellatus) and star drum (Stellifer lanceolatus). All are commonly found in bays and estuaries.

One specimen of the sheepshead (Archosargus probatocephalus) was recovered in the prehistoric Stallings bone sample at Fish Haul Creek. The sheepshead usually is found in muddy, shallow water or over oyster beds (Boschung et al. 1983:613).

The remaining marine fish specimens, both present in the nineteenth century Mitchelville faunal material, are flounder (Paralichthys spp.) and shark (Chondrichthyes). The southern flounder (Paralichthys lethostigma),is a common estuarine and offshore inhabitant (Boshcung et al 1983:741-742). Generally speaking, sharks are found in estuaries throughout the Carolina Province only during the warm months (Dahlberg 1975; Schwartz and Burgess 1975). Common estuarine sharks include the dusky shark (Carcharhinus obscurus), bull shark

(Carcharhinus leucas), and the bonnethead shark (Sphyrna tiburo) (Boschung et al. 1983:340-346).

Commensal Species

Commensal species, animals commonly found near human occupations as pests or vermin, identified include the rat (Rattus spp.) and hispid cotton rat (Sigmodon hispidus). In addition to rats, snakes and amphibians are included among the commensal species. The snakes found in the prehistoric bone assemblage are the rattlesnake (Crotalus spp.), copperhead or cottonmouth moccasin (Agkistrodon spp.), and mud snake (Farancia spp.). The copperhead, cottonmouth moccasin, and mud snakes are all found near marshes (Linzey and Clifford 1981:80, 125, 128). The canebrake rattlesnake (Crotalus horridus atricaudatus) is found near water such as swamps and bayheads (Linzey and Clifford 1981:132). The snake remains from the historic faunal sample are from water snake (Nerodia spp.). The other commensal species identified is the toad (Bufo spp.), which is present in the nineteenth century Historic component.

Prehistoric Faunal Remains

The vertebrate faunal remains recovered from the Stallings component at Fish Haul consist of 603 bone elements and fragments that weigh 0.6 pound (274.2 grams). A total of 58 crab bone elements, almost all claw fragments, that weigh 1.4 ounces (40.9 grams), are included in this total. The Minimum Number of Individuals (MNI), number of bones, weight of bone, and biomass calculated using allometric formulae for each identified taxa and/or species is presented in Table 30. MNI and biomass caclulations by faunal category are summarized in Table 31, and Table 32 lists the 10 species/taxa that contribute the most to the total biomass calculated for the prehistoric faunal sample.

Wild mammals comprise the largest group based on both MNI and biomass calculations. Included in this group are deer (Odocoileus virginianus), raccoon (Procyon lotor), rabbit (probably Sylvilagus palustris, the marsh rabbit, although the cottontail (Sylvilagus floridanus) could be represented), and eastern fox squirrel (Sciurus niger). Deer, raccoon, and rabbit are species that could be found near the marsh, although only the marsh rabbit prefers the wetlands. Deer would normally be found in the vicinity of the maritime forests, especially along its edge, and raccoons would usually be found near fresh water sources near forest edges. Both species only occasionally visit the marsh area. The eastern fox squirrel almost certainly would be associated with the maritime forest, probably in the open forest and in the large trees at the forest edge. The cottontail rabbit

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
White-tailed Deer, Odocoileus virginianus	2	11.76	40	107.3	1.77	53.539
Raccoon, Procyon lotor	1	5.88	4	5.6	0.12	3.630
Rabbit, Sylvilagus spp.	1	5.88	2	0.8	0.02	0.605
Eastern Fox Squirrel, Sciurus niger	1	5.88	1	0.4	0.01	0.302
Unidentified Mammal	-	-	13	8.0	0.17	5.142
SUBTOTAL	5	29.4	60	122.1	2.09	63.22
Turkey, Meleagris gallopavo	1	5.88	3	4.0	0.07	2.117
Common Loon, Gavia immer	1	5.88	2	2.8	0.05	1.512
Duck, Anas ssp.	1	5.88	1	0.7	0.01	0.302
Unidentified Bird	-	-	19	6.2	0.11	3.327
SUBTOTAL	3	17.7	25	13.7	0.24	7.26
Carolina Diamondback Terrapin, Malaclemys terrapin centrata	3	17.65	57	41.0	0.38	11.494
Unidentified Turtle	-	-	35	9.1	0.14	4.235
SUBTOTAL	3	17.7	82	50.1	0.52	15.73
Drum, Sciaenidae	2	11.76	16	8.9	0.20	6.050
Sheepshead Archosargus probatocephalus	1	5.88	1	0.3	0.04	1.210
Unidentified Fish	-		180	10.0	0.19	5.747
SUBTOTAL	3	17.7	197	19.2	0.43	13.01
Rattlesnake, Crotalus spp.	1	5.88	1	0.4	0.005	0.151
Copperhead/Moccasin, Agkistrodon spp.	1	5.88	1	0.1	0.001	0.030
Mud Snake, Farancia spp.	1	5.88	14	1.1	0.02	0.605
SUBTOTAL	3	17.7	16	1.6	0.026	0.79
Crab	-	-	58	40.9	-	-
Unidentified	-	-	155	26.6	-	-
TOTAL	17	100	603	274.2	3.306	100.0

Figure 30. Minimum Number of Individuals (MNI), number of bones, weight, and estimated meat yield by species for the Stallings component.

FAUNAL CATEGORY	MNI #	MNI %	BIOMASS kg	BIOMASS %
Prehistoric Component				
Wild Mammals (Deer, Raccoon, Rabbit, Fox Squirrel)	5	29.41	1.92	66.52
Wild Birds (Turkey, Loon, Duck)	3	17.65	0.13	4.50
Fishes (Drum, Sheepshead, Unidentified Fish)	3	17.65	0.24	14.90
Aquatic Reptiles (Diamondback Terrapin)	3	17.65	0.38	13.17
Commensal Species (Rattlesnake, Copperhead/Moccasin, Mud Snake)	3	17.65	0.026	0.90
TOTAL	17	100	2.886	100
Historic Component				
Domestic Mammals (Cow, Pig)	9	19.15	33.89	84.08
Domestic Birds (Chicken, Turkey, Canada Geese)	7	14.89	0.64	1.59
DOMESTIC TAXA TOTAL	16	34.0	34.53	85.7
Wild Mammals (Deer, Raccoon, Opossum, Rabbit)	5	10.24	1.39	3.45
Wild Birds (Duck, Tern, Rock Dove)	3	6.38	0.06	0.15
Aquatic Reptiles (Diamondback Terrapin, Mud Turtle)	6	12.77	1.15	2.85
Fish (Drum, Black Drum, Catfish, Flounder, Shark)	12	25.53	3.02	7.49
WILD TAXA TOTAL	26	55.3	5.61	13.99
Commensal Species (Rats, Toads, Snakes)	5	10.64	0.156	0.39
TOTAL	47	100	40.306	100

Table 31. Summary of Stallings and Mitchelville faunal categories expressed as counts and percentages for MNI and biomass.

prefers high grass or thickets away from wetlands. Deer consist of at least two individuals, one adult and one subadult. The other wild mammals are each represented by a MNI of one adult.

The next largest group based on biomass computations are the fishes, with at least two unidentified drums (Sciaenidae) and one sheepshead (Archosargus probatocephalus) being present. Drum are relatively large predatory fish that are most common near the mouths of intertidal creeks where they feed (Cain 1973). The sheepshead, on the other hand, would be rather common within the intertidal creeks, usually being found in muddy shallow waters or near oyster beds (Boschung et al. 1983:613). The numbers of each identified fish species present in the prehistoric faunal collection indicate that their capture was by hook-and-line or gigging. Mass recovery of fish by nets or seines is certainly not indicated by the variety or number of fish remains.

The next most common class of vertebrate animals that represent potential food resources are the aquatic reptiles, comprised solely of the Carolina diamondback terrapin (Malaclemys terrapin centrata). The Carolina diamondback terrapin inhabits the estuarine area, being found near shell bottoms and oyster beds where it feeds (Sandifer et al. 1985:202). This terrapin is diurnal, with maximum yields being available during their breeding season of May and early June (Quitmeyer et al. 1985:20), although the diamondback terrapin is present in the marsh on a year-round basis in some quantity.

The wild birds rank next in terms of biomass. One terrestrial species, the turkey (Meleagris gallopavo), and two waterfowl, an unidentified duck (Anas spp.) and the common loon (Gavia immer), each represented by a MNI of one, are present. Turkeys are a terrestrial bird, and usually are found in forested areas, although they are able to survive in a number of different habitats. The common loon is seldom found far from water (Potter et al. 1980:39). They feed by diving for their food, usually fish, and pursuing their prey underwater. Also, loons can only take flight from the surface of open water. The common loon is a common winter resident of the Carolina coastal waters between early October and mid-May, although nonbreeding loons occasionally remain throughout the summer. Ducks, of which seven different species commonly winter on the Carolina coast, are also migratory waterfowl commonly found between September and May (Potter et al. 1980:77, 83-90). However, some duck species, including the American wigeon (Anas americana) and the northern shoveler (Anas clypeata), have been sighted during June along the Carolina coast.

The commensal species identified in the prehistoric component at Fish Haul are comprised only of snakes. These include rattlesnake (Crotalus spp.), copperhead/cottonmouth moccasin (Agkistrodon spp.), and mud snake (Farancia spp.). All are likely to be found near both esturine and palustrine areas near the site.

Considering the top 10 species/taxa in terms of the total biomass calculated for the prehistoric component (Table 32), three are primarily terrestrial -- deer, raccoon and turkey. Six species/taxa, which include drum, unidentified fish, common loon, sheepshead, and mud snake, can be tied to the esturine environment which is located adjacent to the site. The rabbit present can be identified with either the esturine/marsh system, if it is marsh rabbit, or with the terrestrial habitat if the rabbit is the eastern cottontail. In order to investigate questions concerning variety and degree of specialization exhibited by the prehistoric vertebrate faunal assemblage, measures of diversity and equitability were calculated for both MNI and biomass based on the identified species present (Table 33).

In general, the calculation of such measures for small samples such as the Stallings faunal assemblage from Fish Haul is frowned upon (Grayson 1984). It is felt, however, that information can still be obtained from this exercise, as long as it is recognized that the results of the diversity and equitability computations for the Stallings faunal collection are preliminary. The Shannon-Weaver index of diversity (Shannon and Weaver 1949:14) calculated for biomass is rather low (1.244 where the highest possible value is 4.99). Biomass also exhibits an equitability index (Pielou 1966; Sheldon 1969) that is almost midway (0.4850) between low equitability (approaching 0.0), where one or a few species are more heavily used than other species, and high equitability (approaching 1.0), where an even distribution of species indicates a normal pattern of a few abundant species, a moderate number of common species, and many rare species. These figures indicate that a few species contributed the most to the total biomass derived from the vertebrate fauna identified in the prehistoric component. The MNI diversity measure (2.1909) and equitability index (0.8542) are both higher than the measures calculated for biomass. These MNI calculations indicate that while a few species account for the great portion of the biomass total, a rather diffuse (Cleland 1976:59-73) pattern of faunal procurement that took a number of different vertebrate species from both the estuarine/marsh and terrestrial forest, forest edge and cleared/overgrown habitats was employed.

Considering the question of seasonality, deer, raccoon, rabbit, Eastern fox squirrel, turkey, Carolina diamondback terrapin, drum, sheepshead, and presumably the unidentified fish would be available year round. The snakes identified would probably have been absent during the winter months between October/November and March. The migratory waterfowl,

Species	Biomass Rank	MNI Rank
PREHISTORIC COMPONENT		
White tailed deer	1	2
Diamondback terrapin	2	1
Drum	3	2
Unidentified fish	4	-
Raccoon	5	4
Turkey	6	4
Common loon	7	4
Sheepshead	8	4
Rabbit	9	4
Mud snake	9	4
HISTORIC COMPONENT		
Cow	1	6
Pig	2	1
Drum	3	2
White tailed deer	4	7
Diamondback terrapin	5	4
Unidentified fish	6	-
Chicken	7	2
Shark	8	10
Catfish	9	4
Raccoon	10	10

Table 32. Rank of the ten most prominent fauna species by biomass and MNI for the Stallings and Mitchelville components.

COMPONENT	DIVERSITY	EQUITABILITY	N	MNI
Prehistoric	2.1909	0.8542	13	17
Historic	2.5142	0.7911	24	47

COMPONENT	DIVERSITY	EQUITABILITY	N	BIOMASS
Prehistoric	1.2440	0.4850	13	2.696
Historic	1.2851	0.4099	23	39.736

The Shannon-Weaver formula for determining the diversity of a sample is

$$H = -\sum pi \ln pi$$

where H is the measure of diversity, and pi is, in this case, either the MNI or the Biomass of each species i divided by the total MNI or total Biomass for the sample Thus, for each identified species that has a MNI count, pi is calculated by dividing the MNI for that species by the total number of MNI from the sample. The diversity measure D is the sum of all the pi multiplied by the natural log (ln) of each pi. A similar procedure is used to calculate the Diversity index for the Biomass, substituting the Biomass figures for MNI in the above explanation.

The Sheldon formula for determining the equitability of a sample is

$$H' = H/\ln N$$

where H' is the measure of equitability, H is the Diversity measure calculated for the sample, and N is the total number of cases, observations or, in this situation, species for which MNI or Biomass were calculated in a sample. Equitability is simply the Diversity measure divided by the natural log (ln) of N, the number of species for which MNI were calculated or the number of species for which Biomass calculations were made.

Table 33. Diversity and equitability of the MNI and biomass for the prehistoric Stallings and historic Mitchelville components.

ducks and the common loon, are theoretically present on the Carolina coast only during the fall, winter and early spring between September and early May. However, the small number of each (MNI = 1) present in the faunal collection does not rule out the possibility that the remains represent either a duck or common loon that summered on the coast. In summary, the vertebrate remains present in the prehistoric Stallings component at Fish Haul Creek indicate that the site could have been occupied and/or used during any of the four seasons.

Comparison of Fish Haul's Vertebrate Fauna with other Prehistoric Assemblages

There are only a few vertebrate faunal collections from sites in the coastal areas of South Carolina, Georgia, and northern Florida that date to the same period as the Stallings component at Fish Haul, and even fewer still from this time period that report findings in any form other than MNI or MNI based computations. One of the few collections that are directly comparable to the Stallings collection is the faunal assemblage from the Lighthouse Point shell-ring, where a total of 28 species representing five classes of vertebrates with a total of 97 MNI were identified in the 5023 bone fragments recovered from the site (Runquist 1980). Lighthouse Point is a Thom's Creek site near Charleston, South Carolina that immediately post-dates Stallings. By faunal category, Wild Mammals compromise 46.4% of the MNI, Fish 20.6%, Wild Birds 15.5%, Turtles 13.4%, and Commensals 4.1%. Comparing these figures with those for the same faunal categories from the Stallings component at Fish Haul listed in Table 31 shows that there is a more even spread of individuals among the faunal categories at Fish Haul. Although this may be due to the differences in the simple size of the two assemblages, it might suggest that faunal exploitation strategies conducted at small sites such as Fish Haul differ from those associated with large shell midden sites. Differences in time between the two assemblages, however, may also be contributing to the differing patterns noted for Fish Haul and Lighthouse Point.

Historic Faunal Remains

The late nineteenth century historic faunal collection from Fish Haul consists of 3868 bone elements and fragments that weigh 13.5 pounds (5,022.9 grams). These totals include 46 crab claws that weigh 1.1 ounces (32.8 grams). The Minimum Number of Individuals, number and weight of bone, and estimated meat yield (biomass) for the historic faunal sample are presented in Table 34. A summary of the MNI and biomass calculations for seven faunal categories has been listed in

Table 31, and Table 32 ranks the top 10 species/taxa by the biomass each contributed to the total biomass computed for the Historic component.

As would be expected, domestic vertebrates -- pig (Sus scrofa), cow (Bos taurus), chicken (Gallus gallus), turkey (Meleagris gallopavo), and Canada goose (Branta canadensis) -- account for a vast majority of the total historic component's biomass. Although cow represented over 39% of the total biomass, only 6.4% of the total Minimum Number of Individuals identified are cow (MNI = 3). Pig accounts for a little more than 24% of the total biomass, and 12.8% of the total number of individuals present (MNI = 6). Chicken has a different pattern, providing less that 1.0% of the total biomass, while possessing 10.6% of the total Minimum Number of Individuals for the historic component (MNI =5). Turkey accounts for only a small percentage (2.1%, MNI = 1) of the total number of identified individuals and for only a small percentage (0.17%) of the total biomass. Canada goose likewise accounts for only a small portion of the number of identified individuals (2.1%, MNI = 1) and of the total biomass (0.09%, 0.05 kg). Turkey and Canada goose are included with the domestic bird category based on their being grouped with chickens and pigs in at least one historic account. It was reported by one Union soldier shortly after Hilton Head Island was captured from Confederate forces that " . . . geese, turkeys, pigs and chickens were killed and eaten whenever we wanted them" (Todd 1886:104). As noted earlier, by the late nineteenth century turkeys and Canada geese had both had standards of excellence established for them as breeds.

The second most important faunal category according to biomass (with 3.02 kilograms) are the fish, which are first in the total Minimum Number of Individuals (MNI = 12) identified for the historic component. Fish identified include drum (Sciaenidae), black drum (Pogonias cromis), catfish (Ictalurus spp.), yellow bullhead catfish (Ictalurus natalis), shark (Chondrichthyes), and flounder (Paralichthys spp.). All of the identified fish are large predatory species that are common in the deeper waters of the esturine system and/or in the bays and sounds around Hilton Head Island (Cain 1973). These fish do not occur in quantities sufficient to warrent a supposition that they were procured by nets or seines. All were probably obtained as individuals by use of hook and line or perhaps by gigging.

Wild mammals still comprise a small part of the faunal collection from the Historic component at Fish Haul Creek. This category ranks third behind domestic mammals and fish in terms of biomass (3.45 kilograms), and it ranks fifth in terms of numbers of individuals (MNI = 5). Wild mammals present include deer, raccoon, opossum, and rabbit. Raccoon and opossum are common scavengers that are drawn to crops,

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
Cow, *Bos taurus*	3	6.38	97	1670.3	20.92	39.018
Pig, *Sus scrofa*	6	12.77	252	982.3	12.97	24.191
White-tailed Deer *Odocoileus virginianus*	2	4.26	3	65.5	1.13	2.108
Raccoon, *Procyon lotor*	1	2.13	3	6.1	0.13	0.242
Rabbit, *Sylviligus* spp.	1	2.13	6	4.7	0.11	0.205
Opossum, *Didelphis virginiana*	1	2.13	2	0.7	0.02	0.037
Rat, *Rattus* spp.	1	2.13	6	1.4	0.04	0.075
Hispid Cotton Rat, *Sigmodon hispidus*	1	2.13	1	0.2	0.006	0.011
Unidentified Mammal	-	-	547	975.7	12.89	24.041
SUBTOTAL	16	34.0	917	3706.9	48.216	89.93
Chicken, *Gallus gallus*	5	10.64	54	33.5	0.50	0.933
Turkey, *Meleagris gallopavo*	1	2.13	3	5.5	0.09	0.168
Canada geese, *Branta canadensis*	1	2.13	5	1.4	0.05	0.093
Duck, *Anas* spp.	1	2.13	5	2.6	0.03	0.056
Tern, *Sterna* ssp.	1	2.13	1	1.2	0.02	0.037
Rock Dove, *Columba livia*	1	2.13	3	0.5	0.01	0.019
Unidentified Bird	-	-	72	19.8	0.31	0.578
SUBTOTAL	10	21.3	143	64.5	1.01	1.88
Carolina Diamondback Terrapin *Malaclemys terrapin centrata*	4	8.51	214	199.5	1.10	2.051
Mud Turtle, *Kinosternon* spp.	2	4.26	2	1.7	0.05	0.093
Unidentified Turtle	-	-	10	6.7	0.11	0.205
SUBTOTAL	6	12.8	226	207.9	1.26	2.35
Drum, Sciaenidae	5	10.64	125	174.3	1.77	3.301
Black Drum, *Pogonias cromis*	1	2.13	1	3.9	0.11	0.205
Catfish, *Ictalurus* spp.	3	6.38	14	3.4	0.06	0.112
Yellow Bullhead Catfish, *Ictalurus natalis*	1	2.13	6	1.7	0.03	0.056
Flounder, *Paralichthys* spp.	1	2.13	1	0.5	0.01	0.019
Shark, Chondrichthyes	1	2.13	2	4.6	0.47	0.876
Unidentified Fish	-	-	721	38.8	0.57	1.063
SUBTOTAL	12	25.5	870	227.2	3.02	5.63
Water Snake, *Nerodia* spp.	1	2.13	4	0.8	0.11	0.205
SUBTOTAL	1	2.1	4	0.8	0.11	0.21
Toad, *Bufo* spp.	2	4.26	2	0.2	-	-
SUBTOTAL	2	4.3	2	0.2	-	-
Crab	-	-	46	32.8	-	-
Unidentified	-	-	1660	782.6	-	-
TOTAL	47	100	3868	5022.9	53.616	100.0

Table 34. Minimum Number of Individuals (MNI), number of bones, weight, and estimated meat yield by species for the historic Mitchelville component.

trash deposits, hen houses, and similar features that are found around human settlements. Deer, while usually found in forests and along forest edges, also are drawn to certain crops grown by people.

As with the prehistoric assemblage, aquatic reptiles are present in the nineteenth century Mitchelville faunal sample. The Carolina diamondback terrapin and mud turtles^C (Kinosternon spp.) are the two species identified in this category. Carolina diamondback terrapins are found in the esturine/marsh areas adjacent to the site. Diamondback terrapin apparently comprised a good portion of a slave's diet in coastal areas dating back to before the nineteenth century (Quitmeyer 1985b:20) During the late nineteenth and early twentieth centuries the diamondback terrapin became a gourmet item, as well as continuing as a part of the diet of more "common" folk (Obst 1986:183). Although they are occasionally found in estuaries, mud turtles are usually found in freshwater areas (Reitz and Scarry 1986:43). Mud turtles are diurnal, that is they are most active during the day, they enjoy basking in the sun, and they tend to sleep in mud bottoms (Obst 1986). These turtles could be caught by handlines, traps, or by hand.

In general, few wild bird species are present in the historic bone sample. One individual each of duck (Anas spp.), tern (Sterna spp.), and rock dove (Columba livia) account for only 0.15% (0.06 kilograms) of the total historic biomass, although they represent 6.4% (MNI = 3) of the total number of individuals identified. The duck is a migratory waterfowl usually present on the Carolina coast between September and May, although an occasional individual has been noted in the summer. Presumably, the duck would have been gathered from the marsh. Terns are near year round residents of the coast (Potter et al. 1980:176-183). Although terns are usually associated with beach/dune habitats, it is not improbable that they could also be found in the marshes, and perhaps even as a commensal around the town of Mitchelville. Rock doves are normally found in urban settings (Potter et al. 1980:188), and are probably closer to being a commensal species than a wild one. Certainly, given the small number of individuals, and the small quantity of bone elements identified for these species, wild birds do not appear to have been actively included within the faunal resource procurement system of the historic nineteenth century inhabitants of the site.

The true commensal species include rat (Rattus spp.), the hispid cotton rat (Sigmodon hispidus), toads (Bufo spp.), and water snake (Nerodia spp.). It is not known if these were utilized as food resource by the historic occupants of the site, but the small numbers of individuals (MNI = 5) and the small amount of biomass that they comprise

(0.156 kg, 0.39% of total biomass) argues against their use as a food resource. The various houses and structures that comprised Mitchelville would have served as good habitation sites for these commensal species both during and following its occupation by the freedmen.

Although crabs are not a vertebrate fauna, they are present in the historic faunal sample from Fish Haul. A total of 46 claw fragments that weigh 32.8 grams were noted in the collection. Crabs are found on mud, shell and sand bottoms in the salt and brackish waters, especially in the estuaries and the mouths of tidal creeks around sea grass. Most are taken between March and November (Freeman and Walford 1976). Most of the crab are probably blue crab (Callinectes sapidus) (Turner and Johnson 1972:182).

Table 32 summarizes the 10 most prominent fauna species/taxa with respect to their contribution to the total biomass from the historic component at the site. Two domestic species rank first and second, cow and pig, although cow ranks only sixth when MNI are considered as compared to the pig's first place. Another domestic species, chicken, ranks seventh on the biomass list and second when MNI are examined. Fish species take the third (drum), sixth (unidentified fish), eighth (shark), and nineth (catfish) positions in the biomass rankings. The Carolina diamondback terrapin, an aquatic reptile found in the marsh, is the fifth ranked species based on biomass, and the fourth ranked according to MNI. Two wild mammals, deer (fourth) and raccoon (tenth), are the other two species that place in the 10 species ranked according to biomass.

Diversity and equitability indices were calculated for the total biomass and MNI present in the historic component (Table 33). The diversity measure for biomass is low (1.2851) and the equitability is below .50 (0.4099). For MNI, the diversity (2.5142) is in the midrange of the scale (which goes to 4.9), and the equitability (0.7911) is toward the high end (1.0) of the scale. This is interpreted to indicate that a few species contributed the greatest portion of the total biomass, but that a number of species were exploited on a regular basis in addition to the three domestic species of cow, pigs, and chickens. The most important faunal categories after the domestic taxa are fish and aquatic turtles.

The bone modifications exhibited by the pig and cow bones in the historic faunal collection were examined for evidence of sawing, cutting, chopping, and burning (Table 35). Of the 19 pig bones that evidenced modification, there were seven instances of sawing (36.8%), seven instances of cutting (36.8%), five instances of chopping (26.3%), and three instances of burning (15.8%). For the 20 cow bones that had been modified, 15 had been sawed (75%), four had been cut (20%), two had been chopped (10%), and four had been burned (20%). The 19 modified pig bones represent only 7.5% of the total number of pig bones identified in the historic faunal collection, and the 20 modified cow bones total 20.6% of the cow bones present. If one assumes that sawed bone are indicative of purchased meat segments or meat segments given as rations, then it would appear that beef was more likely to be obtained through purchase or as a wage ration than pork. As indicated in the historical accounts considered in the historical background section of the report, and the generalized discussion of cattle and pigs that opened this section, it is probable that most of the pork present in the historic component is homegrown, with certain cuts, such as hams, being available for purchase or as part of a person's wages. The low number of both cow and pig bones that have been burned indicate that little roasting of either meat was being done.

The distribution of identified bone elements by body segment for the cow and pig remains from Fish Haul is shown in Table 36. The cow distribution is somewhat misleading as nine of the 11 head elements are miscellaneous molar fragments, 1 is a right mandible body fragment, and the other is an immature atlas. With this in mind, it is apparent that most of the beef remains are represented by sides of beef incorporating ribs and/or vertebra, and rump roasts. For the pig bones, only 15 of the 79 head bone elements are miscellaneous teeth. The bone element distribution for the pig bones is distributed among the cranial segments, sides of pork that possess ribs and/or vertebra, feet, hindlimbs, and forelimbs in descending order. The pattern exhibited by the beef and pork bone element distribution is taken to support the earlier supposition that beef was probably obtained through purchase or as rations, while most of the pork, although available through purchase and as rations, was probably homegrown.

Block 91-92 Areas and Features 10 and 11

Before comparing the results of the analysis of the Historic faunal collection with a small number of other faunal studies, the remains from the historic midden in the 91-92 blocks, which includes Feature 10 and Feature 11, will be considered. Tables 37 and 38 list the number and weight of bones, and the allometric biomass for each species/taxa identified in the midden zones in the 91-92 block, and Features 10 and 11. The 91-92 block midden zones possess all the remains identified as rat, hispid cotton rat, tern, and yellow bullhead catfish. Features 10 and 11 possess all the remains identified as Canada goose, duck and flounder. All the remains of the following species are found in either

BONE ELEMENT	SAWED	CUT	CHOPPED	BURNT
Pig, <u>Sus scrofa</u>:				
4 rib fragment		X		
2 rib fragment			X	
1 sternum fragment		X		
1 cervical vertebra fragment	X			
1 lumbar vertebra spine fragment	X	X		
2 left distal humerus fragment	X			
1 left proximal radius		X		
1 proximal humerus shaft1	X			
1 left proximal immature femur shaft fragment			X	
1 right ilium			X	
1 right medial ilium	X		X	X
1 right medial ilium	X			
2 longbone frag.				X
19 TOTAL	7	7	5	3
Cow, <u>Bos taurus</u>:				
3 rib fragment	X	X		
4 rib fragment	X			
1 thoracic vertebra spine fragment			X	
1 lumbar vertebra2	X			
1 immature lumbar vertebra	X			
2 lumbar vertebra epiphyses	X			
3 vertebra frag.				X
1 right proximal humerus shaft fragment	X			
1 right proximal femur3	X			
1 right distal tibia shaft fragment		X	X	
1 longbone fragment	X			
1 small longbone (?) fragment	X			X
20 TOTAL	15	4	2	4

1- sawed on both the proximal and distal ends, very thin, like a slice of ham.
2- sawed medially (down the middle of the body of the bone, rather than across the body.
3- sawed on both the proximal and distimal ends.

Table 35. Bone modifications on pig and cow in the Mitchelville collection.

BONE ELEMENT GROUP	COW #	COW %	PIG #	PIG %	DEER #	DEER %
Heads, 1st and 2nd Cervical Vertebra	11	16.17	79	40.31	-	-
Vertebra, Sternum, and Ribs	29	42.64	50	25.51	1	33
Forelimbs	2	2.94	10	5.10	-	-
Forefeet	3	4.41	2	1.02	-	-
Hindlimbs	18	26.47	21	10.71	2	67
Hindfeet	-	-	2	1.02	-	-
Feet	5	7.35	32	16.33	-	-
TOTAL	68	100	196	100	3	100

Table 36. Bone element distribution for the cow, pig, and deer remains from Mitchelville.

SPECIES	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	%
Cow, *Bos taurus*	14	134.8	2.17	14.092
Pig, *Sus scrofa*	86	275.8	4.14	26.884
White-tailed Deer *Odocoileus virginianus*	1	4.0	0.09	0.584
Raccoon, *Procyon lotor*	3	6.1	0.13	0.844
Rabbit, *Sylviligus* spp.	1	0.6	0.02	0.130
Opossum, *Didelphis virginiana*	1	0.4	0.01	0.065
Rat, *Rattus* spp.	6	1.4	0.04	0.260
Hispid Cotton Rat, *Sigmodon hispidus*	1	0.2	0.006	0.039
Unidentified Mammal	139	349.2	5.11	33.184
SUBTOTAL	252	772.5	11.716	76.08
Chicken, *Gallus gallus*	2	2.0	0.04	0.260
Tern, *Sterna* spp.	1	1.2	0.02	0.130
Rock Dove, *Columba livia*	2	0.4	0.009	0.058
Unidentified Bird	11	2.5	0.05	0.325
SUBTOTAL	16	6.1	0.119	0.77
Carolina Diamondback Terrapin *Malaclemys terrapin centrata*	171	149.4	0.91	5.910
Mud Turtle, *Kinosternon* spp.	1	1.0	0.03	0.195
Unidentified Turtle	9	6.6	0.11	0.714
SUBTOTAL	181	157.0	1.05	6.82
Drum, Sciaenidae	79	115.2	1.30	8.442
Black Drum, *Pogonias cromis*	1	3.9	0.11	0.714
Catfish, *Ictalurus* spp.	11	3.1	0.06	0.390
Yellow Bullhead Catfish, *Ictalurus natalis*	6	1.7	0.03	0.195
Shark, Chondrichthyes	1	3.5	0.37	2.403
Unidentified Fish	111	45.0	0.64	4.156
SUBTOTAL	209	172.4	2.51	16.30
Water Snake, *Nerodia* spp.	1	0.3	0.004	0.026
SUBTOTAL	1	0.3	0.004	0.03
Toad, *Bufo* spp.	1	0.1	-	-
Crab	3	0.7	-	-
Unidentified	635	348.0		
TOTAL	1298	1457.1	15.399	100.0

Table 37. Number of bones, weight, and estimated meat yield by species for the 91-92 block.

SPECIES	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
Cow, *Bos taurus*	18	347.4	5.09	36.272
Pig, *Sus scrofa*	55	364.3	5.31	37.839
Unidentified Mammal	75	128.8	2.08	14.822
SUBTOTAL	148	840.3	12.48	88.93
Chicken, *Gallus gallus*	11	4.5	0.08	0.570
Canada geese, *Branta canadensis*	5	2.6	0.05	0.356
Duck, *Anas* spp.	5	1.4	0.03	0.214
Unidentified Bird	26	4.1	0.07	0.500
SUBTOTAL	47	12.6	0.23	1.64
Carolina Diamondback Terrapin *Malaclemys terrapin centrata*	22	25.0	0.27	1.924
Mud Turtle, *Kinosternon* spp.	1	0.7	0.02	0.13
SUBTOTAL	23	25.7	0.29	2.07
Drum, Sciaenidae	24	29.6	0.48	3.42
Catfish, *Ictalurus* spp.	3	0.3	0.006	0.042
Flounder, *Paralichthys* spp.	1	0.5	0.01	0.071
Shark, Chondrichthyes	1	1.1	0.14	0.998
Unidentified Fish	602	25.1	0.39	2.779
SUBTOTAL	631	56.6	1.026	7.31
Water Snake, *Nerodia* spp.	3	0.5	0.007	0.050
SUBTOTAL	3	0.5	0.007	0.05
Toad, *Bufo* spp.	1	0.1	-	-
Crab	25	22.2	-	-
Unidentified	450	161.6	-	-
TOTAL	1328	1119.8	14.033	100.0

Table 38. Number of bones, weight, and estimated meat yield by species for the historic Features 10 and 11 in the 91-92 block.

the 91-92 block midden zones or Features 10 and 11: shark and mud turtle. Otherwise, both proveniences have remains of the species identified for the other historic features and midden zones at the site -- cow, pig, chicken, deer, raccoon, rabbit, opossum, rock dove, Carolina diamondback terrapin, drum, water snake, and crab. The presence of the shark remains indicate that Feature 10 was possibly formed during warm weather, as sharks are generally found in estuaries throughout the Carolina Province, which includes Hilton head Island, only during warm months (Schwartz and Burgess 1975; Dahlberg 1975).

The 91-92 block midden also has four of the 19 pig bones and three of the 20 cow bones that had been modified. Although the 91-92 block midden and Features 10 and 11 are relatively rich when compared with the faunal remains from similar proveniences in other areas of the site, it does appear that the activity which created the remains they contain dates to the later nineteenth century historic component that is identified with the freedmen's town of Mitchelville. It is probable that some kind of group activity involving more than one household from Mitchelville occurred in the vicinity of the 91-92 block midden and Features 10 and 11. What activity cannot be determined based on this study of the faunal remains from these proveniences.

Comparison of the Historic Faunal Assemblages with other Faunal Samples

Given that the nineteenth century archaeological remains at Fish Haul are not a plantation (here used to include planter, overseer, and slave habitations) or tenant farm, it is probable that the faunal collection will more closely resemble faunal samples from urban rather than plantation or other rural settings.

Although it would be desirable to compare the data from Fish Haul to a wider variety of site types, such as nucleated agricultural villages, temporary and permanent habitation areas of civilian support populations employed by the military, or ethnic urban neighborhoods, there is little archaeological or historical information about the faunal assemblages of such sites that is in a form that can be used in this study. Reitz (1984:14-15) proposed a number of hypotheses about the vertebrate faunal composition of the diet of urban and rural sites that date from the late eighteenth into the middle of the nineteenth century. In general urban residents apparently utilized more domestic meat than did rural people and they used a wider range of different species, especially domestic birds. As a consequence, wild animals were utilized to a lesser extent at urban sites and fewer wild species were exploited. Table 39 compares the MNI percentages determined for each of the seven

FAUNAL CATEGORY	URBAN	FISH HAUL CREEK	RURAL	SLAVE
Domestic Mammals	31.0	19.1	18.3	20.5
Domestic Birds	22.6	12.8	4.1	3.0
Wild Mammals	8.0	10.6	19.8	24.7
Wild Birds	6.2	8.5	3.1	2.1
Aquatic Reptiles	5.8	12.8	13.7	10.4
Fish	16.2	25.5	36.8	36.6
Commensals	10.4	10.6	4.3	2.8
TOTAL	100%	100%	100%	100%

Data for the Urban, Rural, and Slave categories are derived from Reitz (1984:Table 7).
Percentages calculated for Fish Haul have turkey and geese placed in the Wild Bird category and dove placed in the Domestic Bird category in order to conform to Reitz's (1984) classification and resultant calculations.

Table 39. Comparison of the Mitchelville faunal categories by percent with Urban, Rural, and Slave faunal category patterns

general historic faunal categories (Domestic Mammal, Domestic Bird, Wild Mammals, Wild Birds, Aquatic Reptiles, Fish, and Commensals) at Fish Haul with composite percentages computed by Reitz (1984:24) for Urban, Rural and Slave contexts in the southern Atlantic Coastal Plain. In only one category, Commensals, is the MNI percentage from Fish Haul similar to the Urban Pattern. However, the Mitchelville data is similar to the Rural pattern only for the Domestic Mammal and Aquatic Reptile categories. For Domestic Birds and Fish, Mitchelville lies intermediate between the Urban and rural patterns when MNI are considered.

Comparison of the Fish Haul percentages with the pattern defined by Reitz for Slave faunal assemblages (Table 39) shows even fewer congruences than with the Urban or Rural patterns. Only for Domestic Mammals are the MNI percentages similar. For all other categories -- Domestic Birds, Wild Mammals, Wild Birds, Aquatic Birds, Aquatic Reptiles, Fish, and Commensals -- the Fish Haul data and the Slave Pattern are different. It is here that the differences in the lifeways of the black freedmen and slaves can begin to be seen. It may be that the differences between the Fish Haul MNI percentages and those of the Urban, Rural, and Slave faunal patterns reflect status and wealth, rather than locational factors.

The differences between the Mitchelville faunal collection and the Rural/Urban Patterns may be due to historical and geographical factors. Mitchelville was established on a Sea Island adjacent to a marsh esturine system, a location not enjoyed by any of the Urban sites used by Reitz (1984:3, 1987), but similar to that of most of the sites included in the Rural Pattern (Reitz 1984:4-5, 1987). Mitchelville was also established to fill a need to house the freed slaves that traveled to Union lines during the Civil War. Once the military support of Mitchelville was withdrawn, the town declined. While the military was present, the freedmen had access to rations and wages to purchase meat segments and live animals that they did not have as slaves, and which they gradually lost after the military departed.

The Fish Haul faunal assemblage can also be compared with that from a hypothesized freedmen/ex-slave site, Colonel's Island, located on a former plantation (Singleton 1985:299-302). This site is definitely a rural site, and has a faunal sample with 46 individuals. A diet derived from foraging is indicated, as nondomestic foods, including deer, raccoon, opossum, fish, and sea turtle, contributed 98% of the meat to the diet (Reitz 1978:342 in Singleton 1985:302). These Fish Haul data certainly do not compare favorably with Colonel's Island, as 85.7% of the meat total at Fish Haul is supplied by domestic species.

In summary, the composition of the late nineteenth century Mitchelville faunal assemblage at Fish Haul does not conform to any of the faunal assemblage patterns noted for urban, rural, or slave sites of the southern Atlantic coast. Probably the historical factors that led to the founding of a small urban site next to an esturine setting, the fact that the inhabitants enjoyed a status that they did not have before as slaves or later after the Union forces left the area, and that the inhabitants had access to wages to purchase meat segments or live animals, or could receive meat segments as part of the rations issued by the Union army to those employed by them, until the military presence on Hilton Head Island ended, are responsible for the unique pattern exhibited by faunal collection from Fish Haul.

Conclusions

In general, faunal samples that do not contain at least 200 individuals or 1400 bones are usually deemed too small for reliable interpretations (Grayson 1979; Wing and Brown 1979). From Fish Haul, the prehistoric Stallings faunal collection possesses neither 200 individuals nor does it have at least 1400 bones. Therefore, the discussion of interpretations and patterns based on the Stallings material has to be viewed as preliminary. Thus, while it appears that a generalized faunal resource procurement system based on a diffuse strategy of resource utilization in both terrestrial and esturine/marsh habitats was operational at the site in prehistoric times, the small size of the Stallings faunal collection precludes a definite statement to that effect. Likewise, information derived from the species present in the collection cannot rule out utilization of the site by the Stalling's people during any of the four seasons of the year.

Although the number of individuals present in the late nineteenth century historic faunal collection from Fish Haul also does not number at least 200, the collection does possess 3868 bone elements and fragments. While not eliminating all doubt about interpretations set forth for the historic faunal remains, there is probably a good basis for accepting the findings derived from the analysis of this material. Although it was originally expected that the historic faunal collection would exhibit a pattern similar to that found in urban faunal assemblages of the southern Atlantic coast, a pattern that differed from generalized urban, rural and slave faunal remains was defined. While historical factors might have contributed to the rather unique pattern for the historic Fish Haul faunal material, there is also the possibility that traits associated with status and/or wealth possessed by the inhabitants of Mitchelville, and not by people of the Urban, Rural, or Slave categories, may be responsible in part for the observed pattern. Until more data is available for both urban and rural status and ethnic groups in antebellum and postbellum southern society, the true meaning of the faunal resource utilization pattern exhibited by the historic Fish Haul faunal collection will not be discerned.

ETHNOBOTANICAL REMAINS

Michael Trinkley

Introduction

During the 1982 excavations at Fish Hall a Stallings feature was excavated from the 1982 block which produced ethnobotanical remains, including primarily wood charcoal and hickory nutshell (Trinkley and Zierden 1983:34-36). Examination of handpicked samples from the Stallings occupation zone yielded evidence of abundant pine and small quantities of oak, yaupon, cedar, willow, and possibly ash. Based on the success of this preliminary study and the desire to examine further the Stallings phase subsistence strategy at the Fish Hall site, quantities of charcoal were handpicked from the 1/4 inch [0.6 centimeter] screens and features which evidenced dark, humic soil were sampled by flotation and waterscreening. This strategy produced handpicked charcoal samples from 88 unit proveniences and from 44 feature proveniences. In addition, waterscreening samples were obtained from 12 of the 24 features and flotation samples were obtained from seven features.

A series of 13 handpicked samples from excavation units and 27 handpicked feature samples were examined by this analysis, representing 15% of the unit proveniences and 61% of the feature proveniences. Handpicked specimens usually provide little information on subsistence since they primarily represent wood charcoal large enough to be readily collected during either excavation or screening. The handpicked samples, however, may provide ecological data through examination of the wood species present. In the course of such a study it is assumed that charcoal from different species tends to fragment similarily (so that no species naturally produces smaller pieces of charcoal and hence would be less likely to be represented) and that charcoal will be collected in the same proportions found in the archaeological record. While this method probably gives a fair indication of the trees in the site area at the time of aboriginal occupation, there are several factors which may bias any environmental reconstruction based solely on charcoal evidence. These biases include selective gathering by site occupants and differential self-pruning of the trees.

Flotation samples are expected to yield more sensitive subsistence information and samples from 0.4 to 0.7 ounce (10 to 20 grams) are usually considered adequate, if no bias was introduced in the field. A series of eight flotation samples, representing all seven features from which flotation samples were collected, are included in this analysis.

The major issues to be investigated involve evidence of subsistence resources, the presence of non-food plants in the assemblage, and the use of fuel woods. Both prehistoric Stallings and historic Mitchelville collections are included in the study.

Procedures and Results

The eight flotation samples were prepared in a manner similar to that described by Yarnell (1974:113-114) and were examined under low magnification (7 to 30x) to identify carbonized plant foods and food remains. Remains were identified on the basis of gross morphological features and seed identification relied on Schopmeyer (1974), United States Department of Agriculture (1971), Martin and Barkley (1961), and Montgomery (1977). All float samples consisted of the charcoal obtained from 5 gallons (23 liters) of soil (by volume). The entire sample from this floated amount was examined, except for the Feature 10 and 26 samples which were so large that a subsample of approximately one-third was used. The results of this analysis are provided in Table 40.

Ignoring the uncarbonized component in each sample, the Stallings collections are composed primarily of wood charcoal, although Features 12 and 18 contain relatively abundant hickory nutshells. Seeds are not common, but Feature 18 evidences single specimens of knotweed (Polygonum sp.) and three-seeded mercury (Acalypha sp.). Feature 12 evidenced two fragmentary seed coats.

The abundance and characteristics of hickory trees has been discussed in the Introduction of this report, but briefly there are three hickories common in the Beaufort area -- bitternut (Carya cordiformis), water (C. aquatica), and mockernut (C. ovalis). These species occur on a variety of soil types, from dry woods to rich or low woods to swamp lands. In South Carolina they fruit in October, although seeds are dispersed from October through December (Bonner and Maisenhelder 1974:269; Radford et al. 1968:363-366). Good crops of all species are produced at intervals of up to three years when up to about 16,000 nuts may be produced per tree (Bonner and Maisenhelder 1974:271) and the nuts may be successfully stored.

In addition to the presence of hickory nuts, the flotation samples indicate the presence of knotweed (Polygonum sp.) and three-seeded mercury (Acalypha sp.). Knotwood is an annual or perennial herbaceous plant which can be found in a variety of habitats, including dry, open ground, wet or swampy ground, and disturbed ground. Species flower and fruit from May through November (Radford 1968:406-414). This plant may be indicative of a disturbed habitat (e.g. Yarnell 1974:117), although the presence of a

Provenience	Wood Charcoal wt	Wood Charcoal %	Uncarb Organic wt	Uncarb Organic %	Shell wt	Shell %	Bone wt	Bone %	Sherd wt	Sherd %	Hickory Nutshell wt	Hickory Nutshell %	Seeds wt.	Seeds %	Total	Seeds
Stallings																
Feature 12	4.75	30 7	6.81	44 0	——		——		1.58	10.2	2.32	15 0	0 01	0 1	15 47	2 UID frags
Feature 17[a]	9 17	84 1	1 23	11 3	0 05	0 4	0 13	1.2	——		0 33	3 0	——		10 91	
Feature 18 w½	6 11	43.1	4 55	32 1	——		0 18	1.3	——		3 32	23 4	0.01	0 1	14 17	1 knotweed, 1 *Acalypha* sp
Historic Mitchelville																
Feature 10, s½	67 61	86 0	10 83	13 8	——		0 14	0 2	——		——		0.01	t	78 59	1 chenopod, 2 UID frags, 1 *Viola* sp
Feature 13, s½	1 87	56 0	1 47	44.0	——		——		——		——		t	t	3 34	1 UID frag
Feature 14	15 76	61 5	9 58	37 4	——		——		——		——		0 28	1 1	25 62	2 Dogwood, 4 UID frags
Feature 26	59 11	91 0	3 28	5 0	——		2 62	4 0	——		——		0.01	t	65 02	2 UID frags

[a] = Analyses of Feature 17, N½, Zone 1 and Zone 2 were combined to produce a sample over 10 grams

t - trace (less than 0 01 gram or less than 0 1%)

Table 40. Flotation sample components, weight in grams.

single seed makes such a conclusion difficult. Knotweed is also recognized as a food source among some groups (Struever and Vickery 1973) and Morton (1974:115) notes that while the plant contains tannin, the young plants may be cooked and eaten as greens. Three-seeded mercury is an annual herb which is strongly associated with waste places and disturbed ground (Radford et al. 1968:664-665). The plant flowers and fruits from late June until about December.

The historic Mitchelville samples are likewise composed primarily of wood charcoal. Hickory nutshells are absent from the collections, although small quantities of seeds were found in each of the four samples (Table 40).

A single chenopod (Chenopodium sp.) and one violet (Viola sp.) seed were recovered from Feature 10. Chenopod (also known as pigweed or goosefoot) is an erect, annual herb, frequently found as a weed in rich cultivated soils. The plant flowers and fruits from June through December (Radford et al. 1968:418-420). Chenopod is frequently found at prehistoric sites and appears to have been a significant aspect of the diet. Yarnell notes, however, that a,

> possible distinction between chenopodium and other weedy food plants is that it may have grown as a volunteer in garden plots under active cultivation at the time, whereas the other plants may have taken over former garden plots (Yarnell 1976:269).

Morton (1974:44) notes that the chenopod has been used in South Carolina as a vermifuge (its active ingredient is an unsaturated terpine peroxide). In addition, the edible portions are a good source of calcium, iron, riboflavin, and ascorbic acid.

The violet, represented by a single seed, is an herbaceous perennial or winter annual, most species of which are not native to North America. Favretti and Favretti (1978:126) report violets in North American gardens from the seventeenth century, and Martin remarks on the folklore of the common blue violet (V. papilionacea),

> [t]he Confederate violet, a color variation of the common blue violet, is white with purple veins. It is called the Confederate violet, because it is so commonly seen growing around the doorways of Southern homes (Martin 1984:57).

Chasmogamous flowering and fruiting of most species occurs from March through May or June, but cleistogamous fruiting will continue until frost (Radford et al. 1986:723). Species may occur naturally in a variety of habitats and may also be cultivated.

The dogwood (Cornus florida), seeds of which were recovered from Feature 14, is usually found as a small, understory tree. The tree prefers light, sandy soil, but may be found on marsh soils along stream banks (Fowells 1968:162-163). Dogwood fruits from September through October and the seeds are dispursed throughout November (Brinkman 1974:337).

The handpicked samples also were examined under low magnification (7 to 30x) with larger pieces of wood charcoal identified, where possible, to the genus level, using comparative samples, Panshin and de Zeeuw (1970), and Koehler (1917). Wood charcoal samples were broken in half to expose a fresh transverse surface. The results of this analysis are shown in Table 41, which is organized by provenience.

In the Stallings samples wood charcoal is abundant and consists almost entirely of pine. Only three samples evidence other identified woods (hickory in one case and oak in two others). Thirteen of the sixteen collections evidenced hickory nutshells, a finding similar to the situation observed in the flotation samples. The Stallings levels in study squares from the 1982 and 129-141 blocks, with only one exception, reveal consistently high levels of hickory nutshell, averaging about 40% of the total recovered charcoal by weight. Of the eight Stallings features examined, six have hickory nutshell levels averaging 24% of the total recovered charcoal by weight. Only one sample contained evidence of acorn.

Two samples, both feature fill, provided evidence of carbonized seeds. Feature 21 contained two hawthorn seeds (Crataegus sp.). The hawthorn is a small tree or shrub which produces a fleshy fruit used as food. The fruits form from August through October, but may disperse throughout the winter (Radford et. 1968:558-562). Hawthorns occur on sandy, xeric woodland soils as well as on alluvial ground. Feature 22 produced a single seed of Juniperus sp., tentatively identified as southern red cedar (J. silicicola). The southern red cedar and red cedar (J. virginiana) are quite similar, but the former is more common in the Coastal Plain. Both are medium sized trees which produce seeds by October-November (Radford et al. 1968:43).

The Mitchelville samples evidence an abundance of pines, followed in abundance by oak, maple, and hickory. Nine of the 20 samples are composed entirely of pine. Pine is found both in architectural contexts and as a fuel. There is

Provenience	*Pinus* sp.	*Carya* sp.	*Queras* sp.	*Acer* sp.	VID wood	Rosin	Tar	Coal	*Carya* nutshell	*Queras* nut	Seeds	Total Sample weight, g
Stallings												
1982-70R110, Z.2,L.2	53.8				5.8				40.4			16 44
1982-70R110, Z.2,L.3	55.9								44 1			6 06
1982-70R110, Z.2,L.4	91.3								8.7			10.04
129-10R20, Z.2,L.2	30.7								33.1			5.02
129-10R20, Z.2,L.3	39.1		11.3						49.6			4.78
129-10R20, Z.2,L.4	66.1								31.5	2.4		4.63
Feature 9, S½	65.2	5.2				23.2			6.4			6.86
Feature 12	66.1					0.7			24.8			5.48
Feature 17, N½,L.1	99.0										1.0	11.51
Feature 17, N½,L.2	100.0											4.74
Feature 18, W½	31.3				7.4				61.2			36.46
Feature 18, E½	80.9				2.2				16.9			17.13
Feature 19	100.0											1.44
Feature 20	91.2								8.8			2.60
Feature 21	42.0								45.5		11.6[a]	4.92
Feature 22	80.9								18.8		0.3[b]	6.13
Historic Mitchelville												
39-0R5, Zone 2	100.0											7.82
162-40R30, Z.1, A.A	68.5										31.5[c]	17.26
91-0R10, Zone 2	93.9		6.1									6.41
92-40R10, Zone 1	100.0											16.37
110-35R10, ph 8	100.0											4.60
123-40R50, Zone 1	87.2				12.8							2.26
123-40R50, ph 1	30.0						63.5				6.5	2.77
Feature 3	100.0[d]											4.02
Feature 4A	100.0											0.42
Feature 4A, Zone 2	32.6		54.2	13.2								1.44
Feature 5	61.0							39.0				2.87
Feature 6	63.2		36.8									1.06
Feature 8, S½	88.6	1.4	10.0									27.15
Feature 10, N½,Z.1	75.8		13.1	6.9		4.2						16.88
Feature 10, S½	84.7		5.6	4.8		4.9						20.02
Feature 11, S½	100.0											6.18
Feature 13, S½	52.7	6.4	32.4							8.5		1.88
Feature 14	100.0											2.11
Feature 25, Zone 1	100.0											0.31
Feature 25, Zone 2	100.0											1.58

[a] *Cratagegus* sp. (Hawthorn) - 2 seeds

[b] *Junipersus* sp. (Cedar) - 1 seed (probably *J. silicicola*)

[c] *Prunus persica* (Peach) - 1 pit

[d] entire sample is noncarbonized

Table 41. Analysis of hand picked samples, by percent.

little doubt that pine was the most common fuel at Mitchelville, even if it was not the fuel of choice. Coal is found in only one of the 20 samples.

Although a small quantity of hickory nutshell is found in one sample (Feature 13, S half), the only probable food remain is the single peach pit (Prunus persica) found in unit 162-40R30, Zone 1, Area A.

Discussion

The Stallings flotation and handpicked ethnobotanical samples are dominated by wood charcoal and a single plant food remain -- hickory nutshells. This analysis provides good evidence for a fire sub-climax pine forest with minor numbers of oak, hickory, and cedar. It is also likely that the Stallings occupation was sufficiently disruptive of the environment to promote the growth of weedy plants. Four seeds were recovered from flotation, yielding 0.7 probable weed seed per 1.0 gram of plant food remains. This is a low density when compared to a site such as Salts Cave where gardening or incipient plant husbandry was being practiced (Yarnell 1974), but the density is similar to other Stallings sites.

The only plant food remains found at Stallings and Thom's Creek sites have been hickory nutshells and acorn (Trinkley 1974, 1976; Trinkley and Zierden 1983) and in each case acorn is so rare as to suggest accidental inclusion. As previously discussed, the hickory is a high quality protein with a caloric value equal to that of most meats. It appears reasonable, given the ubiquity and abundance of the nutshell fragments, to interprete the Stallings people as utilizing hickory as a major food source. In addition to the hickory nutshell, the handpicked specimens yielded two hawthorn seeds, which provided further evidence of Stallings subsistence activity. Yet Smith cautions that, "in no way do the carbonized plant remains represent a true summary of the diet of occupants of the sites" (Smith 1985:122).

The hickory nuts suggest a fall or winter occupation (October-December), although they may be collected and stored. In March 1670, Indians of South Carolina's central coast presented the English with "plenty of Hickery nutts" (Carteret, quoted in Waddell 1980:39), clearly indicating storage for at least three months duration. A similar account reveals the protohistoric storage of acorns into April (Waddell 1980:39). The hawthorn also suggests a fall or winter occupation, but the fruit may be dried for longer storage. Both knotweed and three-seeded mercury tend to seed from summer through winter. The cedar seed, likewise, is suggestive of a winter occupation. The ethnobotanical remains seem clearly to suggest that at least some activities took place at Fish Hall in the fall or winter months.

Occupation at other seasons, of course, cannot be ruled out based on this evidence.

The plant remains from Mitchelville reveal a habitat little changed from the prehistoric period. Wood charcoal dominates the collections, with pine being most abundant. Woods of lesser significance include oak, maple, and hickory, all of which would have been locally available. Coal is found as 39% of the weight of a single sample, suggesting that Mitchelville occupants used wood fuel almost exclusively. Pine was the most common fuel probably because of its availablity and ease of procurement. This is consistent with the generalized historical data. Reynolds notes that wood was the primary fuel of the South during the 1870s and that it was not until the late 1880s and early 1890s that coal became abundant (Reynolds 1942:5-6). Even during this period it is likely that Hilton Head residents continued to rely on wood and the rate of wood use for South Carolina increased by 112% from 1879 to 1918 (Reynolds 1942:Table 6).

Although pine burns quickly and produces heavy smoke, it is easy to ignite and easy to split for wood burning stoves. Pine also has about 80% of the heating value of coal (U.S. Department of Agriculture 1919:30). The other woods probably being burned -- oak, maple, and hickory -- yield 84%, 73%, and 97% of the heat of coal respectively. Only hickory yields significantly more heat, and it was probably more difficult to procure on Hilton Head. Hickory also tends to be difficult to ignite and more difficult to split.

Because of local availability, pine was also used in the construction of Mitchelville structures. Although the sapwood of pine tends to have little or no natural decay resistence, the heartwood is very resistant because the wood may contain up to 15% resin (Pansin and de Zeeuw 1970:457; Scheffer and Cowling 1966:151). This accounts for the preservation of non-carbonized structural remains from the Feature 3 chimney footing. Other structural evidence is provided by the quantity of melted tar obtained from post hole 1 in square 123-40R50. This tar is probably from either a bitumin roof or the repair of a roof.

The Mitchelville sample provides little information on plant foods used by the freedmen. The only food remain recovered is a single peach pit. Hilliard notes that, "[t]he peach was the favorite fruit in most of the South and was prized as a food either fresh, dried, or preserved" (Hilliard 1972:180). Fogel and Engerman (1974:11) mention the use of peaches by slaves and the peach is one of only three dried fruits offered for sale by Ely and Tackaberry at their Mitchelville store.

The presence of a chenopod and violet seed from Feature 10 suggests that the feature was adjacent to some weedy vegetation and was open and in use some time from June through December. The chenopod has also been reported to have been used as a vermifuge, although the single seed may more likely suggest a disturbed habitat.

The failure to recover carbonized plant foods, while disappointing, is not altogether surprising. Work at the Campfield slave site yielded only squash (Cucurbita sp.), hickory and walnut, and chinaberry (Melia arzedarach), in addition to a number of weed seeds (Trinkley 1983b). The squash is the only cultigen, and the nuts probably represent "snack foods" of little dietary importance. The chinaberry represents an example of a probable vermifuge or insect repellant. The weed seeds include several of the Brassicaceae or mustard family and may indicate the presence of pot herbs. Gardner (1982) has identified only corn (Zea mays), rice (Oryza sativa), and the peach from the Yaughan and Curriboo slave sites.

It appears that plant foods are often only minimally preserved in the archaeological record of slave sites. At all the sites thus far studied and reported wild plant foods do not appear to have made a noticeable contribution to the diet. Those plants that did contribute to the diet seem to be limited to a few cultigens.

At Mitchelville the plant foods being used and their probable preparation techniques greatly reduce the opportunities for the remains to enter (or be preserved in) the archaeological record. The historical data from Mitchelville reveals the presence of six plant foods: sweet potatoes and corn were reported as being grown in gardens, and rice, flour, grits (corn), pepper, and allspice were offered for sale. In addition it is reasonable to expect the cultivation of both pot herbs and medicinal or herbal plants. Of the known foods, only corn, rice and possibly pepper might be carbonized and observed in the archaeological record. But the preparation techniques for these foods, discussed by Genovese (1972:548-549), suggests that few items would have been exposed to potential carbonization since they were mainly boiled or fried (for further observations see Trinkley et al. 1985). A further factor limiting the recovery of ethnobotanical remains is the use of wood (probably from fireplaces) as fertilizer (see Nordhoff 1863a:11).

In summary, the Stallings samples suggest that the primary subsistence resource may have hickory nuts, although fleshy fruits were gathered as well. The non-food plants identified in the Stalling collection suggest a pine dominated forest with areas of disturbed ground. The primary fuel came from the abundant pine resources. At Mitchelville plant foods are poorly represented, although the non-food plants suggest a forest type similar to that observed in the Stallings collections and an equal, if not greater, reliance on pine for fuel. The identification of either a Mitchelville privy or well would contribute significantly to the ethnobotancial record, but no such features have thus far been reported.

CLAM SEASONALITY

Cheryl Claasen

Introduction

Quahog shell (Mercenaria mercenaria) from Fish Haul was first examined by the author in 1982. At that time, four individual shells from Feature 2, in the south central portion of square 1982-80R100, Level 3, were examined and found to indicate collection in the months from February through April (Trinkley and Zierden 1983:13, 38). This assessment will be revised in this paper which presents the analysis of 137 additional quahog shells from both the Stallings and historic Mitchelville components. While the prehistoric Stallings Period people collected quahogs in December, the historic occupants apparently collected from October to November. Sixteen hours of work are represented.

Method of Determining Seasonality

While the technique employed has been described in several places to date (Claassen 1982, 1983, 1986a), the control used for this project has only recently been developed and represents a revised version of the one found in those publications.

Briefly, quahog valves are cut in half, if whole, or are ground on an edge if fragmented, to expose an internal sequence of annual growth increments. A year's growth is comprised of two growth increments, one colored white and representing fast growth, the other colored grey, representing slow growth. A suite of environmental and physiological stimuli converge on the animal to determine whether growth will be calcium-rich, thus white in color or calcium-poor, thus grey in color. While an individual animal can be in either fast or slow growth at any time, a population of animals will be primarily in fast growth (100%-88%) in the months of January through May, 0% to 22% in June through November, and in transition (67-89%) in December according to a 3 year long control made of quahogs collected and killed in Bird Shoals, North Carolina. To date the percentages of 23-66% have not been observed in a modern population from this area.

Growth patterns between individuals are distinctive enough that opposite valves of the same individual are occasionally recognized, as are multiple shell fragments from the same animal. This uniqueness in growth patterns permits the use of fragments and the calculation of minimum numbers of individuals.

As stated, the method compares population percentages of archaeological shells and modern shells killed on a known day. The determination of distinct shellfish populations in a shell midden is fraught with difficulty. For the purposes of this technique, it is necessary to assume that shells found within a small area and contiguous to each other or shells contained in a small sealed feature were, in fact, members of the same biological population, and represent a single death assemblage. Additional clues for making this determination can be gleaned from artifactual, soil, and species clustering data and, in fact, such interpretations have been made by Trinkley in submitting these samples for analysis.

Research on the control collection used to interpret the group percentages is currently underway. The National Science Foundation has funded three years of monthly collecting (50 animals each month) from Bird Shoals and the necessary analysis, which began in September of 1985. At this time (August 1986), all shell collected from September 1985 through May 1986 have been analyzed and have been used in interpreting the samples from Fish Haul. With 27 months of collecting ahead, the control (Figure 62) will undoubtedly be revised and the figures of 23-66% be observed. For this reason, the interpretation offered in 1982 needs revision as will those offered at this time. It is, however, believed that seasonal changes will not be required.

Seasonality of Shellfishing for Quahogs During the Stallings Period

Quahog shells from four presumed steaming pits have been examined (Table 42). The interpretation of Feature 2 shells as collected from February to April, must be retracted at this time. Three of the four shells or 75% were observed to be in fast growth (white colored shell at margin) at the time of their death. The other three samples represent December shellfishing.

Feature	N	Fast Death%	Collection Time
2	4	75	December ?
17	18	83	December
18	29	79	December
23	19	84	December

Table 42. Seasonality of clams in Stallings features.

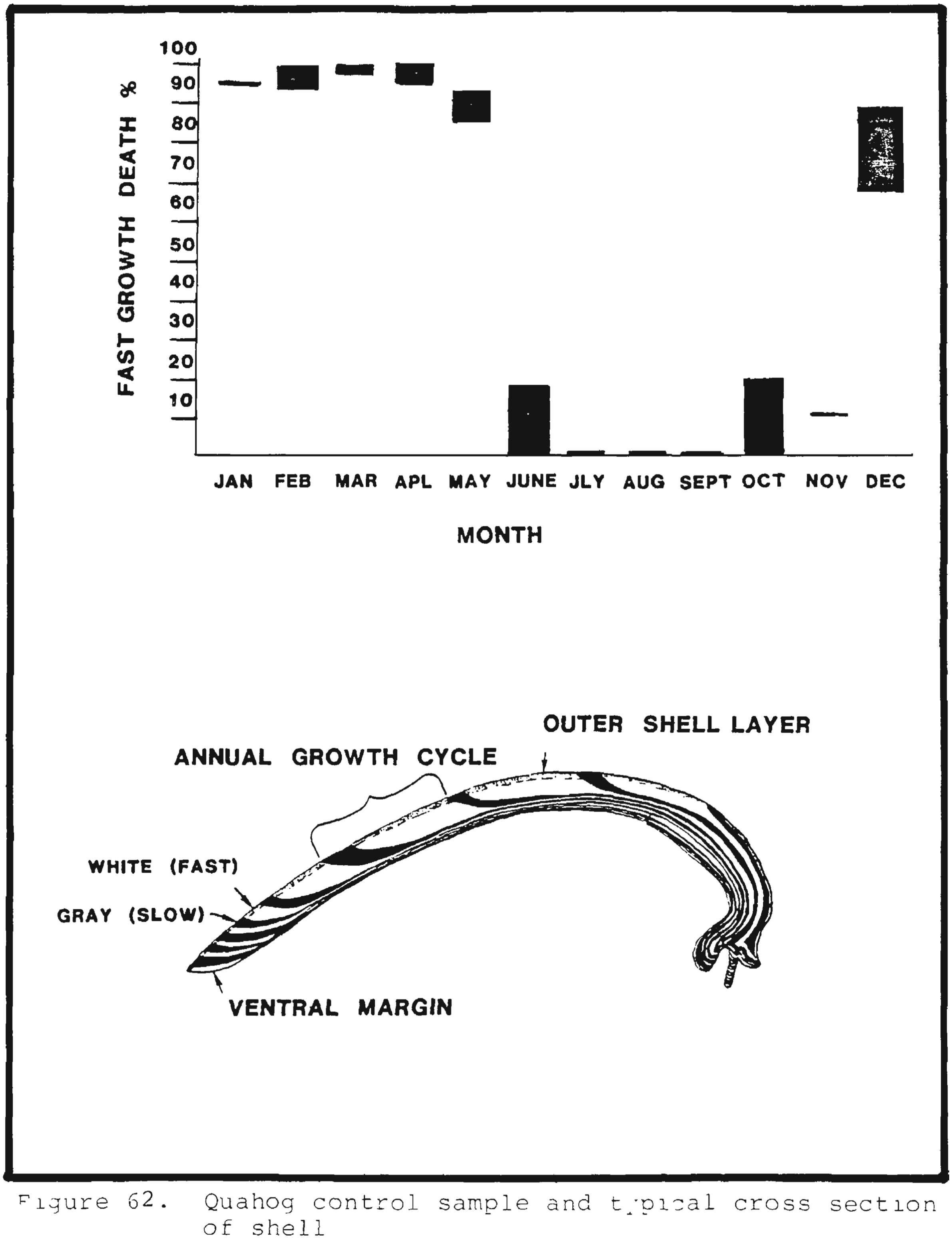

Figure 62. Quahog control sample and typical cross section of shell

The conclusion of December shellfishing is in keeping with the results of shellfishing seasonality from other prehistoric middens in North Carolina as revised in Claassen (1986b) and elsewhere in South Carolina.

Seasonality of Shellfishing for Quahogs During the Historic Period

Quahog shells from three historic features and three excavation proveniences were examined (Table 43).

Feature/ Provenience	N	Fast Death %	Collection Time
4a	7	43	October-November ?
10	13	31	October-November ?
25	5	40	October-November ?
161-162, Area A	24	50	October-November ?
162-40R40, Zone 1	19	53	October-November ?

Table 43. Seasonality of clams in Historic features.

None of these percentages have been observed in the modern control. I predict that future work with the control will find the percentages shown in Table 43 to fall in October and November indicating that the historic occupants shellfished in late fall and into December.

Discussion

One hundred and thirty-four new shells have been utilized in this study of quahog collecting at Fish Haul. With the addition of four shells examined in 1982, 70 shells from the Early Woodland Stallings Component and 68 shells from the historic component are included.

The Stallings people of 1300 to 1700 B.C. appear to have collected quahogs in December, the historic people in October-November. Although the control collection by which month of death has been determined is expected to require revision two years from now, I do not expect this impression of seasonal shellfishing of quahogs to be altered significantly. Historic peoples appear to have gathered quahogs in the fall and people four thousand years ago to have gathered quahogs at the beginning of winter.

I have been careful to specify that this work on season of collecting relates only to the quahog. Oysters may have been collected at a different time. A letter written by a missionary school teacher in the village in April 1867, specified that "we are not going to eat any more oysters after this month" (Martin 1977:68). Work with oysters will be required to address this issue.

The utility of the minimum number of individuals statistic has also been addressed in this study. Typically, shell valves are divided into left and right sets and the larger of the two sets taken to indicate the minimum number of individuals. In this project I attempted to pair whole valves within the same feature and was successful in only four cases. The surficial sculpture and the internal growth structures further indicated that the vast majority of whole valves and marginal fragments were from unique individuals. Using simply the largest valve side set in each case would have grossly underestimated the number of individuals present in the collection from Fish Haul. Formula are available in the population ecology literature for estimating the size of an "original" population. I encourage workers to calculate MNI for shellfish by using at least surface sculpture, if not actually estimating the original number of shells collected.

OYSTERS FROM THE FISH HAUL SITE

David Lawrence

Introduction

Oysters have not been fully utilized in the past in deciphering environmental use by, and behavior of, humans at coastal archaeological sites. Oysters may yield information concerning: (1) source areas -- intertidal vs subtidal gathering, mudflat vs creekbank gathering, (2) behavior during gathering -- site and nature of shell culling, (3) uses of the oysters -- foodstuffs vs agricultural lime vs building materials vs objects of curiosity, (4) seasonality of gathering -- via a ligament growth model developed by the author, and (5) other areas -- including attachment to man-made structures.

With these thoughts in mind, oyster shells from the Fish Haul site (38BU805) were examined. At the author's request, Chicora Foundation, Inc. submitted 40+ left valves from individual samples of appropriate size. Although the use of left valves does preclude analysis of left/right valve sorting during culling and shucking, it does yield the maximum information possible from manageable samples of the oyster shells. Trinkley provided summaries of archaeological context for each of the four samples, and these are repeated here, at the beginning of the discussion of individual samples.

Criteria for Environmental Sources of Oysters

All oysters in the 38BU805 collections belong to the still living species Crassostrea virginica (Gmelin). In the present-day southeastern United States, crassostreid oysters are most common in the intertidal zone along creek banks. In these settings, extreme clustering and crowding of these organisms are common, with other oysters serving as the most common substrate (Battle 1891; Dean 1891). Oysters here tend to be thin-shelled, elongate, and show large left valve attachment areas in response to the crowded conditions. Oysters living in muddy, soft-bottom intertidal flats may also develop as thin-shelled, elongate forms in clusters. However, in my experience, these less crowded oysters show smaller attachment areas (see also Galtsoff 1964: Figures 19, 20). Oysters from subtidal channels and creeks more commonly occur as single individuals, not clusters. Such animals display ovate to subovate shell outlines, and may develop thicker individual valves. Increased left valve cupping, and small attachment areas, also commonly reflect growth as scattered individuals in the subtidal zone.

Oyster associates add to these criteria of environmental differentiation. Along the southeastern coast, competition among organisms for space and other resources has led to the numerical abundance of oysters in the high intertidal zone, since organic diversity increases down the intertidal-to-subtidal gradient. Thus oyster associates increase in number subtidally. Many leave distinctive traces on the oyster shells because of their life habits as epibionts or endobionts. Examples include the perforations and internal galleries of clionid sponges (Hartman 1958; Lawrence 1969), the dumbbell-shaped perforations and oyster-produced blisters caused by polydorid bristleworms (Lunz 1941), encrusting bryozoans (Galtsoff 1964: Figure 387), and attached barnacles. Barnacles and still other organisms may be recognized without the presence of skeletal remains because the oysters are xenomorphic -- they faithfully replicate their substrate on left valve attachment areas. Growth interference may also lead to the recognition of nearby taxa from distinctive shell geometries outside of the attachment area.

Thus elongate and thin-valved oysters with well-developed attachment areas and few shell epibionts and endobionts do typify the highest intertidal settings. Ovate and thick valves with small attachment areas, left valve cupping, and many preserved associates do characterize the subtidal environment as a source. Some of the Fish Haul oysters show all characteristics of subtidal oysters except for the normal associates, leading to a degree of uncertainty about exact source. Given the sum of their characters, however, a subtidal origin is still the most likely one for the cases noted in the following discussions.

Ligament Seasonality Model

Although external shell rings have been recognized in some oysters, details from the more internal ligament region of these organisms are more likely to be well-preserved in materials from archaeological and geological contexts. Periodic growth fabrics in oyster ligaments have been recognized for a number of years and have been primarily used to estimate the age at death of these organisms in both present-day and ancient settings (Bjerkan 1918; Haskin 1954; Nelson 1942; Poisson 1946; Stenzel 1971). I use a functional/seasonal interpretation of these recurrent fabrics, one which involves analysis of both topographic highs and lows in this region plus the relative width of the mid-cardinal area, and one which has the topographic high and narrow mid-cardinal area about the pivotal axis of the shell during the coldest months of the year. The model has withstood blind tests in present-day oysters and is continually being refined. Stated most simply: oysters showing the same stage of ligament development died at the same time of the year and estimates of this season are possible.

Examined Samples

Feature 26

"Historic period; rear yard refuse. Primarily oysters, many burnt; clams present but rare; animal bones present, many of them burnt."

Sample of 64 valves. Small size is a very distinctive feature of these oyster shells. Of the entire valves, only 18 show a height in excess of 6.5 cm. Twenty of the valves, all small, show some degree of darkening or graying. Although dead oyster shell can darken by residence within reducing environment muds, the color tones and surface textures of such shells are different than those of this sample. In an archaeological context, I concur with the supplied burnt shell interpretation of these individuals.

Organisms do not occur attached to, or penetrating, the valve interiors, and the simplistic interpretation is that all of these oysters were gathered while alive. Any culling of dead shells took place away from the location of Feature 26. Given the vagaries of preservation, enough marginal valve chippings are present to suggest that these oysters, especially the unburnt, had their valves forcibly separated with the meats used as foodstuffs. Evidence of forceful entry on the burnt valves is equivocal.

The environmental sources of these oysters are difficult to unravel. The main of the burnt valves show the ovate outline and valve thickness typical of subtidal habitats, yet lack evidence of oyster associates common in such settings in the present day Carolina biogeographic province. Barnacle "ghosts" and evidences of both clionid sponges and polydorid bristleworms do occur on the unburnt shells but are not at all common. Only one of these latter valves shows the outline, thickness, and associates typical of subtidal oysters in the southeast today. Despite the presence of some relatively small attachment areas, the majority of the unburnt valves suggest intertidal origins, with their relatively thin and elongate valves. At least two of the individuals lived attached to mussel shells, with the latter most prominent in the highest intertidal settings -- although attachment to dead shell cannot be ruled out. In sum, the unburnt shells were collected from primarily intertidal settings and the smallest and burnt shells suggest but do not demand subtidal origins. Local and present-day data, on oyster associates within the intertidal gradient in Port Royal Sound, might be sought to help resolve the question of subtidal origins.

Season of gathering is not easily established, because the majority of these individuals did not live through three complete growing seasons, at which time ligament growth fabrics become most evident. However at least some individuals, including both burnt and unburnt valves, clearly suggest late summer-fall (September-December) gathering.

Feature 18

"Stallings period steaming pit; large. Oysters predominant; clam, ribbed mussel, stout tagelus, periwinkle, knobbed whelk, cockle, barnacles, and a single mud dog whelk."

Sample of 79 valves. Oysters larger than those of Feature 26, overall. At least 10 show darkening by burning, as in Feature 26. Burnt valve interiors, plus many of the unburnt individuals, show anastomosing to reticulate patterns of tiny tubes outlined by carbonate or silt-sized sediment; these patterns are herein interpreted as post-burial and fungal/plant in origin. No obvious marine or estuarine oyster associates have penetrated or settled upon the valve internal cavities, and but one individual shows penetration of the ventralmost ligament area by clionid sponges. Thus all but this one specimen are interpreted as gathered while alive. No burnt valves, which include two clusters, show unequivocal evidence of forceful entry; marginal chippings are preserved on a sufficient enough number of the unburnt valves to suggest that they were shucked with meats used as food.

Uncertainties do exist for the environmental sources of these oysters, for the same reasons cited in the description of Feature 26. Intertidal individuals do, however, occur in the sample. Of the decipherable ligament fabrics, the main suggest late summer-fall (September-December) gathering although at least 8 specimens display ligament geometries typical of the cooler months of the year.

Feature 23

"Stallings phase; small pit filled with shellfish. Oysters, rare clams, cockles, stout tagelus, ribbed mussel, and a few knobbed whelk."

Sample consists of 40 individuals; valves are of moderate size for the species. In outline and valve thickness many of these oysters suggest subtidal origins but, as with the historic period samples, they lack the prominent shell epibionts and endobionts typical of oysters from such habitats today. A minority of the valves may have come from intertidal settings but the evidence is not conclusive.

Known associates of living oysters do not occur on valve interiors, and the specimens were gathered while alive. Marginal chippings and internal scrapings indicate forceful entry between the valves, suggesting use as foodstuffs.

The ligament areas indicate fall (October-December) gathering. At least seven of the individuals show saltations of the ligament region, with this event taking place two to three months before gathering. These features normally indicate stressful intervals of time, and are here interpreted as a response to an unseasonable (high temperature?) summer. Regardless of interpretation, the co-occurrence of these features on multiple shells suggests a single year source for these shell materials.

Feature 10

"Historic period; large circular pit. Abundant shell and refuse. Single oysters, clam, occasional whelk fragments; single oyster drill; fish bone abundant."

The sample consists of 76 individuals plus two fragments of "dead" shell. The collection includes both subtidal and intertidal oysters which were gathered live and shucked via forceful entry. There is no evidence of shell heating or burning. Both the cooler winter/early spring months and fall (September-December) times of gathering are suggested (but not demanded) by the ligament growth fabrics.

Comments on the Heated Shells

Although the two samples of oysters subjected to heating come from archaeologically quite different time periods, they show or suggest some similarities worthy of note. Oyster shells can obviously be "thrown" into hot coals of a fire both before and after shucking. Yet in both the Stallings phase and historic period samples, forceful valve entry cannot be demonstrated for the most darkened shells. This observation may be an artifact of preservation, but it also may represent a true picture of the original context of the shells. The possibility exists that, in situations involving the baking or steaming of oysters, the fire itself was used in the culling process. Darkened oysters from Feature 26 are the smallest individuals; they would have yielded relatively little meat and can be viewed as "unworthy" of detailed food preparation techniques. Similarly, the most darkened oysters from Feature 18 include the sample's only clusters, which require extra time for separation, cleaning, and the like. A similar argument could be raised for the results vs efforts in preparing these oysters for cooking. Of course other uses, including burning for lime, cannot be ruled out from the material at hand. It has been fascinating to study these "fired" shells, and realize how poorly we understand them.