

APPENDIX F

STATISTICAL ANALYSIS  
OF SUMMARY FAUNAL DATA

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# STATISTICAL ANALYSIS OF SUMMARY FAUNAL DATA

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## SUMMARY OF FINDINGS

Surprisingly, the occupation categories did not have as clear or consistent an effect as expected on meat species or cost. Wealthy professionals did consume relatively more high-cost cuts and fewer medium-cost cuts than did some others. Also surprisingly, archaeological features from unskilled households did not contain the most economical mix of cuts, but instead resembled the wealthy professionals' assemblage more than the intermediate occupation categories.

Features from unskilled households had lower proportions of pork, which may have been progressively more common towards the higher-earning end of the category's spectrum. This, too, is surprising, given that beef appears to have been the more prized meat, since hotels served more beef, and fewer low-cost cuts, than people ate at home.

Ethnicity affected species preference, but not the cost of cuts. Specifically, U.S.-born white contexts tended to have less beef, and Irish contexts tended to have more mutton.

Dwelling type was well correlated with meat-cut cost. In general, the higher-status the dwelling, the higher the percentage of expensive meat cuts, and the fewer medium- and low-cost cuts. The quality of one's housing was a much better predictor of the quality of one's diet than was one's occupation or ethnicity. Species preferences, however, were not affected by dwelling type. People living in poorer housing expressed roughly the same preferences for meat species as did those in finer housing, but used cheaper cuts to do so.

Being an owner or a renter was irrelevant to meat consumption, except among residents of the intermediate-status Almost-polite houses, where renters ate more expensive cuts and fewer medium-cost and cheap cuts than did owners. In general, it appears that dietary choices were strongly related to one's immediate standard of living, as expressed in the quality of one's dwelling, rather than to one's capital or underlying economic status, as measured by income or homeownership. There are probably modern parallels here.

People in the West of Market neighborhood tended to use more mutton and less beef than those in the other two neighborhoods. This may be due to a modestly higher representation of Irish families there, but that remains uncertain without further statistical testing. Households headed by women used higher proportions of mutton and lower proportions of pork. Since five of the six woman-headed households were Irish (an interesting pattern in itself), the preference for mutton probably owes more to the cultural background of the people than to the gender of the head of the household.

## INTRODUCTION

This appendix describes results of a search for statistically significant patterning in the distribution of meat species (beef, mutton, and pork) and meat-cut cost categories (high, medium, and low) among Cypress Archaeological Project features divided according to potentially meaningful cultural categories. These categories include ethnicity (African American, German, Irish, U.S.-born white), occupation categories (Well-off professional, Professional, Skilled, Unskilled), tenancy (Owner, Tenant, Unknown tenant), neighborhood (East, West, Oakland Point), type of dwelling (from Two-story Victorian, or Polite Victorian house, through Informal workers cottage), private housing versus hotels, and woman-headed households versus others.

## APPROACH AND METHODS

This analysis is based entirely on percentage data for each "analytical unit." These analytical units are single or multiple stratigraphic units taken to represent a single sample of refuse from a single residential context, such as a house or a hotel. Each such context is represented by only one analytical unit, and each feature is taken to represent just one residential context, although this may be a simplification in one or more cases (e.g., Feature 2007). By analyzing the percentage composition of bone from each analytical unit, differences in the size of these features and their depositional history are eliminated from consideration. Only the mix of species and cut prices of the meat consumed is considered here; the amounts consumed are not evaluated.

The statistics used weight each feature equally. In effect, each analytical unit represents the mix of species and cut prices consumed by a single residential unit. This analysis is a comparison of the species and cut-price mixes of these residential units.

The analysis proceeded in steps, summarized below:

1. Select features suitable for the particular analysis.
2. Print a table showing the average species and cost percentages for each context category.
3. Check to see if any variable is significantly non-randomly distributed in the whole subsample.
4. Compare pairs of categories (i.e. Professional vs. Unskilled) to see if any variable (i.e., percentage of beef) is significantly different.
5. Do similar pairwise comparisons using lumped categories (i.e., Unskilled vs. all other occupation categories).
6. Interpret the results.

First, the features to be included in any given comparison were selected to include only those for which the relevant context data were available. Additional restrictions were also

applied in many cases, for example, limiting the cases to residential, as opposed to commercial, properties. For some analyses, features from rare types of contexts were excluded, such as the one Italian household in the ethnicity analysis, or the two Widow households in the occupation analysis.

Second, the data were summarized according to the context variables (such as African American, German, Irish, U.S.-born white) and reported in a table showing the mean percentages of species and meat-cut price categories. These values average the percentages of the features, so that small features count the same as large ones. They give a sense of the central tendencies of each context category. For example, one can note that features from African American contexts average a higher proportion of beef than do features from U.S.-born white contexts.

These tables of mean values are useful exploratory tools, but they are deceptively difficult to interpret. The mean values may hide a great deal of variation, and especially with the small sample sizes here, the differences they suggest may not be meaningful. How large must a difference be to be considered important? How close must two percentages be to be considered effectively the same? It is even possible for the means to be identical when there is actually a real difference between the categories. Consider a hypothetical case in which all the features from Latvian households had around 10% beef, while among the five Estonian households, four features had no beef and one had 100% beef, for an average of 20%. The mean values would suggest that Estonian households typically had a higher proportion of beef than did Latvian households, when in fact the opposite was true.

The next stages of the analysis attempt to resolve these problems by evaluating the statistical significance of the differences between categories of features. The statistics used are nonparametric, that is, they do not assume a normal (bell-shaped) distribution of values. This is important, since the small sample sizes mean that the luck of the draw is likely to produce non-normal sample distributions even if the underlying patterns are normal. Moreover, humans are complicated, and there is no reason to assume normal distributions of behavior in such historically particular, individualistic matters as food preferences. Parametric tests, such as the familiar t-test, will often find "significant" differences between small samples of archaeological data simply because they are not normal and thus fit poorly to the t-test's null hypothesis that both samples are drawn from a single normal distribution.

The statistics used here are the Wilcoxon rank-sum test (also called the Mann-Whitney-Wilcoxon Test) for cases with two classes (such as a comparison of percent beef in Professional features vs. Unskilled features), and the equivalent test for more than two classes, the Kruskal-Wallis test. These are well explained in:

Gibbons, Jean D.  
1993 Nonparametric Statistics: An Introduction. Sage University  
Papers Series on Quantitative Applications in the Social Sciences, 07-090.  
Sage Publications, Newbury Park.

In essence, these tests arrange all the values in rank order, from smallest to largest, disregarding the size of the differences between them. If the percentage of high-cost cuts was greater in Victorian houses than in cottages, the values from Victorian houses would mostly be towards

the high end of the list, and the values from cottages would mostly be towards the low end. If the percentage of high-cost cuts was the same in cottages and Victorians, then the values for each kind of house would be uniformly scattered through the whole list. The tests evaluate whether or not the list is significantly unbalanced, by calculating the odds of getting a pattern at least that unbalanced if you were to put the values in order by chance, such as by randomly drawing "Victorian" or "Cottage" from a collection of slips of paper with the appropriate number of each type. If the chance of getting a list as unevenly distributed as the observed one is low (less than 10%, or less than 5%), then the pattern is deemed to be significant, that is, probably due not to chance, but to a real difference between the two categories.

The third step applies only to analyses involving more than two categories, such as the occupation analysis. In these cases, the Kruskal-Wallis test is applied to each of the meat variables to determine if its distribution among all the categories is significantly different from random. A significant result indicates that there is significant patterning to be explained, but does not indicate what the pattern is.

The fourth step applies to all cases. Here, the Wilcoxon rank-sum test is used to compare pairs of categories, such as Victorian houses vs. Informal workers cottages. These results are easy to interpret: a significant result means that the variable (such as percent mutton) is significantly different in the two categories. Significantly different means that the difference is consistent enough that it is unlikely to be random, so it is appropriate to look for a cultural explanation. A difference with a probability of 5% has only a 5% chance of having occurred randomly, so we can consider it probably the result of some systematic process, rather than the luck of the draw. A significant result does not mean that the difference is large. A real, significant difference might nevertheless be subtle and not very important. Consider the difficulty of interpreting a finding that Latvian households consistently ate 1% more beef than Estonian ones. Significant differences indicate trends in the data that should be taken seriously, probably by examining and plotting the feature values. The pattern that appears is probably due to a real process, but the interpretation is up to the archaeologist.

The fifth step repeats the fourth, but using lumped categories such as features from Polite Victorian houses vs. all others.

The sixth and final step is statistical interpretation, in which the results are subjectively evaluated to see if they make any sort of coherent sense. I have done this in part by ordering the tables of significance tests so as to juxtapose comparisons that seem to be related, allowing me to abstract some generalizations from them. Others might notice and emphasize different patterns in the results. It is also important to look for multiple tests that confirm related trends. This is because the method used here is inductive. That is, I did not start with a hypothesis and test the data to evaluate it. Instead, I ran all the reasonable comparisons I could think of, and pulled out for discussion those that proved significant either at the 10% level (less than 10% chance that the two categories actually have identical distributions of values, that is, less than 10% chance that the difference is an illusion caused by the luck of the draw) or at the more convincing 5% level (less than 5% chance that the differences are an illusion caused by the luck of the draw). This procedure is likely to produce some spurious "significant" results by chance. That is, out of one hundred tests of two identical distributions of values, five are expected to show differences "significant" at the 5% level, just by chance. For this reason, isolated

significant results may or may not reflect real cultural processes. Where multiple significant results seem to reflect a single underlying trend, then the trend can be considered real.

Finally, the lack of statistically significant differences between most of the categories does not mean that there necessarily are no differences between the categories. It simply means that any differences present are not great enough to be detected with confidence based on the given sample size and variability.

The statistics were run on SAS software, using SAS instructions in the program MEAT4.SAS, faunal data from MEATSUM3.DBF, and context data from CYPCTX3.DBF. The program is a simple text file that can be viewed using any word processor, and the data files can be viewed directly by Excel or most database programs.

## RESULTS

### OCCUPATION

| Occupation Category | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|---------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                     |                    |              |                |              |  | High                   | Medium | Low |
| P+                  | 3                  | 49           | 32             | 19           |  | 45                     | 28     | 26  |
| P                   | 10                 | 54           | 31             | 15           |  | 30                     | 44     | 27  |
| S                   | 26                 | 51           | 36             | 13           |  | 29                     | 41     | 30  |
| U                   | 5                  | 59           | 34             | 7            |  | 38                     | 34     | 28  |
| <b>Total/Mean:</b>  | 44                 | 53           | 34             | 13           |  | 31                     | 40     | 29  |

### Comparisons:

All 4 categories together for non-randomness

All pairs:

Wealthy (P+) vs. all others (P,S,U)

Wealthy (P+) vs. Middle (P,S)

Middle (P,S) vs. Unskilled (U)

Middle (P,S) vs. Extremes (U,P+)

Upper (P+,P) vs. Lower (S, U)

Any skill (P+,P,S) vs. Unskilled (U)

## Significant Differences (comparisons that reached at least 10% significance):

| Occupation Category          | Variable | Which has more? | Probability | Sig @ 5% | Sig @ 10% |
|------------------------------|----------|-----------------|-------------|----------|-----------|
| P+ vs. S                     | high     | P+              | 0.0924      |          | X         |
| P+ vs. Middle (S,P)          | high     | P+              | 0.0867      |          | X         |
| All categories (S,U,P,P+)    | medium   |                 | 0.0388      | X        | X         |
| P+ vs. P                     | medium   | P               | 0.0346      | X        | X         |
| P+ vs. S                     | medium   | S               | 0.0576      |          | X         |
| P+ vs. Others (U,S,P)        | medium   | others          | 0.0452      | X        | X         |
| P+ vs. Middle (S,P)          | medium   | middle          | 0.0373      | X        | X         |
| U vs. P                      | medium   | P               | 0.0498      | X        | X         |
| U vs. S                      | medium   | S               | 0.0719      |          | X         |
| U vs. P&S                    | medium   | P&S             | 0.0463      |          | X         |
| U vs. All skilled (S, P, P+) | medium   | all skilled     | 0.0855      |          | X         |
| P&S vs. U&P+                 | medium   | P&S             | 0.0062      | X        | X         |
| P&S vs. U&P+                 | high     | U&P+            | 0.0656      |          | X         |
| U vs. P                      | pork     | P               | 0.0235      | X        | X         |
| U vs. P&S                    | pork     | P&S             | 0.0903      |          | X         |

## Interpretations:

The cost of meat cuts consumed in different households was related to the occupation category of the household, but not as clearly or consistently as might be expected. The one clear pattern is that members of wealthy professional (P+) households ate more expensive meat than did some others. Features from wealthy professional households had a higher proportion of high-cost meat cuts than those from either skilled workers' households or skilled and professional workers' homes combined. These wealthy professional households also had lower proportions of medium-cost cuts than did professional or skilled households, professional and skilled households lumped together, and those lumped with unskilled households. Oddly enough, there were no significant differences in the proportions of low-cost cuts.

Stranger yet, features from unskilled households did not have the most economical assortment of cuts. On the contrary, the percentage data suggest that they were similar to the wealthy professional households in having a relatively high proportion of high-cost cuts, although this pattern was not significant, and they had significantly lower proportions of medium-cost cuts than skilled, professional, skilled and professional, and even all other



professions lumped together. Lumping the paradoxically similar unskilled and wealthy professional households together, these two had more high-cost cuts and fewer medium-cost cuts than did the middle two occupation categories together.

That these patterns appear mostly in the medium-cost cuts, but not consistently in the high-cost cuts or at all in the low-cost ones, suggests that the effect of profession on meat-cut preferences was not simple or clear except for the evidently more lavish spending of the wealthy professionals. The apparent similarity of the extreme high- and low-income groups as opposed to the middle-income skilled and professional households is simply hard to understand. The confusing results by occupation categories may reflect the small numbers of features in the Wealthy Professional (3) and Unskilled (5) samples. With such small samples, real patterns must be very strong to show up as significant, and a few idiosyncratic cases can have a disproportionately misleading effect.

There may be a weak pattern in species preference. The percentage data suggest that pork becomes more common as one progresses from lower-status to higher-status occupation categories. This impression is supported by the significantly lower proportion of pork in unskilled households compared to professional households, and to professional and skilled households lumped together. This does not make obvious sense from an economic or a social-status standpoint.

## ETHNICITY

### Common Ethnicities:

| Ethnicity          | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|--------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                    |                    |              |                |              |  | High                   | Medium | Low |
| African Am         | 4                  | 58           | 30             | 13           |  | 34                     | 36     | 30  |
| German             | 5                  | 58           | 29             | 13           |  | 26                     | 40     | 34  |
| Irish              | 16                 | 48           | 41             | 11           |  | 32                     | 38     | 30  |
| U.S. born white    | 16                 | 48           | 35             | 17           |  | 32                     | 40     | 28  |
| <b>Total/Mean:</b> | 41                 | 50           | 36             | 14           |  | 31                     | 39     | 30  |

All Ethnicities:

| Ethnicity<br>(all known) | Number<br>of<br>Features | Beef | Mutton | Pork |  | Percent Meat-cut Costs |        |     |
|--------------------------|--------------------------|------|--------|------|--|------------------------|--------|-----|
|                          |                          |      |        |      |  | High                   | Medium | Low |
| African-Am               | 4                        | 58   | 30     | 13   |  | 34                     | 36     | 30  |
| Canada                   | 2                        | 63   | 31     | 6    |  | 27                     | 43     | 30  |
| English/US               | 1                        | 70   | 23     | 8    |  | 34                     | 45     | 21  |
| German                   | 5                        | 58   | 29     | 13   |  | 26                     | 40     | 34  |
| German/En<br>glish       | 1                        | 83   | 13     | 5    |  | 12                     | 41     | 47  |
| Irish                    | 16                       | 48   | 41     | 11   |  | 32                     | 38     | 30  |
| Prussian                 | 1                        | 41   | 43     | 16   |  | 27                     | 48     | 25  |
| Scotland                 | 1                        | 45   | 42     | 14   |  | 42                     | 35     | 23  |
| Scots/Irish              | 1                        | 57   | 19     | 24   |  | 32                     | 47     | 22  |
| U.S.-born<br>white       | 16                       | 48   | 35     | 17   |  | 32                     | 40     | 28  |
| <b>Total/Mean:</b>       | 48                       | 51   | 35     | 13   |  | 31                     | 39     | 29  |

Comparisons:

All 4 common ethnicities together for non-randomness

All pairs of common ethnicities

Each of the 4 common ethnicities vs. all the others lumped together, including rare ones

White from former British Empire (Canada, English/US, Irish, Scots, Scots/Irish, US) vs. white from Continental Europe (German, Prussian, Italian)

Significant Differences (comparisons that reached at least 10% significance):

| Ethnicity                           | Variable | Which has more? | Probability | Sig @ 5% | Sig @ 10% |
|-------------------------------------|----------|-----------------|-------------|----------|-----------|
| U.S.-born white vs. African Am      | beef     | African Am      | 0.0421      | X        | X         |
| U.S.-born white vs. German          | beef     | German          | 0.0691      |          | X         |
| Irish vs. all other, including rare | mutton   | Irish           | 0.0678      |          | X         |

Interpretations:

The significant differences by ethnicity are few, and seem to reflect culturally variable preferences for different meat species. Features from U.S.-born white residences have less beef than do those from German or African American homes. Irish households have higher percentages of mutton than all others together, not surprisingly. The cost of meat cuts does not seem to be significantly related to ethnicity.

## DWELLING TYPE

| Dwelling Type                | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|------------------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                              |                    |              |                |              |  | High                   | Medium | Low |
| P (Polite Victorian House)   | 7                  | 51           | 37             | 12           |  | 43                     | 35     | 23  |
| A (Almost-polite House)      | 14                 | 56           | 31             | 13           |  | 37                     | 37     | 26  |
| S (Simple, 2-story)          | 2                  | 35           | 53             | 12           |  | 34                     | 47     | 19  |
| D (Duplex)                   | 4                  | 66           | 27             | 7            |  | 28                     | 47     | 25  |
| I (Informal workers Cottage) | 33                 | 50           | 36             | 14           |  | 29                     | 41     | 30  |
| R/C (Residence over shop)    | 1                  | 57           | 31             | 12           |  | 20                     | 41     | 40  |
| H (Hotel)                    | 4                  | 64           | 28             | 8            |  | 38                     | 45     | 17  |
| B (Butcher shop)             | 1                  | 54           | 33             | 14           |  | 35                     | 26     | 39  |
| NA (Unknown)                 | 2                  | 52           | 41             | 7            |  | 32                     | 34     | 35  |
| <b>Total/Mean:</b>           | 68                 | 53           | 35             | 13           |  | 33                     | 40     | 28  |

| Dwelling Types, lumped  | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|-------------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                         |                    |              |                |              |  | High                   | Medium | Low |
| Non-Victorian (I,D,S,A) | 53                 | 52           | 35             | 13           |  | 31                     | 41     | 28  |
| Victorian (P)           | 7                  | 51           | 37             | 12           |  | 43                     | 35     | 23  |
| <b>Total/Mean:</b>      | 60                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |
|                         |                    |              |                |              |  |                        |        |     |
| Nice (P,A)              | 21                 | 54           | 33             | 13           |  | 39                     | 36     | 25  |
| Simple (I,D,S)          | 39                 | 51           | 36             | 13           |  | 29                     | 42     | 29  |
| <b>Total/Mean:</b>      | 60                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |
|                         |                    |              |                |              |  |                        |        |     |
| Cottage (I)             | 33                 | 50           | 36             | 14           |  | 29                     | 41     | 30  |
| House (P,A,S,D)         | 27                 | 54           | 34             | 12           |  | 37                     | 39     | 24  |
| <b>Total/Mean:</b>      | 60                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |
|                         |                    |              |                |              |  |                        |        |     |
| Dwelling (P,A,S,D,I)    | 62                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |
| Hotel                   | 4                  | 64           | 28             | 8            |  | 38                     | 45     | 17  |
| <b>Total/Mean:</b>      | 66                 | 53           | 35             | 13           |  | 33                     | 40     | 27  |

**Comparisons:**

All 9 categories together for non-randomness, various subsets excluding non-residential, all commercial, etc.

All pairs:

Polite Victorian (P) vs. other homes (A,S,D,I)

Nice homes (P,A) vs. simple homes (S,D,I)

Cottages (I) vs. other homes (P,A,S,D)

Hotel vs. other dwellings except Butcher shop and Residence over shop

**Significant Differences (comparisons that reached at least 10% significance):**

| Dwelling types:                 | Variable | Which has more? | Probability | Sig @ 5% | Sig @ 10% |
|---------------------------------|----------|-----------------|-------------|----------|-----------|
| All Dwelling types              | low      |                 | 0.0715      |          | X         |
| All Dwelling except butchershop | low      |                 | 0.0670      |          | X         |
| All Dwelling except butchershop | beef     |                 | 0.0670      |          | X         |
| Hotel vs. P                     | mutton   | P               | 0.0726      |          | X         |
| Hotel vs. A                     | low      | A               | 0.0797      |          | X         |
| Hotel vs. P                     | beef     | Hotel           | 0.0467      | X        | X         |
| Hotel vs. P                     | medium   | Hotel           | 0.0726      |          | X         |
| Hotel vs. I                     | beef     | Hotel           | 0.0177      | X        | X         |
| Hotel vs. I                     | low      | I               | 0.0177      | X        | X         |
| Hotel vs. Dwelling (P,A,S,D,I)  | beef     | Hotel           | 0.0581      |          | X         |
| Hotel vs. Dwelling (P,A,S,D,I)  | low      | Dwelling        | 0.0326      | X        | X         |
| P vs. D                         | medium   | D               | 0.0726      |          | X         |
| A vs. S                         | mutton   | S               | 0.0679      |          | X         |
| I vs. A                         | high     | A               | 0.0430      | X        | X         |
| I vs. P                         | high     | P               | 0.0094      | X        | X         |
| I vs. P                         | low      | I               | 0.0407      | X        | X         |
| I vs. S                         | beef     | I               | 0.0949      |          | X         |
| I vs. D                         | pork     | I               | 0.0962      |          | X         |
| Vict (P) vs. NonVict (A,S,D,I)  | high     | Vict            | 0.0322      | X        | X         |
| Nice (P,A) vs. Simple (S,D,I)   | high     | Nice            | 0.0042      | X        | X         |
| Nice (P,A) vs. Simple (S,D,I)   | medium   | Simple          | 0.0227      | X        | X         |
| Nice (P,A) vs. Simple (S,D,I)   | low      | Simple          | 0.0957      |          | X         |
| House (P,A,S,D) vs. Cottage (I) | high     | House           | 0.0139      | X        | X         |
| House (P,A,S,D) vs. Cottage (I) | low      | Cottage         | 0.0167      | X        | X         |

**Interpretations:**

Unlike profession and ethnicity, dwelling types do have clear, easily intelligible, and expected patterning in meat cut prices. The quality of one's housing was a much better predictor of the quality of one's diet than was one's profession or ethnicity.

The overall analyses indicate that the percentages of beef and low-priced cuts are significantly non-randomly distributed among different dwelling types. More detail emerges from the pairwise comparisons.

First, hotels clearly differ from other residences. They have significantly higher percentages of beef than do two of the other individual dwelling types and than other dwellings in general. The mean percentages table suggests that hotels also have lower percentages of low-cost cuts than any other dwelling type, but this proves to be significant only in comparison to Almost-polite houses and Informal workers cottages. These two dwelling types are the most numerous in the sample, which probably explains why this pattern appears significant only near both ends of the socioeconomic spectrum. It may well be true across the board, but is just not strong enough to be detected in the comparisons with smaller sample sizes. Given that there are statistically significant differences between hotels and other dwellings on beef and low-cost cuts, plus a few other scattered differences, it is reasonable to take seriously the other differences in hotel meat preferences shown in the percentage table, even though they are not statistically significant. When eating at hotels, people seem to have consumed different meats (more beef, less mutton and pork), and better cuts (especially avoiding the low-cost ones) than they did at home.

Among non-commercial dwellings, there is a consistent trend towards more expensive meats as one progresses from the least to the most prestigious homes. Two-story Victorian homes have significantly more high-cost meat than not only Informal workers cottages, but also than all others lumped together. The top two dwelling types lumped together have more high-cost cuts, and fewer medium and low-cost cuts, than the three lower-status dwelling types lumped together. Informal workers cottages have significantly more low-cost cuts and fewer high-cost cuts than do all the other dwellings lumped together. By a number of measures, then, quality of housing corresponds directly to cost of meat consumed.

The high proportion of beef at hotels, where the cuts were generally more expensive than in homes, would seem to indicate that beef was prized relative to mutton and pork. Yet in homes, while the cost of cuts clearly parallels the quality of the housing, there is no comparable gradation in meat species. The only real hint of it is in the percentage tables, where the "nice" houses (the top two categories) have a higher average percentage of beef than do the three poorer categories—but this pattern did not prove significant. In fact, the humble worker's cottages have significantly more beef than do the three simple two-story houses. The conservative interpretation of this inconsistent patterning is that there really is not a great difference in species by dwelling type. This suggests that poorer people expressed roughly the same preferences for meat species as did wealthier ones, but used cheaper cuts as a means to do so. It might have been preferable to economize subtly in degree, by choosing cheaper cuts, than to economize unequivocally in kind, by eating less beef and more mutton and pork. A more detailed analysis of species and cuts by dwelling type or some related classification might confirm or reject this impression, or offer other interesting insights.

## TENANCY

| Tenure Type           | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|-----------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                       |                    |              |                |              |  | High                   | Medium | Low |
| O (Owner)             | 23                 | 48           | 38             | 14           |  | 33                     | 39     | 29  |
| O/T (Owner/tenant)    | 1                  | 70           | 23             | 8            |  | 34                     | 45     | 21  |
| T (Tenant)            | 25                 | 54           | 33             | 13           |  | 31                     | 40     | 29  |
| U (Unknown/transient) | 13                 | 54           | 35             | 12           |  | 35                     | 41     | 24  |
| <b>Total:</b>         | 62                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |

(The table excludes commercial properties and a residence over a shop.)

### Comparisons:

All 4 categories together for non-randomness

All pairs:

Owner (O) vs. Renter (T,U)

Owner (O) vs. Renter (T,U) within just a single dwelling type: Polite Victorian House, Almost-polite House, or Informal Workers Cottage

### Significant differences:

| Tenure Status                   | Variable | Which has more? | Probability | Sig @ 5% | Sig @ 10% |
|---------------------------------|----------|-----------------|-------------|----------|-----------|
| Owner vs. Renter, Cottages      | Medium   | Renter          | 0.0549      |          | X         |
| Owner vs. Renter, Almost-polite | High     | Renter          | 0.0109      | X        | X         |
| Owner vs. Renter, Almost-polite | Medium   | Owner           | 0.0370      | X        | X         |
| Owner vs. Renter, Almost-polite | Low      | Owner           | 0.0760      |          | X         |

### Interpretations:

Being an owner or a renter did not have an obvious relationship to meat consumption. Across the entire sample, there was no significant difference between owners and renters. Thinking that differences between owners and renters might be made clearer by restricting the analysis to a single kind of dwelling, I also compared owners versus renters within each of the three types of dwellings with sufficient numbers of features for analysis. Among features from Victorian houses, there was no significant difference between owners and renters. Among features from worker's cottages, the only significant difference was in the proportion of medium-cost cuts, a pattern that is hard to assign much meaning to. There was a consistent, significant difference, however, between owners and renters of Almost-polite houses. The renters ate more high-cost cuts and fewer medium- and low-cost cuts than the owners. This contradicts the assumption that owners were better off than renters. In this one category of dwelling, renters seem to have lived better than owners. One could speculate about the pressures of house payments and maintenance on established owners, versus the disposable

income of families with rising fortunes who could afford to rent a nice house but had not yet purchased one. However, the fact that this pattern does not repeat in either the lower-status worker's cottages or the higher-status Victorians makes such interpretations tenuous.

The lack of a significant difference overall between owners and renters, and the inconsistent patterning within specific dwelling types comes as a bit of a surprise, since the quality of one's housing was such a good predictor of meat-cut costs. Diet seems to be related to one's immediate standard of living, rather than one's capital or underlying economic status.

## NEIGHBORHOOD

| Neighborhood       | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|--------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                    |                    |              |                |              |  | High                   | Medium | Low |
| East of Market     | 20                 | 55           | 32             | 14           |  | 36                     | 38     | 25  |
| Oakland Point      | 25                 | 54           | 33             | 13           |  | 28                     | 41     | 31  |
| West of Market     | 17                 | 45           | 43             | 12           |  | 34                     | 39     | 27  |
| <b>Total/Mean:</b> | 62                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |

### Comparisons:

All 3 categories together for non-randomness

All pairs:

### Significant Differences (comparisons that reached at least 10% significance):

| Neighborhoods         | Variable | Which has more? | Probability | Sig @ 5% | Sig @ 10% |
|-----------------------|----------|-----------------|-------------|----------|-----------|
| All Neighborhoods     | mutton   |                 | 0.0081      | X        | X         |
| E vs. W (type=R only) | beef     | E               | 0.0427      | X        | X         |
| E vs. W (type=R only) | mutton   | W               | 0.0024      | X        | X         |
| O vs. W (type=R only) | mutton   | W               | 0.0149      | X        | X         |

### Interpretations:

There is clear patterning in species preference by neighborhood, but no significant patterning in cut costs.

The clearest pattern is in mutton, which has a significantly non-random distribution among the three neighborhoods. The West of Market neighborhood has significantly higher percentages of mutton than either the East of Market or the Oakland Point neighborhoods. The West of Market neighborhood had a correspondingly lower percentage of beef than the other two, although the pattern is significant only in comparison with the East of Market neighborhood. It seems that people in the West of Market neighborhood were substituting mutton for beef, relative to the others.

While it is tempting to suspect that the West of Market neighborhood may have been an Irish district, accounting for the greater prevalence of mutton, the reality is not so clear. The West of Market sample with faunal data does have a higher percentage of Irish properties (35%) than the East of Market (26%) or Oakland Point (17%) neighborhoods. These differences, while of the correct nature to explain the neighborhood species patterning, are not obviously large enough to do so. Additional statistical testing might be able to resolve whether the neighborhood patterns simply reflect ethnic group preferences, or have some other causes.

Interestingly, there is no parallel pattern in cut costs. Although the percentages suggest that the Oakland Point neighborhood had generally less-expensive cuts, the pattern is not significant. In any case, it is not Oakland Point but the West of Market neighborhood that stands out as different in species preference. It appears to be intermediate, not extreme, in cut costs. This all suggests that the neighborhood differences are more of preferences than economics. This is another area that might reward additional investigation, not only statistical analysis but also consideration of the possible differences between the neighborhoods.

## GENDER

| Head of Household Gender  | Number of Features | Percent Beef | Percent Mutton | Percent Pork |  | Percent Meat-cut Costs |        |     |
|---------------------------|--------------------|--------------|----------------|--------------|--|------------------------|--------|-----|
|                           |                    |              |                |              |  | High                   | Medium | Low |
| <b>All Noncommercial:</b> |                    |              |                |              |  |                        |        |     |
| Not woman-headed          | 56                 | 52           | 34             | 13           |  | 32                     | 40     | 28  |
| Woman-headed              | 6                  | 45           | 46             | 8            |  | 38                     | 34     | 28  |
| Total:                    | 62                 | 52           | 35             | 13           |  | 32                     | 40     | 28  |
| <b>Cottages Only</b>      |                    |              |                |              |  |                        |        |     |
| Not woman-headed          | 30                 | 50           | 35             | 15           |  | 27                     | 43     | 30  |
| Woman-headed              | 3                  | 46           | 47             | 7            |  | 41                     | 26     | 33  |
| Total/Mean:               | 33                 | 50           | 36             | 14           |  | 29                     | 41     | 30  |
| <b>Irish Only:</b>        |                    |              |                |              |  |                        |        |     |
| Not woman-headed          | 11                 | 50           | 38             | 11           |  | 30                     | 41     | 29  |
| Woman-headed              | 5                  | 42           | 48             | 10           |  | 36                     | 33     | 31  |
| Total/Mean:               | 16                 | 48           | 41             | 11           |  | 32                     | 38     | 30  |



**Comparisons:**

All pairs, limited as shown

**Significant Differences (comparisons that reached at least 10% significance):**

| Head of Household Gender:              | Variable | Which has more? | Probability | Sig @ 5% | Sig @ 10% |
|--|----------|-----------------|-------------|----------|-----------|
| Non-woman vs. Woman<br>(type=R only)   | mutton   | Woman           | 0.0406      | X        | X         |
| Non-woman vs. Woman<br>(cottages only) | mutton   | Woman           | 0.0850      |          | X         |
| Non-woman vs. Woman<br>(cottages only) | pork     | Non-woman       | 0.0969      |          | X         |
| Non-woman vs. Woman<br>(cottages only) | medium   | Non-woman       | 0.0064      | X        | X         |

**Interpretations:**

The context data indicated that some households were headed by women, but did not show that the others were definitely headed by men, as opposed to being unknown or assumed. For this reason, I used the clumsy woman/non-woman distinction.

Five of the six woman-headed households were Irish (a pattern that is interesting in itself), and three of the six lived in worker's cottages. Since the small number of woman-headed households was so concentrated in certain subsets of the sample, I analyzed the woman-headed households in comparison not only to all the other residences, but also in comparison to just the other Irish households, and just the other worker's cottages. The idea was to separate the effect of the head of household's gender from that of ethnicity or dwelling type.

The patterns are not easy to interpret. Woman-headed households seem to have had significantly more mutton and less pork than did non-woman headed households. This might be due to the woman-headed households being Irish, and the Irish generally having more mutton. Of course, the apparent Irish preference for mutton might equally well result from the unusual number of woman-headed households in the Irish sample. A regional Irish taste for mutton, however, seems more historically plausible. This could probably be resolved with additional statistical scrutiny of the data.

