VI. Dietary Pattern Analysis

Introduction

The value of recovery of bones, teeth, shell, seeds and other plant and animal remains has become widely recognized and acknowledged for the contribution that these artifactual specimens can make to enhanced understanding of a total cultural system. Garbage is artifactual in the sense that the remains of food animals have passed Reed's (1963:214) classic phrase, "through the cultural filter". Daley (1969) makes the valid point that food remains do not constitute a chance assemblage, but rather their presence within a site is due solely to human behavior.

Ultimately, the goal is to understand cultural attitudes toward food, and the economic circumstances by which dietary patterns are formed. Data upon which the reconstruction of historic diet are based are the identified remains of animals, plants and artifacts related to food use that are associated with a historic occupation. Those remnants that provide clues about historic diet are the durable, inedible portions of food, such as shell, bone and tooth fragments of animals, or grains, seeds, fruit pits, and cobs. Even in the best of circumstances, these remnants are a small and disproportionate reflection of the past subsistence, as all foods do not have potentially preservable inedible portions. Although reconstruction of an historic food pattern is aided by written accounts of what dietary practices were followed in the form of cookbooks, records of supply purchases and historic accounts which include dietary references; the reconstruction is clouded somewhat by the biased nature of floral-faunal preservation and the imperfect understanding of refuse depositional patterning.

Floral and faunal materials obtained from excavation and flotation procedures are complementary components. Excavated floral and faunal material is primarily obvious material which the excavator can spot, whereas floral and faunal material derived from flotation, i.e. small fish bones, small seeds, goes through the excavator's screen and are not seen. Each component of material is derived from the same dietary debris, and, if viewed in isolation, would provide a skewed data base from which to understand the full range of exploited resources of the project area. A floral/faunal assemblage derived solely from excavation procedures would yield a somewhat different dietary picture if not viewed in conjunction with smaller specimens collected in flotation procedures. An analysis utilizing only excavated faunal material might suggest a diet comprised of small to large mammals whereas once the flotation component is assessed it might be suggested that the consumers ate much more fish than mammal. The small fish bones cannot be seen by the excavator which leads to a biased floral/faunal assemblage. The aim of this analysis was to collect both macro and micro materials in a manner which would allow maximum data recovery.

Although a floral and faunal analysis cannot completely recreate a subsistence system, the data was analyzed in such a manner as to discern patterned trends or relationships between assemblages which will enhance understanding of the diachronic and synchronic socio-economic characteristics of the project area.

FAUNA

A total of 12,415 faunal specimens were recovered from the project area (Table 87). Of these 12,415 specimens 4,268 were recovered from Area A, 2,956 from Area B, 2,011 from Area D, 1,773 from Area E, and 1,407 from area H. Some of the specimens were not recovered from analytical units, but rather from fill or rubble levels. The total number of faunal specimens which were recovered from meaningful analytical units was 6,968. Of these 6,968 specimens 4,026 were recovered from Pre-Industrial site components and 2,942 were recovered from Industrial site components. A detailed discussion of faunal materials is contained within Appendix F.

Species Present

Six domesticate species are present in the faunal assemblages. The six are Bos tarus (cow), Sus scrofa (pig), Capra hirca (goat), Ovis aries (sheep), Meleagris gallopavo (turkey) and Gallus gallus (chicken). In addition, Canis familiaris (dog), Felis domesticus (cat), Scuirus carobinensis (gray squirrel), Syvalagus sp. (rabbit), Rattus sp. (rat), Ondatra zibethicus (river otter) and Ectopostes migratorius (passenger pigeon) are also present. Non-domesticate bird and reptile specimens are also present. Fish and molluscs are also well represented within the project area. Among the taxa represented, several species are not associated with cultural activity. Birds, dogs, cats, rats, squirrels and turtles may appear within archaeological assemblages as a result of their natural activities.

Domesticate mammals are by far the predominant recovered faunal component. Cow and pig remains predominate over sheep and goat. Superficially beef appears to have been a more popular food item than pork but, a large number of unidentified rib, vertebrae, longbone and butchered and non-butchered non-diagnostic fragments are present within most assemblages. For the most part, bone that has been modified by butchering has been rendered less species diagnostic. It is problematic in terms of analysis to fully understand which species were truly represented by a high occurrence frequency, because butchering can obliterate major diagnostic properties of skeletal elements. For the most part, both epiphyses are lost in butchering and the analyst is left with merely the width of a longbone cut at some point along the shaft to aid in species identification. To further complicate the issue, ribs and vertebrae are difficult elements from which to assess species classification. Presumably, some of the butchered and non-butchered bone which cannot be classified to type is that of Bos tarus. Conversely, some of the unidentified bone may belong to Sus scrofa. Given the disproportionate amount of bone unidentified as type, it would be imprudent to infer either beef or pork as being the preferred food source.

Butchered Mammal

Home butchering practices predominate in the project area until around 1800. At that point, professionally butchered specimens begin to appear in the faunal assemblages. Home butchering is generally characterized by coarse and heavy striations on the cutting surface as well as occasionally evidenced "stop and start" marks. A "stop and start" mark is one whereby the domestic butcher begins the butchering process, but because of repeated sawing

TABLE 87. Faunal Assemblage Totals (By Area and Chronological Order)

Area A	Total Assemblage
Excavation Unit 30N/110W	2035
Excavation Unit 0North/100W	265
Excavation Unit 20N/100W	794
Feature 27	40
Excavation Unit 20S/120W	32
Excavation Unit 0North/120W	186
Excavation Unit 10N/120W	33
Feature 15	328
Feature 17	104
Feature 25	14
Feature 19	174
Area B	
Excavation Unit 83S/124E	751
Excavation Unit 83S/124E topsoil	165
Excavation Unit 73S/124E	329
Area D	
Excavation Unit 20S/545E	266
Excavation Unit 30S/535E	125
Excavation Unit 30S/525E	132
Feature 1	1459
Area E	
Excavation Unit 50N/515E	111
Excavation Unit 60N/505E	72
Excavation Unit 60N/525E	347
Excavation Unit 60N/495E	66
Excavation Unit 60N/520E	300
Excavation Unit 55N/510E	77
Excavation Unit 55N/500S	83
Excavation Unit 55N/530E	193
Excavation Unit 55N/515E	203
Excavation Unit 50N/495E	281
Excavation Unit 50N/505E	40
Area H	
Feature 2	607
Feature 11	310
Non-Analytical Mixed Deposits and Features:	
Area A	
Feature 18	32

Table 87. (continued)

Non-Analytical Mixed Deposits and Features:	
Area A	Total Assemblage
Feature 28	200
Area B	
Feature 1	56
Excavation Unit 73S/116E	892
Excavation Unit 83S/116E	746
Feature 5	12
Area H	
Feature 1	395

applications may create a parallel line adjacent to the cut which actually cleaves the bone in the manner in which the butcher intended. Professionally cut meat exhibits no "stop and start" marks, but rather results in one clean smooth cut bone surface. Table 88 presents the frequency of domestic and professional butchering chronological sequencing within the project area.

As is evident from the following chart, professionally butchered meat first appears in the Second Street topsoil deposit (circa 1774). Home butchering continues to be practiced on into the 1900s, but professionally butchered meat cuts become common in most assemblages after 1800.

Skeletal Elements

Important to the analysis of socio-economic factors influencing the faunal assemblages, is the understanding of frequency of various skeletal elements within each assemblage, and what this reflects in terms of consumerism. Differential access to resources can be reflected in proportional variation of skeletal elements. Various parts of an animal carcass are more highly prized than others. A sirloin steak is a more highly desired meat cut than a flank steak or brisket. The sirloin steak is highly marbled with fat, contains a great deal of flavor, and requires a short cooking time whereas the flank or brisket does not have these attributes. By translating skeletal elements into a ranked status scale, socio-economic differentiation of early consumers can be assessed.

A useful method has been proposed by Schulz and Gust (1983:44) to understand early butchering practices and nineteenth century retail ranking of beef cuts. Gust and Schulz assert that this ranking of beef cuts is also applicable to pig, sheep and goats. This ranking model was utilized in this analysis despite the fact that evidence of home butchering was occurring. It was thought that the home butcher would desire the same quality of cuts that

would later be furnished by the retail butcher. The purpose of ranking the skeletal elements present within the recovered faunal assemblages was to ascertain if variation existed between social classes which might be reflected in the quality of meat consumed.

TABLE 88. Domestic and Professional Butchering within the Project Area.

	Domestic	Professional	Location
1771	19	0	Area B EU 83S/124E topsoil
	37	0	EU 73S/124E topsoil
1774	12	0	Area A Market St. topsoil
	12	1	Second St. topsoil
1802	19	33	Area D Feature 1
1804	5	4	EU 20S/545E, 30S/535E, 30S/525E
1810	1	11	Area A lower topsoils
	94	84	EU 30N/110W
	2	9	EU 0North/100W
	6	9	EU 20N/100W
1811	0	2	Area A Feature 27
	5	10	Feature 28
1849	2	1	Feature 17
	58	80	Feature 15
	8	15	EU 20N/100W (ER19Z1)
1850	0	1	Feature 25
1851	0	27	Area H Feature 2, Level 2C
1854	8	16	Feature 2, Level 2B
1858	1	7	Feature 11
1860	2	14	Feature 2, Level 2A
circa 1900	6	44	Area A Feature 19

EU=Excavation Unit

All skeletal elements which were identified to species were accorded a rank value. Unidentified skeletal material was not included in the ranking procedure. Recovered skeletal elements were placed in one of the following nine categories:

1. short loin - lumbar vertebrae
2. sirloin, rib - illium, sacrum, 7-13 thoracic vertebrae, 6-12 ribs (proximal)
3. round - distal femoral shaft

4. rump - proximal femoral head, ishium, coccygeal vertebrae

5. chuck - 1-6 thoracic vertebrae, scapula, 1st 5 ribs

6. arm, cross ribs, short ribs - distal humerus, 6-12 ribs (cut mid-section)

7. flank, short plate, brisket - 6-12 ribs distal end, 3-5 ribs distal end

8. neck - cervical vertebrae, atlas, axis

9. hindshank - tibia/fibula, manus pes
   foreshank - ulna/radius

Every attempt was made to place skeletal elements in the most appropriate category. For example, ribs are a component of several categories of meat ranking, therefore if a rib shaft was encountered, it was placed in category 6 (cross rib, short rib). If a proximal rib end was encountered, it was placed in category 2 (rib) and distal rib fragments were placed in category 7 (flank). Vertebrae fragments which could not be assigned a precise position in the vertebral column were included in category 2 (rib) because most vertebrae are accommodated by category one or two.

Once each recovered element had been assigned a value ranking from one through nine, the units of analysis were consolidated into High, Medium, and Low. The High category included meat cuts ranked as 1, 2, or 3. The Medium category included those skeletal elements representative of 4, 5, and 6. The Low category encompassed those skeletal elements ranked as 7, 8, or 9.

The ranking of skeletal elements was done in order to attempt correlation of dietary patterns with differentiated access to dietary resources. It was hoped that through a ranking procedure, some measure could be made whereby cuts and types of meat could be associated with economic status. Ranking the recovered skeletal elements from industrial and pre-industrial assemblages allowed hypothesis testing. The hypotheses tested were:

1. More costly meat cuts will be present in high level groups than in middle or low groups.

2. In the industrial period the cost difference between the groups in terms of cuts of meat will be greater than in the pre-industrial period.

A series of calculations were run whereby assemblages were tested against one another for equality of proportions of high, medium, and low value skeletal elements. The Z statistic was used to test the null hypothesis that the proportions of ranked skeletal elements were the same between populations. Each classification of meat value was tested at the .05 confidence level.

The Z values for tabulated contexts are presented in Table 89. Various combinations of features and occupation levels were run, in order to establish if clear patterns were present.

Table 89. Z Values For High, Medium, and Low Status Cuts of Meats

PRE-INDUSTRIAL OCCUPATION LEVELS

Area E Market Street Versus Second Street
High Z = 2.33>1.65 REJECT
Medium Z = 1.44<1.65 DO NOT REJECT
Low Z = 1.0<1.65 DO NOT REJECT

Area D Versus Area B (EU 73S/145E, Topsoil)
High Z = .33<1.65 DO NOT REJECT
Medium Z = .40<1.65 DO NOT REJECT
Low Z = .60<1.65 DO NOT REJECT

Area D Versus Area B (EU 83S/124E, Topsoil)
High Z = 2.80>1.65 REJECT
Medium Z = 1.83>1.65 REJECT
Low Z = .60<1.65 DO NOT REJECT

PRE-INDUSTRIAL FEATURES

Area A Feature 27 Versus Area A Feature 28
High Z = .89<1.65 DO NOT REJECT
Medium Z = 1.70>1.65 REJECT
Low Z = 3.11>1.65 REJECT

Area D Feature 1 Versus Area A Feature 27
High Z = 2.60>1.65 REJECT
Medium Z = 4.50>1.65 REJECT
Low Z = 2.80>1.65 REJECT

Area D Feature 1 Versus Area A Feature 28
High Z = 1.00<1.65 DO NOT REJECT
Medium Z = 8.75>1.65 REJECT
Low Z = 14.00>1.65 REJECT

Area A Features 27 and 28 Versus Area D Feature 1
High Z = 1.40<1.65 DO NOT REJECT
Medium Z = 7.50>1.65 REJECT
Low Z = 1.00<1.65 DO NOT REJECT

PRE-INDUSTRIAL VERSUS INDUSTRIAL ASSEMBLAGES

Area A Features 27 and 28 Versus Area A Dowdall Contexts
High Z = 1.75>1.65 REJECT
Medium Z = 1.00<1.65 DO NOT REJECT
Low Z = .25<1.65 DO NOT REJECT

Table 89 (continued)

Area H Feature 11 Versus Area D Feature 1
High Z = 6.25>1.65 REJECT
Medium Z = 1.67>1.65 REJECT
Low Z = 9.50>1.65 REJECT

INDUSTRIAL OCCUPATION LEVELS VERSUS PRE-INDUSTRIAL OCCUPATION LEVELS

Area A Dowdall Contexts Versus Area E Market and Second Streets
High Z = 1.33<1.65 DO NOT REJECT
Medium Z = 4.00>1.65 REJECT
Low Z = 5.67>1.65 REJECT

INDUSTRIAL PERIOD FEATURES

Area D Dowdall Features Versus Area H Features 2 and 11
High Z = 5.00>1.65 REJECT
Medium Z = 5.00>1.65 REJECT
Low Z = 10.00>1.65 REJECT

The results of application of the Z statistic to the pre-industrial occupation levels indicated that while some diversity was noted between occupation levels, the overall trend was that the frequencies of ranked bone were similar between the assemblages. Comparison of the pre-industrial features did point up some differences. Features 27 and 28 from Area A were shown to exhibit similar high value meats, but dissimilar medium and low value cuts. Feature 1 from Area D was shown to be totally dissimilar to Feature 27 of Area A, and shared similar high value scores to Feature 28 of Area A. The combined assemblages from Feature 27 and 28 of Area A yielded Z values that were similar to those derived from Area D, Feature 1 (see Table 89).

The diversity between assemblages was much more apparent when pre-industrial assemblages were tested against industrial period assemblages. However, there are some interesting exceptions. The most striking pattern was exhibited between pre-industrial features of Area A and industrial period features from the same area. The Dowdall contexts within Area A yielded very similar Z values to the pre-industrial Features 27 and 28 (see Table 89).

The similarities noted between the pre-industrial and industrial features of Area A were much greater than the similarities of the industrial features of Area A and other industrial features. The Dowdall contexts are believed to have been generated by persons of medium to high socio-economic level, while Features 2 and 11 of Area H are believed to have been filled by households of low socio-economic standing. Those assumptions were indeed supported by application of the Z statistic (see Table 89). The pronounced dissimilarities of the faunal assemblages from those areas suggests greater social distance between the Dowdall contexts and Features 2 and 11 of Area H than was observed between the pre-industrial and industrial assemblages of Area A alone.

Application of the Z statistic to the industrial features of Area H against Feature 1 of Area D demonstrated great differences in the assemblages (see Table 89 for the results of the test of Feature 11, Area H, against Feature 1 of Area D). The greatest diversity noted for the features from the two areas was observed in the very high proportions of low value meats in the industrial features.

Tests conducted on the industrial period Dowdall occupation levels versus the pre-industrial occupation levels from Area E (see Table 89) demonstrated that the high value meat elements were very similar. That finding is consistent with the results of the comparisons between the Dowdall industrial features and the pre-industrial features from Area A.

The results of the application of the Z statistic indicated that high ranked meats were indeed recovered from contexts believed to have been deposited by persons of higher socio-economic ranking. Further, the test results indicated that dissimilarity between the occupants of the study blocks was greater in the industrial period than was observed for the pre-industrial period.

Cooking

Chaplin (1971) discusses the structure of biological properties of bone and the ramifications of cooking in order to explain the taphonomy of bone. Taphonomy is the study of processes that operate on organic remains after death to form fossil deposits (Gifford 1981). The chance of survival of bone after disposal will of course, depend on the nature of the environment into which it is put and the physical and chemical properties of the bone when it was discarded.

The vast majority of animal bones from archaeological sites are found in a more or less fragmentary condition. Much of the fragmentation results from both pre- and post-depositional variables. Before a bone is discarded a number of things can happen which will affect its ability to survive burial: modification by butchering, modification by cooking, modification by dogs or rodents. After a bone is discarded it can be further modified by lack of rapid burial, weathering or soil acidity. In this project area many of the faunal specimens were recovered from privies. A privy environment causes additional hazards to survival by enhanced possibility of waterlogging material and enhanced possibility of fungal deterioration. Given all these variables, rarely are faunal assemblages comprised predominantly of whole bones.

In an attempt to elicit as much information from fragmented non-diagnostic material, analysis focused upon cooking processes as a primary variable affecting the survival rate of archaeologically recovered bone. Chaplin (1971:14), in discussing the structure and biological properties of bone, explains that a bone that has been roasted within the joint may have lost much of its organic matter and may be quite brittle. He holds that the same is partly true for a bone that has been stewed or boiled, and bone strength will ultimately depend on the type of bone and the length of cooking time. Chaplin asserts that cooking for just long enough to make the meat tender

does not render the bone very brittle, though it will have lost some organic matter, especially fat. But if the boiling is prolonged, it is possible to destroy the bone almost completely.

Chaplin (1971:15) discusses the five main conditions in which bone can be discarded; fresh, putrescent, roasted, lightly boiled, and heavily boiled. As would be expected the first two are highly organic, and the bone retains its physical properties. The roasted bone has lost much of its organic matter, and as a consequence is brittle. The lightly boiled bone has also lost some organic matter, but is still greasy and less brittle than the roasted bone. The heavily boiled bone has lost the greater part of its organic constituents and is quite crumbly and porous. It would therefore seem that the highest bone recovery rate would come from bones which had not had prolonged cooking. Generally speaking, better cuts of meat come from areas where muscle is highly marbled with fat and do not require a great deal of cooking time. Less expensive cuts of meat are leaner with less marbling of fat, and require more cooking time to render tender and easily edible.

When a carcass is cut for meat, the bones of different joints can be cut with the meat or it can be cut as a filet without the bone. If bones are cut as an integral part of a joint such as a pig shoulder, they then suffer the fate of how the meat is cooked. The joint may be roasted, stewed, boiled and then may be given to the family dog. This analysis attempted to understand the end products - the bone which has gone through the discard process. The research question was asked as to whether the state of preservation of skeletal elements in the assemblage could be suggestive of various methods of cooking. The hypothesis that cooking techniques could be reflected by fragmentation was tested.

A test was administered to ascertain differences in proportions of fragmentation between an assessed middle to high socio-economic assemblage and a low socio-economic assemblage. Although there are many variables which can affect bone preservation, to attempt testing, one would have to assume that all factors affecting fragmentation of bone was equal in both locational control areas. A Z statistic was utilized to test for differences of proportion in a low socio-economic assemblage and a middle to high socio-economic assemblage exhibited in fragmentation. When fragmentary bones were viewed in relation to all mammalian specimens at a .05 confidence level, the hypothesis that $P_1 = P_2$ was rejected. The difference in fragmentation between the assemblages was great as demonstrated by a Z score of $17.50 > 1.65$. However, the differentiation in fragmentation does not support the hypothesis that a high bone fragmentation is correlated with poorer cuts of meat. As it is primarily mammal bone which is most affected by cooking processes, it was hoped that different cooking techniques between assemblages would be suggested by differentiation in fragmentation. Unfortunately the test results did not substantiate the test hypothesis.

FLORA

A total of 129,346 floral specimens were retrieved from the project area (Table 90). The collection of the floral specimens was greatly aided by the use of flotation procedures. Flotation is a water separation technique that separates light organic material from its geological matrix. Each processed

TABLE 90. Floral Assemblage Totals (By Area and Chronological Order)

	Domestic Plant Remains				Wild Plant Remains			
	Seeds	Pits	Shells	Totals	Seeds	Shells	Totals	Total Assemblages
Area A								
Feature 27	21,491	519	-	22,010	29,130	-	29,130	51,140
Feature 25	40	-	-	40	1,134	-	1,134	1,174
Feature 19	-	-	-	-	-	-	-	-
Area B								
EU 83S/124E topsoil	-	1	-	1	86	-	86	87
EU 83S/124E Level 8	170	1	-	171	250	-	250	421
EU 73S/124E	243	13	-	256	271	-	271	527
Area D								
EU 20S/545E	-	-	-	-	-	-	-	-
EU 30S/535E	3	-	-	3	11	-	11	14
EU 30S/525E	-	-	-	-	29	-	29	29
Feat. 1 Levels 7 & 8	10,877	977	-	11,854	9,956	1	9,957	21,872
Area E								
EU 50N/515E	-	-	-	-	8	-	8	8
EU 60N/505E	-	-	-	-	-	-	-	-
EU 60N/525E	-	-	-	-	3	-	3	3
EU 60N/495E	-	-	-	-	27	-	27	27
EU 60N/520E	-	-	-	-	6	-	6	6
EU 55N/510E	-	-	-	-	-	-	-	-
EU 55N/500E	-	-	-	-	6	-	6	6
EU 50N/495E	-	-	-	-	34	-	34	34
EU 50N/505E	-	-	-	-	6	-	6	6
Area H								
Feature 2	1,963	190	-	2,153	7,520	-	7,520	9,673
Feature 11	2,391	398	2	2,791	3,765	1	3,766	6,557

EU = Excavation Unit

(continued)

TABLE 90. (continued)

	Domestic Plant Remains				Wild Plant Remains			
	Seeds	Pits	Shells	Totals	Seeds	Shells	Totals	Total Assemblages
Non-Analytical/Mixed Deposits and Features:								
Area A								
Feature 18	313	-	-	313	3,477	-	3,477	3,790
Feature 28	1,240	350	-	1,590	2,660	-	2,660	4,250
Area B								
EU 73S/116E	-	8	-	8	-	-	-	8
Feature 1	-	-	-	-	81	-	81	81
Feature 5	1,847	2	-	1,849	8,531	-	8,531	10,380
Area H								
Feature 1	144	-	-	144	338	-	338	482

EU = Excavation Unit

sample produces a light and heavy fraction. It is expected that heavy fraction samples will contain charcoal, small mammal bone fragments and shell or, in general, larger biological material. It is expected that light fraction samples will contain small seeds, fish and bird bones, small snails and, in general, smaller biological material (Watson 1976).

Floral specimens were recovered which represented the presence of cherries, peaches, plums, grapes, watermelons, figs, apples, pears, cucumbers, peppers, squash, raspberries, Chenopodium, Amaranthus and nutshell. These specimens represent seeds from food plants, flower plants and weed plants. A detailed discussion of floral material is contained within Appendix G.

A seed analysis must first begin by understanding the processes by which seeds enter the archaeological record, which can be either natural or cultural. Some plants flourish in disturbed soil (around house foundations, areas prepared for cultivation of other plants) and others can be transported by the cultivator into the area. To assume that all seeds present in an assemblage are the result of human intervention is, of course, erroneous. Activities such as disposal of garbage debris, clearing of lots or yards, burning garbage, and collecting plants all affect the micro-environmental conditions of the site. Rodents or other burrowing animals often store seeds or nuts in subsurface locations, thereby creating an ambiguous picture of man/floral interaction.

It also must be remembered that some seeds may be present in an archaeological context as a result of indirect plant usage. This means that the plant rather than the seeds were utilized and the seeds are a by-product of plant usage. Another source of archaeological seed is the accidental preservation of seed rain unrelated to the use of the plant or seeds (Minnis 1981:145). Small naturally dispersed seeds can blow into burned trash middens or privies.

Weed plants are to a large degree "background noise" in a floral investigation. However, weed seeds can be an informative element. High frequencies of weed plants in historic assemblages can suggest land use patterns. For example, one would expect more weed plants to be present in a vacant lot than in a domestic backyard setting. Weeds are an annoyance, and it is likely that a house resident would modify backyard weeds whereas the vacant lot weeds would be subject to their own selection processes without major intervention by man.

In the same manner, flower seeds can indicate human manipulation of micro-environmental settings. In this project area the two major weed/flower specimens are Amaranthus and Chenopodium. In fact, these two floral specimens can also be classified as potential food sources. Amaranthus is an interesting weed plant. Close to a dozen Amaranths occur in North America, and they are commonly called wild beet or pigweed. Sometimes these plants are cultivated, and sometimes they spread as a result of disturbed soil conditions. The Amaranth is not an unattractive plant and is quite good to eat. Knap (1979) relates that the flavor is subtle and delicate. In addition, Amaranth is high in vitamin content and also in minerals, especially iron. The young

leaves are the best for eating as they are the most tender part of the plant. The plant can be enjoyed in a salad or cooked in the same manner as "mustard greens".

Chenopodium is commonly called Lamb's Quarters or Goosefoot. This weed/flower is also a commonly eaten wild plant. Goosefoot is a relative of cultivated spinach and is considered a tasty foodstuff. Goosefoot produces thousands of small seeds per plant and these seeds can be ground for bread making.

The other recovered floral material is much less ambiguous than the Amaranth or Chenopodium. Cherries, peaches, plums, grapes, watermelon, figs, apples, pears, cucumbers, peppers, squash and raspberries are all delicious dietary items and are certainly major components of present day dietary regimen. The major point to be made concerning these floral specimens is that different plant reproductive strategies can result in different seed dispersal rates. Amaranthus can produce up to 10,000 seeds per plant, whereas one cherry has only one pit. This must be remembered when recovered floral material is quantified and compared. In the project area several privy features contain high amounts of floral material. It is quite possible that undigested seeds contained in fecal matter were recovered from privy assemblages. Quantification of floral material is difficult to assess; consequently, the presence of floral material should be viewed as a seasonal component of a dietary system rather than in absolute terms.

CHRONOLOGICAL SUMMARY OF FLORAL AND FAUNAL SPECIMENS

The topsoil deposits in Area B (Excavation Units 73S/124E and 83S/124E) represent the earliest faunal and floral material from the project area. The topsoil deposits have been described as the original marsh surface in Area B. The presence of Pseudemys scripta (Pond slider) and Trionyx spiniferus (soft shell turtle) are not surprising given the proximity of an early marsh environment. Faunal specimens from Area B were generally in poor condition due to water saturation and fungus deterioration; however, by contrast the material recovered from the two units was in relatively good condition. Large domestic mammal remains dominated both assemblages. Burned, incinerated and scavenged bone was rare or absent. Sawed bone was absent. Indeed, there was little evidence of symmetrically sawed bone, representing professional butchering, in any of the assemblages from Area B including those dating to the early 1900s. Cut Sus or Caprinae bones were scarce in both collections.

In addition to large domestic mammals, the only other domestic species contributing significantly to the diet was Gallus gallus (chicken). Gallus remains were present in both assemblages. Cranial remains were rare and the common post-cranial specimens included thoracic and pelvic limb bone elements especially coracoid, humerus, ulna, femur and tibio-tarsus fragments. These elements are associated with areas of meat concentration on the chicken, including back, wing, thigh and leg portions. Vertebrae, rib, limb extremity and innominate remains were much less common. Overall, the evidence indicated Gallus gallus was an important secondary food resource and was common in the early as well as later dated assemblages.

Wild animal remains were rare or absent in the assemblages. This was also characteristic for the entire project area. Based on present evidence, wild species contributed little to the general diet.

Floral

The floral material was recovered in good physical condition. The assemblage consisted of 87 identifiable specimens representing one domestic (1) and 5 wild (86) species. The domestic remains included only 1 pit of Pranus persica (peach). The wild remains consisted of Rubus (raspberry), Chenopodium (Goosefoot) and Amaranthus (Pigweed).

The topsoil deposits on the Market Street lot have a MCD of 1774. The assemblages attributed to a sheet midden within the original topsoil area: Excavation Units 60N/495E, Levels 3A, B; 55N/510E, Levels 3A, B, and C; 55N/500S, Levels 3A, B; 50N/495E, Level 3A; and 50N/505E, Level 3A. The recovered bone was in fairly good condition from all of the Market Street topsoil deposits. Although there was a great deal of fragmentation, there was little evidence of weathering. Large domestic mammal dominate every assemblage. No professionally sawed bone was observed in any of the assemblages and cut specimens were uncommon. Bos tarus remains were more common than Sus or Caprinae remains. Food processing refuse was common in all assemblages. Cranial remains were common for Bos, Sus and Caprinae. Evidence of burned, incinerated or scavenged bone was rare.

Chicken remains were rarely identified in assemblages from Area E. Turkey remains were also uncommon within Market Street assemblages. Further, wild animals, fish and shell remains did not contribute significantly to assemblages.

Floral

The floral remains were primarily representative of weeds. Chenopodium and Amaranthus predominated the samples. Raspberry seeds were the only floral remains recovered reflective of food refuse or food processing.

The topsoil deposits on the Second Street lot have a MCD of 1782. The assemblages attributed to a sheet midden within the original topsoil are: Excavation Units 50N/515E, Level 3A; 60N/525E, Levels 3A, B; 60N/520E, Levels 3B, C; 55N/53[illegible]E, Levels 3A, B, C, and D; and 55N/515E, Level 3A. The assemblages comprising the Second Street topsoil were recovered in poor condition. The assemblages were characterized by high fragmentation. In fact, indeterminate large mammal bones constitute the bulk of the assemblages. Rib fragments constitute a large portion of the recovered specimens. No burned, incinerated or scavanged bone was noted for any assemblage. Wild animal species were rare, if not absent, from most assemblages. Chicken and turkey remains were rare, if not absent, from most assemblages, as were fish remains. Goose remains were present in Excavation Units 50N/515E and 55N/515E in small quantities. Professionally sawed bone is absent and cut bone is rare, and assemblages represent food refuse and food processing.

Floral

Very few floral specimens were recovered from the Second Street lot assemblage. No food refuse was recovered but rather the recovered material consisted only of American Elm tree seeds.

Feature 1 of Area D has a MCD of 1802. Feature 1 was a brick cistern subsequently used as a privy. Levels 7 and 8 represent the sealed undisturbed fecal matter from the lower part of the cistern. The bone assemblage was in good condition and did not evidence as much fragmentation as other assemblages. Feature 1 yielded a high number of identifiable bone fragments, and thirteen species recognized with the collection. An abundance of wild animal remains and an abundance of fish remains were found. Shellfish remains abundant when compared to earlier deposits, with twenty identified oyster shell fragments, and clam recorded for the feature. Professionally sawed bone was quite common and cut bone was still frequent. Caprinae represented the most common domestic animal remains in the assemblage. Both mature and immature specimens were recorded. Rats were common throughout the cistern deposit, and many of the other bone specimens exhibited rodent gnawing marks. Goose remains were scarce, but chicken remains were more numerous. Few turkey remains were recovered. Fish remains included 811 elements, constituting the largest assemblage of fish remains from the entire project area. Ictalurus (catfish) represented the largest amount of identified specimens.

Floral

The total floral assemblage from level 7 included 6,934 identifiable specimens consisting of nine domestic (3,064) and five wild (3,870) species. The total assemblage from level 8 consisted of 14,877 identifiable floral specimens and represented one of the greatest concentrations of floral refuse in the project area. The assemblage consisted of eight domestic (8,790) species and six wild (6,809) species.

The common domestic species included Prunus avium (Sweet Cherry), Vitis sp. (grape), Ficus carica (fig), Prunus persica (peach), Prunus domestica (plum), Citrullus vulgaris (watermelon), Malus pumila (apple) and Capsicum sp. (pepper). The common wild species consisted of Rubus sp. (Raspberry), Chenopodium (Goosefoot), Amaranthus (Pigweed) and Quercus sp. (Oak). The assemblages indicated a dense concentration of floral refuse, and, in general, most of the seed and pit remains represented either food refuse or fecal material.

The topsoil deposits of Area D have a MCD of 1804 and are comprised of assemblages in Excavation Units 20S/545E, topsoil; 30S/535E, topsoil; and 30S/525E, topsoil. The small faunal sample was in fairly good condition but with a high degree of fracture. Large mammal remains predominate, with a high incidence of mammal rib and longbone fragments. No wild species were identified, and no burned, incinerated or scavenged bone noted. There is a low frequency of both cut and sawed specimens.

Floral

Very few floral specimens were recovered from the topsoil deposits of Area D. No specimens were recovered from Excavation Unit 20S/545E. Small amounts of Vitis sp. (grape) and Chenopodium (Goosefoot) were recovered from Unit 30S/535E. Only Chenopodium was present in Unit 30S/525E. This would seem to represent weed seeds which have been incorporated into the assemblages.

The lower topsoil deposits of Area A have a MCD of 1810 and the upper topsoil deposits have a MCD of 1833. The assemblages which comprise the topsoil are from Excavation Units 20S/120W, 0North/120W, 10N/120W, 30N/110W, 0North/100W, and 20N/100W. With the exception of topsoil in Unit 30N/110W, the recovered faunal material was in poor condition with fungus pitting, splitting and surface peeling. The assemblages are characterized by a high frequency of fragmented material. Topsoil in Excavation Unit 30N/110W had the largest collection of faunal specimens in Area A (1225), and large mammal dominates all assemblages. No shell was recovered from the assemblages. Burned, incinerated and scavanged bone was rare, as were wild species. Fish remains were rare, while chicken is common and turkey is less common. One river otter (Ondatra zebethicus) was recovered from the topsoil in Unit 30N/110W. Rodent remains are high in Unit 20N/100W.

These assemblages seem to represent randomly deposited food refuse. No floral materials were recovered from these assemblages.

Feature 27 of Area A is a barrel lined privy and has a MCD of 1811. The faunal assemblage was in poor physical condition. Bone specimens exhibited peeling, splitting, fungus pitting and cracking. Many pieces were coated with sediments due to waterlogging, and several fragments exhibited carnivore scavenging marks. The assemblage was highly fragmented, and only 40 bone fragments were recovered. All identified bone specimens were either Bos tarus, Sus scrofa, or Caprinae, and shell remains were absent. Two bird fragments and two fish elements were recovered.

Floral

The floral material was in better condition than the faunal material. Most seeds and pits were complete. The bulk of the assemblage consisted of seeds and pits with other floral parts not represented. The floral assemblage from the feature consisted of 11,159 seeds and pits representing at least 13 species. The most common remains were Prunus avium (Sweet cherry), Rubus sp. (Raspberry), Fig, and Uitis sp. (grape).

It is important to remember that although the species totals were large, they tend to be misleading since many of them constitute multiple seeded fruits; each containing a high number of seeds. A cherry, on the other hand, has only one pit per fruit. Therefore, although 3,535 Raspberry and 6,400 Fig seeds were recovered, the actual number of individual fruits represented was much lower. Prunus persica (peach), Citrullus vulgaris (watermelon), Malus pumila (apple) and Capsicum (pepper) were also represented. Ryegrass, Chenopodium and Amaranthus were common in the assemblage.

Feature 28 of Area A is a barrel lined privy with a MCD of 1815. The assemblage was in good condition and consisted of 192 bone and eight shell fragments. Eight types of animals are represented. Large mammal remains were most common and accounted for 50% of the assemblage, while wild animal remains were rare. Sus remains were rare. Bird bones accounted for 40% of the collection, but most were associated with a fragmented goose skeleton. Gallus gallus remains were rare. The assemblage was highly fragmented, but evidence of rodent and carnivore scavenging was absent. Fish remains consisted of skull and tail elements.

Floral

The floral assemblage was in good physical condition with mostly complete seeds or pits. Many seeds were covered or attached to clumps of dark organic fecal material. The total wild floral remains included 1,800 seed specimens, as well as roots and wood charcoal. The common wild species included Rubus sp. (Raspberry). Other less abundant species were Chenopodium (Goosefoot) and Amaranthus (Pigweed). In addition to the wild species, cherry, peach, grape, watermelon, fig and apple comprised a total of 4,250 specimens. Overall, the floral remains from Feature 28 represented food refuse and fecal material.

Features 15, 17, 25, and topsoil level Z10G Unit 20N/100W of Area A are all associated with the Dowdall occupation. Feature 15 of Area A has a MCD of 1849. This feature was a "shell filled" trench. Feature 15 yielded 309 bone fragments and 19 shells. The bone assemblage was in excellent condition. The quality of bone preservation was probably due to the fact that the refuse was associated with a closed, protected feature (trench). There was a low number of indeterminable bone fragments, and evidence of rodent or carnivore scavenging was absent. Large domesticate mammals predominate, while wild animals were rare. There was a high incidence of sawed and cut bone. Bird and fish remains were rare, and only one Rattus sp. fragment was recovered. Eighteen oyster shells were identified, but most were discarded in the field without a count.

No floral remains were recovered from Feature 15.

Feature 17 of Area A has a MCD of 1849. This feature was an open trash pit deposit, and consequently the faunal material was in poor physical condition. The bone assemblage from Feature 17 consisted of 44 specimens. In addition, 55 oyster shell fragments and 5 clam shell fragments were recovered. Large mammal remains constituted the bulk of the bone assemblage representing 39 of the 44 total bone elements. Wild animal bone remains were rare. The material exhibited cut marks but sawing was rare and exhibited little evidence of scavenging, burning or incineration.

No floral material was recovered from Feature 17.

The uppermost topsoil deposit in Unit 20N/100W (Level Z1) has a MCD of 1849. The assemblage was recovered in poor physical condition and the majority of the assemblage is fragmented. Domesticated mammal predominated in the assemblage, and there were high frequencies of Gallus gallus (chicken) remains. Fish remains were rare, while shell was absent.

No floral remains were recovered.

Feature 25 of Area A has a MCD of 1850. Feature 25 was a barrel privy which consisted of ash and cinders covering a fecal deposit. This assemblage was associated with the Dowdall mineral water bottling business. The faunal assemblage is small and totals only 14 bone elements, representing three mammal species. The shell remains consist of 13 fragments representing two species. The assemblage was in poor condition, characterized by flaking of the compact bone, concretions on the surface of the bones and pitting. All faunal remains were post-cranial fragments. Identified animals included Bos tarus, Sus scrofa and Rattus sp. Each type was represented by one element fragment. The remainder of the assemblage consisted of indeterminable fragments. Shell material consisted of 10 oyster and 3 clam fragments.

This assemblage represents a small amount of food refuse and shell which may have been associated with the mineral water bottling business.

Floral

The floral material was in good condition and consisted of mostly unbroken seeds. A total of 1,174 floral specimens represented one domestic and 3 wild species. The domestic remains were of Vitis (grape) and the wild were Rubus sp. (Raspberry), Chenopodium sp. (Goosefoot) and Amaranthus (Pigweed). Overall, the evidence indicated a low density of floral refuse.

Feature 11 of Area H was a barrel privy which consisted of fecal matter and secondary refuse. The assemblage from the privy was in fair physical condition. The total assemblage consisted of 310 specimens. Wild species were quite common and accounted for 51% of the total assemblage. Sus scrofa constituted the bulk of domestic mammal remains. This was the greatest concentration of Sus bones in the entire project area. Bos tarus remains were rare. One human tooth was recovered. This was the only human bone specimen in the project area. Rattus remains were common. Gallus remains were common, as were crab remains. Oyster and clam shells were common.

Floral

The floral assemblage consisted of 6,557 identifiable specimens representing nine domestic and six wild species. The common domestic species included Prunus avium (Sweet cherry), Vitis sp. (grape), and Ficus carica (fig). Other species were Prunus persica (peach), Citrullus vulgaris (watermelon), Malus pumila (apple), peanut and coconut. This material represented the only remains of peanut and coconut in the project area.

The most abundant wild species were Rubus sp. (Raspberry). Other species included Chenopodium sp. (Goosefoot), Amaranthus sp. (Pigweed) and Cayra (Hickory).

Feature 2 of Area H has a MCD of 1855. Feature 2 was a barrel privy. The assemblage from Feature 2 was in poor condition, and the specimens were coated with mineral deposits. The assemblage was highly fragmented and much of the material included rib and longbone fragments. Burned, incinerated and scavenged bone was absent, while sawed and cut bone specimens were common.

362 of the 702 total specimens were eggshell or exoskeletal fragments. Large mammal remains were common. Wild species remains were abundant. They consisted of fish, shellfish and potentially edible species of turtle and bird. Oyster remains were more common than clam.

Floral

The floral remains were recovered in good condition. The floral assemblage consisted of 9,673 identifiable specimens representing six domestic and one wild species. The common domestic plant remains were Prunus avium (Sweet cherry), Vitis sp. (grape) and Ficus carica (fig). Other species recorded were Citrullus vulgaris (watermelon) and Pyrus sp. (pear). The greatest concentration of pear seeds was from this assemblage. Wild species included only Rubus sp. (Raspberry). Other floral remains included roots and wood charcoal fragments.

Feature 19 of Area A was a structure possibly associated with a barn. The bone assemblage was in poor physical condition and was highly fragmented. The total assemblage consists of 174 bone fragments representing nine types of animals. Large domestic animals dominated the assemblage, and constituted 56% of the total. Wild animal remains were rare, and a high frequency of professionally sawed bone was noted. Rattus remains were common, while Gallus gallus remains were uncommon. Fish were uncommon in the assemblage.

Floral

The floral assemblage contained only roots, wood charcoal, bark debris and straw fragments.

SUMMARY

Plant and animal remains were recognized as an important component in assessing the total cultural system of the project area. This recognition allowed floral and faunal materials to be tested in a manner analogous to what are considered more conventional artifacts (i.e. glass, ceramics, metal) found in an urban context. Floral and faunal material was viewed as cultural data subject to quantification and capable of utilization in hypothesis testing. Testing consisted of quantitative exploration to discern patterned differentiation between contrasting socio-economic groups of the project area both synchronically and diachronically.

It was hoped that floral and faunal remains would reflect in a straightforward manner, food procurement differentiation between inhabitants of the project area. Test procedures were administered to ascertain differences between lower and upper socio-economic groups. In addition, hypotheses were tested relating to changes through time in socio-economic standards of project area inhabitants. The results of the testing procedures suggested that skeletal elements which were associated with the most valued meat cuts were indeed more strongly correlated to assemblages attributed to high socio-economic community ranking. Unfortunately, there was no assemblage from the pre-industrial period which was attributed to low socio-economic community ranking which could be used to measure social distance synchronically. However, when a high socio-economic assemblage of the pre-industrial period

was tested against a low socio-economic assemblage of the industrial period, the differences were profound. Testing also suggested that the Dowdall assemblage, which was characterized as a medium to high socio-economic domestic/commercial assemblage, was more strongly correlated to the high socio-economic assemblages of the pre-industrial period than to more contemporary assemblages. The most striking difference in the industrial assemblages was seen between the Dowdall assemblage and the features of Area H, which were attributed to lower socio-economic ranking.

The cultural patterns of urban America are diverse and complex. Floral and faunal remains are a by-product of human cognitive patterns of behavior which can reflect that diversity. It is hoped that through continued refinement of analysis enhanced understanding of these patterns can be accomplished.