Chapter 7
SUBSISTENCE REMAINS

This chapter examines the archaeobotanical and archaeofaunal remains from Ayers Town. These remains derive from both cultural and natural processes, and reflect the subsistence and firewood-selection practices of the site's inhabitants as well as the naturally-occurring plant and animal species that inhabited the site environs. Carbonized botanical remains were ubiquitous within sub-plow zone feature contexts and were recovered by two methods. More than 1,800 liters of feature fill, comprising 185 discrete contexts from 87 separate features, were processed by flotation. All fill from organically rich features and deposits, such as smudge pits and carbon-rich strata within storage pits, was processed in this manner. Flotation resulted in the recovery of approximately 28 kg of carbonized and uncarbonized plant remains. The remaining feature fill was processed by waterscreening through 1/16-inch mesh. This resulted in the recovery of 166 samples from 55 features, totaling about 4.5 kg of charcoal. Because of the overall sample size of the archaeobotanical remains, it was not feasible to analyze all recovered specimens; instead, the analysis was restricted to materials recovered by flotation and focused on contexts judged to have the best potential for providing information about subsistence practices within individual households.

Archaeofaunal remains were less ubiquitous than archaeobotanical remains at Ayers Town. Two hundred thirty-seven discrete archaeological contexts, representing 51 features and 14 excavation units, produced about 6.8 kg of animal bone and freshwater mussel shell. Most features yielded less than 10 specimens each; however, four features — Features 91, 123, 140, and 190 — contained substantial quantities of bone. With the exception of the few samples found in the plow zone, all animal bones and mussel shell not individually excavated and bagged during feature excavation were recovered by waterscreening or flotation. The analysis of archaeofaunal remains from Ayers Town considered all recovered specimens.

The analyzed archaeobotanical sample from Ayers Town includes both carbonized and weathered (but uncarbonized) plant remains. They indicate a crop assemblage that consisted predominantly of maize with much smaller amounts of beans, squash, and an indeterminate cereal grain. A comparison of the Ayers Town archaeobotanical assemblage with assemblages from the earlier towns of Nassaw-Weyapee and Charraw Town suggests that Ayers Town's inhabitants may have relied more on parched maize, subsequently ground into meal, than on boiled hominy; or they may have processed corn in larger workgroups than during earlier decades. Hickory nuts and acorns are the only arboreal nut crops represented in the sample, and utilized fleshy fruits include peach, maypop, grape, persimmon, elderberry, mulberry, bramble, and possible sumac. Peach, an Old World domesticate, was the most common fleshy fruit. The recovery of single pokeweed and spurge seeds suggests the possible use of these two plants for greens, and the presence of jimsonweed, nightshade, tobacco, coffee, and morning glory seeds indicate their use as medicinal plants. Numerous weathered but uncarbonized seeds were recovered from feature contexts; those not represented in the sample of carbonized remains include groundcherry, blueberry, purslane, chenopod, and sedge.

The analysis of archaeofaunal remains identified a wide array of wild species, indicating an economic base focused upon both riverine and terrestrial resources. This is consistent with patterns observed in the archaeofaunal assemblages recovered from the roughly contemporary Catawba settlement of Old Town and slightly later settlement of New Town. A minimum of 12 fish species are represented, with the remains of bullhead catfish being the most numerous. Other fishes include gars, minnows, suckers, catfishes, pickerels, sunfishes, and basses. Freshwater mussels also were collected from the nearby Catawba River. Both toad and frog bones were recovered, but these may represent animals that simply were trapped in deep storage pits. Remains of Eastern Mud Turtle, Slider/Cooter, and Eastern Box Turtle were recovered, and these likely were intentionally collected by the site's inhabitants. At least seven species of birds are represented, with Wild Turkey and Domestic Chicken dominating the assemblage. Other bird species identified include Mallard, Mourning Dove, Common Flicker, Pileated Woodpecker, and Blue Jay. Bones of both wild and domesticated mammals were recovered, with White-tailed Deer being the predominant species represented. Squirrel, Opossum, Cottontail, Raccoon, and Black Bear remains also were found. Domesticated mammals found at Ayers Town include Pig, Cattle, Horse, and Dog. In contrast to Old Town and New Town assemblages which are dominated by domesticated mammalian species, the Ayers Town assemblage indicates a much greater reliance on hunting White-tailed Deer.

More detailed discussions of the analyses of archaeobotanical and archaeofaunal remains from Ayers Town are presented below.

Archaeobotanical Analysis

by
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The analysis of macrobotanical remains from Ayers Town focused on samples associated with the Federal period Catawba habitation of the site. The goals of botanical analysis were threefold: (1) to identify the plants present in the Ayers Town assemblages; (2) to determine whether any variation existed between the identified residential complexes with regard to the distribution of macrobotanical remains; and (3) to compare the late eighteenth-century Ayers Town botanical assemblages with those from the earlier Catawba sites of Nassaw-Weyapee (38YK434) and Charraw Town (38YK17), as well as to contemporaneous assemblages from other Indian nations in the American Southeast. The results of these comparisons show the Ayers Town assemblages, particularly contexts in the southern portion of the site, to be relatively enriched in maize kernel fragments. This distinguishes these contexts not only from other portions of the site but also from Nassaw-Weyapee and Charraw Town. In addition, little evidence for the farming of cool-season grass crops, either indigenous or European, is present at Catawba sites. This suggests there were differences in agricultural practice between the Catawba and contemporary groups such as the Creek, whose settlements have yielded unambiguous evidence for the cultivation of native grasses and European cereals in the eighteenth century.

Environment and Archives

Ayers Town is located approximately 400 meters (0.2 mile) southwest of the Catawba River on the eastern edge of the second terrace, immediately adjacent to a backswamp on the sandy T-

1 levee that drains into Ferry Branch. Situated on highly acidic clay loam, this area now supports a bottomland forest of chestnut oak, water oak, yellow poplar, sweetgum, water oak, eastern cottonwood, green ash, blackgum, red maple, willow oak, and American sycamore. Results of botanical analysis indicate the Catawba managed this area by clearing fields, simultaneously allowing for inter-cropped agriculture and the development of productive edge habitats. The older terraces west of the site likely supported mesic mixed hardwood or oak-hickory forests. In settling on the second terrace, the inhabitants of Ayers Town maintained proximity to the Catawba River while living on an ecotone that provided ready access to both upland and bottomland resources.

The diary of Lady Henrietta Liston, who visited a Catawba town thought to be 38YK534 in 1797, provides glimpses of the surrounding landscape as well as Catawba foodways. Liston (1797:25) notes that the town she visited was "in a hollow near the River." She also describes the meals she saw cooking and Catawba agriculture:

> On the Colonels fire stood a pot, & there was a hoecake on the hearth. I asked what was in the Pot, he said Deers flesh for breakfast, but did not offer us any. In another Hut we found Wild Turkey preparing in the same manner. The only cultivation we saw was a small quantity of Indian corn in the vicinity of the Town, cultivated I am told, by the Women, & this is rather for traveling with (when an Indian sets out on a journey the flour of Indian Corn in a bag & pot to boil it in is all his provision) than to use as bread. [Liston 1797:28]

In this somewhat contradictory passage Liston notes a hoecake cooking on the hearth and identifies maize as the only crop she saw, but asserts it was ground into flour and boiled instead of being used to make bread. She may have understood, with or without cause, the hoecake to be made of wheat flour. It is also possible some nuance was lost in the process of translation. Unfortunately for Liston and for us, she did not get a taste of breakfast. However, her account, besides providing evidence for maize processing into flour, indicates the continued role of Catawba women as farmers, following a long-standing gendered division of labor in southeastern American Indian societies (Hudson 1976; Thomas 2001).

The first macrobotanical study to be done in the region was conducted by Jamie Civitello (2005) under the mentorship of Gail Wagner at the University of South Carolina. Civitello examined samples from Spratt's Bottom (38YK3), a multi-component site on the east (north) bank of the Catawba River near Fort Mill, South Carolina. Two calibrated radiocarbon dates bracket a prehistoric occupation of the site between AD 920 and 1276, while a preponderance of 5/64 inch-bore kaolin pipe stems indicate an historic Catawba component that lasted from about 1720 to 1750 (Civitello 2005:47). The historic component may be the product of an early iteration of the Nassaw community, which subsequently moved upriver where they were depicted on a 1756 map (Merrell 1989:163). The goal of Civitello's research was to examine anthropogenic landscape change. She found that an increase in maize ubiquity from the prehistoric to the historic component (25% to 71%) coincided with an increase in the use of pine for firewood (Civitello 2005:98). The prehistoric wood assemblage consisted of 71% oak, 12% southern pine, and 6% hickory, while the historic component contained 65% pine, 27% oak, and 2% hickory. This pattern suggests the historic inhabitants of Spratt's Bottom had placed more land under cultivation than their predecessors and were re-using old fields. A corollary of this increased emphasis on agriculture was a higher nutshell-to-wood ratio, along with a more diverse nutshell assemblage, from prehistoric contexts (Civitello 2005:98–99).

Table 7.1. Summary of Ayers Town Flotation Samples by Context.

	Samples Collected		Samples Sorted	
Context	N	Vol. (L)	N	Vol. (L)
Borrow pit	31	286.5	0	–
Cellar/Storage pit	95	1146.9	39	328.5
Smudge pit	52	273.8	0	–
Other	7	80.4	0	–
Total	185	1803.6	39	328.5

Methods of Recovery and Analysis

Sampling procedures utilized during fieldwork at Ayers Town varied by context. All smudge pits were floated in their entirety. Flotation samples from other feature contexts were collected at the excavators' discretion. With the exception of postholes standardized 10-liter samples were collected from most zones of feature fill, but in cases of high charcoal density entire contexts were processed by flotation. Flotation was conducted using a SMAP-type machine that collected heavy fractions in 0.01-in^2 (0.25-mm^2) mesh and light fractions in approximately 125µ chiffon fabric. Poppy seed recovery rates of this system have not been established (Wagner 1982), but the identification of tobacco seeds in Ayers Town assemblages may be a positive measure of its effectiveness. A total of 1,803.6 liters of feature fill were processed from 185 discrete contexts (Table 7.1). Thirty-one of these samples were from borrow pits, 95 were from cellar and storage pits, 52 were from smudge pits, and seven were from other contexts such as refuse-filled stump holes and possible Archaic or Woodland features. The analysis of Ayers Town macrobotanical materials presented here is based on a subsample of 39 cellar and storage pit fills from 13 different features. This represents 21% of the total number of flotation samples collected from Ayers Town and 41% of the cellar and storage pit samples. Samples were chosen for analysis according to feature location, with the goal of sampling across the site to enable an assessment of intra-site variation in the distribution of plant remains.

Analysis of flotation samples followed procedures described by Pearsall (2000). This process involved separating samples into size-graded fractions using geological sieves, which were then examined under a low-power stereoscopic microscope. The 2-mm fraction was completely sorted and the smaller fractions scanned for seeds, nutshell, and other identifiable plant materials. Seeds were identified with reference to the type collection of southeastern botanical materials in Dr. Margaret Scarry's paleoethnobotany lab at the Research Laboratories of Archaeology, University of North Carolina, Chapel Hill. Both counts and weights were recorded for all food-plant fragments and seeds. Since there is variation among archaeobotanists with regard to the recording of nutshell, maize kernel fragments, and other materials less than 2 mm in size, these items were tabulated separately to enable comparability with other studies (Appendix D). While it is common practice to interpret all non-carbonized seeds in moist, acidic depositional contexts of the Southeast as modern contamination, multiple samples from Ayers Town were found to contain weathered seeds. These often consisted of the seed coats of fruits such as maypop, elderberry, and bramble, although a large number of weathered tobacco seeds (n=114) were also identified. Since partially carbonized specimens of wood and peach endocarp fragments were present in the collection, it is posited that these uncarbonized weathered seeds

are associated with the eighteenth-century Catawba occupation of Ayers Town. They have been tabulated separately from the carbonized materials.

Standardization by volume is necessary for quantitative comparison between samples in order to demonstrate that any differences are not due simply to variation in the amount of soil processed. The volume of each sample was measured in a calibrated bucket prior to flotation. While the accuracy and precision of volume measurements vary with soil type (Wright 2005), most of the Ayers Town and other eighteenth-century Catawba feature fills consist of sandy clay loam, so the effects of such variation should be limited. Feature contexts that were floated in their entirety were sub-sampled with a riffle splitter and the fraction examined recorded. To enable quantitative analysis, the same fractional value was applied to the total volume of soil to estimate the volume of the sub-sample. Ubiquity measures, or the total number of samples in which an item was found, were also calculated.

Results

The Ayers Town macrobotanical remains have been grouped into analytical categories that reflect their origin and likely uses: crops, nuts, fleshy fruits, greens, medicine, and small grains/weeds. While these categories are useful for the purposes of presentation, it should be noted that a single plant could have multiple uses, just like other artifacts. After processing, maize kernels were food while maize cobs became fuel, with the same being true for nut meat and nut shell. Fleshy fruits such as elderberry under certain circumstances were also medicines. Thus, while the categories have economic significance with regard to the means and primary purpose of extraction, the distribution of these materials at a site may have as much or more to do with their secondary uses. This is particularly well-illustrated in the case of maize cob smudge pits.

The crop assemblage from Ayers Town consists of maize, beans, squash, and a single indeterminate cereal grain (Table 7.2). Maize kernels, cupules, and cob row sections were the most frequently encountered cultigens. Kernels were found in 54% of the samples, cupules in 72% of the samples, and cob row sections in 36% of the samples. Taken together, some part of the maize plant was found in 35 samples, giving maize 90% ubiquity. Eight fragments of beans and probable beans were recovered from 18% of the samples, while a single piece of squash rind was found in Zone 1 of Feature 158. A partial seed from Feature 140, Zone 5, resembles a European cereal grain, but due to its fragmentary nature could not be identified as to species. The high ubiquity of maize kernels and cupules in Ayers Town feature fill positively aligns with Liston's (1797:28) comment that the "only cultivation" she saw in the vicinity of the town was "Indian Corn."

Hickory nuts and acorns were another staple food of Ayers Town residents (Table 7.3). Since hickory shell is more durable than acorn, it is typically better represented in archeological assemblages. Four pieces of possible hickory nut meat were identified in Feature 140, Zone 5, while acorn meat was recovered from Features 123 and 162. Hickory shell was found in 59% and acorn shell in 13% of Ayers Town samples. If tentative identifications are taken into account, the total ubiquity of hickory is 67% and acorn is 18%. The presence of only hickory and acorn in the Ayers Town nut assemblages may indicate a lack of early successional habitats

Table 7.2. Carbonized Cultigens from Ayers Town (>1.4 mm).

Plant	Portion	Count	Weight (g)	Ubiquity Count	Ubiquity Percent
Maize	Kernel fragment	84	0.76	21	54
cf. Maize	Kernel fragment	1	<0.01	1	3
Maize	Cob row	112	8.75	14	36
Maize	Cupule fragment	1,888	10.91	28	72
cf. Maize	Cupule fragment	1	<0.01	1	3
Total Maize				35	90
Bean	Seed fragment	5	0.03	4	10
cf. Bean	Seed fragment	3	0.02	3	8
Total Bean				7	18
Squash	Rind	1	0.01	1	3
Indeterminate cereal	Seed fragment	1	<0.01	1	3

Table 7.3. Carbonized Nut Remains from Ayers Town (>1.4 mm).

Plant	Portion	Count	Weight (g)	Ubiquity Count	Ubiquity Percent
cf. Hickory	Nut meat	4	0.03	1	3
Hickory	Nut shell	138	3.50	23	59
cf. Hickory	Nut shell	4	0.02	2	5
Total Hickory				26	67
Acorn	Nut meat	9	0.30	3	8
Acorn	Nut shell	60	0.19	5	13
Total Acorn				7	18

in the area, as might contain hazel, but is perhaps more likely evidence for targeted acquisition of preferred resources. The ratio of nutshell to wood weight at Ayers Town is 1 to 37.9 grams, and the ratio of nutshell to maize cupule weight is 1 to 5.3 grams.

The assemblage of carbonized fleshy fruits consists of peach, maypop, grape, persimmon, elderberry, mulberry, bramble, and possible sumac (Table 7.4). The most common fruit remains were peach endocarp fragments, which constituted 72% of the fruit assemblage. They were found in 31% of the examined contexts. Eleven elderberry seeds were present in Zones 3 and 4 of Feature 5, which also yielded uncarbonized specimens. Maypop was present in more samples than elderberry (four, or 10% ubiquity) but only six fragments were identified. Grape and persimmon are represented by three specimens each, from three contexts in the case of grape and two in the case of persimmon. Mulberry was present in Features 4 and 27, and the single carbonized bramble seed in the collection was found in a sample from Feature 5, Zone 3. Feature 140, Zone 6, contained a possible sumac seed. Although potentially eaten as a fleshy fruit, sumac has a variety of documented uses. The Cherokee used different parts of the plant to treat discomforts ranging from dysentery to sunburn, while both the Creek and Delaware would smoke the leaves with tobacco to relieve respiratory problems (Moerman 1986:402–406).

Table 7.4. Carbonized Fleshy Fruit Seeds from Ayers Town.

Plant	Portion	Count	Weight (g)	Ubiquity Count	Ubiquity Percent
Peach*	Pit fragment	74	1.04	12	31
cf. Peach	Pit fragment	2	0.02	2	5
Total Peach				12	31
Maypop	Seed fragment	6	0.01	4	10
Grape	Seed	2	0.01	2	5
Grape	Seed fragment	1	0.01	1	3
Total Grape				3	8
Persimmon	Seed	1	0.06	1	3
Persimmon	Seed fragment	2	0.02	2	5
Total Persimmon				2	5
Elderberry	Seed	11	<0.01	2	5
Mulberry	Seed	2	<0.01	2	5
Bramble	Seed	1	<0.01	1	3
cf. Sumac	Seed	1	<0.01	1	

Two seeds from plants commonly used as greens—pokeweed and spurge—are present in the Ayers Town collection. A carbonized pokeweed seed fragment was identified in a sample from Feature 123, and Feature 33 yielded a single spurge seed. In addition to being consumed as food, both plants were likely used for medicinal purposes. Their most common application was for dermatological problems. Pokeweed, in particular, has been used by the Cherokee, Delaware, Mohegan, and Rappahannock to treat skin ulcers, swelling, poison ivy, and warts (Moerman 1986:184, 337–338). The Cherokee and Delaware also identified it as "blood medicine," with the cooked greens and sometimes roots being consumed to build, stimulate, and purify blood.

The Ayers Town samples contain seeds from four plants used primarily as medicines, broadly defined as non-food substances used to achieve a state of well-being: jimsonweed, tobacco, morning glory, and possible coffee (Table 7.5). Jimsonweed (*Datura stramonium*) is the most ubiquitous, occurring in 21% of the examined samples. Most of the seeds (114, or 87%) were present in Feature 4 fill. As jimsonweed produces seed pods, and a single plant can produce around 20,000 seeds in a season (Levitt and Lovett 1984), it is possible this seemingly high number of seeds reflects the presence of a single carbonized pod. A seed and seed fragment from Feature 140 that could be classified only to the nightshade family Solanaceae may also be *Datura* seeds, since nine unambiguous examples were identified in this feature. Plants of the genus *Datura* contain the alkaloids atropine and scopolamine (Friedman and Levin 1989), and there are ethnographic accounts of Indians in the American Southwest using *Datura* species for its hallucinogenic properties in ritual contexts (Moerman 1986:148–149). Similar references are lacking in the Southeast, where *Datura* leaves were used primarily as a dermatological aid: the Cherokee used the leaves to treat boils, and the Delaware, Mohegan, and Rappahannock applied crushed leaves to wounds. Jimsonweed was also used to treat respiratory problems such as asthma, pneumonia, and sore throats among the Cherokee and Rappahannock (Moerman 1986:149–150). *Datura* seeds have been recovered from three Cherokee contexts dating to the 1830s (Cuthrell 2005). Its use continued into the twentieth century, as suggested by a

Table 7.5. Representation at Ayers Town of Small Grain/Weed Seeds and Carbonized Seeds of Plants Used for Greens and Medicine.

Plant	Portion	Count	Weight (g)	Ubiquity Count	Ubiquity Percent
Greens					
Pokeweed	Seed fragment	1	<0.01	1	3
Spurge	Seed	1	<0.01	1	3
Medicine					
Jimsonweed	Seed	47	0.11	6	15
Jimsonweed	Seed fragment	84	0.03	5	13
Total Jimsonweed				8	21
Nightshade family	Seed	1	<0.01	1	3
Nightshade family	Seed fragment	1	<0.01	1	3
Total Nightshade				2	5
Tobacco	Seed	4	<0.01	2	5
cf. Coffee	Seed	1	<0.01	1	3
cf. Coffee	Seed fragment	1	<0.01	1	3
Total cf. Coffee				2	5
Morning glory	Seed	1	0.01	1	3
Small Grain/Weed					
Indeterminate Grass	Seed	3	<0.01	2	5
Weedy legume	Seed	3	<0.01	3	8
Composite	Seed	1	<0.01	1	3

photograph of a Cherokee cabin, taken in 1908, which shows a considerable stand of apparent jimsonweed growing adjacent to the house (Figure 7.1) (Harrington 2002[1909]).

Four carbonized tobacco seeds were identified in the bottom-most zones of Feature 107. The ubiquity of tobacco is greater when uncarbonized specimens are considered, as will be discussed below. Possible coffee bean fragments were recovered from Features 5 and 74. If these seeds are indeed coffee, they were likely the product of Caribbean coffee plantations. Documented use of coffee in historic period American Indian communities is scarce; one coffee seed was identified at the Welch site, the home of a post-removal *metis* Cherokee family (Cuthrell 2005). A single *Ipomoea sp.* seed, probably morning glory, was recovered from Zone 3 of Feature 185. Morning glory was used as cough medicine by the Cherokee and Iroquois, and as a diuretic among the Cherokee and Creek (Moerman 1986:235–236). The remaining carbonized seeds in the assemblage come from plants that may have been utilized for their small grains, although it is also possible these are incidental "weed" inclusions. These include grass seeds from Features 33 and 107, wild legume seeds from Features 4, 5, and 170, and a Composite seed from Feature 33.

The weathered seeds from Ayers Town come from plants grouped in the fleshy fruits, greens, medicine, and small grain/weed categories. These seeds were often damaged such that it was possible to observe that only the seed coat remained. Although these are not truly desiccated remains since they have been subject to decomposition in a humid environment, they are similar to desiccated assemblages in that they are more species rich than the carbonized assemblage (Van der Veen 2007). Among the fleshy fruits (Table 7.6) there are two species —

Figure 7.1. Stand of apparent *Datura stramonium* growing adjacent to an early twentieth-century Cherokee cabin (Harrington 2002[1909]).

groundcherry and blueberry — present in the weathered assemblage that are not present in the carbonized assemblage. In addition, the ubiquity of certain species is much greater for the weathered rather than for the carbonized assemblage. This is the case for bramble, of which weathered seeds were found in 44% of the samples but only one carbonized seed was identified overall. Similarly, the ubiquity of weathered elderberry seeds is 31% compared to 5% for carbonized seeds. It seems that the weathered seed coats of these smaller seeds were more likely to remain mostly intact and identifiable compared to larger seeds such as those of maypop and grape. While 41 weathered maypop seeds and seed fragments were identified compared to six carbonized seed fragments, they occurred in a similar number of samples (although not the same ones). Carbonized grape seeds were identified in three samples, and weathered examples were found in two.

Weathered seeds from plants used as greens included pokeweed, purslane, and spurge (Table 7.7). While only one fragment of carbonized pokeweed was found, 22 weathered examples were present in eight samples. Eleven weathered purslane seeds were found in five samples, and one weathered spurge seed was found in Zone 1 of Feature 107. The only medicinal plant represented in the weathered seed assemblage is tobacco. Most of these seeds

Table 7.6. Weathered Fleshy Fruit Seeds from Ayers Town.

Plant	Portion	Count	Ubiquity Count	Ubiquity Percent	Carbonized Ubiquity Count	Carbonized Ubiquity Percent
Bramble	Seed	128	17	44	1	3
Bramble	Seed fragment	9	2	5	n/a	
Total Bramble			17	44	1	3
Elderberry	Seed	178	11	28	2	5
Elderberry	Seed fragment	116	5	13	n/a	
Total Elderberry			12	31	2	5
Maypop	Seed	11	1	3	n/a	
Maypop	Seed fragment	30	5	13	4	10
Total Maypop			5	13	4	10
Groundcherry	Seed	4	3	8	n/a	
Grape	Seed	1	1	3	2	5
Grape	Seed fragment	9	2	5	1	3
Total Grape			2	5	3	8
Blueberry	Seed	1	1	3	n/a	

Table 7.7. Weathered Seeds from Plants Used as Greens and Medicine, and Small Grain Seeds.

Plant	Portion	Count	Ubiquity Count	Ubiquity Percent	Carbonized Ubiquity Count	Carbonized Ubiquity Percent
Greens						
Pokeweed	Seed	10	6	15	n/a	
Pokeweed	Seed fragment	12	5	13	1	3
Total Pokeweed			8	21	1	3
Purslane	Seed	11	5	13	n/a	
Spurge	Seed	1	1	3	1	3
Medicine						
Tobacco	Seed	114	4	10	2	5
Small Grain/Weed						
Chenopod	Seed	1	1	3	n/a	
Sedge	Seed	1	1	3	n/a	

(94%) were found in the bottom-most zone of Feature 107. The small seed and weed assemblage consists of a chenopod seed from Feature 5 and a sedge seed from Feature 74. Neither species is present in the carbonized assemblage. Sedge leaves were often used as a raw material for the construction of baskets and matting.

Overall, the Ayers Town botanical assemblage consists of plants that thrive in agricultural fields, edge environments, and early successional communities. Hickory and acorn are the only examples of climax woodland species, and these are more productive in edge environments. Despite the proximity of Ayers Town to wetland settings, elderberry and sedge are the only two wetland species present in the assemblage. Although the fields observed by Liston were not

extensive, they clearly supported most of the botanical resources that were grown and gathered by Ayers Town residents.

Quantitative Analysis

Quantitative analysis of macrobotanical remains, like the analysis of other archaeological materials, requires careful attention to the processes that produced the assemblage. Since carbonization is the primary route to preservation for most plant materials, attention to factors resulting in carbonization distinguishes the analysis of plant remains from that of other materials. The likelihood of a particular plant material becoming carbonized depends mostly on whether or not it was intentionally burned as fuel or waste-fuel. In forested areas, wood is the most likely material to be carbonized, while in arid, pastoral contexts seed-containing dung is common fuel (Hastorf and Wright 1998). Cleansing of storage areas by fire may result in a broader spectrum of carbonized materials, as may accidents during food preparation or more tragic circumstances. In a very general sense, the amount and types of burning that take place in a given context contribute to the size and diversity of its botanical assemblage.

Calculating the density of carbonized material per unit soil enables an assessment of the amount of charcoal-producing activities represented therein. The total botanical weight density values from Ayers Town have a median value of 0.26 gram per liter, with 50% of the densities falling between 0.065 and 0.865 gram per liter. A box plot of these values shows that with the exception of six outliers, all of the total botanical weight densities are less than 2 grams per liter (Figure 7.2). Feature fills that contain unusually high densities of carbonized materials include Zone 3 of Feature 5, and Zones 4, 5, 6, 8, and 9 of Feature 123. In addition to identifying

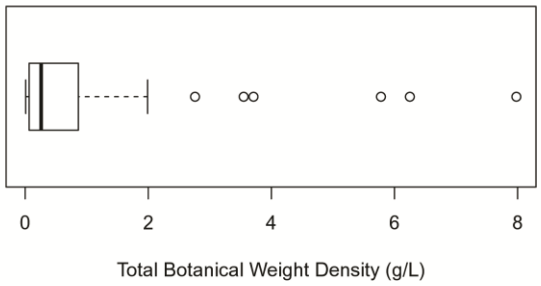

Figure 7.2. Boxplot of carbonized plant weight density values from analyzed Ayers Town flotation samples. The outlying values are from Feature 123 and Zone 3 of Feature 5.

outliers, this information can be used to investigate formation processes of the storage pits themselves. Cases in which charcoal density increases with zone depth likely represent an inverted profile, created when the soil dug out of a new storage pit was used to fill in an old pit. At Ayers Town such profiles are exhibited by Features 5, 107, and 185. Alternatively, the presence of relatively charcoal-free soil at the bottom of the pit, as in Features 27 and 140, may be the result of deliberate re-surfacing of the storage pit with "clean" soil to enable its re-use. Since the amount of charcoal on the surface of a habitation site could be expected to increase over time, pits containing only low-density fills may date to the earliest occupation of a site.

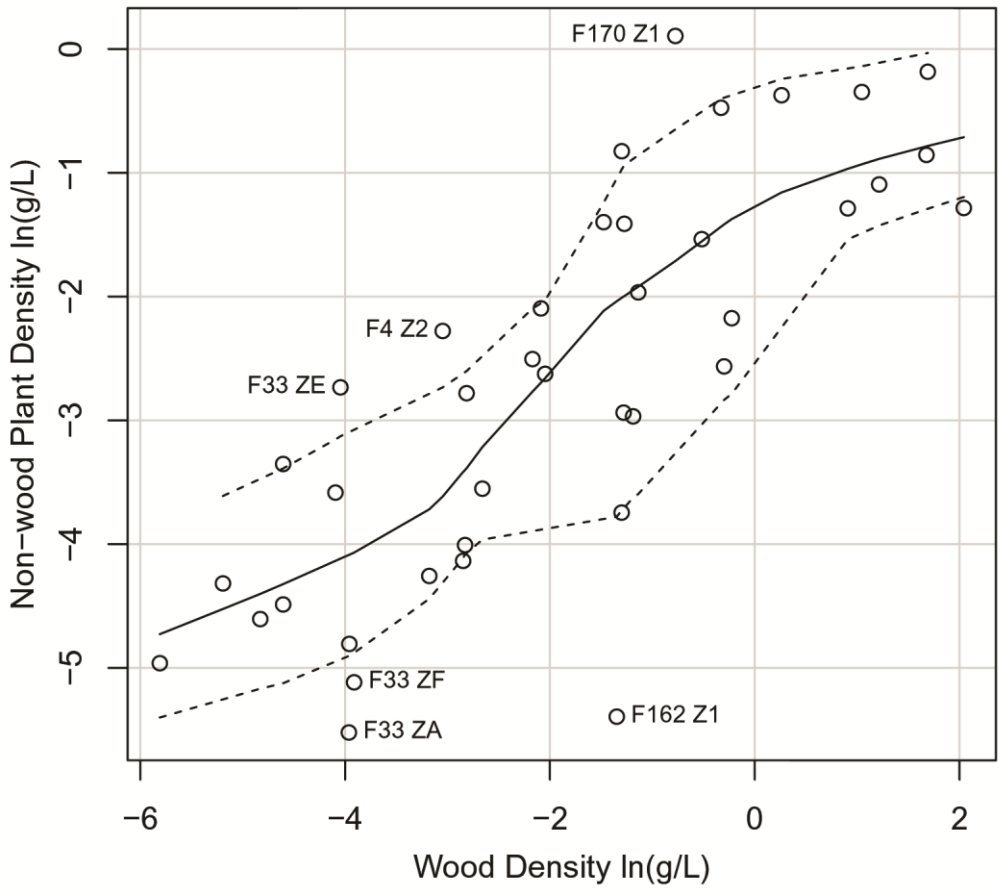

Figure 7.3. Loess non-parametric regression of logged plant weight density as predicted by logged wood weight density. The dotted lines mark the root-mean-square residuals.

This may be the case for Feature 33 at Ayers Town, which has density values between 0.02 and 0.08 grams per liter. Features containing the cleanest fills — Features 5, 27, 33, and 140 — occur in Residential Complexes C and D, and generally in the western portion of the site, while fills with the highest charcoal density are present at the southern portion of the site in Features 5, 123, 140, 162, and 185. Residential Complex D is notable in containing features that contain fill with both the highest and lowest charcoal densities of the analyzed samples.

A loess non-parametric regression of logged plant weight density as predicted by logged wood weight density shows that in most cases the plant density of Ayers Town samples is predicted by their wood density (Figure 7.3). This suggests an absence of contexts produced by the burning of storage pit contents *in situ* or other unusual burning events among the analyzed samples. Unlike simple linear regression, loess regression solves not for a single line but calculates a series of solutions using neighborhood subsets of the data. When the root-mean-square residuals are plotted along with the regression line, it is easy to identify samples with residuals greater than the mean values. Samples with low plant density given the amount of wood present are Zones A and F of Feature 33 and Feature 162, Zone 1. Samples with high plant density given the amount of wood present are Zone E of Feature 33, Zone 2 of Feature 4, and Zone 1 of Feature 170. The latter fills may have been collected from areas where more intensive food preparation activities took place.

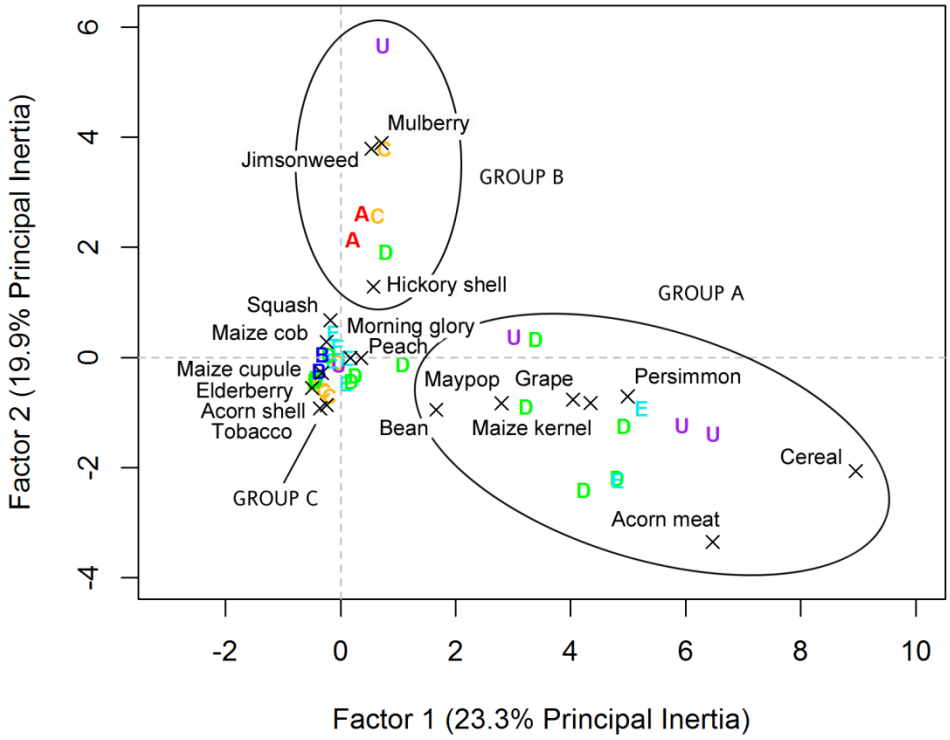

Figure 7.4. Correspondence analysis biplot of plant material counts for Ayers Town samples, labeled by residential complex. The symbol "U" stands for Feature 140, which was not assigned to a residential complex.

Variation in sample composition can be examined through correspondence analysis of count data. Since Zone F of Feature 33 did not produce any identifiable plant remains, it is excluded from analysis. Very infrequently encountered species produced spurious results, and these were also omitted: bramble, pokeweed, composite, spurge, grass, and weedy legume. Doing so required the removal of one sample (Zone A of Feature 33) that contained only these items. The resulting correspondence plot (Figure 7.4) displays three main groupings. The first is defined by Factor 1, which contains 23.3% of the principal inertia. Samples with high positive loadings in this factor contain more maize kernels than expected, such that most (0.626) of the inertia in this factor can be attributed to maize kernels (Table 7.8). Acorn meat, persimmon, and grape also are more likely to occur in these samples, one of which contains the single identified cereal grain fragment. Beans and maypop are also slightly correlated with Group A. Maize cupules, however, have negative loadings on Factor 1, indicating Group A samples contain less cupules than expected. Samples included in Group A come from Residential Complexes D and E (Features 33, 123, and 162), along with Feature 140. Groups B and C are defined by Factor 2, which contains 19.9% of the principal inertia. It distinguishes samples with more than expected jimsonweed and hickory from those that contain more than expected maize cupules. The greatest contributions to the inertia of this factor come from jimsonweed (0.745) and hickory (0.090). Mulberry is correlated with these items in Group B. Acorn shell, tobacco, and elderberry have negative loadings and more frequently occur in Group C samples. Squash, peach, and morning glory have low quality values, indicating their variation does not correlate

Table 7.8. Correlation Analysis Statistics Calculated from Counts of Plant Materials from Ayers Town.

				Correlation[1]		Correlation[2]	
Plant Material	Mass	Quality	Inertia	Factor 1	Factor 2	Factor 1	Factor 2
Maize kernel	0.033	0.830	0.181	0.626	0.023	0.805	0.025
Maize cob row	0.044	0.123	0.011	0.003	0.004	0.056	0.067
Maize cupule	0.745	0.863	0.035	0.079	0.060	0.523	0.340
Bean	0.002	0.087	0.019	0.005	0.002	0.068	0.019
Squash	0.001	0.004	0.009	0.000	0.000	0.000	0.004
Cereal	0.001	0.227	0.034	0.032	0.002	0.217	0.010
Hickory shell	0.054	0.379	0.058	0.018	0.090	0.072	0.307
Acorn meat	0.004	0.268	0.159	0.149	0.040	0.218	0.050
Acorn shell	0.024	0.046	0.085	0.001	0.018	0.004	0.042
Peach	0.029	0.014	0.063	0.004	0.000	0.014	0.000
Maypop	0.002	0.060	0.077	0.019	0.002	0.056	0.004
Grape	0.001	0.162	0.029	0.019	0.001	0.158	0.005
Persimmon	0.001	0.246	0.028	0.030	0.001	0.242	0.004
Elderberry	0.004	0.051	0.010	0.001	0.001	0.025	0.026
Mulberry	0.001	0.087	0.028	0.000	0.012	0.003	0.084
Jimsonweed	0.052	0.926	0.164	0.015	0.745	0.021	0.905
Morning glory	0.000	0.001	0.003	0.000	0.000	0.001	0.000
Tobacco	0.002	0.040	0.008	0.000	0.001	0.006	0.034

[1] Variable contribution to factors, or the principal inertia (deviation from expected value) in each factor that is attributable to each plant material.

[2] Variable squared correlation with factors, or the amount of total inertia for each plant material associated with each factor.

well with either of the first two factors. Samples in Group B were collected from features in Residential Complexes A, C, and D (Features 4, 27, and 33), as well as from Feature 140, while Group C samples are distributed broadly across the site.

The significance of the associations identified through correspondence analysis is only immediately apparent in the case of Group A. Maize kernels, cereal grain, and acorn meat are the edible portions of crops and staple foods that require processing prior to consumption. Since they are relatively free of processing waste, Group A fills may have been collected from areas where food preparation, but not early stage processing, took place. It is less clear why hickory shell and mulberry would be more likely to be found in samples with jimsonweed, and acorn shell, elderberry, and tobacco in samples with maize cupules. Seasonality does not provide a satisfactory explanation in either case, as mulberry is an early season fruit, and hickory nuts and jimsonweed ripen in the fall. Similarly, elderberry and tobacco may seed in mid-summer, but acorns would not be available until the fall. Temporality may be evident, however, in the distribution of hickory shell compared to cobs and cupules. Since Group C fills occur across the site and are defined primarily by high concentrations of cupules, this suggests cobs were typically burnt as fuel on a year-round basis, as corn was likely stored on the cob. The

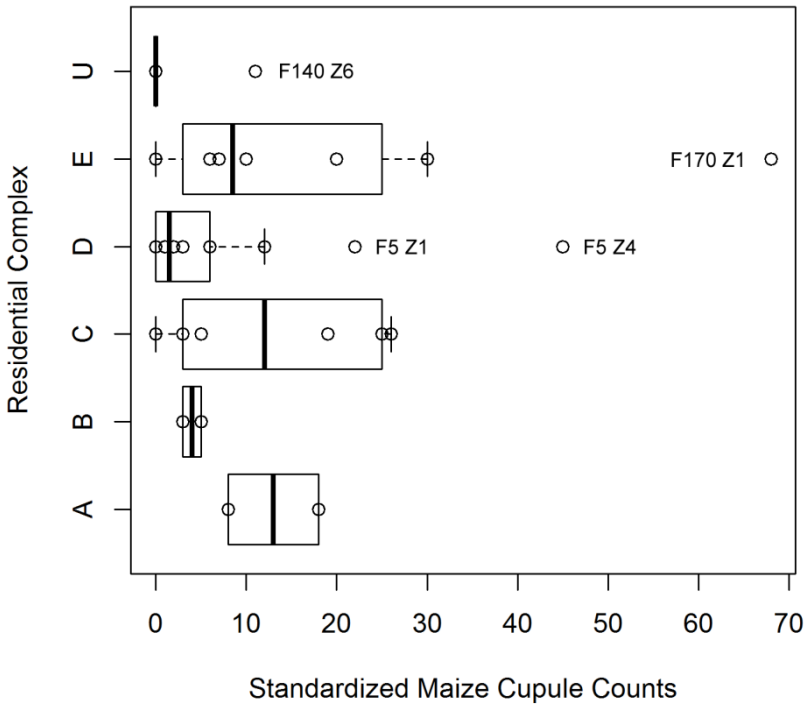

Figure 7.5. Box plots of standardized maize cupule counts by residential complex. The symbol "U" stands for Feature 140, which was not assigned to a residential complex.

separation of hickory nutshell from this general fuel group may indicate hickory processing was more limited in duration.

Investigation of the spatial distribution of particular plant materials can further refine our understanding of variation among the residential complexes at Ayers Town. An examination of maize cupule counts, standardized by the weight of carbonized material in each sample (Figure 7.5), shows the median values for Residential Complex D and Feature 140 to be very low, with the highest medians among the Complex A and C samples. Complexes D and E contain features with zones that yielded very high outlying values. The disparity between the very low and very high cupule counts in Complex D is due to the contrast between Feature 123, which has very high botanical weight density but very low cupule counts, and Feature 5, which has very high cupule counts. In Complex E, Feature 170 contains the highest standardized cupule counts. The median nutshell counts, standardized by the weight of carbonized material in each sample (Figure 7.6), are highest for Complexes A and C. Again, Complex D has a low median value but high outlying counts, in this case attributable to Features 5 and 33. The distribution of maize cupules may be the result of differential disposal rather than differential frequency of maize processing since cobs were also used as fuel in smudge pits. This may be the case for Complex E, where there are more smudge pits than the other residential areas. It is clear, however, that nuts were more frequently processed in the northern and western portions of the site (i.e., Residential Complexes A, C, and D).

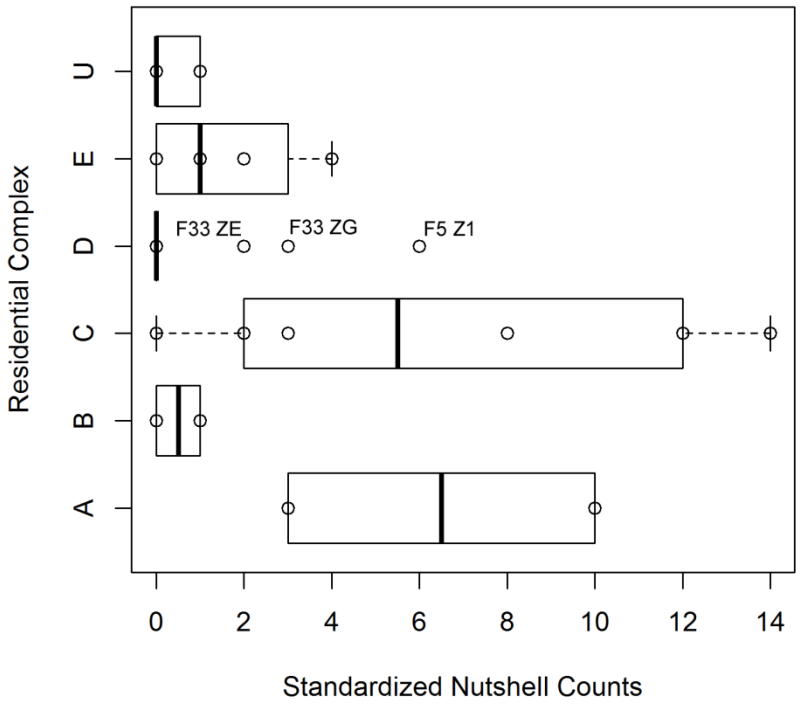

Figure 7.6. Box plots of standardized nutshell counts by residential complex. The symbol "U" stands for Feature 140, which was not assigned to a residential complex.

The most widely distributed weathered seeds at Ayers Town are bramble and elderberry. When standardized by volume, elderberry counts are consistent across the site with the exception of Features 5 and 123, which both have outlying values of more than 10 seeds per liter. Both of these features are located in Residential Complex D. The medians of standardized weathered bramble seed counts are highest for Residential Complexes A, B, and C (Figure 7.7). Feature 74 in Complex B and Feature 107 in Complex C have the highest values, which range from about two to three seeds per liter. Areas with relatively high occurrences of bramble and elderberry seeds may be indicative of locations where these items were temporarily massed for consumption or processing.

A comparison of plant material ubiquity by residential complex (Table 7.9) shows the influence of sample size on these spatial comparisons. The greatest number of analyzed samples come from Residential Complex D (n=16), and most of the low-ubiquity items come from Complex D samples. By comparing the number of samples in a complex that contain a certain item to the item's overall site ubiquity, it is possible to assess whether the material is evenly distributed across the site. With the exception of nutshell, mulberry seeds, and jimsonweed seeds, most items seem to be distributed evenly across the site. Hickory shell has a 59% ubiquity, so it might be expected to occur in approximately half of the samples from an area. It is present in all four samples from Complexes A and B. Similarly, since acorn shell has 13%

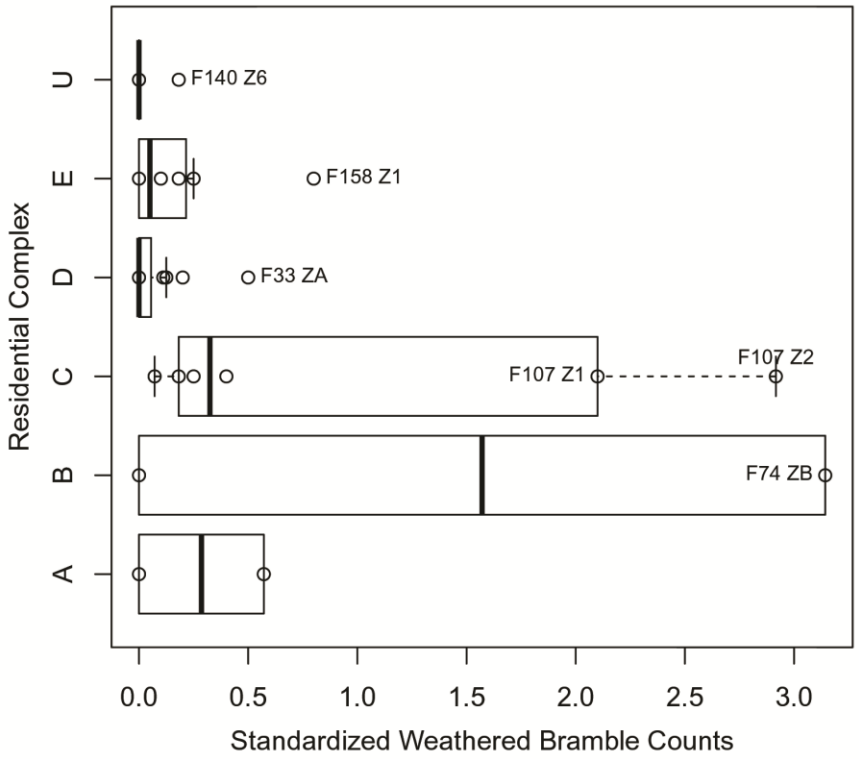

Figure 7.7. Box plots of standardized weathered bramble counts (count/sample volume) by residential complex. The symbol "U" stands for Feature 140, which was not assigned to a residential complex.

ubiquity, it should not even be present in these areas. However, it has 50% ubiquity in Complexes A and C. Mulberry has only 5% ubiquity and was found in Complexes A and C. Finally, jimsonweed seeds have 20% ubiquity but were found in both samples from Complex A (Feature 4). Feature 140, which was not assigned to a residential complex, also has unusually high amounts of jimsonweed seeds and maize kernel fragments, and low amounts of peach endocarp fragments.

The results of these spatial analyses suggest the presence of subtle variation in plant use across the site. If the residential complexes were inhabited sequentially, this variation may also be temporal. The households in the northern portion of the site appear to have been processing more nuts — particularly acorn — than those in the southern portion of the site, where maize kernel fragments are more abundant. This latter discrepancy was apparent in the correspondence analysis of Ayers Town samples, as samples containing more maize kernels were collected from features in Residential Complexes D and E, as well as from Feature 140.

Comparison of the Ayers Town macrobotanical materials to data compiled from the mid-eighteenth century sites of Nassaw-Weyapee (38YK434) and Charraw Town (38YK17) has the potential to identify variation in Catawba plant use during the second half of the eighteenth century. Extensive quantitative analyses are not warranted as only 13 samples from Nassaw-Weyapee and 12 from Charraw Town have been examined to date. However, ubiquity comparisons suggest the existence of similarities and differences in Catawba plant use at these sites (Table 7.10). The most striking similarity is the consistency in maize ubiquity, with Ayers

Table 7.9. Distribution of Plant Materials by Residential Complex.

Plant	Complex A (2 samples)	Complex B (2 samples)	Complex C (6 samples)	Complex D (16 samples)	Complex E (8 samples)	Feature 140[1] (5 samples)	Ubiquity (%)
Maize kernel	1	–	1	9	6	4	54
Bean	–	–	1	1	1	1	10
Squash	–	–	–	–	1	–	3
Grain	–	–	–	–	–	1	3
Hickory shell	2	2	4	7	6	2	59
Acorn shell	1	–	2	2	–	–	13
Peach	1	–	3	3	4	1	31
cf. Coffee	–	1	–	1	–	–	5
Maypop	–	–	1	1	1	1	10
Grape	–	–	1	–	–	2	8
Bramble	–	–	–	1	–	–	
Persimmon	–	–	–	1	–	1	5
Elderberry	–	–	–	2	–	–	5
Mulberry	1	–	1	–	–	–	5
cf. Sumac	–	–	–	–	–	1	3
Jimsonweed	2	–	2	–	1	3	21
Morning glory	–	–	–	–	1	–	3
Tobacco	–	–	2	–	–	–	5
Pokeweed	–	–	–	1	–	–	3
Composite	–	–	–	1	–	–	3
Spurge	–	–	–	1	–	–	3
Grass	–	–	1	1	–	–	5
Weedy legume	1	–	–	1	1	–	8

[1]Not assigned to a residential complex.

Town maize ubiquity (90%) falling between that of Nassaw-Weyapee (85%) and Charraw Town (92%). In certain respects, Charraw Town differs from both Nassaw-Weyapee and Ayers Town, while in others Ayers Town is different from the earlier sites. There is a much higher ubiquity of beans at Charraw Town (50%). Nuts are also more common at this site, with hickory occurring in 83% of the samples and acorn in 75%. At Ayers Town and Nassaw-Weyapee, on the other hand, hickory has 67% and 69% ubiquity, respectively, and acorn 18% and 23% ubiquity. Bramble is also more common at Charraw Town than the other sites. On the other hand, Ayers Town is distinguished from both earlier sites by its lower nut diversity, lower ubiquities of fruits such as peach, maypop, and grape, and by the presence of jimsonweed.

A correspondence analysis of counts shows that while the majority of samples from all three sites overlap, there is a set of samples from Ayers Town that have higher than expected maize kernel counts (Figure 7.8). Maize kernels contribute the most inertia (0.507) to Factor 2, which contains about 20% of the principal inertia (Table 7.11). These samples are from Features 123, 140, and 162, all in the southern portion of the site. This result is similar to that obtained in the correspondence analysis of only the Ayers Town contexts, but clearly the kernel rich samples are distinctive when compared to mid-eighteenth century Catawba contexts as well. Factor 1, which contains 23% of the principal inertia, contrasts samples with more hickory shell to those with more maize. Hickory is the primary source of inertia (0.402) for this factor, while maize kernels

Table 7.10. Percent Ubiquity of Plants Identified at Three Catawba Sites.

Plant	Scientific Name	Ayers Town (39 samples)	Nassaw-Weyapee (13 samples)	Charraw Town (12 samples)
Maize	Zea mays	90	85	92
Bean	Fabaceae sp.	18	15	50
Squash	Curcurbita sp.	3	23	17
Sunflower	Helianthus annus	–	15	–
Grain	Unidentified cereal	3	–	–
Hickory	Carya sp.	67	69	83
Acorn	Quercus sp.	18	23	75
Chestnut	Castenaea dentata	–	15	–
Hazelnut	Corylus sp.	–	–	8
Peach	Prunus persica	31	77	83
Apple/Pear	Rosaceae	–	15	–
Coffee	cf. Coffea sp.	5	–	–
Maypop	Passiflora incarnata	10	62	83
Grape	Vitis sp.	8	31	50
Bramble	Rubus sp.	3	8	33
Persimmon	Diospyros virginiana	5	8	8
Nyssa sp.	Black gum	–	–	8
Elderberry	Sambucus sp.	5	–	–
Mulberry	Morus sp.	5	–	–
Sumac	cf. Rhus sp.	3	–	–
Jimsonweed	Datura stramonium	21	–	–
Morning glory	Ipomoea sp.	3	–	–
Tobacco	Nicotiana sp.	5	8	–
Pokeweed	Phytolacca americana	3	–	8
Purslane	Portulaca oleracea	–	–	17
Composite	Compositae	3	–	–
Spurge	Euphorbia sp.	3	–	17
Sedge	Scirpus sp.	–	8	–
Grass	Gramineae	5	–	–
Weedy legume		8	–	8

and cupules contribute 0.141 and 0.279, respectively. Peach is moderately correlated with Factor 1, being more likely to occur in samples with high hickory counts relative to maize processing waste. Grape, maypop, and bean, on the other hand, are moderately correlated with Factor 2, occurring more frequently in samples with high maize kernel counts. Squash, acorn, and persimmon all have very low quality values, making their positions on the graph difficult to interpret. Ayers Town samples with higher than expected maize kernel counts plot at the top of the graph, with considerable overlap in contexts from all three sites below. However, more Nassaw-Weyapee and Ayers Town samples are in the lower left quadrant of the graph due to

Table 7.11. Correlation Analysis Statistics Calculated for Counts of Plant Materials from Ayers Town, Nassaw-Weyapee, and Charraw Town.

				Contribution[1]		Correlation[2]	
Plant Material	Mass	Quality	Intertia	Factor 1	Factor 2	Factor 1	Factor 2
Maize kernel	0.037	0.759	0.180	0.141	0.507	0.219	0.540
Maize cob/cupule	0.689	0.953	0.082	0.279	0.001	0.950	0.003
Bean	0.015	0.216	0.060	0.008	0.057	0.036	0.180
Squash	0.001	0.004	0.017	0.000	0.000	0.000	0.004
Hickory shell	0.103	0.877	0.182	0.402	0.244	0.620	0.257
Acorn	0.029	0.093	0.106	0.026	0.013	0.070	0.023
Peach	0.078	0.304	0.106	0.099	0.023	0.262	0.042
Maypop	0.037	0.224	0.118	0.013	0.118	0.032	0.193
Grape	0.009	0.281	0.021	0.008	0.019	0.112	0.169
Persimmon	0.001	0.081	0.126	0.024	0.018	0.053	0.028
Maize kernel	0.037	0.759	0.180	0.141	0.507	0.219	0.540

[1] Variable contribution to factors, or the principal inertia (deviation from expected value) in each factor that is attributable to each plant material.

[2] Variable squared correlation with factors, or the amount of total inertia for each plant material associated with each factor.

their high maize cupule content, while most Charraw Town samples have higher values in both factors due to their greater maypop, grape, bean, hickory, and peach counts.

In sum, the macrobotanical assemblages from Ayers Town, Nassaw-Weyapee, and Charraw Town display variation on a theme. Maize was clearly the staple crop at all three sites, but the extent to which supplementary resources were used varied. The Charraw Town assemblages contain evidence of more collecting activities with regard to both mast and fruits, while the Ayers Town and Nassaw-Weyapee assemblages contain less of these resources. In particular, fruits such as peach, maypop, and grape occur less frequently at Ayers Town. On the other hand, certain contexts at the site contain relatively high densities of maize kernel fragments. The only evidence for Catawba use of European staple crops at these sites is the single partial cereal grain from Ayers Town.

Discussion

This investigation has adopted a multi-scalar approach to the analysis of macrobotanical remains. The distribution of materials within Ayers Town provides information concerning spatial and possibly temporal variation in activities at the site level, roughly corresponding to the history of the community. Comparisons between Ayers Town, Nassaw-Weyapee, and Charraw Town provide information about the nature of variation in plant use between Catawba communities during the second half of the eighteenth century. Comparisons even further afield can help situate late eighteenth-century Catawba plant use generally in the long-term context of European colonialism in the Southeast.

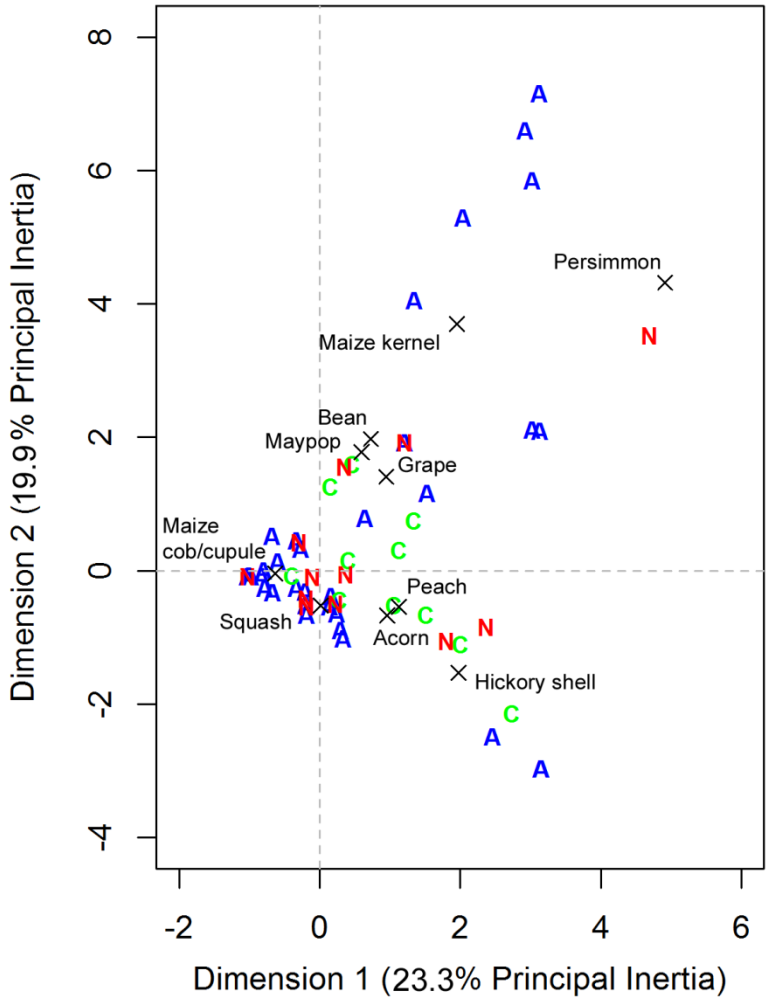

Figure 7.8. Correspondence analysis biplot of plant material counts for Ayers Town (A), Nassaw-Weyapee (N), and Charraw Town (C) samples.

Variation in the density of carbonized material in storage pit fills across Ayers Town indicates localized differences in the extent of burning activities that enriched the surrounding soil with charcoal waste. Storage pits with the cleanest fills are present in the western part of the site, while fills with the highest charcoal densities are present in the southern portion of the site. At a minimum this indicates more hearth cleanings ended up in the southern portion of the site. The northern and southern portions of Ayers Town are further distinguished by the presence of more maize kernel fragments in the southern portion of the site, and more nut shell in the northern and western portion of the site.

The primary difference between the Ayers Town and mid-eighteenth century Catawba botanical assemblages is the presence of fills with more maize kernel fragments at Ayers Town. This is the case despite the fact that all three sites have similar overall maize ubiquities, which seems to indicate this difference is not related to the extent to which maize was utilized. Instead, the elevated maize kernel counts in Features 33, 123, 140, and 162 may be the result of variation in cooking or farming practices. Maize processed by dry heat (parching or roasting) is more likely to become carbonized than boiled maize. However, the boiling of kernels during hominy

production produces kernels that are less affected by distortion during carbonization, potentially resulting in the preservation of more complete specimens (King 1987:186–197). While Lady Liston advises us that Ayers Town residents ate boiled maize on the road, she notes that it was processed into flour beforehand. It is possible that the high maize kernel fragment densities in the southern portion of the site are the result of Catawba women parching more grain for grinding into corn meal. Alternatively, the high kernel fragment counts at Ayers Town may be the result of changes in maize farming practices. Archaeobotanists in England have debated the significance of "grain-rich" assemblages (Hillman 1981; Jones 1985; Stevens 2003; Van der Veen and Jones 2006). Initially thought to distinguish "producer" from "consumer" sites, grain-rich contexts are now thought more likely to be evidence for either large-scale production or consumption. This is based on the premise that grain-rich samples are the result of relatively rare accidents that are simply more likely to occur when cereals are handled in bulk (Van der Veen and Jones 2006:226). From this perspective, the higher maize fragment densities may be evidence for Catawba women at Ayers Town producing or processing corn in larger groups than those working in the 1750s. In either case, the parching of more maize for flour or working in larger groups may be associated with the development of the Catawba's itinerant pottery trade.

Another notable characteristic of the Ayers Town's botanical assemblage is an absence of indigenous spring-ripening grass seeds and only a single partial European cereal grain. Their Muskogee contemporaries, on the other hand, clearly farmed both indigenous and European cool season grasses. At Cussetuh Town (ca. 1750–1775) a total of 44 cereal grains were identified in 12% of the examined samples, while the slightly later town of Salenojuh (ca. 1770–1780) yielded 133 cereal grains (Bonhage-Freund 2007). The Cussetuh macrobotanical assemblage contains only a single maygrass seed, but 70 seeds of this native spring-ripening grass were identified in the Salenojuh samples. Contexts dating c. 1750 to 1780 at Fusihatchee yielded six seeds of little barley and four wheat-like seeds, along with cereal grain rachis fragments (Gremillion 1990). The presence of rachis fragments is strong evidence for the farming of cereal grains. The identification of only a single partial cereal grain at Ayers Town, and no indigenous cool-season grasses, suggests a significant difference in farming practices between these two contemporary groups. This difference cannot be attributed to logistics associated with the itinerant pottery trade, for indigenous and European cool-season grasses are absent from the earlier Catawba sites of Spratt's Bottom, Nassaw-Weyapee, and Charraw Town, all of which pre-date the development of Catawba trade ware. Although not caused by Catawba itinerancy, it is possible this pre-existing agricultural pattern made it easier for Catawba families to travel to the low country in the winter and spring, as they would not be concerned about maintaining fields or harvesting during this part of the year. In focusing on seasonality rather than "origin" of crops, this analysis has attempted to avoid the conflation of origin and identity that is frequently employed in analyses of artifacts from historic period American Indian sites (Silliman 2009). In other words, the fact that cereals ultimately originated in Europe does not automatically mean this was salient to American Indian groups. Once grown in concert with other cool season grasses, cereals became Indian crops too. In most cases their growing, storage, and processing requirements, not to mention their taste, likely played a more important role in their use than their pedigree.

The macrobotanical materials from Ayers Town, Nassaw-Weyapee, and Charraw Town provide unambiguous evidence for Catawba maize production during the second half of the eighteenth century. Higher standardized maize kernel counts at Ayers Town suggest changes in the processing of maize rather than the extent to which maize was utilized as a staple crop. Nuts,

also an important resource, were most heavily exploited at Charraw Town. While Ayers Town residents' nut-collecting is comparable to that of the Nassaw-Weyapee community, there is less evidence for the use of fleshy fruits at Ayers Town compared to both earlier sites. Finally, Catawba agriculture of the mid to late eighteenth century appears to have focused on warm-season crops. A dramatic change in Catawba plant use does not appear to accompany the dramatic shift in ceramic production associated with the development of Catawba trade ware, but the subtle change observed in maize processing may be associated with the production of a "just add water" travel food as Lady Liston was told.

Archaeofaunal Analysis

by

Thomas R. Whyte

Archaeofaunal remains resulting from archaeological excavations at Ayers Town yielded 3,785 archaeofaunal specimens from 237 discrete archaeological contexts. All of these are attributed to the late eighteenth-century Catawba occupation of the site. The assemblage and contexts, when compared with those of nearby Catawba Old Town and New Town (Davis and Riggs 2004), provide a unique opportunity to investigate intercommunity variations in subsistence practices during the Federal period that may reflect vestiges of pre-Federal period ethnic identities.

Methods of Identification and Analysis

Specimens were examined by the author to identify the anatomical element (bone, tooth, etc.) and species represented, the portion (distal, proximal, etc.) and side (left *versus* right) represented by each element, and when possible, the age and sex of the individual represented. Each specimen also was examined for evidence of artificial modification (cut marks, polish, striations, etc.), burning, perimortem or postmortem breakage, carnivore or rodent gnawing, and digestion. Specimens from each provenience unit were weighed (to the nearest tenth of a gram) in broad taxonomic groupings (usually by class) and, with the exceptions of indeterminate vertebrate bone and large bird eggshell fragments, were counted. Although they were weighed, the latter exceptions are too numerous and fragmentary, often in part because of recovery and processing damage, for their enumeration to have any meaning. Consequently, the number of identified specimens per taxon and provenience excludes eggshell fragments and vertebrate remains that could not be assigned to a class. While it is probable that all eggshell fragments recovered represent the Domestic Chicken, some fraction of them may have originated from eggs of wild birds. Therefore, all fragments were conservatively identified as "large bird eggshell."

Identification of specimens was made with reference to the comparative collection in the Zooarchaeological Lab at Appalachian State University. This collection is nearly comprehensive for the Holocene vertebrate fauna of the study region, lacking only in extinct species and a few species of salamanders, snakes, cyprinid fishes, and migratory passerine birds. Specimens of rare fish species (family Catostomidae) were borrowed from Robert E. Jenkins of Roanoke College, Virginia. Other Catawba River fishes were generously donated to the comparative collection by David J. Coughlan of Duke Energy. Arthur E. Bogan of the North Carolina Museum of Natural Sciences provided identifications of some freshwater mussel shell. Some

specimens evidently fractured during archaeological recovery (as indicated by an absence of soil staining on fracture surfaces) were combined when possible and recorded as individual specimens. As a result, specimen totals presented for any one provenience here may be fewer than those reported in the RLA's preliminary inventories for the sites. Potentially conjoinable fragments that had broken apart prior to excavation were recorded as individual specimens.

A final note to be made is a point on current convention in presenting the vernacular or common names of animals in scientific literature. Most biological sciences have begun to capitalize official common names such as "Wild Turkey" but to retain lower case in naming more general groupings such as "turkey." This new convention is followed herein.

Potential Biases

Evidence of preservation bias was immediately apparent at the start of this analysis. Of the 3,785 enumerated specimens recovered from Ayers Town, only 28% are burnt. However, a few features yielded only calcined vertebrate remains while most contained a combination of burnt remains and ones not affected by fire. Higher frequencies of especially calcined bone, when conditions of burial and soil acidity and moisture are relatively similar, are usually an indication that unburned bones in those same deposits have experienced more biophagic degradation (Whyte 1997, 2001, 2011). Decomposition was likely influenced by bone size and density, and thus variable among vertebrate classes and animal sizes (Lyman 1993).

Use of varying mesh size in recovery of archaeofaunal specimens must be taken into account when comparing contexts and sites (Reitz and Wing 2008). Sediments passed through quarter-inch mesh are less likely to contain remains of smaller vertebrates and invertebrates (e.g., land snails, toads, mice, passerine birds) and the smaller elements (e.g., scales, phalanges, carpals, and teeth) of mid-sized vertebrates. However, all feature contexts at Ayers Town, whether wet-screened or floated, were minimally processed by 1/16-inch mesh. Thus, recovery bias essentially was limited to feature versus plow zone contexts.

The preservation and identification of scales may have resulted in a bias in favor of the representation of two fish families—Catostomidae (suckers) and Centrarchidae (basses). Cycloid scales exceeding 7 mm in diameter were identified as family Catostomidae, whereas ctenoid scales of that size were assigned to the family Centrarchidae and likely represent Largemouth Bass (*Micropterus salmoides*).

Certain vertebrate specimens, despite their extreme fragmentation and diminutive size, remain identifiable to some degree because of their distinctive textures or unique structures. These include catfish (*Ameiurus* spp.) pectoral spines, turtle (Testudunes) carapace and plastron (costal) bones, large bird (probably chicken) eggshell, and pig and deer tooth enamel. Taxa and elements represented by these specimens relative to others are thus better represented in the resulting data. This is especially true for the contexts that yielded only small crumbs of calcined vertebrate remains. These preservation, recovery, and identification biases are observed in the analysis and interpretation that follow.

Table 7.12. Number of Identified Specimens (NISP) of Animal Remains from Ayers Town.

Scientific Name	Common Name	NISP
Stylomatophora	Terrestrial Snail	3
Elliptio icterina	Variable Spike	1
Elliptio complanata	Eastern Elliptio	11
Elliptio sp.	Elliptio	1
Unionidae	Freshwater Mussel	38
Lepisosteus osseus	Longnose Gar	4
Nocomis leptocephalus	Bluehead Chub	2
Moxostoma collapsum	Notchlip Redhorse	2
Carpoides cyprinus	Quillback	1
Moxostoma sp.	Redhorse	3
Ameiurus brunneus	Snail Bullhead	11
Ameiurus catus	White Catfish	26
Ameiurus nebulosus	Brown Bullhead	3
Ameiurus platycephalus	Flat Bullhead	4
Ameiurus sp.	Bullhead	128
Esox niger	Chain Pickerel	28
Lepomis auritus	Redbreast Sunfish	1
Lepomis gullosus	Warmouth Sunfish	3
Lepomis sp.	Sunfish	20
Micropterus salmoides	Largemouth Bass	38
Centrarchidae	Bass/Sunfish	34
Osteichthyes	Bony Fish	855
Bufo sp.	Toad	25
Rana sp.	Frog	1
Kinosternon subrubrum	Eastern Mud Turtle	1
Chrysemys sp.	Slider/Cooter	10
Terrapene carolina	Eastern Box Turtle	39
Testudines	Turtle	44
Anas platyrhynchos	Mallard	2
Meleagris gallopavo	Wild Turkey	20
Gallus gallus	Domestic Chicken	31
Zenaida macroura	Mourning Dove	1
Colaptes auratus	Common Flicker	7
Dryocopus pileatus	Pileated Woodpecker	1
Cyanocitta cristata	Eastern Blue Jay	1
Mimidae	Mimic Thrush	1
Fringillidae	Sparrow	4
Passeriformes	Perching Bird	17
Aves (small)	Small Bird	3
Aves (medium)	Medium Bird	2
Aves (large)	Large Bird	88
Aves	Bird	79
Didelphis virginiana	Opossum	7
*Canis familiaris**	Domestic Dog	1
Canis sp.	Dog/Wolf	2

Table 7.12 Continued.

Scientific Name	Common Name	NISP
Ursus americanus	Black Bear	1
Procyon lotor	Raccoon	1
Sciurus carolinensis	Gray Squirrel	39
Sciurus sp.	Tree Squirrel	13
Sylvilagus sp.	Cottontail	7
Sus scrofa	Domestic Pig	144
Odocoileus virginianus	White-tailed Deer	158
Cervidae	Deer/Elk	3
Bos Taurus	Domestic Cattle	24
Artiodactya	Even-toed Mammal	13
Equus caballus	Domestic Horse	3
Mammalia (small)	Small Mammal	35
Mammalia (large)	Large Mammal	246
Mammalia	Mammal	1,494
Vertebrata	Vertebrate	24
Total Counted Specimens		3,785

* *Canis familiaris* (dog) specimens include a nearly complete skeleton of a young (less than one month) pup recovered from Feature 140.

**Unidentified vertebrate remains, extremely numerous and fragmentary, were weighed (149 g) but not counted.

Results

Archaeofaunal remains from the Ayers Town site are relatively numerous and representative of diverse species (Table 7.12). They include 3,785 enumerated specimens, 149 g of unidentifiable vertebrate bone, and 5 g of large bird eggshell fragments. These were recovered from 51 subterranean features and a few plow zone contexts. Most features yielded less than ten specimens each. Features 123 and 140 each contained over a thousand specimens. That only 28% of specimens are burnt indicates exceptional faunal preservation at this site. The four subterranean pit features (91, 123, 140, and 190) that yielded more than 100 enumerated specimens exhibit varied taxonomic compositions (Table 7.13). This and the fact that the items contained in these features are arguably re-deposited secondary refuse indicate that dietary evidence is not evenly homogenized among contexts and no one context can be regarded as representative of the overall site. It is with necessary caution then that dietary and other cultural reconstructions are made on the basis of the following summary of taxa.

Molluscan remains (54 specimens) from the site include whole and fragmented valves of terrestrial snails (Stylomatophora) that are likely intrusive or inadvertent inclusions, and whole and fragmented valves of freshwater mussels that likely represent food (Table 7.12). The latter identify at least two species (*Elliptio complanata* and *E. icterina*). The majority of specimens (70%) are very small fragments of valves that could only be identified as family Unionidae (Table 7.12). The posterior margins of several mussel valves are damaged, probably as a result of shucking. No valves within the analyzed sample exhibit evidence of use as tools; however,

Table 7.13. Taxonomic Composition (%) for Primary Features at Ayers Town.

Taxon*	Feature 91	Feature 123	Feature 140	Feature 190
Fishes	17	41	52	65
Turtles	7	2	8	4
Wild birds	0	9	8	3
Wild small mammals	0	12	3	1
Wild large mammals	45	11	14	5
Chickens	10	6	<1	3
Pigs	17	20	9	17
Cattle	3	0	6	1

*Includes only specimens minimally identified to animal family.

four specimens with heavily ground edges were classified as scrapers and are described in Chapter 6.

Bony fish remains (1,163) from this site outnumber all other classes and represent a minimum of 12 species, including gars, minnows, suckers, catfishes, pickerels, sunfishes, and basses (Table 7.12). Most numerous are remains of bullhead catfishes (*Ameiurus* spp.). Fish remains were particularly numerous and of diverse species in Features 123 and 140. Seventy-four percent of fish remains, primarily ribs, spines, and vertebrae were identifiable only as class Osteichthyes. Individuals of all the species represented may have been captured by angling with baited hook, with nets, or by poisoning (see Speck 1946). The abundance of nocturnal catfish remains (*Ameiurus* spp.) may indicate deliberate fishing at dusk or dark, or (more likely) the use of seines or poison at any time (Speck 1946). All of the species represented are relatively common today, although the numbers of some have undoubtedly been affected by historically introduced competitors, river impoundment, siltation, and pollution.

Skeletal remains of toads of the genus *Bufo* (25 specimens) and a frog of the genus *Rana* (one specimen) were recovered. The toad remains are mostly whole bones representing all parts of the skeleton and were recovered from three deep storage pits (Features 3, 123, & 140). For the most part, these remains probably represent natural entrapment (see Whyte 1994). Three of the five specimens (representing a minimum of two individual toads) from Zone 6 of Feature 140 are calcined and may have become so through refuse burning. There are no records of toad use by the historic Catawba, although Lawson (Lefler 1967:132) reports, and may have derived his observation from natives of the Carolina Piedmont, that "the Common Land-Frog is likest a Toad, only he leaps, and is not poisonous. He is a great Devourer of Ants, and the Snakes devour him. These Frogs baked and beat to Powder, and taken with Orrice-Root cures a Tympany."

Turtle remains (94 specimens), recovered from a variety of features at Ayers Town, are primarily costal fragments representing Eastern Mud Turtle (n=1), Slider/Cooter (n=10), Eastern Box Turtle (n=39), and indeterminate turtle (n=44) (Table 7.12). None shows evidence of artificial modification other than burning.

Bird remains from this site (256 enumerated [bone] specimens and 5 g of eggshell fragments) are representative of seven species and two additional families (Table 7.12). The majority are remains of the larger birds, Wild Turkey (20 specimens) and Domestic Chicken (31 specimens). The eggshell pieces are presumed to have derived from domestic poultry. No

evidence of Peafowl or other domestic fowl besides the chicken was identified. Also represented are Mallard, Mourning Dove, Common Flicker, Pileated Woodpecker, and Easter Blue Jay. These were recovered from various feature contexts with no evident patterning. However, all but one of the woodpecker remains were recovered from Feature 123. If Speck's (1946) ethnographic data are reliable and can be extended to earlier Catawba, no bird save the Mourning Dove and Bald Eagle was exempt from the menu.

Ten species are represented by more than 2,191 mammalian specimens (Table 7.12). These include a variety of wild and domesticated taxa. Most remains (76%) of the former are squirrel (*Sciurus* spp.). Six of the seven bones of Opossum (*Didelphis virginianus*) were recovered from Feature 123 and represent a single individual. One nearly complete skeleton of a Domestic Dog (puppy) was recovered from Zone 6 of Feature 140 and appears to have been deposited there out of convenience. The other domestic dog remains are two metatarsal fragments (one calcined) recovered from Features 123 and 139.

White-tailed Deer (*Odocoileus virginianus*) remains comprise the majority of identifiable specimens of wild mammals and are dominated by cranial and foot elements (66%) due to density-mediated preservation (Lyman 1993) and identification bias. Cut marks and carnivore gnawing were observed on several specimens. The one antler tine had been sawn from the rack, perhaps to provide a tool handle. Cut marks are most common at limb joints and on the necks of ribs. Evidence of some perimortem fracture of long bones indicates possible marrow-getting or bone reduction for soup making.

Domesticated mammal remains identified include those of pig (n=144), cattle (n=24), and horse (n=3) (Table 7.12). The vast majority (85%) of pig remains are parts of the head (primarily teeth), thus inflating their perceived representation relative to other taxa. Only one pig bone, a rib fragment, exhibits cut marks. Cattle remains include a variety of cranial and postcranial bones. One scapula and one ilium exhibit chop marks made with a cleaver, hatchet, or large knife. Horse remains from this site include a relatively whole mandible of an old individual (judging from tooth wear) from Feature 140, a carnivore-gnawed proximal phalanx, also from Feature 140, and a mandibular first molar from Feature 123. The occurrence of the mandible in Feature 140 may indicate the consumption of older horses deemed otherwise useless. However, the presence of a carnivore (dog)-gnawed horse phalanx in the same feature suggests secondary deposition of yard debris.

Conclusion

Ayers Town, occupied from about 1781 to 1800, overlaps with the occupations at Old Town (1761–c. 1800) and New Town (c. 1790–1820), located across the river. This site yielded 3,785 enumerated archaeofaunal specimens that, like those at Old Town (Table 7.14) and New Town (Table 7.15), represent a remarkable array of wild species and are dominated by fish remains. But in contrast to the Old Town and New Town assemblages, remains of White-tailed Deer are much more abundant than those of domestic stock. This difference cannot be explained by temporal or geographic differences and may reflect ethnic preferences or differences in the extent of economic involvement with white invaders. Lady Henrietta Liston may have visited Ayers Town in 1797, where she made the observation that: "He apologized for the smallness of their numbers saying, the young Men had not yet come in from hunting. We had, indeed, met some of them selling their Deerskins a hundred miles to the South" (Liston 1797). This raises

Table 7.14. Number of Identified Specimens (NISP) of Animal Remains from Old Town.

Scientific Name	Common Name	NISP
Pleuroceridae	Aquatic Snail	1
Stylommatophora	Terrestrial Snail	13
Unionidae	Freshwater Mussel	29
Esox sp.	Pickerel	1
Moxostoma cf *carolina*	Carolina Redhorse	2
Scartomyzon braesius	Brassy Jumprock	1
Moxostoma sp.	Redhorse	1
Catostomidae	Sucker	16
Ameiurus brunneus	Snail Bullhead	4
Ameiurus sp.	Bullhead Catfish	50
Lepomis sp.	Sunfish	4
Micropterus salmoides	Largemouth Bass	4
Centrarchidae	Bass/Sunfish	13
Osteichthyes	Bony Fish	161
Caudata	Salamander	3
Bufo sp.	Toad	40
Chrysemys picta	Painted Turtle	8
Chrysemys sp.	Slider	1
Terrapene carolina	Eastern Box Turtle	12
Testudines	Turtle	23
Meleagris gallopavo	Wild Turkey	7
Gallus gallus	Domestic Chicken	15
Passeriformes	Perching Bird	4
Aves (medium)	Medium-sized Bird	1
Aves (large)	Large-sized Bird	60
Aves (indeterminate size)	Bird	2
Carnivora	Carnivore	2
Mus musculus	House Mouse	6
Rattus norvegicus	Norway Rat	9
Muridae	Old World Rat	1
Sciurus sp.	Tree Squirrel	4
Rodentia	Rodent	7
Sylvilagus sp.	Cottontail	10
Odocoileus virginianus	White-tailed Deer	87
Bos Taurus	Domestic Cattle	12
Sus scrofa	Domestic Pig	125
Artiodactyla	Even-toed Mammal	7
Mammalia (large)	Large Mammal	210
Mammalia (small)	Small Mammal	7
Mammalia	Mammal	1196
Vertebrata	Vertebrate	*
Total Counted Specimens		2,159

*Unidentified vertebrate remains, extremely numerous and fragmentary, were weighed (110 g) but not counted.

Table 7.15. Number of Identified Specimens (NISP) of Animal Remains from New Town.

Scientific Name	Common Name	NISP
Pleuroceridae	Aquatic Snail	1
Triodopsis albolabris	White Lipped Snail	1
Triodipsis sp.	Triodopsis snail	1
Stylommatophora	Terrestrial Snail	22
Elliptio icterina	Variable Spike	2
Elliptio sp.	Freshwater Mussel	6
Unionidae	Freshwater Mussel	13
Mollusca	Mollusk	1
Moxostoma cf *robustum*	cf Robust Redhorse	4
Ameiurus brunneus	Snail Bullhead	2
A. catus	White Catfish	1
A. nebulosus	Brown Bullhead	1
A. platycephalus	Flat Bullhead	4
Ameiurus sp.	Bullhead Catfish	49
Lepomis sp.	Sunfish	1
Micropterus salmoides	Largemouth Bass	1
Centrarchidae	Bass/Sunfish	2
Osteichthyes	Bony Fish	156
Bufo sp.	Toad	2
Kinosternidae	Musk Turtle	1
Chrysemys sp.	Slider	1
Terrapene carolina	Eastern Box Turtle	9
Testudines	Turtle	45
Gallus gallus	Domestic Chicken	1
Picidae	Woodpecker	1
Passeriformes	Perching Bird	2
Aves (large)	Large-sized Bird	7
Aves (indeterminate size)	Bird	1
Ursus americanus	Black Bear	1
Peromyscus sp.	Deer Mouse	1
Sciurus niger	Fox Squirrel	1
Sciurus sp.	Tree Squirrel	1
Sylvilagus sp.	Cottontail	1
Equus sp.	Horse/Mule	1
Odocoileus virginianus	White-tailed Deer	6
Bos taurus	Domestic Cattle	6
Sus scrofa	Domestic Pig	69
Artiodactyla	Even-toed Mammal	1
Mammalia (large)	Large Mammal	31
Mammalia (small)	Small Mammal	2
Mammalia	Mammal	228
Vertebrata	Vertebrate	*
Total Counted Specimens		687

*Unidentified vertebrate remains were weighed (21.7 g) but not counted.

the possibility that members of the confederacy at that time retained vestiges of earlier ethnic identity that may be expressed in material culture, architecture, and the vagaries of subsistence.

Diminished evidence of hunting at the slightly later site of New Town (only six specimens of White-tailed Deer, no remains of Wild Turkey, and very few remains of wild small game) may indicate a decided preference for domestic fauna. However, Calvin Jones (1815), upon visiting New Town, observed that the men were away hunting and fishing while the women were engaged with their pottery. Perhaps a lack of success in the former is an indication of the impact on deer populations by the ever-increasing whites in the region. Brown (1966:322) states that after a small reservation was purchased for the Catawba in 1842 (two decades after the abandonment of New Town), "Hunting and fishing were resumed, but a rabbit, a squirrel, or an opossum was the biggest game possible to snare."

Frank Speck (1946:9) later noted: "The decline of hunting among Siouan-speaking Indians of the Carolinas dates from the beginning of the last century, when the spread of European settlement attended with the conversion of the forest areas into cotton and corn fields marked the extermination of the larger animals of the Piedmont section." He further mentions (p. 9): "there has not been a Catawba Indian living within the last generation who has experienced the thrill of hunting any beast greater than the raccoon." He also noted (p. 13) that "Since the wild turkey has for many years been unknown in the inhabited districts of the Catawba valley, the memory (of turkey calling) only has come down to us in the use of the bird's wing bone as a 'call' for young birds." From this Speck (1946:5) deduced that: "Not finding it compatible with their big-game and campaigning tradition to accept a transitional status as small animal hunters and fishermen, they held their place in a depleted faunal environment, and became a supine community." Yet it is clear from Speck's (1946) study of Catawba hunting, trapping, and fishing, and from the archaeofaunal evidence from Federal-period Catawba sites, that fishing was always a reliable focus of the Catawba subsistence economy. Perhaps their common designation as the "River People" is on the mark.