The Overseas Chinese Experience as Seen through Plants: Macrobotanical Analysis from the Market Street Chinatown, San Jose, California

Authored by
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Preface to MSCAP Technical Report 9

Archaeobotany – the study of people's interactions with plants in the past– has become a central research focus of the Market Street Chinatown Archaeology Project (MSCAP). "The Overseas Chinese Experience as Seen Through Plants," authored by Dr. Virginia S. Popper, is the fifth MSCAP Technical Report on this subject, and this painstaking study presents important new information about plant use by San Jose's early Chinese immigrant community.

There are four sources of botanical remains in the Market Street Chinatown collection: (1) visible large plant specimens – seeds, wood fragments, and other plant parts – that were collected by hand by excavators and lab specialists and set aside for later analysis; (2) "matrix" samples, which are bags of gravel-sized mixed materials collected from inside archaeological screens after larger artifacts have been removed; (3) soil samples, which were largely collected from soil that had already passed through an archaeological screen; and (4) microscopic plant residues that adhere to the surfaces of other artifacts, such as ceramic bowls or grinding stones.

This research is the first study of botanical remains from sources (1) and (2). Both sources include large specimens that are rarely present in source (3) and never present in source (4). These larger specimens add important new information about plant use at the Market Street Chinatown. Dr. Popper has identified several new plant taxa that were not identified through earlier studies of Market Street Chinatown soil samples or residues. These include large pits from fruits like peach, plum (including both locally-grown and Chinese plums), cherry, apricot, longan, European olives, Chinese olives, and the fruit of the Asian pheasant tree; nuts like coconut and peanut; roots such as *Allium* sp. (onion/leek) and winter radish; legumes like chickpeas, adzuki beans, and mung beans; gourds such as *luo han guo* and snake gourd; and other flavorful foods such as chili pepper, shiitake mushroom, Szechuan pepper, and Miner's lettuce.

In addition to expanding our understanding of the types of plant foods enjoyed by Market Street Chinatown residents, Dr. Popper integrated her research findings with those from previous studies to provide a comprehensive picture of plant use as well as an improved understanding of the processes that formed archaeological deposits. These analyses will contribute greatly to interpretation of artifacts throughout the collection.

We are especially grateful to the Lang Fund for Environmental Anthropology, which provided substantive funding for this study, and to Chinese Historical and Cultural Project and History San José for their support of this research. Megan Kane, MSCAP collections manager, inventoried and cataloged specimens and matrix samples prior to analysis and facilitated collections transfers related to the study. Dr. Jade d'Alpoim Guedes and Dr. Gary Crawford helped identify some unknown plant types, and Dr. Eugene Anderson consulted on Chinese food classification. Beth Howlett provided access to the Kam Wah Chung archives. Dr. Heather Trigg, Dennis Piechota, and Melody Henkel assisted with photographing the collection. The Fiske Center of the University of Massachusetts Boston provided the laboratory facilities for this study.

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Introduction

The Market Street Chinatown Archaeology Project researches a collection of artifacts that were excavated in downtown (Block 1) San Jose, California, by Archaeological Resource Services (ARS) in 1985-1988.

Market Street Chinatown, located at the intersections of Market and San Fernando Streets, was founded in the 1860s. Block 1 was part of Ohlone ancestral territory prior to Spanish colonization in 1777, when the Pueblo of San José was established there. Following U.S. annexation of California in 1848, Block 1 became the site of the first California state capitol along with several businesses and homes. Chinese residents and businesses began to move onto Block 1 in the early 1860s. This early phase of the Market Street Chinatown was destroyed by an accidental fire in 1870, but Chinese businesses and homes were quickly rebuilt. By the mid 1870s, Chinese residences and businesses occupied the majority of the block, including stores, professional offices, tenement housing, temples, small manufactories, restaurants, and an opera house. The Chinatown was destroyed in an arson fire in 1887, after which many of the Chinatown-period deposits were buried and capped. They were rediscovered during construction-related excavations during San Jose's downtown redevelopment.

The ARS archaeologists uncovered 63 features associated with the Chinese occupation of the area, including lined and unlined pits and wooden structures. ARS collected many samples from the features including soil samples, screen matrix samples from which major artifacts had been removed, and individually cataloged macrobotanical specimens.

This report provides the results of the analysis of 20 screen matrix samples and 129 bags of macrobotanical specimens (Tables 1 and 2) from 26 Market Street Chinatown features sent to the University of Massachusetts, Boston. The two types of materials represent botanical evidence recovered during different stages of the archaeological process.

The macrobotanical specimens were recovered by ARS excavators or laboratory technicians during the process of screening feature soils and during laboratory analysis of recovered artifacts. Typically, these specimens are larger than 1/8 inch and easily visible with the naked eye. They were cataloged individually or in batches.

Screen matrix samples appear to have been collected after screening was completed. A total of 77 screen matrix samples have been cataloged in the collection to date, twenty of which were selected for analysis in this study. From analysis of the screen matrix samples and discussions with ARS archaeologists, it appears that the screen matrix samples consisted of the materials remaining in a 1/8 inch or 1/16 inch archaeological screen after larger artifacts had been removed. Screen matrix samples were not saved systematically, and we do not know why screen matrix samples were saved from some features and levels and not from others (Voss and Kane 2013).

Neither the macrobotanical specimens nor the screen matrix samples come from known soil volumes, which limits the quantitative information that we can get from them. However, the archaeobotanical specimens and screen matrix samples are important complements to volume-controlled soil samples, the other main source of archaeobotanical evidence in the collection. From inspection of the soil samples and discussions with ARS archaeologists, it appears that soil samples were mostly (but not always) collected from feature soils that had already been passed through a mesh screen to remove larger artifacts. Ten of these soil samples have been analyzed by Puseman et al. (2012).

Together, the three sources of archaeobotanical evidence provide complimentary information from different stages of the archaeological excavation process: archaeobotanical specimens are typically the largest materials and were recovered by hand during excavation and laboratory analysis; screen matrix samples include archaeobotanical materials that remained in sorting screens after larger artifacts were removed by hand; and soil samples include archaeobotanical materials that remained in feature soils that had already passed through the sorting screens.

Market Street Chinatown

Almost all of the Overseas Chinese who travelled to California in the mid-19th century were escaping poverty and turmoil in Guangdong, a province in southern China. After the Gold Rush most became low-paid laborers in factories, construction, and farms. Others became merchants and businessmen, catering to the needs of the Overseas Chinese and some non-Chinese. Market Street Chinatown was a dense and diverse community. There were many full-time residents; some owned or worked at businesses in Chinatown, others worked as local fishermen, or in nearby factories and farms. Shopkeepers often lived above their stores. Tenement houses accommodated full-time workers and some short-term visitors from farms, mines, or factories outside of San Jose (Voss 2005:430). Consequently, the Chinatown population was mobile, moving between this urban zone, the Guadalupe River, the San Francisco Bay, nearby farmlands, and more distant locations.

Research conducted for the Market Street Chinatown Archaeology Project shows that the Overseas Chinese at Market Street melded their traditional Chinese lifeways with Western practices. For example, preliminary analysis of the ceramics calculated that 73% were from Asia and 22% were British and American-produced wares (Voss 2005:433). Similarly, Henry (2012) found that meat consumption showed a mix of Chinese and Euro-American food practices. Faunal remains from Feature 86-36/5 were mainly from pigs that had been butchered in the Chinese tradition (43%), chicken, and fish; but beef, butchered with Euro-American methods also was eaten. Pigs and chickens were raised in Chinatown, but the beef cuts were purchased from Euro-American butchers (Henry 2012). Henry (2012:94) remarked that the quantity of bones was high, indicating frequent meat consumption by the Overseas Chinese and, in turn, a degree of prosperity that may have surpassed their lives in China.

Pollen, phytoliths, and macroremains from five Market Street features, provided a broad picture of the local environment and an array of locally grown and imported plants used or deposited at the site (Puseman et al. 2012). (These results are discussed in greater detail below.) Cummings et al. (2014) analyzed the data to look at intracommunity variation in diet, using the traditional southern Chinese food classification system that distinguishes the staple grain dishes (*fan*) from the flavorful side dishes of vegetables, meats, and seasonings that accompany them (*tsai*). They found some distinctions between trash deposits associated with merchant/professional buildings, which had a greater variety of *fan* (wheat, barley, millet, and sorghum), and those associated with tenement housing, which had a greater variety of *tsai* (e.g. legumes, melon/gourds, fruits). However, tenement-associated deposits in different parts of the site also produced distinct assemblages of plants, suggesting that occupation as well as class played a role in shaping diets (Cummings et al. 2014:168). This report extends the research on plant use at Market Street Chinatown with the analysis of remains from additional features.

Methods

The 20 screen matrix samples differed greatly in size, and some were too large to sort in a timely manner (Table 1). My sampling strategy aimed to get a representative picture of the remains and to target rare items. Consequently, the largest samples (85-31/18-926 and 86-36/5-1895) were first split using a riffle box, with the final subsample size (based on sample weight) determined by the density of remains and the variety of recovered taxa. I sorted incremental splits until we were no longer finding new taxa. In both cases this was 25% of the screen matrix sample.

These subsamples and the smaller screen matrix samples were sifted through a series of nested sieves (4.00, 2.00, 1.00, and 0.50 mm) for further subsampling and sorting. It is easier to sort material of similar size, given the shallow depth of field of the incident light binocular microscope (10-60x). In addition, the 2.00-1.00 mm, and 1.00-0.50 mm fractions tended to contain hundred of seeds, so often a smaller portion of those fractions were sorted. After pulling out about 100 of any one taxon of seed in a sample, the rest were counted, but not pulled. For most samples, all the unsorted portions were scanned for taxa not yet recovered in the subsample. For samples 85-31/18-926 and 86-36/5-1895, only an additional 25% of the sample was scanned, bringing the total of the examined subsample to 50%. Wood and charcoal were not identified from any of these samples because a brief look at the specimens showed that they did not add to the information provided by Puseman et al (2012) and Seiter and Worthington (2013).

Most batches of the cataloged macrobotanical specimens were small enough that they did not require screening or subsampling (Table 2). The two exceptions were catalog numbers 86-36/5-1395 and 86-36/13-194, both of which contained hundreds of small seeds similar to those observed in the matrix samples. In both cases the cataloged macrobotanical specimens were screened and only 10% (by weight) of the 2.00-1.00 mm was sorted; the rest of the fraction was scanned for taxa not yet recovered. Catalog number 86-36/13-212 also was unusual; it was a coconut shell with matted midden debris adhering to the inside. Some of this material was loosened from the shell, water-screened, and tabulated.

The plant remains were identified using comparative plant and seed collections at the University of Massachusetts, Boston, floras, and seed identification manuals (Cappers et al. 2009; Hickman 1993; Martin and Barkley 1961; Hu 2005). Dr. Jade d'Alpoim Guedes (Washington State University) and Dr. Gary Crawford (University of Toronto at Mississauga) assisted with some identifications. Most of the seeds and fruits were counted, but nutshell, cereals, beans, and *Prunus* seeds were weighed because variations in fragmentation can make weight a more representative measure of abundance. Seeds were recorded as carbonized (C) even if they were only partially carbonized in order to indicate exposure to fire. When only one fragment of a seed or fruit type was recovered, it was considered a whole if more than half of the seed was present. If there were multiple fragments of a type that clearly came from different seeds, the minimum number of seeds was noted in the raw data table in parentheses. Some screen matrix samples and cataloged specimens contained many fragments of squash/gourd and watermelon seeds. For these, tops and bases were matched to tabulate a minimum number.

Results

The analysis of the screen matrix samples and macrobotanical specimens recovered over 100 taxa of botanical remains (seeds, fruits, and other plant parts). These include a variety of cultivated, non-domesticated, native and introduced plants. Non-domesticate is a useful term to use for wild plants that could have been exploited as potherbs and medicines. Table 3 lists the scientific and common names (in English and Chinese if available) of the identified taxa. Most Chinese names are standard Mandarin transliterations (pinyin without diacritical marks) from Hu (2005) or the Flora of China (2008); not all variations of the Chinese names are listed in the table.

The basic data tables for this report are available in the electronic Appendix. Table A1 presents the raw data —absolute counts and weights (grams)— of the remains recovered from the 20 analyzed screen matrix samples. Within each sample the remains are listed in columns according to the percentage of the sample sorted and scanned. On this table, a “scan” column was not included in those cases where the whole sample was sorted or no new taxa of plants were identified in the scan. As noted above, wood and charcoal were not separated out due to time constraints. Table A2 estimates the total whole counts of the remains in each of the screen matrix samples. First the count of a taxon from a sorted subsample was multiplied up to 100% and added to the fully sampled count. The remains noted during scanning were counted as representative of the whole (100%) sample even if only a portion of the sample was scanned and added to the estimated total count. These estimated counts are in italics and could inflate the actual number of remains. Second, fragments were converted into whole counts using formulas specific to each taxon as noted in Table 4. Some formulas were based on the average weight of whole specimens in the samples. Others were based on a conservative estimate of the percentage of a whole seed represented by the average fragment. (If a value in Table A2 includes converted fragments, it is in bold.)

Tables A3-A8 present the raw data from the cataloged macrobotanical specimens except for samples 86-36/5-1395 and 86-36/13-194, where estimated totals (in italics) are given for a few taxa. These tables also indicate the presence of bark, charcoal, wood, bone, and other non-floral remains, to assist with any future cataloging of the cataloged specimens. However, for further analysis of these macrobotanical remains in this report, those categories of remains are not included. Any numbers in parentheses indicate a minimum number of whole specimens based on the appearance of the fragments. Tables A9-A14 convert the macrobotanical specimens to whole counts and estimated totals.

For the interpretation of these data, the tables were rearranged to give a functional presentation of the taxa and to combine the results by feature, giving estimated whole counts. Tables 5 and 6 combine all the remains by feature, for the matrix samples and macrobotanical specimens respectively, with the exception of one bag of macrobotanical specimens (Catalog number 86-36/13-194) from Feature 86-36/13 that more closely resembles the matrix samples. Tables 7 and 8 calculate the relative proportions of each taxon in the features, merging the carbonized and uncarbonized items, and summary statistics: the percentage of the remains that are carbonized and number of taxa present. (If more than one part of a taxon was recovered, they were counted as one. Unknowns and plant parts, while not specifically identified, most likely come from distinct taxa.) Relative proportions give some indication of the concentration of different taxa, given that the methods of collecting these remains preclude the use of most quantitative measures. However, the initial calculation of relative proportions showed that in the matrix samples blackberry/raspberry (*Rubus*) seeds swamped the calculations, masking difference among the other taxa. Consequently, Table 7 shows the percentage of the whole sample comprised by *Rubus* in bold, but all the other calculation are for the remains excluding *Rubus*. For two of the macrobotanical entries with numerous *Rubus* seed, the calculations were presented with and without *Rubus* (Table 8). Caution is necessary when interpreting these tables. One cannot determine the precise importance of various fruits in the diet from these figures, because fruits contain different numbers of seeds. For example, grapes have only one to four seeds per fruit, while blackberries may contain 30 or more seeds. And the nutritional value of a single large fruit, such as a peach, would be equivalent to many smaller grapes or berries. In addition, when comparing the relative proportions among samples, it is important to remember that in richer samples with more taxa, the proportion of any individual taxon will be lower even if the amount is comparable to that of another sample. Finally, Table 9 shows the presence of each taxon by feature for the matrix samples (M) and macrobotanical specimens (B).

The organization of the taxa in the tables begins with the classification of Chinese foodstuff. As mentioned above, a general distinction is made between *fan* and *tsai* dishes, with *fan* the staple and *tsai* the side dishes. These are more than functional categories. Chinese foodways prescribe a balance between *fan* and *tsai* foods to maintain balance in the body and good health (Chang 1977; Simoons 1991). Eating must also balance foods with *yin* and *yang* qualities, and as part of this, foods categorized as “hot” or “cold” (Chang 1977:10; Anderson and Anderson 1977:367). Anderson and Anderson (1977; see also Anderson 1988) present a more detailed classification of Chinese foodstuffs that combines functional and taxonomic categories. This is the basis for organizing these report tables.

The first category of plants is the *fan* staple grains. The second category is vegetables or *tsai*, which is sometimes translated as "greens" (Anderson 1988:126). Within the *tsai* category a group mainly of cucurbits (members of the Cucurbitaceae family such as squashes, gourds, cucumber, and melons) are grouped as *kua*. Another subgroup, the legumes (*tou*) could be considered *tsai*, because they are ingredients in dishes eaten with rice or other grains, but also *fan*. Anderson and Anderson (1977:326-327) note that soybeans traditionally were one of the classic Five Stapes (Five Grains) and that "Bean sprouts bridge the gap between grains and *ts'ai* "vegetables," since they are considered *ts'ai* but are made from grains (beans)." Fruits and nuts (*kuo*) are distinct from vegetables (Anderson and Anderson 1977:332). Because of the importance of maintaining bodily balance for good health, most of these foodstuffs have medicinal properties. Finally, plants and plant parts that do not clearly fit into one of the above categories are grouped as "other." This does preclude the possibility the item was deposited in the site as the result of utilitarian, food, or medicinal use. More specific information on these taxa follows.

For all the report tables, remains were uncarbonized unless noted as carbonized (C) or the combination of carbonized and uncarbonized items (C/UC). Some of the uncarbonized seeds looked modern and may have been introduced into the deposit during the excavations. (See the taxa and feature descriptions below.) However, they are few and do not significantly effect the interpretation of the assemblage. And except for the Unknown Types, remains were whole (or considered whole) unless followed by the designation "frag." Any uncertain identification is indicated "cf" (compares favorably).

Descriptions of Taxa, Unknowns, and Plant Parts

This section describes the taxa recovered in the current analysis of screen matrix samples and cataloged macrobotanical specimens from Market Place Chinatown. When appropriate it discusses the origin of the taxon, its uses, history of cultivation in California and/or China, and the likely source of the plant. It summarizes the charred/uncharred status, feature location, and other findings of the taxon from previous analyses of plant remains at the site. The discussion draws on a number of references including Anderson (1988), Hu (2005), and Simoons (1991) for the history and uses of plants in China. Medicinal uses of plants also came from Beth Howlett (personal communication 2014), Li et al. (1973), Lim (2012), and Lu (1994). Calfora (2014) was the primary source for the distribution of individual taxa in California, and the Flora of China (2008) and Hu (2005) provided this information for plants growing in China.

Abutilon theophrasti Velvetleaf

Abutilon theophrasti is an uncommon weedy plant in California. It is native to southern Asia and has long-lived seeds, which may account for its pristine uncarbonized condition (Fryxell and Hill 2013). Although it grows in disturbed places, it seems unlikely that is was part of the San Jose urban landscape and introduced into the deposits at the time of excavation. On the other hand, it was recovered from Feature 86-36/5 Levels 6 and 8, which contain a smattering of other seeds representing the local flora. In China, *Abutilon theophrasti* is grown for its fibers, but it is also common in disturbed places and abandoned fields. Chinese medicine uses the leaves, flowers, and seeds to cure a variety of ailments. Therefore, the seeds could also indicate the collection of seeds for medicinal purposes.

Acer sp. Maple

Two species of maple grow in the San Jose area today: box elder (*A. negundo*) and big leaf maple (*A. macrophyllum*). One uncarbonized achene/seed from Feature 86-36/13 is probably *A. macrophyllum*, a common native tree in California that grows along streambanks and canyons. A few other seeds in this sample also seem to represent the local flora. A second seed, recovered from Feature 85-31/18 Level 3, resembles *A. negundo*. Box elder is a common native ornamental tree in California. Both of these species are soft maples, a type recovered as charcoal but not wood in small amounts in Seiter and Worthington's (2013) analysis. Similarly, Puseman et al. (2012) recovered *Acer* charcoal from Features 86-36/5 Layer 6, 85-31/11, and 85-31/18 Layer 3 (the locus of the *A. negundo* seed). They also identified *Acer* pollen in Feature 85-31/6. A large variety of maples grow in China, so we cannot rule out that the seeds are introduced seeds, but it seems likely that they represent vegetation growing in the vicinity of San Jose.

Allium sp. cf. Onion/garlic

Two carbonized bulb or shoot bases were recovered from Feature 85-31/18. The one from Level 2 consists of the real stem (a disk from which the adventitious roots grow) and the lower portion of the sheathing leaves, and most closely resembles a green onion or leek type of *Allium*. The identification of the carbonized bulb/shoot base from level 2/3 is less clear. Many types of *Allium* are cultivated in China, and according to Anderson (1988:130) they are a common garnish or minor ingredient in prepared dishes. Hu (2005:315) notes that Chinese leek (*Allium tuberosum*) is commonly grown in the kitchen gardens of Chinese Americans, and it is likely that some types of *Allium* were among the earliest crops planted by the Chinese immigrants to California.

Arachis hypogaea Peanut

Peanut, a native plant of South America, is a commercial crop in California today. It was introduced to China by Portuguese traders in the 16th century and by the end of the 19th century was extensively cultivated there. The Chinese boil or roast and eat the seeds as a snack or add it to other dishes. According to Simoons (1991:282) roasted peanuts are highly regarded by the Chinese. Lim (2012:535) records that the seeds, oil, and whole plant are used in traditional Chinese medicine. The nuts have a neutral energy in the Chinese diet. The samples from Market Street Chinatown mainly contained peanut shells, and the only seed (from Feature 86-36/19) was inside a pod fragment. Several other Features contained shell fragments: 85-31/18, 85-31/6, 86-36/7, 86-36/9, 86-36/13, 86-36/18, 86-36/20, and 88-91/26. All the remains were uncarbonized. So peanuts were a familiar food to the Chinese immigrants and were readily available in California.

Arctostaphylos sp. Manzanita

Manzanita is a very common native chaparral and woodland plant of coastal California. Its berries (drupes) ripen in early summer. While many native California groups ate the berries (Strike 1994), the presence of only one uncarbonized seed from Feature 85-31/18 suggests it was not an important resource and probably reflects the local vegetation.

Asteraceae Sunflower family

One uncarbonized Astereaceae seed fragment was found in a Feature 85-31/18 Level 2/3 sample in this analysis and Wohgulmuth and Honneysett (Clevenger 2004:39) found another in their sample from Feature 85-31/18. Puseman et al. (2012) identified Asteraceae charcoal in Features 86-36/7, 85-31/11, and 85-31/28, but identified large quantities of pollen in all the features they examined. They suggest that sunflower family plants were a major component of the local weedy vegetation. These seeds probably come from weeds growing in the vicinity, although they could be from plants encouraged as ornamentals.

Benincasa hispida var. *chiehqua* (*mao gua*) Hairy gourd/fuzzy melon
Benincasa hispida var. *hispida* (*dong gua*) Winter melon/white gourd

Mao gua is one of the most widely cultivated cucurbits and important vegetables in China. This summer crop, generally eaten when immature, tastes like zucchini and is cooked in soups and stir-fries. Many uncarbonized *Benincasa hispida* var. *chiehqua* seeds were recovered in these samples coming from 9 of the 26 features (Table 13). The *dong gua* variety of *Benincasa hispida* is also widely cultivated in China. This variety is harvested when mature and can weigh up to 18kg. Its firm rind and waxy coat makes it good for storing. The flesh is cooked fresh in soup and other dishes; it may be dried or preserved for later use. Lim (2012:169, 176) notes for both varieties that the fried or roasted seeds are eaten and that the fruits and seeds have a variety of medicinal uses in China. We found slightly more seeds of *Benincasa hispida* var. *hispida* than the *chiehqua* variety, again all uncarbonized, occurring in 10 of the 26 features. Puseman et al. (2012) also recovered *Benincasa hispida* (subspecies unknown): a charred seed from Feature 85-31/11, many uncarbonized fragments from Feature 86-36/5 Layer 6, and some whole and uncarbonized remains from Feature 86-36/5 Layer 8. (In the current study, more seeds were found in Level 8 than Level 6.) Today both plants are minor crops for Asian specialty farmers in the Central Valley of California (Molinar and Yang 2001:5). According to Chan (1986:86), fresh vegetables were so important in Chinese cuisine that the Chinese in California grew them in kitchen gardens and truck gardens starting in the 1850s. The seeds from Market Street Chinatown probably come from locally grown fruits.

Bromus sp. cf. Brome grass

Brome grass is a common plant in coastal California grasslands, but also grows in open, disturbed habitats. The caryopses ripen in the late spring. These three large carbonized grass caryopses from Feature 85-31/18 Layer 2/3 could be the same type as Puseman et al.'s (2012) Poaceae A, recovered from Features 85-31/6, 86-36/6, and 85-31/11. They also identified grass pollen in all features, so brome grass probably was part of the local weedy vegetation.

Calandrinia sp. Red maids

Calandrinia sp. grows in a variety of coastal California habitats, including grassy and disturbed areas. The seeds ripen in the late spring and early summer. Uncarbonized seeds were present in the upper two levels of Feature 86-36/13. Puseman et al. (2012) found charred *Calandrinia* in Feature 85-31/11 and uncharred seeds in Features 86-36/5, 85-31/6, and 85-31/18**.** These seeds represent the local weedy vegetation.

Canarium cf. *album* Chinese olive

Canarium album is a native plant of China, which is widely grown in southern China. Its fruit is eaten raw, dried, pickled, or preserved in sugar, and is used for tea. Canarium kernels, which taste like almonds, are also esteemed in southern Chinese cuisine. Traditional Chinese Medicine uses *Canarium* fruits and seeds for a variety of ailments. *Canarium* seeds were identified in 13 of the 26 features (Table 13) and were slightly more often uncarbonized than carbonized. Blasdale (1899:43) mentions finding green and salted and dried *Canarium* for sale in the Chinese section of San Francisico and preserved Chinese olives are common in American Chinese stores today. The Market Street Chinatown seeds probably come from imported fruits.

Capsicum sp. Chili pepper

Chili pepper is native to Mexico or South America, depending on the species, but was cultivated in California beginning in the Spanish-colonial Period. Chili peppers also were introduced early to China, brought by Portuguese traders in the 16th century. Today *C. annuum* is widely cultivated and used fresh or dried as a flavoring in Chinese cuisine, although Cantonese cooking typically uses less chili than Szechuanese. Traditional Chinese medicine uses chili peppers to induce sweating. Two uncarbonized *Capsicum* seeds were identified from Feature 86-36/13 Level 3, but given the subsampling this totals five estimated whole seeds. These probably were grown in California.

Cereal grain Wheat or barley

Carbonized cereal grain fragments, probably wheat or barley, were recovered from Feature 86-36/5, which also contained wheat grains, and Feature 86-36/18. See the discussions below of wheat and barley for more information.

Cicer arietinum Chickpea

Chickpeas, which are native to western Asia, were part of the California Spanish-colonial suite of crops and today California is a major chickpea growing area (Muehlbauer and Abebe Tullu 1997). In China chickpea cultivation and use is infrequent. We found one carbonized seed in Feature 85-31/2. This may reflect the diet of the previous inhabitants of the area.

Citrullus lanatus Watermelon

Watermelon cultivation in California dates back to the Spanish-colonial period. (Allen 1998). Watermelons, which are native to Africa, also have a long history of use in China where they are valued as a fresh summer fruit and for their roasted and sometimes spiced seeds. Some varieties have been bred to produce little flesh and many seeds. In addition, the fruit and seed have medicinal properties and cold energy. Watermelon seeds were one of the most abundant remains in these samples, occurring mainly uncarbonized in 9 of the 26 features. The carbonized seeds came primarily from Feature 85-31/18 Layer 2/3, but also from Feature 86-36/5 Level 8 and Feature 85-31/6. Wohgulmuth and Honneysett (Clevenger 2004:38-39) also identified charred and uncharred watermelon seeds from Feature 85-31/18 and charred seeds from Feature 85-31/20. Puseman et al. (2012) recorded charred seed fragments from Feature 85-31/11. Blasdale (1899:48) noted that in the Chinese section of San Francisco, watermelon seeds were frequently eaten. Given the large number of watermelon seeds in the samples, it seems more likely that they come from eating fresh locally grown watermelon as well as snacking on the seeds. However, some of the seeds could have been imported (see Cucurbitaceae seed kernels below).

Claytonia perfoliata Miner's lettuce

Miner's lettuce is a common annual herb that grows in a variety of habitats including agricultural fields and disturbed sites in urban areas. Native California groups ate the leaves raw or cooked and its common name refers to its consumption by miners during the California Gold Rush. It is a good source of vitamin C and was presumably used to avoid scurvy (USDA Forest Service 2014). One uncharred seed was recovered from Feature 86-36/13 Layer 2. It probably came from weeds growing in the vicinity, although the plants may have been collected as pot greens.

Cocos nucifera Coconut

Coconuts have a long history of use in China, mentioned in documents dating to the 2nd century, but only grow in the extreme south. While coconut meat (endosperm) and milk are consumed in China, Hu (2005:302) mentions that it is rare and mainly available sugared for candy. The meat and milk are used in traditional Chinese medicine and have warm energy. Coconuts do not grow in California. We found coconut endocarp (inner shell) fragments from Feature 86-36/13 (Layers 1 and 3 and samples labeled between Features 13 and 14). Seiter and Worthington (2013) recovered coconut shell from Feature 86-36/13 Layers 1 and 2, and suggest that the cononuts were imported from Hawaii. Puseman et al. (2012) mention that the palm family phytoliths they identified may be from coconut.

Cucumis melo Melon

Melons, native to Africa and southwestern Asia, were mentioned in a late 5th century Chinese herbal and are widely cultivated in China today. There are many varieties, some eaten fresh while others are cooked or pickled. Chinese traditional medicine uses melon root, peduncle, fruit pulp and seeds to cure a variety of ailments (Lim 2012:229). Uncarbonized melon seeds were recovered from Feature 85-31/24, and Feature 86-36/13 Layers 2 and 3. Melons have been grown in California since Spanish-colonial times, so these likely come from local farms (Vallejo 1890). The *Cucumis* seed fragments from Feature 86-36/13 Layers 1/top and 2 most likely are cucumber or melon.

Cucumis sativus cf. Cucumber

A variety of *Cucumis* species grow in China, but the seeds recovered in these samples probably come from the commonly cultivated cucumber. Documents dating to the 7th century mention cucumber use in China. Today it is a major summer vegetable, which is eaten raw, cooked, or pickled. The fruits, shoots, leaves, and roots are used in traditional Chinese medicine and cucumbers have cooling energy in the Chinese diet. Cucumbers have been grown in California since Spanish-colonial times, so the seeds in these samples most likely came from local farms (Vallejo 1890). Whole uncharred seeds were recovered from Feature 86-36/13 Layers 2 and 3. The *Cucumis* seed fragments from Feature 86-36/13 Layers 1/top and 2 most likely are cucumber or melon.

Cucurbita maxima Winter squash

Cucurbita maxima is native to subtropical South America. Currently, according to the Flora of China (2008), it is a frequent crop in China. Uncharred fragments of large squash seeds that most closely resemble *Cucurbita maxima* were found in the samples from Features 85-31/13 and 86-36/13 Level 2. Puseman et al. (2012) recovered uncarbonized *Cucurbita maxima*-type seed fragments from Feature 86-36/5 Layer 8. Since this squash grows readily in California, these seeds probably came from locally grown fruits.

Cucurbita moschata Winter/butternut squash

Cucurbita moschata is native to Central America and northern South America, and was brought to China in the Ming Dynasty. In Chinese cuisine, both young and mature fruits are cooked and the seeds are roasted. According to Anderson (1988:132) winter squash, usually *C. moschata*, "is considered coarse and plebian, a poverty food." The uncharred squash seed fragments from Feature 86-36/14 most closely resemble *C. moschata*. Since this squash grows readily in California, it most likely is of local origin.

Cucurbitaceae Squash/gourd family

A number of uncharred seed kernels from Feature 86-36/13 Layer 1 and Feature 86-36/15 Layers 1 and 2, a possible charred rind fragment from Feature 85-31/18 Layer 2/3, and small uncharred seed fragments from several features could not be more specifically identified than as squash or pumpkin. Cucurbitaceae seeds are an extremely popular snack food in China, coming from a variety of squashes as well as watermelons and melons. Pumpkin seeds also were listed in an inventory of the medicines used by Ing Hay, a Chinese doctor who began practicing in eastern Oregon in the 1880s (Beth Howlett, personal communication 2014). Robert Spier (1958:80) examined invoices of Chinese imports during the early 1850s, housed at the U. S. Custom House at San Francisco. Melon seeds were among the less common items mentioned (Spier 1958:80). Salted melon seeds were still being imported to San Fransico in 1873 (Coe 2009:119). These could be from watermelon, a squash, or another melon. Therefore the remains in the Market Street Chinatown features could come from Chinese or California sources.

Cupressaceae Cypress family

Feature 86-36/18 Below Layer 3 contained uncharred scale-like leaves from the Cypress family. These most like come from cypress (Cupressus sp.) or juniper (Juniperus sp.), Cypress family taxa that grow in the area. Seiter and Worthington (2013) identified Western red cedar wood (*Thuja plicata*) from the site, but it does not grow locally.

Cyperaceae Sedge family

A carbonized Cyperaceae seed was recovered from Feature 85-31/18 Layer 2/3. Puseman et al. (2012) also found a carbonized Cyperaceae seed in Feature 85-31/18 Layer 2 and Cyperaceae pollen in Feature 86-36/5. This identification to family encompasses a very large variety of plants, but many grow in wet open locations. It is likely that these represent the weedy vegetation growing around San Jose Chinatown.

Dimocarpus longan Longan

Longan is widely cultivated in southern China for the sweet aril that encloses the seed. Besides being eaten fresh, the fruits are dried and canned. Dried fruits are considered a good omen and are thrown over the bride and groom at weddings. Longan has warm energy in the Chinese diet and various parts of the plant have medicinal properties. The leaves and flowers are brewed into a medicinal tea; the dried fruit is a tonic for a variety of ailments; and the ground seeds stop wounds from bleeding. Longan is a common *bupin* ("repair substance") in traditional Chinese medicine; a *bupin* is a home-made preparation made by simmering a number of ingredients and taken to repair an imbalance in the body and restore one's natural immunity (Hu 2005: 161-162). Longan currently grows in southern California, but longan probably was one of the dried fruits imported from China in the mid-19th century (Spier 1958:80). We recovered longan seeds from eight features and more were charred than uncharred.

Dracotomelon dupperreanum Asian pheasant tree

Dracotomelon dupperreanum trees are indigenous to the tropical forests of southern China and produce a sour fruit that may be cooked as a savory dish or preserved in sugar. The fruit is also used as a medicine. Imported preserved fruits are sold in American Chinese grocery stores today, and probably were as well in 19th-century California. Eight features contained *Dracotomelon dupperreanum* seeds, most of which were charred.

Ericaceae Heath family (includes huckleberry)

One uncarbonized seed from a plant in the Heath family was recovered from Feature 86-36/13 Top Layer. This family includes plants such as California huckleberry (*Vaccinium ovatum*) and madrone (*Arbutus menziesii*), both of which grow in the area around San Jose. Puseman et al. (2012) identified *Arbutus* charcoal from Feature 86-36/5. The seed probably comes from the local flora.

Euphorbia spathulata cf. Warty spurge

One uncharred seed that most closely resembles warty spurge was found in Feature 86-36/13. This native California plant grows in open, generally disturbed places and probably was part of the local weedy vegetation. Puseman et al. (2012) identified *Euphorbia* pollen in Feature 85-31/6, supporting this interpretation.

Fabaceae Legume family

Feature 86-36/18 Below Layer 3 contained one charred legume seed fragment from a wild type. Puseman et al. (2012) also recovered Fabaceae seeds (charred and uncharred from Features 86-36/5, 85-31/6, and 85-31/18) and pollen from Feature 86-36/5. And Wohgulmuth and Honneysett (Clevenger 2004:39) identified weedy types from Feature 85-31/18. A variety of Fabaceae plants thrive on disturbed soils, so this evidence reflects the local weedy vegetation.

Ficus carica Fig

Figs are native to the Near East and were introduced to China in the Tang Dynasty (618–907 A.D.). Today they are grown in the warmer region of China, but are rare. Chinese medicine uses fresh and dried figs, fig leaves, and fig roots to cure a variety of ailments and the fruits have a neutral energy in the Chinese diet. Most of the Market Street Chinatown matrix samples contained uncarbonized fig seeds. Only a few of the macrobotanical batches had figs, in part because the rest were not collected in a manner to recover small seeds. The fig seed totals from Feature 85-31/18 Layer 2 and 2/3, Feature 86-36/5 Layers 6 and 8, Feature 86-36/13 all layers, Feature 86-36/15 Layer 2, and Feature 86-36/18 Layer B ranged from 1 to 67. Wohgulmuth and Honneysett (Clevenger 2004: 38) noted hundreds of fig seeds in their Feature 85-31/20 sample. And Puseman et al. (2012) found hundreds of unburnt fig seeds in Feature 86-36/5 Layer 6 and smaller amounts in Feature 85-31/6 Layer 2, Feature 86-36/7 Layer 3, Feature 85-31/18 Layers 2 and 3, and Feature 85-31/28. Large numbers of unburnt figs usually indicate privy deposits, since the seeds pass through the digestive system relatively intact. Figs have been grown in California since Spanish-colonial times, so these figs probably came from local farms

Fragaria sp. Strawberry

Cultivated strawberries (*Fragaria* × *ananassa*) are a hybrid of a wild variety from eastern North America and another from Chile. Several *Fragaria* species are grown in China and the hybrid is widely cultivated. Strawberries have cooling energy in the Chinese diet and may be used to treat several illnesses. Anderson (1988:135) categorizes strawberry as a minor fruit in China, but it was an important crop for Chinese farmers in California. Chan (1986:124) describes "By the 1870s the cultivation of strawberries, raspberries, blackberries, and gooseberries had become one of the most important means of livelihood for Chinese residents in Santa Clara County." Only uncharred strawberry seeds were recovered in this group of Market Street Chinatown samples. While Feature 85-31/18 Layer 2/3 and Feature 86-36/5 Layer 8 contained some seeds, Feature 86-36/13 (all layers) contained the most, totaling in the hundreds. Puseman et al. (2012) identified *Fragaria* pollen in Features 86-36/5, 86-36/7, 85-31/18, and 85-31/28 and recovered hundreds of uncharred seeds from Feature 86-36/5, with fewer from Features 86-36/7, 85-31/18, and 85-31/28. The only charred seeds came from Feature 85-31/11. As with figs, the strawberry seeds probably come from privy deposits. And their recovery depends on collecting archaeological deposits without screening or with very fine screens, which may explain their absence in some of the matrix and most of the macrobotanical samples.

Ginkgo biloba cf. Ginkgo

Ginkgo trees are native to East Asia and have a long history of cultivation in China. The fleshy fruit contains a hard inner nutshell-like layer and an edible kernel (endosperm). The roasted "nut" is a delicacy in China and the seed kernel may be cooked with vegetables or meat for a main dish, or with sugar to make a dessert. Traditional Chinese medicine uses the seeds, leaves, and roots to treat a variety of ailments. Three small nutshell-like fragments that resemble ginkgo were recovered uncarbonized from Feature 86-36/13 Layer 3 and Feature 86-36/5 and carbonized from Feature 85-31/18 Layer 2/3. Wohgulmuth and Honneysett (Clevenger 2004:39) identified burnt nutshell and a seed kernel from Feature 85-31/18. Ginkgo nuts were among the foods imported to San Francisco from China in the mid-19th century (Spier 1958:80), so these likely were imported.

Hordeum sp. Wild barley

One carbonized wild barley seed came from Feature 85-31/18 Layer 2/3. A variety of native *Hordeum* species grow in the coastal grasslands, some of which can also be found in disturbed soils along streambanks and roads. So this seed most likely represents the weedy flora of the region. Puseman et al. (2012) identified carbonized *H. pusillum* in Feature 85-31/18 Layer 2, however I expect that it might be a different species since *H. pusillum* is rare in California.

Hordeum vulgare Barley

Early colonists introduced barley to California where it became one of the major cultivars at Spanish-colonial settlements. Barley, a native of Western Asia, is a staple grain in northern China and is widely cultivated in other parts of China, although not in the extreme south. In Chinese cuisine, barley usually is ground and prepared as a flat cake, as congee and cooked in other dishes. Barley leaves, stalks, grain and dried sprouted grain are used in traditional Chinese medicine. To prepare barley as a "cooling" tea the grains are fried until slightly browned, and as a poultice for burns, the grains are fried until charred and then ground up. Charred barley grains were found in the Feature 85-31/18 Layer 2/3 samples. Puseman et al. (2012) found a charred rachilla fragment that may be from *Hordeum* in Feature 85-31/18 Layer 2, and cereal pollen and charred cereal grains in several samples that may be from cultivated barley. These barley remains indicate that this easily available grain was used for food and possibly as medicine in San Jose Chinatown.

Juglans hindsii Northern California black walnut

Juglans hindsii is native to northern California. It grows wild along streams and on disturbed slopes, but also is cultivated as rootstock for *Juglans regia.* Native California groups ate the nuts. For Chinese uses of walnut see the following discussion of *J. regia*. *J. hindsii* nutshell was recovered uncharred from Feature 85-31/20 and 86-36/18 Layer B. Wohgulmuth and Honneysett (Clevenger 2004:38) found two charred nutshell fragments in their sample from Feature 85-31/20. Walnuts were a familiar food to the Chinese immigrants, and although Northern California black walnuts are smaller than the cultivated variety, they seem to have eaten the local nuts when available. Puseman et al. (2012) found *Juglans* pollen, charred nutshell (Features 85-31/11 and 85-31/28), wood (Features 86-36/5 and 85-31/18), but it could not be identified to species.

Juglans regia English walnut

Juglans regia is native to Asia and southeast Europe and has a long history of cultivation in China. In Chinese cuisine, the nuts are eaten raw, fried, roasted, and sugared, as well as prepared in a variety of savory dishes and desserts. They have a warm energy in the Chinese diet, and both the seeds and their oil have medicinal uses. Walnuts are a *bupin*, used in home-made preparations to promote health. *Juglans regia* cultivation in California dates to the Spanish-colonial period and walnut shells were recovered from Mission Santa Cruz (Allen 1998:46). Lelong (1896:8, 13) notes that climatic conditions favor walnut cultivation in Southern California, but adds "The largest walnut orchard of early planting in the northern part of the sate is located near Los Gatos, in Santa Clara County; it is about thirty years old, and produces fair crops yearly." He also notes that Joseph Sexton, who is credited with introducing large-scale commercial walnut cultivation in California, purchased the sack of English walnuts that he used to develop new varieties in San Francisco, and that these supposedly were imported from South America (Lelong 1896:12). Consequently, the remains found here could be from local sources or imported. The samples in this study contained mainly uncharred nutshell, coming from Features 86-36/5, 86-36/6, 86-36/9, 86-36/12, 86-36/13 Layers 2 and 3, and 86-36/14. Some charred nutshell was found in Feature 86-36/5 Layer 8. Wohgulmuth and Honneysett (Clevenger 2004:39) recovered uncharred nutshell in Feature 85-31/18. Puseman et al. (2012) found *Juglans* pollen, charred nutshell (Features 85-31/11 and 85-31/28), wood (Features 86-36/5 and 85-31/18), but it could not be identified to species.

Lentinula edodes cf. Shiitake mushroom

Shiitake mushrooms are native to East Asia where they have long been cultivated as a food and medicine. In China, fresh mushroom caps are cooked, frequently in vegetarian dishes, but they also are dried for future use. Shiitake mushrooms have a neutral energy in the Chinese diet and are used to treat a variety of illnesses. Mushrooms were commonly listed on mid-19th century invoices from ships bringing food from China to San Francicso (Spier 1958:80). Cultivation of shiitakes in the United States began after 1972 when a ban on importing live shiitake cultures was lifted, so these remains would come from imported dried mushrooms. The carbonized mushroom caps were found in Feature 85-31/18 Layer 2/3.

Leonurus sp. Motherwort genus

Leonurus does not grow in California. Several species of *Leonurus* grow in China. *L. artemesia*, which grows in southern China, is used medicinally. In addition, its young shoots are cooked with rice in a stew. The uncharred *Leonurus* seed in this assemblage came from Feature 86-36/5 Layer 8. Puseman et al. (2012) also recovered *Leonurus* seeds in Features 86-36/5 Layer 8 and 85-31/11.

Lilliaceae cf Lily family

One uncarbonized seed from Feature 86-36/13 Layer 2 most closely resembles a seed from a lily family plant. A large variety of plants in this family grow in the San Jose region. Some are ornamental plants and others are crops. Dried lily bulbs are an important ingredient in Chinese cuisine, and lily seeds were recorded are among the items listed on mid-19th century invoices from ships bringing food from China to San Francicso (Spier 1958:80).

Litchi chinensis Litchi

Litchi is a native of China, and has a long history of cultivation there. The sweet aril that encloses the seed may be eaten fresh, dried, pickled, or preserved and the fruits may be dried or canned. While the Chinese often eat litchis for dessert, they also cook them in sweet-and-sour and other dishes. Chinese traditional medicine uses litchi fruit, seed, and other plant parts for remedies and they have warm energy in the Chinese diet. Litchi trees were not grown in California until 1897, when they were brought to California from Florida. Generally, litchis do not grow well in the United States (California Rare Fruit Growers 1996). Blasdale (1899:42) recorded that dried litchis and litchis preserved in sugar were available in the Chinese section of San Francisco. So the litchi seeds in these samples certainly come from the dried fruits recorded as imported from China starting in the mid-19th century (Spier 1958:80). More of the litchi seeds in these samples were carbonized than uncarbonized. The carbonized seeds were recovered in Features 85-31/2, 85-31/6 Layer 1S, 85-31/18 Layers 2, 2/3, and 3, 85-31/20 Lower layer, 86-36/6 Layers 2 and 3, 86-36/13 Layer 3, and 86-36/19. The uncarbonized seeds came from Features 85-31/6, 85-31/18 Layer 3, 85-31/20 Lower layer, 86-36/6 Layer 2, and 86-36/13 Layers 2 and 3. Wohgulmuth and Honneysett (Clevenger 2004:38) also identified a burnt litchi seed from Feature 85-31/20.

Lupinus sp. Lupine

Two uncharred *Lupinus* seeds were found in these samples, on from Feature 85-31/18 Layer 2, and the other from Feature 86-36/5 Layer 6. *L. bicolor* is a native lupine that commonly grows in the San Jose area, especially in open or disturbed locations. These seed most likely represent the weedy flora of the region, although the plants may have been protected or encouraged for their colorful blooms.

Lycium chinense cf. Chinese boxthorn

Chinese boxthorn is a native Chinese plant that is grown in southern China for the leafy shoots, which can be harvested in winter, and for its medicinal berries and roots. The vine also grows in disturbed soils along roads and near houses, among other locations. The dried berries are a common *bupin* ("repair substance") in traditional Chinese medicine (Hu 2005: 162, 222). Chinese boxthorn has naturalized in California although the closest location to San Jose that is recorded is in Solano County (Calfora 2014). Gary Crawford (personal communication 2014) notes that these uncharred seeds from Features 86-36/5 Layer 8, and 86-36/13 Layers Top, 2 and 3 look most closely like his Chinese boxthorn comparative material.

Malus/Pyrus sp. Apple/pear

Native crab apples from northern and central China and native pears from northern and western China have long been eaten in China. Apples and pears have cooling energy in the Chinese diet and when eaten can cure several types of ailments.

And while China is a major producer of commercial apples today, Simoons (1991:244) notes that Guangdong was not a favorable place to grow them. Some pears were also cultivated in the south. But the seeds recovered from Market Street Chinatown probably come from varieties of the common apple (*M. pumila*) and/or pear (*P. communis*) that were introduced to California from Europe. Apples and pears were growing at Mission Santa Clara as early as 1792, but beginning in the 1850s large numbers of apple and pear trees were imported from nurseries in the East to plant in orchards in the Santa Clara Valley (Jacobson 1984). Jacobson (1984:90, 96) reports that most pears were grown in the lowland areas north of San Jose and Santa Clara, and that apples, while common in kitchen gardens, were not a major commercial crop. Chinese laborers worked in fruit orchards, and began growing their own apple and pear trees in the late 1870s (Chan 1986:230). Most of the apple or pear seed fragments in these samples were unburnt, coming from Feature 86-36/5 Layer 8 and Feature 86-36/13 Layers Top, 2, and 3. The burnt seed fragments came from Feature 85-31/18 Layer 2/3.

Malva sp. Mallow

A few types of mallow grow in China. *M. verticillata* roots, seeds, and leaves serve as medicinal remedies and its young leaves can be eaten. A number of native and introduced mallow species grow in the San Jose area, many of them common weeds in disturbed locations, such as houselots, along roadways, and in fallow gardens. Uncarbonized mallow seeds were found in Feature 85-31/13, Feature 86-36/5 Layer 8, and Feature 86-36/18 Layers A and B, and one carbonized mallow seed in Feature 85-31/18 Layer 2/3. Puseman et al. (2012) identified Malvaceae pollen in the features, reflecting its growth in the area, and uncarbonized seeds in Feature 86-36/5 Layer 6, Feature 86-36/7, and Feature 85-31/11. The mallow seeds probably come from weeds growing in Market Street Chinatown, but some plants may have been protected or encouraged to provide a ready source of medicine.

Medicago sp. Burclover/alfalfa

Medicago growing in California includes alfalfa (*M. sativa*), a cultivated forage plant, and a number of wild and often weedy species, all of which are introduced species and some of which also grow in China. These weeds are abundant in disturbed and agricultural soils of the Santa Clara Valley. In China the young shoots of some *Medicago* species are eaten and the alfalfa plant and root serve medicinal purposes. Uncharred *Medicago* seeds were recovered from Feature 86-36/5 Layer 8 and Feature 86-36/13 Layer Top, and a pod resembling *M. polymorpha* (California burclover) was found in Feature 86-36/5 Layer 8. While the pod may be some other species of burclover, it was spiny, indicating that it was not alfalfa. This would suggest that the *Medicago* seeds in the sample also were not alfalfa. Puseman et al. (2012) identified charred *M. sativa* in Feature 86-36/5 Layer 4. Given the abundance of *Medicago* in the area, it seems likely that these seeds come from local weeds.

Melilotus sp. cf. Sweetclover

The *Melilotus* species that grow in California are native to Eurasia, and all also grow in China. Sweetclover is a common weed in open and disturbed area in California. Chinese traditional medicine uses the fruit, stalk, leaves, and root of *M. arvensis* to treat a variety of ailments. Feature Feature 86-36/18 Layer Below 3 had uncarbonized sweetclover seeds. Puseman et al. (2012) recovered uncarbonized sweetclover seeds in Feature 86-36/7.

Momordica charantia Bitter gourd

Momordica charantia is a native cucurbit of southern Asia that has long been cultivated in southern China. It is generally eaten cooked as a vegetable. In addition, all parts of the plant have medicinal properties and cold energy. The seeds are ground into powder and taken to ameliorate fatigue and impotence. Blasdale (1899:30) reported that *Momordica charantia* was a major crop in Chinese gardens along the Sacramento River and commonly eaten by the Chinese in California. Bitter gourd seeds are one of the most ubiquitous remains in these Market Street Chinatown samples, recovered in 14 of the features (Table 13). All of the seeds were uncarbonzed except for one from Feature 85-31/18 Layer 2/3. Puseman et al. (2012) also record finding bitter gourd seeds in most of the features, with uncharred specimens from Feature 86-36/5 Layer 8, Feature 85-31/6 Level 2, Feature 86-36/7 Layer 3, Feature 85-31/18 Layer 3, and Feature 85-31/28, and charred seeds from Feature 85-31/11. In addition, they identified *Momordica* pollen from Feature 86-36/5. Wohgulmuth and Honneysett (Clevenger 2004:38) found uncharred bitter gourd seeds in Feature 85-31/20. Given the ease of obtaining locally grown bitter gourd, it seems unlikely that these seeds came from imported plants.

Momordica cochinchinensis Spring bitter melon

Momordica cochinchinensis requires a warm humid climate and grows well in southern China. While it is cultivated in fields, it also grows on roadsides, rice-fields, and abandoned areas. The young fruit is cooked as a vegetable and the seeds (*mubiezi* in traditional Chinese medicine), roots, and leaves are used medicinally (Lim 2012:377; Li et al. 1973). Two uncarbonized seeds were found in Feature 86-36/18 Layer B. These were certainly imported from China.

Olea europaea Olive

Olives are native to the Mediterranean and southwestern Asia and, according to Hu (2005:627), olive fruits were introduced many times to China. Nonetheless, olive cultivation in China was rare until the 1960s. Olives have a neutral energy in the Chinese diet and may be used to treat several ailments. Olives came to California with the Spanish missionaries and colonial settlers and were recorded growing at Mission Santa Clara and Mission San Jose. Olives may be cured or pressed for their oil. One probable carbonized olive fruit was recovered from Feature 85-31/18 Layer 2 and a few uncarbonized seeds (pits) were recovered from Feature 86-36/9. Wohgulmuth and Honneysett (Clevenger 2004:39) identified a carbonized seed from Feature 85-31/18. These olives would have come from local orchards.

Opuntia sp. Prickly-pear

The Market Street Chinatown prickly-pear seeds probably are *Opuntia ficus-indica* (Mission prickly-pear), the only prickly-pear that grows in the San Jose area. This species originated in Mexico and has become naturalized in California where it grows in dry locations. Prickly-pear fruits and pads are popular Mexican foods and the cultivated species were brought to California in the Spanish-colonial era. *Opuntia* pulp and juice have been used medicinally in Mexico and China. *Opuntia* is native to the Americas, but a few species, including *Opuntia ficus-indica* (*li guo xian ren zhang*), were introduced to China in the 1600s and early 1700s. There they are cultivated as hedges and for their edible fruits. So the Chinese immigrants to California may well have been familiar with these plants. The archaeological seeds were all unburnt, coming from Feature 85-31/18 Layer 2/3, Feature 86-36/5 Layers 6 and 8, Feature 86-36/13 Layers top, 2, and 3 and Feature 88-91/26. Puseman et al. (2012) recovered an unburnt endosperm fragments from Feature 85-31/18 Layer 3.

Oryza sativa Rice

Rice is the staple grain of southern China, so much so that the word for cooked rice and food (*fan*) are the same. For southern Chinese, food eaten without rice is considered a snack and not a meal. Simoons (1991:64) notes "in rural South China and adult male consumed 470 or 485 pounds of rice a year" and that much of the agricultural land was devoted to rice cultivation. The most common preparation of rice in southern China is boiled, but rice flour may be made into noodles and cakes, and rice is fermented to make vinegar. Rice has a neutral energy in the Chinese diet and can be cooked to cure a number of ailments. Rice florets (hulls) and straw served a variety of purposes including fuel, and packing material. Although rice is cultivated in California today, it was not grown there in the 19th century, because the growing conditions were not appropriate for long grain rice (Chan 1986:82, 269). Nonetheless, as Chan (1986:82) reports, rice and sweet potatoes were the primary foods of the early Chinese immigrants to California, and most of the rice was imported from China. It was commonly listed on mid-19th century shipping invoices recorded in San Francicso (Spier 1958:80). Although large quantities of rice were imported, it was relatively expensive, at least in the Chinese mining camps. Chan (1986:82-84) shows that in 1865, a sack of rice cost $6, four times the cost of a sack of flour.

This study recovered carbonized rice grains (caryopses) from Feature 85-31/13, Feature 85-31/18 Layer 2/3, and Feature 86-36/5 Layer 8. In addition, uncharred florets (the hulls or structures surrounding the grain) were found in Feature 86-36/5 Layers 6 and 8 and Feature 86-36/13 Layers 2 and 3. Wohgulmuth and Honneysett (Clevenger 2004:39) also recovered charred grains from Feature 85-31/18. Puseman et al. (2012) identified rice phytoliths and pollen in addition to grains and florets. Feature 85-31/6 contained many husk phytoliths and floret fragments (charred and uncharred), along with some pollen and charred seeds. Feature 85-31/11 had *Oryza* pollen and possible charred seeds. Feature 85-31/18 Layer 2 had some pollen, an uncharred awn and a charred seed, while Layer 3 had one charred and one uncharred floret. Feature 85-31/28 contained rice pollen, many leaf and stem phytoliths, and charred and uncharred florets. Feature 86-36/5 contained many *Oryza* glume, leaf, and stem phytoliths with most concentrated in Layer 8, fewer in Layer 6, and very few in Layer 4. The many leaf and stem phytoliths in Feature 86-36//6 were interpreted as packing material (Cummings et al. 2014). Feature 86-36/7 had *Oryza* pollen and a few phytoliths.

Panicum sp. cf. Panic grass/millet

The lemma and palea are bracts that surround a grass floret as well as the ripe caryopsis (seed). The one uncarbonized example recovered from Feature 86-36/13 Layer 3 could come from a wild or cultivated type of *Panicum*. Many wild *Panicum* species grow in California, primarily in open areas, fields, and moist habitats. *Panicum miliaceum*, broomcorn millet, has been and continues to be an important crop in northern China. It may be eaten as porridge or brewed for an alcoholic drink. Given the uncertain identification of this specimen and the single occurrence, it seems prudent to consider it as coming from the local vegetation.

Phaseolus vulgaris/Glycine max Common bean/soybean

The Market Street Chinatown samples contained a number of cultivated bean seeds, some of which may be common beans (*Phaseolus vulgaris*) and others of which may be large soybeans (*Glycine max*). All are carbonized and most have a split texture, which I replicated when I carbonized some cooked soybeans. None have any seed coat left and few have traces of the embryo. If these came from a pot of burnt beans, one would expect to find the beans clumped together. But these cotyledons are separate, fairly flat, and quite thin. More research may indicate whether these could be cooked or fermented soybeans. Most of these were recovered from Feature 86-36/5 Layer 8, with one each in Feature 86-36/5 Layer 6, Feature 86-36/13 Layers 1 and 3, and Feature 88-91/26. Puseman et al. (2012) identified pollen from four types of cultivated beans in Feature 86-36/5: *Canavalia*, *Phaseolus*, *Pisum*-type, and *Vicia*-type. They suggest that the pollen came from buying fresh beans at a local market. They also recovered one whole and many fragments of charred *Phaseolus* seeds in Feature 85-31/11, along with a possible *Phaseolus* pod phytolith. Feature 85-31/6 had charred seed fragments identified as *Pisum/Glycine* (pea/soybean).

Phaseolus vulgaris is native to Mesoamerica and was brought to California with the Franciscan missionaries and colonial settlers. The dried beans (seeds) were an important part of the Spanish-colonial era diet. Current *Phaseolus vulgaris* cultivation in China is mainly for fresh green beans and is common in Guangdong.

Soybeans are native to eastern Asia and have long been cultivated in China. The many Chinese varieties are eaten cooked, roasted, fermented (beans and sauce), and prepared as tofu, soybean milk, soybean oil and other foods. *Dou-chi*, the fermented black soybean, is commonly used as a seasoning in southern China. To make it the beans are soaked with herbs, steamed, fermented, and mixed with salt and dried. Soybeans have a neutral energy in the Chinese diet. In traditional Chinese medicine, soybeans are used to cure a variety of ailments. A bill of sale from a Chinese mining camp in 1865 lists China beans and China peas showing that a variety of dried pulses were imported to California (Chan 1986:83-84). And the salt beans referred to on mid-19th century shipping invoices may refer to the importation of fermented soybeans from China to San Francisco (Spier 1958:80).

Physalis sp. Groundcherry

Two species of *Physalis* grow in the San Jose area. *P. lancifolia* is native to South America and grows in wet locations, fields, and disturbed soils. *P. philadelphica* (tomatillo) is native to Mexico, where is it a common cultivated food. In California it grows in disturbed area and fields. A number of *Physalis* species have been introduced to China, but *P. alkekengi* (*suan jiang*) is a native plant that is cultivated as an ornamental. Its fruit is used medicinally. One uncharred *Physalis* seed was found in Feature 86-36/13 Layer 2. Puseman et al. (2012) also found uncharred *Physalis* seeds in Feature 86-36/5 Layers 6 and 8, and Feature 85-31/18 Layer 2.

Platanus racemosa cf. Western sycamore

One uncharred seed that resembles *Platanus racemosa* was recovered from Feature 86-36/5 Layer 8. *Platanus racemosa* is a common native tree that grows in moist areas. Puseman et al. (2012) identified *Platanus* charcoal in Features 86-36/7 and 85-31/11. These remains reflect the natural vegetation in the area.

Poaceae Grass family

Many grasses grow in California, and they probably were common weeds in San Jose and in the farms and orchards of the Santa Clara Valle. Many grass seeds are morphologically similar, so they are difficult to identify more specifically. Feature 85-31/18 Layer 2/3 had one carbonized fragment and two large Poaceae types, one carbonized and one uncarbonized. Feature 86-36/5 Layer 8 also had one carbonized large type. This large type may be the same as the Poaceae A type identified by Puseman et al. (2012). Their pollen analysis identified grass pollen in all features, attesting to its prevalence in the local flora. They also identified charred grass seeds and other spikelet parts from Feature 86-36/5 Layers 6 and 8, Feature 86-36/6, Feature 85-31/11, and Feature 85-31/18 Layer 2.

Polygonum sp. Knotweed

Knotweed is a common wild and weedy plant in California. It grows in disturbed or moist soils and the fruits generally ripen in late spring and summer. A few native and introduced species grow in the San Jose area. In China many parts of knotweed plants are used medicinally and some knotweeds are steeped to prepare *liangsha* ((“cooling tea”), an herbal drink prepared in the summer to promote good health. Feature 85-31/18 Layer

2/3 contained one charred knotweed seed and Feature 86-36/13 Layers Top and 2 each contained one uncharred seed. Puseman et al. (2012) also recovered an uncharred seed in 85-31/18 Layer 2. These seeds probably reflect the local weedy flora.

Polygonum orientale Kiss me over the garden gate

Polygonum orientale or (*Persicaria orientalis*) is native to China, where it is cultivated as an ornamental plant in gardens, but also grows wild along road and in disturbed areas. According to Li et al. (1973:344) the steamed or roasted seeds promote health; among other things they "brighten the eye and benefit the breath." The flowers also have medicinal uses. *Polygonum orientale* seeds were sent from England to John Custis in Williamsburg, Virginia in 1737 (Southern Garden History Society 2008:4) and the plants have become a common ornamental plant in the eastern United States. However, they are rare in California and none are recorded growing in the region around San Jose. One uncarbonized seed from Feature 86-36/13 Layer 2 most closely resembles this species and would appear to be an imported medicinal plant.

Portulaca sp. Purslane

The clump of uncarbonized purslane seeds from Feature 86-36/13 Top Layer probably are *Portulaca oleracea*, the only species that grows in the San Jose area. This is a common introduced weed in California, which grows in disturbed habitats. A few species of purslane grow in China and some have medicinal uses. *Portulaca oleracea*, a weedy plant in fields, is used medicinally, but also is collected as a green vegetable. The young shoots and leaves are eaten fresh or cooked. Blasdale (1899:48) reported finding purslane on vegetable stands in the Chinese section of San Francisco, although not in large quantities. Puseman et al. (2012) found many uncharred *Portulaca* seeds in Feature 86-36/5 Layers 6 and 8, Feature 85-31/11, Feature 85-31/18 all layers, and Feature 85-31/28. This indicates that it was a common weed growing in the area and that it was easily available as a potherb.

Potamogeton sp. Pondweed

Pondweed is an aquatic plant that grows in shallow water, ponds, streams, and irrigation ditches. A few species grow in the San Jose area. Several species also grow in China, two of which are eaten locally. Pondweed leaves, tender shoots or the whole plant provide greens. In addition, traditional Chinese medicine uses the root as a medicine. One uncarbonized *Potamogeton* seed was found in Feature 86-36/5 Layer 8. This probably came from a nearby source.

Prunus armeniaca Apricot

Apricots have been grown in China possibly as far back as the Han dynasty (B.C. 210- 220 A.D.). Currently the Chinese cultivate several varieties, some with juicier fruits than others and some with sweeter seed kernels. The fleshy part of the fruit may be eaten fresh or preserved and has a neutral energy in the Chinese diet. Seed kernels are used like almonds, added to savory or sweet dishes. The seed kernels have a warm energy and are a common *bupin* ("repair substance") in traditional Chinese medicine serving as a lubricant for the lungs and intestines and to promote longevity. Apricots were growing at Mission Santa Clara as early as 1792. In the 1850s improved apricot trees were imported from nurseries in the East to plant in Santa Clara Valley orchards, but they did not become a major crop there until the beginning of the 20th century (Jacobson 1984:96). Jacobson (1984:133) records that apricot harvesting began around the beginning of July, but drying apricots would have extended their availability. Only a few carbonized pits could be securely identified as apricot, all coming from Feature 85-31/18 Layer 2. Some large *Prunus* pits in the samples were too fragmented or eroded to specifically identify as apricot or plum. These are discussed in the plum section.

Prunus mume Chinese plum/Japanese apricot

Prunus mume (*mei*) is a native plant of China that has long been cultivated for its fruit (more like an apricot than a plum) and as an ornamental. Its sour fruit may be consumed pickled as a snack, preserved in sugar, or dried, salted and cooked in sauces for other foods. The fruit and other plant parts are used to treat a variety of intestinal ailments. *Mei* flowers in the winter and has often been depicted in Chinese art and poetry. According to Anderson (1988:134) *mei* has "an honored place in Chinese consciousness." It seems certain that this fruit was imported to California, arriving as one of the dried fruits frequently imported from China to San Francisco (Spier 1958:80). Only two uncarbonized pits were found in the samples, one from Feature 86-36/13 Top Layer and the othe from Feature 85-31/18 Layer 2/3.

Prunus persica Peach

Peaches are native to northern China and were domesticated fairly early. In the north, they are eaten fresh or cooked as soup or dessert. They are less common in the south, generally eaten dried or pickled as a snack. Peaches are symbols of long life and fertility and bring luck, abundance, and protection (Anderson 1988:135). Peaches have warm energy in the Chinese diet and both the flesh and dried seed kernels are used in traditional Chinese medicine. Peach trees were grown at Mission Santa Clara as early as 1792, but beginning in the 1850s improved varieties were brought from the East to plant in the Santa Clara Valley (Jacobson 1984). Peaches were very popular with mid-19th century California miners (Chapman 2013:37). Chan (1986:230) notes that in the late 1870s, peaches were one of the main fruits raised by Chinese fruit growers. These samples contained both carbonized and uncarbonized peach pits, but the majority were uncarbonized and many of these were recovered in Feature 86-36/13 (all layers). Uncarbonized pits also came from Feature 85-31/18 Layer 2, Feature 85-31/20, Feature 85-31/24, Feature 85-31/28, Feature 86-36/5 Layer 6, Feature 86-36/18, and Feature 86-36/20, while carbonized pits came from 8 features. It seems likely that these would be local peaches since they were readily available.

Prunus sp. (cherry type) Cherry

Several *Prunus* species produce fruits that are called cherries, some native to the Americas, some to Europe, and some to Asia. While the Chinese cultivate a number of cherry varieties (some imported), local types are grown primarily in the north. Some are eaten fresh, while others are cooked or preserved. Cherries have warm energy in the Chinese diet and can cure a variety of ailments. Simoons (1991:222) writes "In Chinese symbolism, the cherry represents beautiful women or women in general." Cherries are a major fruit crop in California, and have been grown there since Spanish-colonial times. Harvesting begins in mid May. Jacobson (1984:90) documents that the first commercial cherry orchards were planted in 1868 at Willows Glen near San Jose. Almost all of the cherry pits in these samples were uncharred. They were recovered in Feature 85-31/18 Layer 2/3, Feature 86-36/13 Layers 1 and 2, Feature 86-36/18, Feature 86-36/19, and Feature 86-36/26. The two charred pits came from Feature 85-31/18 Layers 2 and 2/3. Since cherries were easily available, these pit probably come from local sources.

Prunus sp. (plum type) Plum

Similar to cherries, a number of different *Prunus* species are called plums. A few types are cultivated in China. Plums have a neutral energy in the Chinese diet and both the fruits and the seed kernels serve as herbal remedies. Plums have been grown in California since Spanish-colonial times, but in the 1850s improved stock was imported to plant in Santa Clara Valley orchards ((Jacobson 1984:90; Vallejo 1890). The two main types grown in California are *P. domestica* and *P. salicina*; prunes come from a variety of *P. domestica*. According to Chan (1986:230) plums were one of the main fruits raised by Chinese fruit growers starting in the late 1870s. So the seeds in these samples most likely came from local farms. The plum pits were almost evenly divided between charred and uncharred specimens, with the uncharred coming from Feature 86-36/5 Layer 8, Feature 86-36/13 Layers 1 and 2, Feature 85-31/18 Layer 3, and Feature 86-36/19. Charred pits were found in Feature 85-31/2, Feature 85-31/13 Layer 3, Feature 85-31/20, Feature 86-36/6, and Feature 86-36/19. Wohgulmuth and Honneysett (Clevenger 2004:38) also recovered charred plum pit fragments from Feature 85-31/20.

Some *Prunus* pits in the samples could only be identified as apricot or plum. The preponderance of identified plum over apricot would suggest that more of these are plum. The uncharred pits were found in Feature 85-31/1, Feature 86-36/13 (all layers), Feature 85-31/13, and Feature 86-36/15. The charred pits were found in Feature 85-31/1, Feature 85-31/13, Feature 85-31/10, Feature 85-31/18 Layer 2, Feature 86-36/6, Feature 86-36/9, and Feature 86-36/26.

Pulse fragment Cultivated bean fragment

A number of cultivated bean fragments were too small to identify further. Most of these probably are *Phaseolus vulgaris* or *Gycine max*, types discussed above. However, Puseman et al. (2012) identified pollen from *Canavalia*, *Phaseolus*, *Pisum*-type, and *Vicia*-type in their analysis, so these could be fragments of other pulses. The charred fragments in this study came from Featuer 85-31/2, Feature 85-31/18 Layer 2/3, Feature 86-36/5 Layers 6 and 8, and Feature 86-36/13 (all layers).

Raphanus sativus cf. Winter radish

Raphanus sativus is native to Mediterranean Europe. It is mentioned in a late 7th century Chinese herbal, and today is one of the most important vegetables in China, part of the typical diet that also includes rice, cabbages, greens, and soybeans. The roots may be eaten raw, cooked, or pickled, and the greens may be cooked. The whole plant and the roasted seeds have medicinal uses in China. Radishes came to California in the 19th century (Bolander 1870). It seems likely that this was a crop planted in the Chinese truck gardens, since it is an easily grown cool weather crop, but I have not found any references to it. Radish seeds were among the medicines used by Ing Hay, a Chinese doctor who began practicing in eastern Oregon in the 1880s A hybrid of a wild form and cultivated radish has naturalized in California, growing in disturbed soils, fields, and along roads. One carbonized seed was recovered from Feature 85-31/18 Layer 2/3. It is possible that this seed comes from the medicinal use of the plant, since it is carbonized and only one specimen has been recovered. But it could also have come from a local weed.

Rhus sp. Sumac

One carbonized *Rhus* seed was recovered from Feature 86-36/5 Layer 6. Puseman et al. (2012) identified a carbonized seed from Feature 86-36/6. The local sumac is *R. aromatica*, a shrub that grows in scrub and on slopes and washes. Some Native California groups ate the berries and used other plant parts as medicine (Strike 1994). A few species of sumac are used in traditional Chinese medicine to cure a variety of ailments. They use the leaves, seeds, flowers, bark, and sap. Since this is not a weedy plant in urban areas, it is not clear how the seed would have gotten into the Chinatown deposits unless the fruits were collected for some purpose.

Ribes sp. Currant/gooseberry

Several native and introduced *Ribes* species grow in China, although none seem to grow in Guangdong. The Chinese eat the fruits of some currant and gooseberry varieties and use some to make wine. A few wild types of *Ribes* grown in the San Jose area today. But Chan (1986:124) records that by the 1870s gooseberries were an important crop for the Chinese farmers of Santa Clara County. Cultivated gooseberries (*R. grossularia*), are native to Europe, northwestern Africa, and parts of Asia. Most of the *Ribes* seeds in these samples were uncharred, and the great majority came from the seed-rich macrobotanical sample from Feature 86-36/13 Layer 2. Other uncharred seeds were found in Feature 86-36/5 Layer 8 and Feature 86-36/13 Layer 1, while charred seeds that probably come from this taxon were found in Feature 86-36/5 Layers 6 and 8 and Feature 86-36/18.

Robinia pseudoacacia Black locust

Black locust is a tree that was introduced to California from Eastern North America possibly at the time of the gold rush to provide mining timber (Bossard et al. 2000). It is somewhat weedy, growing in disturbed areas such as abandoned houses, along roadsides and streambanks. The one uncharred seed found in Feature 86-36/5 Layers 6 looks fresh. It may be a recent intrusion or a very well preserved remnant of the Chinatown vegetation.

Rosaceae Rose family

A few specimens in these samples were identified as Rosaceae seeds, but they all probably are immature or fragments of *Malus* or *Pyrus* (see the entry above). They were found in Feature 86-36/13 Layer 3 and Feature 85-31/18 Layer 2/3. Puseman et al. (2012) identified a small amount of Rosaceae pollen and charcoal in the samples they analyzed.

Rubus sp. Blackberry/raspberry

Many wild species of *Rubus* grow in China. The fruits are generally eaten fresh, but may be cooked or made into wine. Raspberries have a warm energy in the Chinese diet. Traditional Chinese medicine uses the dried fruits, seeds, and leaves to cure a variety of ailments and the Chinese raspberry fruit was found among medicines used by Ing Hay, a Chinese doctor who began practicing in eastern Oregon in the 1880s. Wild *Rubus* commonly grows in California as well, often in moist habitats, but by the 1870s the Chinese farmers of Santa Clara County were major growers of raspberries and blackberries (Chan 1986:124). *Rubus* was by far the most abundant seed in the samples, reaching totals in the thousands. Large numbers of unburnt *Rubus* usually indicate privy deposits, since the seeds pass through the digestive system relatively intact. Unburnt seeds were recovered from Feature 85-31/13, Feature 85-31/18 Layer 2/3, Feature 86-36/5 Layers 6 and 8**,** Feature 86-36/13 (all layers), Feature 86-36/18 (all layers), and Feature 86-36/15. The sole charred seed came from Feature 85-31/18 Layer 2/3. Wohgulmuth and Honneysett (Clevenger 2004:38-39) recovered hundreds of unburnt seeds in Feature 85-31/18 and Feature 85-31/20. Puseman et al. (2012) found unburnt seeds in Feature 86-36/5 (all layers), Feature 85-31/6, Feature 86-36/7, Feature 85-31/18 Layer 2/3, and Feature 85-31/28, and three charred examples in Feature 85-31/11. These berries would have come from nearby farms.

Rumex sp. Dock

A number of *Rumex* species grow in China. The Chinese eat the young leaves of sorrel (*R. acetosa*) and use the fruits and leaves for medicinal purposes. California also has a variety of *Rumex* species, some native and some introduced that grow in disturbed or moist habitats. The seeds ripen in late spring and summer. One uncharred *Rumex* seed was recovered from Feature 86-36/5 Layer 8. Puseman et al. (2012) found one charred seed fragment in Feature 85-31/11. While these seeds probably came from weedy plants growing in the area, they may have been encouraged or protected to provide this potherb and medicine.

Sambucus sp. Elderberry

Four species of *Sambucus* grow in China but the ones Hu (2005) records as eaten come from Taiwan (fruit) and Inner Mongolia (leaves). Elderberry leaves, stems, and roots are used in traditional Chinese medicine. Two native species grow in the San Jose area, both preferring streambanks and moist places. Native California groups collected the fruits in summer and cooked or dried them before they were eaten. In Europe elderberry flowers and berries are prepared as drinks and the berries may be made into jam or pies. Uncharred *Sambucus* seeds were recovered from Feature 85-31/18 Layer 2/3, Feature 86-36/5 Layers 6 and 8, and Feature 86-36/13 (all layers). Puseman et al. (2012) also identified uncharred *Sambucus* seeds from Feature 86-36/5 Layers 6 and 8 and Feature 85-31/18 Layers 2 and 3, along with Feature 85-31/11 and Feature 85-31/28. One charred seed from Feature 85-31/6 could be *Sambucus*. Elderberry fruits were easily available in San Jose and their presence may indicate traditional uses as medicine or their uses as food and beverage ingredients.

Scirpus sp. Bulrush

A large number of bulrush species grow both in China and in the San Jose region. Bulrush prefers wet areas, such as marshes, stream banks, and meadows. These samples contained one unburnt seed from Feature 86-36/13 Top Layer, and one burnt seed from Feature 86-36/5 Layer 8. Most likely they came from accidental inclusions of local weeds.

Sesamum indicum Sesame

Sesame is not native to China, but is mentioned in a Chinese agricultural manual dating to the 1st century B.C. Today China is a major producer of sesame seed and the seed is used for food, oil, and medicine. Sesame cultivation in California began in the early 20th century and still is not common (Yermanos et al. 1964). Blasdale (1899:48) recorded that black and white sesame seeds were available in the Chinese section of San Francisco, and though he does not directly say they were imported, he implies it. Sesame seeds were recovered in many of the Market Street Chinatown features with matrix samples, but they were not very abundant. All were uncarbonized and many were eroded, so they probably are more completely digested than other small seeds that pass through the digestive system intact. Seeds were found in Feature 85-31/18 Layer 2/3, Feature 86-36/5 Layers 6 and 8, Feature 86-36/13 (all layers), and Feature 86-36/18 (all layers).

Setaria italica cf. Foxtail millet

One carbonized caryopsis (seed) from Feature 85-31/18 Layer 2/3 could be *Setaria italica*. Foxtail millet was one of the earliest domesticate in China (Zhao 2011) and it is still an important grain crop in northern China. Millet is most often served as porridge and is a popular snack food outside of northern China. The grain also has medicinal properties. Foxtail millet does not seem to be a crop grown in northern California, so this grain probably was imported.

Setaria sp. cf. Bristle grass/millet

Layers 2 and 3 of Feature 86-36/13 contained three uncarbonized bracts (the lemma and palea that surround a grass floret as well as the caryopsis) that most closely resemble *Setaria* sp. They could come from a wild or cultivated type. A few native and naturalized *Setaria* species grow in the San Jose area, generally in moist, disturbed areas, including roadsides and streambanks. Given the uncertain identification of the remains, it seems prudent to consider them as coming from the local vegetation. Puseman et al. (2012) also recovered *Setaria* remains from Feature 85-31/6 that could not be specified as wild or cultivated. In their text, the charred remains are described as florets and in the tables as caryopses.

Siraitia grosvenorii Luo han guo

Siraitia grosvenorii is a cucurbit that is native to southern China, where it is widely cultivated. Its sweet fruit is usually dried and then made into soup, tea, sweets, or medicine. Hu (2005:169, 218-221) lists *luo han guo* as a *bupin*, or "repair substance," commonly found as a whole dried fruit in American stores. In China it would be prepared at home with other ingredients as a tea or soup to soothe the respiratory and digestive systems. Hu's recipe for *luo han guo* soup includes the seeds as well as the rind and pulp along with dried longan, jujube, apricot seed and some other ingredients. *Luo han guo* does not grow in California, so the recovered seeds would have been from imported fruits. Unburnt seeds were found in Feature 85-31/2, Feature 85-31/13, Feature 86-36/5 Layer 8, and Feature 86-36/18. One burnt seed was found in Feature 85-31/2.

Solanaceae Nightshade family

A few seeds in the Market Street Chinatown samples could only be identified as Solanaceae. A large number of plants from this family grow in the natural vegetation of the Santa Clara Valley and the seeds most likely come from one of them. Uncharred seeds were found in Feature 86-36/13 Layers 2 and 3, and charred seeds in Feature 85-31/18 Layer 2/3 and Feature 86-36/13 Layer 3.

Solanum lycopersicum Tomato

Tomatoes are native to Andean South America. According to Anderson (1988:131) tomatoes were recorded in China in the 1500s while Hu (2005:664) says they were introduced in the early 1920s. Now they are a widespread crop in China, generally eaten cooked. Tomatoes have slightly cold energy in the Chinese diet and are eaten raw or cooked to treat a number of illnesses. Tomatoes traveled from Mexico to California with the Spanish colonists and were recorded thriving at a farm near Mission San Jose in 1851 (Hedrick 1950:372). Fairly large numbers of uncarbonized tomato seeds were recovered from Feature 85-31/18 Layer 2/3, Feature 86-36/5 Layers 6 and 8, Feature 86-

36/15, and Feature 86-36/13 (all layers, with the largest amount from Layer 2). Puseman et al. (2012) identified uncarbonized tomato seeds from Feature 85-31/6, Feature 85-31/28, Feature 85-31/11, Feature 86-36/5 Layers 6 and 8, Feature 86-36/7, and Feature 85-31/18 Layer 2. One carbonized seed came from Feature 85-31/11. Most of the uncarbonized seeds probably come from privy deposits, since the seeds pass through the digestive system relatively intact.

Sorghum bicolor Sorghum

Sorghum, a native of Africa, has long been cultivated in northern China and, until maize supplanted it, was the third most important cereal in China. The stalks provide sugar, fencing material, and fuel and the grains are usually cooked as porridge. Simoons (1991:76) notes that the northern Chinese prefer millet, considering sorghum a food for the poor. Commercial production of sorghum did not begin in the United States until the 1850s (Dial 2012). Today *Sorghum bicolor* is naturalized in California, growing in disturbed habitats and along roadsides. Two charred sorghum grains were found in Feature 88-91/26. Puseman et al. (2012) identified a charred *Sorghum* floret from Feature 85-31/6. It seems likely that the grains come from a cooking accident, but the source of the crop is unclear.

Trichosanthes anguina Snake gourd

Snake gourd, a native cucurbit of tropical Asia, is cultivated in China for its young fruits, which are cooked as a vegetable. Traditional Chinese medicine uses the roots, seeds, and mature fruits to cure illness. Today snake gourd is a minor crop for Asian specialty farmers in the Central Valley of California (Molinar and Yang 2001:4). One uncharred *Trichosanthes anguina* seed was found from Feature 86-36/5 Layer 8. This could be from an imported fruit, or it might have been grown in a Chinese truck garden.

Triticum durum/aestivum Wheat

Durum and bread wheat were domesticated in Western Asia and bread wheat was introduced to China by 2500 BC (Flad et al. 2010). It soon became one of the major staples in northern China. Today bread wheat is grown primarily in north, central and western China, and durum wheat is not common. Wheat, ground into flour and then cooked as dumplings or noodles (rarely bread), is consumed throughout China, but is more important in the North. Wheat has cooling energy in the Chinese diet and has some medicinal uses. To make a balm for burns, wheat grains are fried until they are charred, and then ground and mixed with oil (Lu 1994:488). Wheat was brought to California by the Spanish colonists and was a major crop grown at the Pueblo of San José and Mission San José. During the 1850s and 1860s, wheat was the primary crop in the Santa Clara Valley (Jacobson 1984:66). It is difficult to distinguish between durum and bread wheat from the grains alone (Hillman et al. 1996). Today more bread wheat is grown in California than durum and this probably was true in the past as well. Carbonized wheat grains were recovered from Feature 85-31/13, Feature 85-31/18 Layer 2/3, Feature 86-

36/5 Layers 6 and 8, Feature 86-36/13 Layer 3, and Feature 88-91/26. Wohgulmuth and Honneysett (Clevenger 2004:39) also found carbonized grains in their sample from Feature 85-31/18. Puseman et al. (2012) recorded carbonized wheat from Feature 85-31/28. Most cooks in Market Street Chinatown probably purchased flour rather than grinding their own grain. Thus, the presence of these grains may be related to animal feed, their use as medicine, or some other purpose.

Ulmus minor cf. English elm

One uncarbonized elm nutlet recovered from Feature 86-36/9 looks more like *U. minor* than *U. parvifolia*. Both are introduced trees that are cultivated, but also grow in waste places in the San Francisco Bay area. The almost pristine condition of this fruit suggests that it was introduced during the excavation of Market Street Chinatown.

Vigna sp. Adzuki/mung bean

Two types of carbonized *Vigna* seeds were recovered in the Market Street Chinatown samples. One example from Feature 85-31/18 Layer 2/3 is rectangular and may be mung bean (*V. radiata*). The other two specimens (from Feature 85-31/18 Layer 2/3 and Feature 86-36/18 Layer B) are less symmetrical and more closely resemble *V. angularis*, adzuki bean. Mung beans were domesticated in India, have long been part of traditional Chinese cuisine, and are grown in many parts of China today. Besides eating mung bean sprouts, the Chinese extract the starch from the seeds to make cellophane noodles and boil the beans to make a curd and soup. Mung bean sprouts and flour are used in traditional Chinese medicine as a cooling food and for other conditions. Anderson (1988:125) describes "mung bean sweet soup is one of the commonest methods of restoring equilibrium in people who feel they are over heated." Oplinger et al. (1997) report that *V. radiata*, known as the Chickasaw pea, was growing in the United States by 1835. In addition, they note that at the time of publication almost all mung bean cultivation was in Oklahoma and that 75% of the mung beans eaten in the United States were imported. While some mung beans are grown in California at present (Myers 1998:84), I have found no record of their cultivation in California in the 19th century. A bill of sale from a Chinese mining camp in 1865 lists China beans and China peas showing that a variety of dried pulses were imported to California (Chan 1986:83-84). This suggests that the bean from Feature 85-31/18 was imported.

Adzuki bean is an East Asian domesticate which is widely grown in China today. Popular recipes in China include cooking the beans with rice and making a paste from the dried beans that are used in many desserts. Adzuki beans also have medicinal properties. While Perry may have brought the first beans to the US from Japan in 1854, more securely identified seeds were imported from Japan and China in the 1890s (Piper and Morse 1914:6-7). Adzuki beans are grown in California today (Myers 1998:84), but these Market Street Chinatown seeds would have been imported.

Vitis vinifera Grape

Vitis vinifera was introduced to China in the 2nd century, but because alcoholic beverages in China were made from rice and other grains, grapes were not widely cultivated through the 19th century. Now European grapes are eaten fresh or dried and are made into wine. They have a neutral energy in the Chinese diet. In addition, the roots, leaves, and fruits are used medicinally. A couple of wild grape species with edible fruits grow in southern China. Grapes were brought to California by the Spanish colonists and vines were growing at Mission Santa Clara as early as 1792. Chan (1986:230) describes that by the 1880s grapes were an important crop for the Chinese farmers of Santa Clara County. The Market Street Chinatown samples contained both grape fruits and seeds. Three carbonized fruits came from Feature 85-31/20 and one carbonized seed each from Feature 85-31/6 and Feature 85-31/18 Layer 2/3. Uncarbonized seeds were recovered from Feature 85-31/6, Feature 85-31/18 Layer 2, 2/3, and 3, Feature 86-36/5 Layers 6 and 8, Feature 86-36/18, Feature 86-36/15, Feature 88-91/26, and particularly plentiful from Feature 86-36/13(all layers). Puseman et al. (2012) also found a carbonized seed from Feature 85-31/6 and uncarbonized seeds from Feature 86-36/5 Layer 8, Feature 85-31/6, Feature 85-31/18 Layer 2 and 3, and Feature 85-31/28. Wohgulmuth and Honneysett (Clevenger 2004:38-39) recorded uncarbonized seeds from Feature 85-31/18 and Feature 85-31/20. Most of the grape seeds probably come from privy deposits, since the seeds pass through the digestive system relatively intact.

Xanthium strumarium cf. Cocklebur

The two *Xanthium* fruits recovered in the Market Street Chinatown samples (Feature 86-36/13 Layers 2 and 3) are somewhat eroded, but closely resemble the native California cocklebur (*Xanthium strumarium*). This is a common weed in disturbed, seasonally wet area such as grassland and watercourses. The Chinese cocklebur, also *X. strumarium*, is listed as a New World introduction in the Flora of China (2008). However, seeds identified as *X. strumarium* were recovered from Neolithic sites in China (Jiang et al. 2013) and cocklebur leaves were mentioned as a fermentation ingredient in an agricultural text from the 6th century (Anderson 1988:50). Today the young shoots of cocklebur are a common Chinese vegetable and are used to make medicated yeast in traditional Chinese medicine. The fruits and roots also have medicinal properities. Cocklebur was found among medicines used by Ing Hay, a Chinese doctor who began practicing in eastern Oregon in the 1880s. It seems likely that the Market Street Chinatown fruits come from the local vegetation. But the prickly burrs could have been brought to the area accidently, stuck on the fur of animals, or could have been collected as medicine.

Zanthoxylum sp. Fagara/Szechuan pepper

In China wild and cultivated species of *Zanthoxylum* provide fruits used as a spice and as medicine to cure a variety of ailments. Fagara has been used in China since at least the Han dynasty (206B.C.- A.D. 220). For seasoning food, most often the husks (pericarps) are added whole or toasted and ground in to a powder and then mixed with other spices. The seeds and husks are sold together in Chinese grocery stores and Eugene Anderson (personal communication 2014) confirms that both the seeds and the husks may be used. There is no record of *Zanthoxylum* growing in California in the 19th century, so these seeds probably were imported. Uncharred fagara seeds were found in Feature 85-31/18 Layer 2 and 2/3, Feature 86-36/5 Layer 8, Feature 86-36/13 Layer 2, and Feature 86-36/18.

Zea mays Maize

Maize is a Mexican domesticate and was introduced into China in the early 1500s. Until the mid-20th century, it was a major part of the diet only in the mountainous areas of southwestern China. In China, maize is prepared mainly as a thick flat pancake, but it is also made into porridge, noodles, and an alcoholic drink. Maize has a neutral energy in the Chinese diet and the roots and leaves may be boiled to make a medicine. Maize was a staple of the Spanish colonists in California, and was an important crop at Mission San Jose. The Feature 86-36/18 and Feature 86-36/20 samples contained charred cob fragments. Puseman et al. (2012) recovered a variety of cob parts and kernels in the Market Street Chinatown samples they analyzed from Feature 85-31/11 and Feature 85-31/6. They also identified pollen in Feature 85-31/28, Feature 85-31/18 Layer 2 and 3, Feature 85-31/11, 86-36/7, and Feature 86-36/5 Layer 6, and a glume phytolith from Feature 86-36/5 Layer 6.

Ziziphus sp. Jujube

The *Ziziphus* seeds recovered in the Market Street Chinatown samples are probably *Ziziphus jujube*, a native of northern China. Jujubes are a key fruit in northern China, where they primarily grow, but are also used in southern China, where there are a large variety of other local fruits. Exported fruits are usually dried or preserved in sugar before shipping and may be used as a soup, sauce or dessert ingredient. Jujube fruit is another *bupin*, or healing ingredient, that is made into tea or broth at home. It is considered a heating food. Traditional Chinese medicine uses the fruits, pits and other plant parts to cure a variety of ailments. Hu (2005:87) reported that while the number of jujube trees increased in the California after 1900, all the jujube fruits and other products in American Chinese stores at that time were imported. Uncharred jujube seeds were found in Feature 85-31/13 and Feature 86-36/13 Layers Top and 2, while charred seeds were found in Feature 86-36/5 Layer 8. Puseman et al. (2012) identified uncharred seeds from Feature 85-31/18 Layer 2 and charred seeds from Feature 85-31/6. These seeds are another example of an imported Chinese food.

Unknown types and plant parts

Unknown Type G is a small (3.0 x 1.5 mm) ovoid seed with a yellow-brown finely reticulate surface from Feature 86-36/13. None of them was whole and it is unclear if the outer seedcoat is missing. Unknown Type 7 is a large (10 x 6.4 mm) biconvex seed with a round cross section from Feature 86-36/13. The seedcoat has been eroded, giving it a cracked appearance. Unknown Type 10, from Feature 86-36/13, seems to be a tan fruit rind fragment, about 8 mm thick. Unknown Type 14A are small spherical seeds (1.5-3.0 mm diameter) with a tan surface, eroded in most places to reveal a black faintly striated surface. Unknown Type 14B is also an eroded spherical seed, 1.5 mm in diameter, with a smooth brown surface eroded to reveal long narrow cells. Both come from Feature 86-36/13 and their eroded natures suggest they were part of ingested foods that passed through the intestinal system. Unknown Type 15, from Feature 86-36/13, is a small (2.5 mm long) dark seed that has collapsed in, making it difficult to identify. One end looks flat, while the other looks pointed; it has a reticulate surface. Unknown Type 16 C is a carbonized seedcoat or fruit rind with a leathery surface and a spongy interior. It was found in Feature 85-31/18. One loculicidal capsule with two carpels was found in Feature 86-36/20. A stiff tan monocotyledon leaf blade tip with linear veins came from Feature 86-36/14. Other plant parts that could not be identified to taxon included small buds from Feature 86-36/13, hirsute bracts from Feature 86-36/5, charred fruit stems from Feature 85-31/18, a possible root fragment from Feature 85-31/13, a large (9 mm long) thorn from Feature 86-36/13, an unknown thick seedcoat/nutshell fragment from Feature 86-36/5, and and unknown fruit from Feature 86-36/18. Many features contained unidentifiable seed fragments, both charred and uncharred.

Feature Summaries

The 26 features in this study were labeled by the ARS archaeologigsts as wood-lined trash pits (12), unlined trash pits (9), bone pits (3), and wooden structures (2). They suggested that several were used first as privies and later as trash pits. Puseman et al.'s (2012) results and the taxa descriptions above confirm that the features were used as privies and trash dumps, and that they accumulated an array of wild plants. Privies provide a remarkable window into the diet and plant exploitation activities of their users. Most plant remains from archaeological sites are by-products of food production, food preparation and other activities, and do not directly represent the diet of the site inhabitants. But plant foods that are completely consumed and pass through the digestive system relatively intact in human feces are often extremely well preserved by the moist anaerobic conditions of privies. These foods are rarely recovered from other garbage contexts, because they generally are eaten raw, so there are few cooking accidents to toss out, and if eaten whole, there are no by products to toss. Trash pits and privies serve as dump areas for kitchen waste, such as large pits or seeds that are not eaten, and other garbage. Periodically, privy deposits may be capped by a layer of fill to reduce the smell. If the fill is collected from an open area it could contain wild and weedy seeds and other plant parts. In addition, seeds or plant parts could accidentally blow into or be carried into pits and privies.

The following summaries of the feature contents describe the most significant, but not necessarily all the taxa and plant parts recovered in each feature. The remains discussed are seeds or pits unless otherwise mentioned, and the numbers cited are the relative proportions from Tables 7 and 8 or the estimated wholes and totals from Tables 5 and 6. Unknown types and plant parts were calculated as distinct taxa. For the actual counts of items recovered see the appendix tables. To be conservative in the interpretation, seeds from crops that could grow in California are considered local, although a number of them, such as peaches and plums, could well have been imported as dried fruits or seeds.

Feature 85-31/1

Five macrobotanical specimens were collected from this trash pit, which is located in the southern part of the site. The remains, one Chinese olive (*Canarium* cf. *album*) seed, two apricot/plum (*Prunus* sp.) pits, a peach pit (*Prunus persica*), and an unidentifiable seed fragment, were mainly were carbonized (80%), suggesting that large trash may have been burned for disposal. The large identifiable seeds come from fruits, but the absence of small seeds may be a result of the archaeological collection process.

Feature 85-31/2

Eleven bags of macrobotanical specimens from this wood-lined pit (located, like Feature 85-31/1, in the southern part of the site) were tabulated together. They contained 23 items representing 9 taxa, and 48% were carbonized. Two taxa stand out as unusual for the Market Street assemblage. Most of the specimens were the imported cucurbit *Siraitia grosvenorii* (*luo han guo*) and Feature 85-31/2 had the largest concentration of this taxon in the assemblage. In addition, this feature had the only example of chickpea (*Cicer arietinum*), an uncommon food in Chinese cuisine. Other imported fruits included Chinese olive, longan (*Dimocarpus longan*), and litchi (*Litchi chinensis*), while the peach, plum, and watermelon (*Citrullus lanatus*) could have been local products. A pulse fragment could not be identified more specifically. Similar to Feature 85-31/1, the large remains were carbonized, perhaps from burning trash. Only the *luo han guo* and watermelon seeds were unburnt, with the exception of one *luo han guo* seed. This indicates a different method of trash disposal for these smaller, flatter seeds.

Feature 85-31/6

Feature 85-31/6 was a shallow unlined trash pit, located in an area of merchant/professional activity (Cummings et al. 2014:151). Seventeen bags of macrobotanical specimens contained 53 items, representing 11 plant taxa. *Benincasa hispida* var. *hispida* (*dong gua*, winter melon) dominated the specimens. The remaining items were primarily an array of imported fruits, including Chinese olive, longan, litchi, and *Dracotomelon dupperreanum* (Asian pheasant tree), many of which were carbonized. Locally grown foods included peanut (*Arachis hypogaea*), grape (*Vitis vinifera*), and watermelon. Only 34% of the items were carbonized, because the winter melon and hairy gourd (*Benincasa hispida* var. *chiehqua*) were unburnt. The carbonized grape and watermelon seeds were unusual for this Market Street Chinatown assemblage, since grapes were usually preserved unburnt in the privy deposits and watermelon seeds were rarely burnt. This indicates more burning of trash deposited in this feature, again with the exception of melon/gourd seeds.

Puseman et al. (2012) analyzed macroremains, pollen, and phytoliths from a soil sample from this feature (Sample 5), identifying a broader range of plants and providing a richer picture of the plant use in this area. The grains (rice, *Oryza sativa*, and maize, *Zea mays*) and beans, possible common pea or soybean, were carbonized, as were many of the fruit seeds. There were relatively few fig (*Ficus carica*), tomato (*Solanum lycopersicum*), grape and other seeds one would associate with privy deposits. Cerealia pollen dominated the pollen assemblage, and was interpreted as coming from wheat flour. What stands out most from this feature is the high number of cereal glume and stem remains, particularly of rice in the macroremains and rice, maize, and wheat in the phytoliths. These grain byproducts could indicate cereal processing in the area, the use of byproducts as animal feed, or some other use for the glumes and straw such as packing material. Many of these also were carbonized, suggesting they were burned for disposal or to produce heat for some activity.

Feature 85-31/9

Feature 85-31/9 was a bone pit located in the southern part of the site near Features 85-31/1 and 85-31/2. Two carbonized longan seeds were collected from the deposit, again following the pattern of burning large seeds as seen in the nearby features.

Feature 85-31/10

This unlined trash pit was located near Feature 85-31/6, which was identified by Cummings et al. (2014:151) as an area of merchant/professional activity. The 14 macrobotanical specimens resemble those from Feature 85-31/6, with the majority unburnt cucurbits (*Momordica charantia*, bitter gourd) and the rest (29%) large burnt seeds (Chinese olive, apricot/plum, and unidentifiable).

Feature 85-31/11

Feature 85-31/11 was an unlined pit containing pig bones located in an area of tenement housing (Cummings et al. 2014:151). The collected macrobotanical specimens were carbonized peach pits and kernels. Puseman et al. (2012) analyzed a flotation sample containing macroremains, pollen, and phytoliths from this feature (Sample 7), recovering a much broader array of plants. Overall, the feature is noticeable for containing few privy remains, many weed seeds, and little charcoal, but a large percentage of charred remains, including the highest concentration of maize. The presence of so many burnt grass and weed seeds could suggest the burning of animal dung.

Feature 85-31/12

This unlined trash pit is located south of Feature 85-31/6, which was identified by Cummings et al. (2014:151) as an area of merchant/professional activity. The macrobotanical specimens collected were one uncharred bitter gourd seed and one charred longan seed.

Feature 85-31/13

Eight bags of macrobotanical specimens and two relatively small matrix samples were analyzed from this wood lined pit located near Features 85-31/11 and 85-31/20.

The pit measured 1.22 by 0.97 m and 1.17 m in depth. The matrix samples contained few seeds and only 7 taxa. Wheat (*Triticum durum/aestivum*), probable wheat, and rice grains were the only carbonized remains (totaling 38%). The unburnt seeds were bitter gourd, *Rubus* (blackberry/raspberry), *Ziziphus* sp. (jujube), and *Malva* (mallow). The 23 macrobotanical items represented 12 taxa, and 39% were carbonized. Most of these were fruits, including local peach, apricot/plum, and watermelon along with imported Chinese olive and longan. There were few cucurbits (*kua*), but this feature was one of the few containing imported *luo han guo*. The macrobotanical specimens also included an additional carbonized wheat caryopsis.

Feature 85-31/18

Feature 85-31/18 was a wood-lined pit (measuring about 1.8 by 1.2 meters and 0.9 meters deep) located in an area of merchant/professional activity (Cummings et al. 2014:151). Seven matrix samples contained a large number (8183) and variety (45 taxa) of plant remains, but most of these came from two of the Layer 2/3 interface matrix samples. Blackberry/raspberry seeds made up the vast majority (83%) of the plant remains in the matrix samples, followed by grape, tomato, and smaller numbers of sesame (*Sesamum indicum*), fig, strawberry (*Fragaria*), prickly pear (*Opuntia*), elderberry (*Sambucus*), and Szechuan pepper (*Zanthoxylum*). These high numbers of very small seeds that pass through the digestive system relatively intact are characteristic of a privy deposit. In addition, they indicate that at least two of the matrix samples were collected using a fine screen. The proportion of cucurbits (*kua*) in the matrix was low. In contrast, these samples contained the greatest number of rice, wheat, and barley (*Hordeum vulgare*) grains in the matrix samples. (One rice grain had a hull fragment adhering to it, demonstrating that some rice was shipped with the hull on.) A possible foxtail millet (*Setaria italica*) grain also was recovered. Other large-seeded local fruits were not particularly abundant, and the watermelon and apple/pear (*Malus*/Pyrus) seeds were generally carbonized, unlike in other samples. Imported taxa include several that are rare in the samples: ginkgo (*Ginkgo biloba*), Chinese "plum" (*Prunus mume*), shiitake mushroom (*Lentinula edodes*), winter radish (*Raphanus sativus*), and adzuki/mung beans (*Vigna*). The matrix samples also contained a wide variety of wild taxa, including many burnt grass seeds (Poaceae, *Bromus*, *Hordeum*) and two taxa that often grow in mesic habitats: sedge (Cyperaceae) and knotweed (*Polygonum*, a potential medicinal plant). The presence of manzanita (*Arctostaphylos*) indicates that some wild plants were brought to town from the dryer chaparral or woodland. Although only 1.2% of the remains in the matrix samples were carbonized, this is a relatively high proportion given the overwhelming presence of uncarbonized, smaller seeds that typically accumulate in privy deposits.

The 46 bags of macrobotanical specimens from Feature 85-31/18 contained 100 items representing 17 taxa. It appears that these specimens were collected from screened soils, as they consist mainly of large-seeded fruits. Imported taxa (Chinese olive, longan, Asian pheasant tree, and litchi) outnumber the local ones, although there are more local taxa (peach, apricot [*Prunus armeniaca*], cherry [*Prunus*], plum, and olive [*Olea europaea*]) than in the matrix samples. Of the one hundred items, 34 were unburnt grape seeds, so the high percentage of carbonized items (47%) indicates that most other remains were burnt. Two of these are bulb or shoot bases that could be a leek or spring onion (*Allium*). Cucurbits again are underrepresented compared to the rest of the assemblage. The only wild seed resembles box elder (*Acer negundo*), a local tree.

Three flotation samples from Feature 85-31/18 have been analyzed, one by Wohgulmuth and Honneysett (Clevenger 2004:39) and two by Puseman et al. (2012). Wohgulmuth and Honneysett (Clevenger 2004:39) recovered items similar to the matrix samples, with burnt ginkgo, rice, olive, and wheat, more burnt than unburnt watermelon, and hundreds of unburnt blackberry/raspberry seeds. Puseman et al. (2012) found overall that Sample 8, from Level 2, contained items reflecting the local environment, while Sample 9, from Level 3, contained evidence of economic plants. The range of macroremains in the flotation samples was smaller than the matrix samples, and all the taxa, except for jujube and a few wild taxa, also were identified in the matrix samples. Sample 9 contained many cereal grain phytoliths, supporting the presence of grains in the matrix samples. The Sample 9 pollen was dominated by *Agave*-type and Brassicaceae, suggesting the use of possible lily and mustard family plants, none of which have preserved in the macroremains. Charcoal from the sample, while not abundant, supports the manzanita seed evidence from the matrix sample that people or animals were carrying in plants from the surrounding countryside. California bay (*Umbellularia californica*) and buckthorn (*Rhamnus*) were not lumber sources and were transported into San Jose for fuel or some other purpose.

Feature 85-31/20

Feature 85-31/20 was a wood-lined trash pit located near Features 85-31/12 and 85-31/13. Five bags of macroremains contained 13 items representing 8 taxa. No small items were identified, so it is not surprising that 54% of the remains were carbonized. The most unusual of these were burnt grapes (fruits) and the other burnt seeds came from plum, peach, litchi, and the Asian pheasant trees. The unburnt remains included bitter melon, an unidentifiable Cucurbitaceae fragment, black walnut (*Juglans hindsii*), litchi, and peach. Wohgulmuth and Honneysett (Clevenger 2004:39) analyzed a flotation sample from this feature, identifying hundreds of fig and blackberry/raspberry seeds, some burnt watermelon, litchi, plum, black walnut, bulb and nutshell remains, as well as unburnt grape and bitter melon seeds. Thus the flotation sample provided evidence that the pit was used as a privy as well as for kitchen waste.

Feature 85-31/24

Feature 85-31/24 was a wood-lined trash pit located in the far southern part of the site. Two unburnt peach pits and one unburnt melon (*Cucumis melo*) seed were identified.

Feature 85-31/28

Only three macroremain specimens were submitted from Feature 85-31/28, an unlined trash pit located in an area of merchant/professional activity (Cummings et al. 2014:151): two unburnt peach pits and one unburnt bitter melon seed. Puseman et al. (2012) analyzed one flotation sample (Sample 10) from the feature, finding some evidence of privy deposits (strawberry, fig, grape, blackberry, tomato, and elderberry) and kitchen waste (wheat, bitter melon, cucurbit seed fragments, and walnut). Phytolith analysis revealed numerous rice leaf and stem phytoliths and cereal grain husk phytoliths, while the macroremains contained carbonized and uncarbonized rice florets. Since rice was not grown in California at this time, the source and purpose of the stem and husk material is intriguing. They most likely came from packing material that was discarded in the privy, perhaps as a capping layer or after use as bedding or feed for the livestock in Chinatown.

Feature 86-36/5

Feature 86-36/5 was a large wood-lined pit (measuring 3.25 by 1.25 meters and 2.2 meters in depth) located in an area of tenement housing (Cummings et al. 2014:151). Two matrix samples were analyzed, from Layers 6 and 8, but their results were combined for this discussion since they contained similar taxa in generally similar proportions. The estimate of total seeds in the matrix samples was 19,184, with about 75% coming from Level 8. Forty taxa were identified and only 0.6% of the remains were carbonized. The high percentage of uncarbonized seeds reflects the preponderance of seeds from privy activity: 94% of the seeds were blackberry/raspberry. Tomato seeds were the next most abundant, followed by grape, currant/gooseberry (*Ribes*), fig, and strawberry. Fig and strawberry seeds, which are extremely small, outnumbered tomato seeds in the flotation samples analyzed by Puseman et al. (2012), indicating that some of the smallest seeds may be missing in these matrix samples. Other privy-derived seeds included sesame, Szechuan pepper, prickly pear, and elderberry. The range of larger fruits was somewhat small (apple/pear, watermelon, English walnut [*Juglans regia*], plum, and jujube), but there were a fair number of cucurbits. Although masked in the sample proportion calculation by the huge number of small seeds, there were usually high numbers of carbonized grains (wheat and rice) and beans (common bean/soybean [*Phaseolus vulgaris*/*Glycine max*] and pulse fragments) in these samples. A couple of unburnt rice florets were present. In addition this feature contained many wild and weedy taxa. Local trees were represented by big leaf maple (*Acer macrophyllum*), black locust (*Robinia* pseudoacacia), and Western sycamore (*Platanus racemosa*). Unburnt *Medicago* seeds (more likely burclover than alfalfa) could have come from open lots or agricultural fields, while the Western sycamore, pondweed (*Potamogeton*), bulrush (*Scirpus*), and dock (*Rumex*) probably came from moist habitats. Mallow and sumac (*Rhus*) are local taxa with known medicinal uses. Velvet-leaf (*Abutilon theophrasti*), motherwort (*Leonurus*), and Chinese boxthorn (*Lycium chinense*) are potential medicinal plants that are rare or not known to grow in California. Three types of seeds from this feature were in pristine condition: velvet-leaf, black locust, and lupine (*Lupinus*, also recovered from Feature 85-31/18). These are long-lived seeds with durable seed coats, but they raise the possibility of more recent contamination of the deposits. Given the extreme rarity of velvet-leaf in

California, and the lack of evidence of disturbance from other studies, at present, it seems prudent to consider them part of the Chinatown-era assemblage.

The macrobotanical specimens from Level 6 are less abundant and diverse than those from Level 8, but generally similar, so they were combined for this analysis. Peach is the only taxa exclusive to Level 6. Overall 1863 items representing 23 taxa were identified from Feature 86-36/5; 1% was carbonized. Again the samples were dominated by blackberry/raspberry (87%). Cucurbits, including hairy gourd, winter melon, bitter melon, and *luo han guo* comprised over half of the remaining of sample. This feature had the only occurrence of snake gourd (*Trichosanthes anguina*), a possible import whose seed is used in traditional Chinese medicine. Other small privy-type seeds included grape, fig, strawberry, and tomato, while the larger fruits included local watermelon and English walnut and imported Chinese olive and gingko. Like the matrix sample, Level 8 had the highest number of domesticated beans in the assemblage. One burnt wheat grain and one unburnt rice floret were present. The few weedy plants included three hirsute modern-looking plant bracts, two mallow seeds, and a probable California burclover pod.

Puseman et al. (2012) analyzed three flotation samples from Feature 86-36/5 (Samples 1,2, and 3) and the macroremains similarly show the use of the pit as a privy and trash pit. They also identified a motherwort seed. The analysis of microremains provided a broader picture of the local environment and economic plants. For example, large amounts of Brassicaceae pollen showed that mustard family plants (e.g. radish, turnip, mustard) probably were eaten although these moist, fleshy roots and leaves have not preserved. In addition, they identified pollen from *Canavalia*, *Phaseolus*, *Pisum* -type, and *Vicia*–type beans, which might come from fresh legumes. The samples contained many rice glume, leaf, and stem phytoliths along with cereal grain and maize cob phytoliths.

Feature 86-36/6

Feature 86-36/6 was a circular unlined trash pit located in an area of merchant/professional activity (Cummings et al. 2014:151). The macrobotanical specimens totaled 17 items representing 6 taxa, all fruits and nuts. Litchi seeds comprised 41% of the remains; the rest were Chinese olive, Asian pheasant tree, apricot/plum, plum, and English walnut. Most were carbonized (71%), which could indicate that large pits (i.e. trash) were burnt before disposal in pits. The flotation sample (Sample 4) analyzed by Puseman et al. (2012) recovered no cultigens, but a few carbonized wild seeds, including sumac, a large grass, and clover (Trifolium). The sample was collected from Layer 2 (also the location of many of the macroremain specimens), a deposit of ash containing both burnt and unburnt bone. Thus the remains were not burnt in situ, but probably came from cleaning out an oven, roasting pit, above ground trash burn, or some other location of burning. The low pollen numbers confirm that this was a deposit of burnt material, since fire destroys pollen. However, there were large numbers of rice leaf and stem phytoliths in the ash, which raises the possibility some of the ash comes from material used as fuel or kindling, or that the stems and leaves was burned as trash.

Feature 86-36/7

Feature 86-36/7 was a wood-lined pit or possible cistern located in an area of tenement housing (Cummings et al. 2014:151). The only macroremain submitted was an unburnt peanut shell. Puseman et al. (2012) analyzed a flotation sample (Sample 6) from the feature, identifying a modest amount of remains including blackberry, tomato, fig, strawberry, cucurbit, and some wild taxa. The phytoliths showed few economic types, and the pollen showed a mix of economic and local vegetation taxa.

Feature 86-36/8

Feature 86-36/8 was a bone pit near Feature 86-36/5. The 36 macroremains from the pit were all cucurbits, primarily bitter melon (69%) and the rest hairy gourd and winter melon. None were carbonized.

Feature 86-36/9

Feature 86-36/9 was a wood-lined trash pit near Feature 86-36/7. Of the 13 items submitted for identification, olive pit and peanut shell were the most common. Other taxa were apricot/plum (the only burnt item), English walnut, an English elm fruit (*Ulmus minor*), and unidentifiable seeds fragments. The English elm fruit has a fairly delicate wing which is in excellent condition, so it seems likely that this was introduced during the excavation of the feature.

Feature 86-36/12

Only one item, an unburnt English walnut fragment, was identified from Feature 86-36/12, an unlined trash pit.

Feature 86-36/13

Feature 86-36/13 was a wooden structure located in the vicinity of Features 86-36/5 and 86-36/7. Three matrix samples were analyzed from three levels of the feature, and in general they contained the same taxa and proportions of remains, so they were combined for the analysis. Feature 86-36/13 was the richest feature, with 58 taxa totaling an estimated 34,195 items; only 0.03% was carbonized. Seiter and Worthington (2013) similarly found that this feature contained the most wood and the widest variety of wood species of all the features they analyzed. The matrix plant remains were so numerous that only small portions of the 0.50-4.00 mm fractions were sorted. While, as already mentioned, subsampling can inflate the numbers of rare taxa, this is particularly true in these samples where the subsamples were very small. Consequently, if a rare item was encountered in the subsample, the estimated whole sample amount (i.e. multiplied by 8 or 16 depending on the sample) might be inflated compared to a rare item identified while scanning the unsorted portion of the same sample, which was counted as one only. This cautions us not to consider differences in the quantity of taxa significant if the difference is counts of 10 or 20.

The majority of the Feature 86-36/13 matrix sample seeds came from privy deposits. Blackberry/raspberry seeds made up 67% of the remains, followed in decreasing abundance by grape, tomato, strawberry, and fig. There were smaller amounts elderberry, currant/gooseberry, Chinese boxthorn, prickly pear, sesame and Szechuan pepper, and chili pepper (*Capsicum*). The samples contained many cucurbits, including some possible cucumber (*Cucumis sativus*), and a variety of larger fruits. Local taxa included a lot of watermelon as well as apple/pear, melon, peach, and cherry. Jujube, Chinese olive, Chinese "plum," litchi, ginkgo, and Asian pheasant tree were among the imported taxa. With all these seeds, only one wheat grain, and one rice floret, and a few beans were recovered. While probable panic grass/millet (*Panicum*) and bristle grass/millet (*Setaria*) bracts were also recovered, these could be wild taxa. Wild plants were extremely diverse and could have come from open areas in town or humid habitats. They included red maids (*Calandrinia*), heath family (Ericaceae), lily family (Liliaceae cf.), burclover/alfalfa, knotweed, bulrush, and nightshade family (Solanaceae) to name a few. Chinese boxthorn and cocklebur (*Xanthium strumarium*) could have been used as medicine. The only carbonized seeds besides the wheat and beans were a nightshade family seed, two litchi, seeds and some unidentifiable seed fragments.

Nine bags of macroremains from Feature 86-36/13 were submitted for analysis. Eight were tabulated together. One of these, catalog number 86-36/13-212, was a coconut shell (*Cocos nucifera*) with matted midden debris adhering to the inside. This midden debris was water screened to recover additional botanical specimens. Altogether, the eight bags contained 645 items representing 30 taxa; 1% of the items were carbonized. The macroremains were collected from a screen small enough to catch grape seeds (52% of all remains), but too large to catch many of the smaller items such as blackberry/raspberry, fig, strawberry, and rice floret fragments. However, these were present in the midden debris recovered through water screening from the coconut shell (catalog number 86-36/13-212). The number of cucurbit seeds was not high, relative to other samples. But there were many watermelon, Chinese olive, and peach seeds along with a variety of other fruits. This was the only feature in this study where coconut was recovered. No cereal grains were found. The only carbonized items were one common bean/soybean (*Phaseolus vulgaris*/*Glycine max*), one pulse, and one Chinese olive. The only wild plant items -warty spurge (*Euphorbia spathulata*) and bristlegrass (Setaria) bracts- came from inside the coconut shell.

The ninth batch of macroremains from Feature 86-36/13 was tabulated separately in Tables 6 and 8 because it had so many seeds. This batch (catalog number 86-16/13-194, from Layer 2) contained an estimated 5956 items representing 39 taxa; none were carbonized. Blackberry/raspberry seeds made up 72% of the items. Table 8 also shows the relative proportion of taxa without including blackberry/raspberry (numbers in italics). Of these, 57% were grape and there were significant amounts of currant/gooseberry, prickly pear, fig, strawberry, tomato, and watermelon. The cucurbits included possible cucumber and the only occurrence of possible *Cucurbita maxima* squash/pumpkin. The larger fruits are similar to those found in the other matrix samples and macrobotanical batches from this feature. High numbers of possible Chinese boxthorn support their being something ingested (be it for medicinal or subsistence purposes) rather than accidental inclusion. Kiss me over the garden gate (*Polygonum orientale*) could be from an ornamental plant and/or medicine. An array of other plants (e.g. Brassicaceae, miner's lettuce [*Claytonia perfoliata*], groundcherry [*Physalis*], and knowtweed) probably reflects the local weedy vegetation, but parts of these plants could have been collected as potherbs or for medicinal purposes.

Feature 86-36/14

Three uncharred items were collected from Feature 86-36/14, a redwood-lined trash pit. One was a large squash/pumpkin seed that resembles *Cucurbita moschata*; another was English walnut shell; and the third was a stiff monocotyledon leaf tip.

Feature 86-36/15

Feature 86-36/15 was a wooden structure that may have been part of Feature 86-36/13. The macrobotanical specimens support this interpretation or the mixing of deposit from the two structures. (Excavators remarked that the deposits were disturbed.) Plant remains from the two features are similar. Ninety-three items were recovered, representing 10 taxa, and none were carbonized. Grapes were the predominant taxa (59%), with some blackberry/raspberry, tomato, and fig. The proportion of cucurbits was similar to that of Feature 86-36/13, but of particular interest, Feature 86-36/15 contained 10 cucurbit seed kernels. The only other feature with cucurbit seed kernels was Feature 86-36/13 (Catalogue number 86-36/13-144). Large fruit remains were rare, with only one watermelon seed and one apricot/plum pit.

Feature 86-36/17

Feature 86-36/17 was a wood-lined trash pit. Seven unburnt Chinese olive pits and one unburnt Asian pheasant tree seed indicated the disposal of trash from imported fruits in the feature.

Feature 86-36/18

Feature 86-36/18 was a large redwood-lined trash pit located at the far northwestern corner of Block 1. It measured 2.7 by 1.3 meters in extent and 1 meter deep. Three matrix samples contained 770 items, representing 16 taxa; only 0.5% was carbonized. Almost all the remains were blackberry/raspberry seeds (96%), but unlike other features, sesame makes up the largest portion of the rest. Other taxa typical of privy deposits were grape, Szechuan pepper, currant/gooseberry, and fig. A smattering of wild taxa included mallow, burclover, sweetclover (*Melilotus*), a wild bean (Fabaceae), and cypress family (Cupressaceae) leaves. Only two cucurbit seeds were found, but based on the macrobotanical specimens (see below) this is the result of collecting the matrix samples from below a screen that caught the large items. Four carbonized items were a cereal grain, a possible adzuki/mung bean, a currant/gooseberry seed and the wild bean. The sample from Layer B contained the most items.

Five bags of macroremains contained 32 items representing 15 taxa; 16% was carbonized. Cucurbits were the largest portion of the remains, with high amounts of *luo han guo* compared to other features. This was also the only feature with spring bitter melon (*Momordica cochinchinensis*), an imported taxon whose seeds are used in traditional Chinese medicine. Since the fruit is eaten when young, and these seeds are mature, they seem likely to represent the medicinal use. Fruits and nuts include a variety of local taxa (grape, peach, cherry, watermelon, black walnut, and peanut) and a couple of imported taxa (Chinese olive and Asian pheasant tree). No grains or beans were recovered, but this feature contained one of only two maize cobs found in this study. No wild taxa were present, perhaps because very small items were not collected or pulled from the screens by the original excavators. The carbonized items were the maize cob, one Chinese olive pit, the Asian pheasant tree seed, and two unknown fruits. Together the matrix samples and macrobotanical remains show a mix of privy deposits and kitchen trash.

Feature 86-36/19

Feature 86-36/19 was an unlined trash pit. Eleven taxa of plants, totaling 99 items, were collected from the feature; 6% was carbonized. Almost 90% of the items were cucurbits, mainly hairy gourd, winter melon, and bitter gourd. Other items included peanut shell, one with a peanut inside, Chinese olive, longan, litchi, peach, plum, and cherry. Many of the large pits and seeds were carbonized.

Feature 86-36/20

Feature 86-36/20 was a wood-lined trash pit near Feature 86-36/19. With only 10 items representing six taxa, none were abundant. Three were winter melon seeds, two were watermelon seeds, and one each were peanut shell fragment, carbonized peach pit, carbonized peach pit kernel, and carbonized maize cob fragment. The tenth item was a loculicidal capsule with only two carpels, so it is not from the lily family.

Feature 88-91/26

Feature 88-91/26 was an unlined trash pit that contained 157 items representing 15 taxa; 8% was carbonized. This feature had the highest concentration (73%) of winter melon seeds, with a smattering of other fruits, both local (grape, peach, plum, and cherry) and imported (longan and Chinese olive). Again the majority of large fruits were burnt. This was the only feature in this study that contained sorghum (*Sorghum bicolor*), both carbonized, although Puseman et al (2012) found sorghum in Feature 85-31/6. The wheat and common bean/soybean also were carbonized.

Discussion

The Market Street Chinatown matrix samples and macrobotanical specimens contained a mix of cultivated and non-domesticated, or wild/weedy taxa, but the most ubiquitous and abundant remains were cultivated plants, and the variety was impressive (Table 9). Peach was the most common food remain, recovered in 15 of the 26 features, followed by bitter gourd in 14 features, Chinese olive in 13 features, winter melon in 10 features, and peanut, hairy gourd, watermelon and apricot/plum in 9 features. Many of these taxa were not abundant, but their ubiquity attests to their widespread consumption. Grape was the most common small seed, found in 8 features, but the absence of blackberry/raspberry and other small seeds in most features most likely stems from the lack of matrix or flotation samples, where small seeds were collected. The matrix samples contained both large and small cultigens, indicating that most features were used both as trash pits and as privies. Blackberry/raspberry seeds were by far the most abundant remains in the assemblage, followed by grape, tomato, strawberry, watermelon, and fig in the matrix samples, and grape, winter melon, tomato, and watermelon in the macrobotanical specimens. These fruits produce many seeds, but the huge numbers of blackberry/raspberry and grape suggest that these were preferred fruits.

The plants recovered from Market Street Chinatown represent a variety of activities at the site. Food was purchased from local farms and imported from China, sold at stores, and prepared for daily meals and festivities. Cooking and eating created trash from unused by-products, such as peach pits, cooking accidents that burned or spoiled food, fuel, and human waste. Chinatown residents also visited local doctors, drugstores, and grocery stores to obtain medicine, or may have gathered familiar medicinal herbs when they were in the countryside (Bowen 2002). Horses, pigs, and chickens required food and bedding material and produced soiled bedding and manure that needed to be removed. The movement of people and animals in and out of town was a means for the introduction of non-local wild plants. Some may have been collected on purpose for food or medicine, some may have been eaten by animals, and others probably were transported accidentally. Weeds growing in Chinatown may have blown in and been swept up for disposal. These and other activities created a large amount of waste and trash that needed to be removed.

The Market Street Chinatown features were filled with this trash and waste as well as accidental inclusions. Human waste, containing small seeds from fruits and vegetables, was deposited in privies. Some kitchen waste, such as cucurbit seed and large fruit pits, may have been tossed in privies or trash pits. Other kitchen waste was probably fed to the livestock. Henry (2012:68) found a large number of rat bones in Feature 86-36/5, perhaps representing disposal of carcasses from rat catching or other pest management tactics. However rats likely also entered the trash pits while alive, burrowing into trash pits and mixing the deposits; they probably ate a variety of discarded foods and jeopardized stored foodstuffs as well. If the privies/trash pits were covered by lids or structures, relatively few non-edible wild or weedy seeds would blow into or be carried into the pits, for example those carried on shoes or clothing when people opened the pits to dispose of human waste or trash. Therefore wild/weedy seeds in these deposits likely represent capping episodes, dumping of backyard sweepings or weeding, or seeds that entered when the pit was open to the elements (perhaps during periodic cleaning out). Privy and trash deposits may periodically have been capped with fill to reduce the smell. If the fill came from nearby open areas, it could contain local weeds. Some fill could have included trash from the occupants who lived in the area prior to the arrival of the Overseas Chinese, unearthed when digging pits. With the large Chinatown population it is possible that privies were periodically cleaned out as they were in other urban areas. Some human waste may have been collected to fertilize the crops in nearby truck gardens (Nordhoff as cited in Spier 1958:81). The Chinatown residents may also have burned some of the trash, throwing fruit pits and smaller items into ovens and hearths along with firewood and coal, and burning larger amounts outside. The resulting ash and embers may then have been dumped into trash pits and privies.

While the unusual wealth of uncarbonized remains from Market Street Chinatown provides information on many plants that are rarely preserved in archaeological sites, the carbonized remains also offer insights into Chinatown life. Twenty-four of the taxa recovered from Market Street were always or mainly burnt. These include all the cereal grains and beans, as well as longan, litchi, Asian pheasant tree, wild grasses, and a few other wild taxa. This study and Puseman et al. (2012) found only burnt wheat, rice, barley, sorghum, foxtail millet, and maize, although unburnt rice florets and spikelets were common. Similarly the common bean/soybeans, adzuki/mung beans, chickpea, and peas were all burnt. The grains and beans may have been accidentally burnt during cooking, as was surely the case for the onion/garlic bulb, the grape fruit, and the olive fruit in the assemblage. Other activities that may have produced the burnt grains include charring barley and wheat to prepare medicines, burning the dung of grain-fed animals, and general burning of trash. Why would grains and beans only occur in a carbonized state? Since most are as dense as many of the uncarbonized taxa found in the same features, it is not a matter of preservation or decomposition. It seems likely that unburnt grains and beans were eaten by scavenging animals, such as the pigs, chickens, dogs, and rodents that also lived in Chinatown, leaving behind only the burnt ones. A comparison of the Market Street Chinatown feature contents reveals that the number of charred remains is one of several variables that distinguish one from another.

Of the 26 Chinatown features in this study, only 9 had flotation (Puseman et al. 2012) or matrix samples that collected small seeds; these provide the most representative picture of plant use and form the core of this discussion. Most of the features contained a mix of privy and kitchen waste, but in different proportions and with different types dominating the non-privy remains. Some of this variation may be explained by the size of the sampled deposit, which unfortunately was not recorded for the matrix samples and macrobotanical specimens. Larger deposits, or more dumping episodes, would reflect plant use by more people over a longer time span. This, in addition to the collection of larger remains, probably explains most of the differences between the results from this study and that from the same features by Puseman et al. (21012).

Feature 86-36/13 stood out from the others, containing the greatest variety of taxa (69) and highest quantity of remains. Small seeds from privy deposits, cucurbits, and seeds from large fruits were abundant and there were a large variety of non-domesticated seeds. In contrast, there were very few grains and beans and few burnt remains. If these contents reflect the meals of tenement occupants, since it was located near Feature 86-36/5, it shows a broad diet with both local and imported foods. I would suggest that the lack of grains is more a result of the lack of burnt remains rather than dietary choices.

In contrast to Feature 86-36/13, Feature 85-31/18,with the second highest variety of plants (53), had many imported foods and numerous small seeds, but low numbers of cucurbits, and the highest number of grains of the matrix samples and high numbers of cereal grain phytoliths. High grain counts seem correlated with evidence of burning. While the charcoal densities of the flotation samples were moderate (Puseman et al. 2012), many of the large fruit seeds were carbonized although some types of fruit seeds were seldom burnt, such as watermelon and apple/pear. Many rare taxa were found in the feature, which may reflect that it was associated with merchant/commercial buildings as well as the increased potential for preservation with charring. These included the leek/spring onion, shiitake mushroom, Chinese “plum,” radish, and apricot.

Feature 86-36/5 had the second highest number of remains, 46 taxa, and contents more like Feature 86-36/13, although it was in an area of tenements. It contained many small seeds, cucurbits, and non-domesticates, but it also had many grains and beans compared to the other features analyzed. Puseman et al. (2012) recorded high densities of charcoal in layers 6 and 8, which is one index of burning activity, and high numbers of cereal stem, leaf, and grain phyotoliths. This again suggests that evidence of burning is associated with the quantity of grains and beans in the features.

Feature 85-31/6 was also a merchant associated deposit with evidence of significant burning. Puseman et al. (2012) recorded fairly high charcoal densities, high cereal grain and bean counts, and phytoliths from grain by-products, which may be the result of burning. The macroremains contained taxa that were rarely burnt (grape and watermelon) along with a fair number of burnt imported fruit seeds. It also had a high proportion of unburnt winter melon seeds, and low counts of small fruit seeds evidencing a mix of trash more than a privy deposit. Another sample with many cereal grains, Feature 85-31/13 (association unknown) followed a similar pattern with primarily carbonized seeds of large fruits. Small remains were not collected from the feature or were not present. Feature 85-31/11 had few privy remains and low charcoal density, but a high percentage of charred remains, especially maize fragments and beans. Maize cobs may have been used as fuel. In addition, the many burnt grass and weed seeds may have come from burnt animal dung.

Another group of features share one of the following traits: high numbers of uncharred cucurbits or seeds of large fruits that were predominantly charred. Again, for some, small remains were not collected or not present. The macrobotanical specimens from Feature 85-31/1 mainly were burnt seeds from large fruits, while those from Feature 86-36/8 all were cucurbits. Features 85-31/2 and 86-36/19 contained many unburnt cucurbits, but the large fruit seeds were burnt. Feature 88-91/26 contained many unburnt cucurbits, and burnt seeds from large fruits, along with a bit of wheat, sorghum, and bean. While the hand-picked macroremains from these features may not have been a random selection of the seeds in the screen or deposit, it seems unlikely that they would have favored cucurbits over other taxa or charred over uncharred large fruits pit and seeds. Concentrations of the cucurbits could well reflect that they were an easily available vegetable or that the samples come from one dumping episode.

Two features showed evidence of burning without extensive cereal remains. The Feature 85-31/28 macroremains added little to the results obtained by Puseman et al. (2013) of merchant-related plant use. There was some evidence of privy deposits, but they were mixed with kitchen waste. Most notable were the fairly high charcoal densities, rice florets, and cereal grain, leaf and stem phytoliths. A similar phytolith assemblage came from Feature 86-36/6, which looked like an ash lens from a burn deposit, perhaps from cleaning out an oven. There were few small seeds, many large burnt seeds and pits, and many rice leaf and stem phytoliths, which as mentioned above may have been from kindling or may have been a way to get rid of packing material or soiled straw.

Feature 86-36/18, which was some distance from the other sampled features, had an unusual group of remains. It contained a mix of privy and trash deposits, with relatively high amounts of atypical imported taxa, sesame and *luo han guo*, and the only spring bitter melon seed. There was little evidence of burning and very few cereal grain and bean, although a maize cob fragment was recovered.

The Market Street macroremains present a picture of Chinatown life with an ample and varied diet supplied by local farms and imported from China. Many of these products were grown by Overseas Chinese, who began farming traditional crops soon after arriving in California as share croppers and truck gardeners (Chan 1986; Spier 1958:81). They primarily grew vegetables and small fruits, and according to Nordhoof (cited in Spier 1958:81), by 1872 two thirds of the vegetables in California were grown by Chinese farmers. Other farmers worked in the fruit orchards that thrived in the Santa Clara Valley and beyond (Chan 1986; Jacobson 1984). Many of these vegetables and fruits and some of the non-domesticates recovered from the Chinatown features provided the balanced diet and other herbs that were needed to promote good health according to traditional Chinese cuisine and medicine.

Nonetheless, Puseman et al.'s (2012) pollen and phytolith research and documentary sources tell us that some important Chinese plant foods are missing from this assemblage. Anderson and Anderson (1977:328) describe the typical 20th century diet in southern China as primarily rice, soybeans, cabbages, mustards, and radishes. Hsu (2000:21) cites a report from an 1893 edition of The Taishan Gazetteer of southern Guangdong that "farming provided a varied diet; in addition to starches such as rice, taro, and sweet potatoes, crops included 24 types of vegetables, 12 kinds of melons, and 24 different fruits." The lists of foods typically imported from China included cabbage sprouts in brine, oranges, bamboo shoots, yams, ginger, and chestnut flour to name a few (Coe 2009: 118-119; Spier 1958:80). Prepared foods such as steamed dumpling and noodles would commonly have been eaten. And given the reports of extensive, perhaps daily, use of herbal teas, *liangsha*, and *bupin*, by the Overseas Chinese (Culin cited in Bowen 2002:176; Hu 2005) we probably are missing many traditional Chinese remedies.

Macroremains from Market Street Chinatown attest to the strong ties between the Overseas Chinese and traditional Chinese foodways as well as the active role the Overseas Chinese took in molding 19th century farming in California. They used their expertise in farming to supply the Chinese vegetables that were a major part of their diet and essential to their health, and to expand their consumption of familiar non-Chinese foods that were less commonly eaten in southern China. This study confirms the results of Cummings et al. (2014) showing a general similarity in the foods eaten by different occupations and classes, with variation among features more likely due to the amount of privy deposits, kitchen waste, mixing of deposits with fill, and burning of garbage peculiar to each feature.

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Tables

Table 1. Provenience and Subsample Information for the Matrix Samples from Market Street Chinatown, San Jose, California.

			% of Screen Fraction Sorted[2]				%	Total	
Catalog #	**EB #[1]**	**Provenience**	**#5**	**#10**	**#18**	**#35**	**Scan**	**Wt (g)**	**Context**
85-31/13-495	5461	Feature 85-31/13	100	100	100	100	100	194	wood-lined pit
85-31/13-496	5462	Feature 85-31/13	100	100	100	100	100	51	
85-31/18-994	5455	Feature 85-31/18, Level 2	100	100	100	100	100	51	redwood-lined trash pit
85-31/18-966	5450	Feature 85-31/18, Level 2	100	100	100	100	100	73	
85-31/18-995	5451	Feature 85-31/18, Level 2	100	100	100	100	100	253	
85-31/18-927	5453	Feature 85-31/18, Level II/III interface (redwood interface)	100	100	12.5	100	100	5000	
85-31/18-926	5449	Feature 85-31/18, Level II/III interface (shoe leather)	25	25	25	25	25	4250	
85-31/18-952	5454	Feature 85-31/18, Level 2/3 interface	100	100	100	100	100	236	
85-31/18-996	5456	Feature 85-31/18, Level 2/3	100	100	100	100	100	30	
86-36/5-1836	5459	Feature 86-36/5, Level 6	100	100	25	25	100	2000	wood-lined trash pit
86-36/5-1893	5460	Feature 86-36/5, Level 6	100	100	50	50	100	500	
86-36/5-1892	5457	Feature 86-36/5, Strata 8	100	25	25	100	100	2000	
86-36/5-1895	5452	Feature 86-36/5, Stratum 8	25	25	25	25	25	2500	
86-36/5-1896	5458	Feature 86-36/5, Layer 8	100	25	25	100	100	2000	
86-36/13-337	5463	Feature 86-36/13, Top Layer	100	6.25	6.25	100	100	1500	wooden structure
86-36/13-338	5464	Feature 86-36/13, Layer 2	100	12.5	12.5	100	100	2000	
86-36/13-339	5465	Feature 86-36/13, Layer 3	100	12.5	12.5	100	100	2000	
86-36/18-558	5467	Feature 86-36/18, Cell 2 Interior, Level A	100	100	100	100	100	2500	redwood-lined trash pit
86-36/18-592	5468	Feature 86-36/18, Cell 3, Layer B	100	100	100	100	100	1500	
86-36/18-555	5466	Feature 86-36/18, Cell 1, Below Layer 3 to Floor	100	100	100	100	100	1500	

[1]The EB number is the laboratory accession number.
[2]Subsample based on weight.

Table 2. Provenience Information for the Macrobotanical Specimens from Market Street Chinatown, San Jose, California.

Feature	Catalog #	Level	Context
F 85-31/1	85-31/1-141		trash pit
F 85-31/2	85-31/2-195		wood-lined pit
	85-31/2-196		
	85-31/2-197		
	85-31/2-198		
	85-31/2-199		
	85-31/2-200		
	85-31/2-201		
	85-31/2-202		
	85-31/2-203		
	85-31/2-204		
	85-31/2-205		
F 85-31/6	85-31/6-45		unlined trash pit
	85-31/6-46		
	85-31/6-47		
	85-31/6-48		
	85-31/6-49		
	85-31/6-50		
	85-31/6-51		
	85-31/6-65	Level 1S	
	85-31/6-74	Level 1S	
	85-31/6-75	Level 1S	
	85-31/6-76	Level 1S	
	85-31/6-133	Level 2, ash lens	
	85-31/6-115	Level 3	
	85-31/6-116	Level 3	
	85-31/6-117	Level 3	
	85-31/6-118	Level 3	
	85-31/6-119	Level 3	
F 85-31/9	85-31/9-39	General Surface	bone pit
F 85-31/10	85-31/10-18	Level 1	unlined trash pit
F 85-31/11	85-31/11-1		bone pit
F 85-31/12	85-31/12-1		unlined trash pit
F 85-31/13	85-31/13-329	General Surface	wood-lined pit
	85-31/13-190	Level 3	
	85-31/13-195	Level 3	
	85-31/13-282	Level 4, bottom	
	85-31/13-199		
	85-31/13-248		
	85-31/13-249		
	85-31/13-310		

Table 2. (Continued)

Feature	Catalog #	Level	Context
F 85-31/18	85-31/18-482	Level 1	redwood-lined trash pit
	85-31/18-493	Level 1, E section	
	85-31/18B-39	Level 1, W section	
	85-31/18-150	Level 2	
	85-31/18-157	Level 2	
	85-31/18-213	Level 2	
	85-31/18-230	Level 2	
	85-31/18-235	Level 2	
	85-31/18-257	Level 2	
	85-31/18-258	Level 2	
	85-31/18-730	Level 2	
	85-31/18B-229	Level 2	
	85-31/18B-231	Level 2	
	85-31/18B-233	Level 2	
	85-31/18B-235	Level 2	
	85-31/18B-236	Level 2	
	85-31/18B-237	Level 2	
	85-31/18B-238	Level 2	
	85-31/18B-239	Level 2	
	85-31/18B-300	Level 2	
	85-31/18B-210	Level 2, E corner	
	85-31/18B-211	Level 2, E corner	
	85-31/18-256	Level 2, SE corner	
	85-31/18-317	Level 2, SE corner	
	85-31/18-300	Level 2, NW corner	
	85-31/18-307	Level 2, NW corner	
	85-31/18B-230	Level 2, W section	
	85-31/18-703	interface Levels 2/3	
	85-31/18-704	interface Levels 2/3	
	85-31/18-705	interface Levels 2/3	
	85-31/18-706	interface Levels 2/3	
	85-31/18-619	Level 3	
	85-31/18-620	Level 3	
	85-31/18-621	Level 3	
	85-31/18-622	Level 3	
	85-31/18-623	Level 3	
	85-31/18-624	Level 3	
	85-31/18-625	Level 3	
	85-31/18-626	Level 3	
	85-31/18-627	Level 3	
	85-31/18-628	Level 3	
	85-31/18-629	Level 3	
	85-31/18-630	Level 3	
	85-31/18-712	Level 3	
	85-31/18B-323	E section	
	85-31/18B-452		
F 85-31/20	85-31/20-43	Upper level,	wood-lined trash pit
	85-31/20-233	lower level	
	85-31/20-247	Lower level W	
	85-31/20-358	lower level, E	
	85-31/20-382	NE corner	

Table 2. (Continued)

Feature	Catalog #	Level	Context
F 85-31/24	85-31/24-205		wood-lined trash pit
	85-31/24-213		
F 85-31/28	85-31/28-15		unlined trash pit
	85-31/28-119		
F 86-36/5	86-36/5-799	Level 6	wood-lined trash pit
	86-36/5-1395	Level 8	
F 86-36/6	86-36/6-180	Level 2	circular trash pit
	86-36/6-181	Level 2	
	86-36/6-182	Level 3	
F 86-36/7	86-36/7-117	Level 1	wood-lined cistern
F 86-36/8	86-36/8-6	Level 1	bone pit
	86-36/8-27	Level 1	
F86-36/9	86-36/9-315	0-50 cm	wood-lined trash pit
F 86-36/12	86-36/12-20	General Surface	unlined trash pit
F 86-36/13	86-36/13-28	Level 1	wooden structure
	86-36/13-144	Level 1	
	86-36/13-194	Level 2	
	86-36/13-211	Level 3	
	86-36/13-212	Level 3	
	86-36/13-223	Level 3	
	86-36/13-226	Level 3	
	86-36/13-248		between Feature 13 and 14
	86-36/13-254		Between Feature 13 and 14
F 86-36/14	86-36/14-84	0-35 cm	redwood-lined trash pit
F 86-36/15	86-36/15-6	Level 1	wooden structure; part of F
	86-36/15-1	Level 2	
F 86-36/17	86-36/17-79	0-20 cm	wood-lined trash pit
F 86-36/18	86-36/18-304	Level A	redwood-lined trash pit
	86-36/18-182	Layer B	
F 86-36/19	86-36/19-17	Layer 1, 0-base	unlined trash pit
	86-36/19-312	0-base	
F 86-36/20	86-36/20-91		wood-lined trash pit
F 88-91/26	88-91/26-237		unlined trash pit
	88-91/26-238		
	88-91/26-239		
	88-91/26-240		
	88-91/26-241		

Table 3. Scientific and Common Names of Identified Market Street Chinatown Botanical Remains.[1]

Scientific Name	English Common Name	Chinese Common Name
Abutilon theophrasti	Velvet-leaf	Qing ma
Acer macrophyllum cf.	Big leaf maple	
Acer negundo cf.	Box elder	
Allium sp. cf.	Onion/leek	
Arachis hypogaea	Peanut	Luo hua sheng
Arctostaphylos sp.	Manzanita	
Asteraceae	Sunflower family	
Benincasa hispida var. *hispida*	Winter melon/white gourd	Dong gua
Benincasa hispida var. *chiehqua*	Hairy gourd/fuzzy melon	Mao gua
Bromus sp. cf.	Brome grass	
Brassicaceae	Mustard family	
Calandrinia sp.	Red maids	
Canarium cf. *album*	Chinese olive	Gan lan
Capsicum sp.	Chile pepper	
Cereal frag.	Wheat or barley	
Cicer arietinum	Chickpea	Ying zhui dou
Citrullus lanatus	Watermelon	Xi gua
Claytonia perfoliata	Miner's lettuce	
Cocos nucifera	Coconut	Ye zi
Cucumis melo	Melon	Tian gua
Cucumis sativus cf.	Cucumber	Huang gua
Cucumis sp.	Cucumber/melon	
Cucurbita maxima cf.	Squash/pumpkin (includes kabocha)	Sun gua
Cucurbita moschata cf.	Squash/pumpkin (includes butternut)	Nan gua
Cucurbita sp.	Squash/pumpkin	
Cucurbitaceae	Squash/gourd family	
Cupressaceae	Cypress family	
Cyperaceae	Sedge family	
Dimocarpus longan	Longan	Long yan
Dracotomelon dupperreanum	Asian pheasant tree	Ren mian
Ericaceae	Heath family (includes huckleberry and madrone)	
Euphorbia spathulata cf.	Warty spurge	
Fabaceae	Legume family	
Ficus carica	Fig	Wu hua guo
Fragaria sp.	Strawberry	Cao mei

Table 3. (Continued)

Scientific Name	English Common Name	Chinese Common Name
Ginkgo biloba cf.	Ginkgo	Bai guo
Hordeum sp.	Wild barley	
Hordeum vulgare	Barley	Da mai
Juglans hindsii	Northern California walnut, black walnut,	
Juglans regia	English walnut	Hu tao, he tao
Lentinula edodes	Shiitake mushroom	Tung ku
Leonurus sp.	Motherwort genus	Hong hua ai, Yi mu cao
Lilliaceae cf	Lily family	
Litchi chinensis	Litchi	Li zhi
Lupinus sp.	Lupine	
Lycium chinense cf.	Chinese boxthorn	Gou qi
Malus/Pyrus sp.	Apple/pear	Ping guo/Yang Li
Malva sp.	Mallow	
Medicago sp.	Burclover/alfalfa	Mu xu/ Zi mu xu
Medicago cf. *polymorpha*	California burclover	
Melilotus sp. cf.	Sweetclover	
Momordica charantia	Bitter gourd	Ku gua
Momordica cochinchinensis	Spring bitter melon	Mu bie zi
Monocotyledon	Includes grass, lily, and sedge families; parallel leaf veins	
Olea europaea	Olive	Qi dun guo, Mu xi lan
Opuntia sp.	Prickly pear	Xian ren zhang,
Oryza sativa	Rice	Dao
Panicum sp. cf.	Panic grass/millet	Ji zi, shu zi
Phaseolus vulgaris/ Glycine max	Common bean/soybean	Cai dou/da dou
Physalis sp.	Groundcherry	Suan jiang
Platanus racemosa cf.	Western sycamore	
Poaceae	Grass family	
Poaceae large	Large grass	
Polygonum orientale	Kiss me over the garden gate	Hong liao
Polygonum sp.	Knotweed	
Portulaca sp.	Purslane	Ma chi xian
Potamogeton sp.	Pondweed	
Prunus armeniaca	Apricot	Xing
Prunus mume	Chinese "plum," Japanese apricot	Mei hua
Prunus persica	Peach	Tao
Prunus sp. (cherry)	Cherry	Yang ying tao,

Table 3. (Continued)

Scientific Name	English Common Name	Chinese Common Name
Prunus sp. (plum)	Plum	Li, Yang li
Pulse frag.	Cultivated bean fragment	
Raphanus sativus cf.	Winter radish	luo bo
Rhus sp.	Sumac	Yan fu mu
Ribes sp.	Currant/gooseberry	Cu li
Robinia pseudoacacia	Black locust	Yang huai
Rosaceae	Rose family	
Rubus sp.	Blackberry, Raspberry	Xuan gou zi
Rumex sp.	Dock	Suan mo
Sambucus sp.	Elderberry	
Scirpus sp.	Bulrush	
Sesamum indicum	Sesame	Zhi ma
Setaria italica cf.	Foxtail millet	Xiao mi, Liang
Setaria sp. cf.	Bristle grass/millet	
Siraitia grosvenorii	*luo han guo*	Luo han guo
Solanaceae	Nightshade family	
Solanum lycopersicum	Tomato	
Sorghum bicolor	Sorghum	Gao liang
Trichosanthes anguina	Snake gourd	She gua
Triticum durum/aestivum	Wheat (naked, includes bread and hard)	Xiao mai
Triticum sp. cf.	Wheat (immature)	
Ulmus minor cf.	English elm	
Vigna sp.	Adzuki/mung bean	Chi dou /lü dou
Vitis vinifera	Grape	Pu tao
Xanthium strumarium cf.	Cocklebur	Cang er shu
Zanthoxylum sp.	Fagara, Szechuan pepper	Hua jiao
Zea mays	Maize	Yu shu shu
Ziziphus sp.	Jujube	zao

[1]cf. is an abbreviation for compares favorably.

Table 4. Fragment to Whole Conversion Formulas.

Taxon or plant part	Whole equivalent
All taxa and plant parts	only 1 fragment
Arachis hypogaea shell	1.49g
Capsicum sp.	2 fragments
Cereal fragment	0.01g
Citrullus lanatus and other cucurbit seeds	1 base
Other cucurbits	10 fragments (unless distinctions noted during sorting)
Dimocarpus longan	4 fragment
Ginkgo biloba	all fragments
Juglans regia nutshell	8g
Litchi chinensis	4 fragments
Malus/Pyrus sp.	3 fragments
Oryza sativa	0.004g
Poaceae fragment	3 fragments
Prunus persica	2.090g
Prunus sp. (cherry)	0.154g
Prunus sp. (apricot/plum)	0.525g
Pulse fragment	0.082g
Rosaceae fragment	4 fragments
Vitis vinifera	8 fragments
Unidentifiable seed	1 fragment

Table 5. Estimated Whole Counts by Feature for the Market Street Chinatown Matrix Samples.[1]

Category Taxon or plant part	Feature					
	85-31/13	85-31/18	86-36/5	86-36/13	86-36/18	All samples
Grain/*fan*						
Cereal C			2		1	3
Hordeum vulgare C		6				6
Oryza sativa C	1	13	5			19
Oryza sativa floret			2	1		3
Setaria italica cf. C		1				1
Triticum durum/aestivum C	1	6	13	1		21
Triticum sp. cf. C	1					1
Vegetable/*ts'ai*						
Capsicum sp.				4		4
Lentinula edodes C		2				2
Raphanus sativus cf. C		1				1
Rumex sp.			1			1
Sesamum indicum		12	40	74	7	133
Solanum lycopersicum		277	491	1758		2526
Zanthoxylum sp.		7	4	8	3	22
kua (mainly cucurbits)						
Benincasa hispida var. *chiehqua*			17	79		96
Benincasa hispida var. hispida		4	54	62		120
Cucumis melo				1		1
Cucumis sativus cf.				1		1
Cucumis sp.				10		10
Cucurbitaceae			5	65	1	71
Cucurbitaceae rind cf. C		1				1
Momordica charantia	1	1	25	40	1	68
Momordica charantia C		1				1
tou (legumes)						
Phaseolus vulgaris/Glycine max cf. C			10	1		11
Pulse C		3	12	4		19
Vigna sp. C		1				1
Vigna sp. cf. C		1			1	2
Fruit and nut/*kuo*						
Arachis hypogaea shell		1				1
Canarium cf. *album*				4		4
Citrullus lanatus		1	4	270		275
Citrullus lanatus C		16				16
Dracotomelon dupperreanum				2		2
Ficus carica		23	73	122	2	220
Fragaria sp.		6	51	544		601
Ginkgo biloba cf.				1		1
Ginkgo biloba cf. C		1				1
Juglans regia nutshell				1		1
Juglans regia nutshell C			1			1
Litchi chinensis C		1		2		3
Malus/Pyrus sp.			2	15		17
Malus/Pyrus sp. C		3				3
Opuntia sp.		1	5	81		87

Table 5. (Continued)

Category	Feature					
Taxon or plant part	85-31/13	85-31/18	86-36/5	86-36/13	86-36/18	All samples
Prunus mume		1		2		3
Prunus persica				5		5
Prunus persica C		1				1
Prunus sp. (apricot/plum)				1		1
Prunus sp. (cherry)		1		2		3
Prunus sp. (plum)			1	1		2
Ribes sp.			4	91		95
Ribes sp. cf. C			59		1	60
Rosaceae		3		6		9
Rubus sp.	2	6775	18030	23074	738	48619
Rubus sp. C		4				4
Sambucus sp.		8	7	81		96
Vitis vinifera		923	179	7459	3	8564
Vitis vinifera C		1				1
Ziziphus sp.	1			17		18
Ziziphus sp. C			1			1
Other						
Abutilon theophrasti			2			2
Acer macrophyllum cf.				1		1
Arctostaphylos sp.		1				1
Asteraceae		1				1
Bromus sp. cf. C		3				3
Bud				33		33
Calandrinia sp.				9		9
Cupressaceae leaves					1	1
Cyperaceae C		1				1
Ericaceae				1		1
Fabaceae C					1	1
Fruit stem C		4				4
Hordeum sp. C		1				1
Leonurus sp.			4			4
Lilliaceae cf				8		8
Lupinus sp.		1	1			2
Lycium chinense cf.			1	41		42
Malva sp.	1		12		2	15
Malva sp. C		4				4
Medicago sp.			9	9	1	19
Melilotus sp. cf.					5	5
Panicum sp. cf. lemma & palea				1		1
Platanus racemosa cf.			4			4
Poaceae frag. C		2				2
Poaceae large		1				1
Poaceae large C		12	4			16
Polygonum sp.				1		1
Polygonum sp. C		1				1
Portulaca sp.				6		6
Potamogeton sp.			1			1
Rhus sp. C			1			1

Table 5. (Continued)

Category	Feature					
Taxon or plant part	85-31/13	85-31/18	86-36/5	86-36/13	86-36/18	All samples
Robinia pseudoacacia			2			2
Scirpus sp.				16		16
Scirpus sp. C			4			4
Setaria sp. cf. lemma & palea				1		1
Solanaceae				1		1
Solanaceae C		4		1		5
Solanaceae cf. C		1				1
Xanthium strumarium cf.				1		1
Unknown Type 7				1		1
Unknown Type 10				8		8
Unknown Type 14A				32		32
Unknown Type 14B				16		16
Unknown Type 15				1		1
Unknown Type 16 C		1				1
Unidentifiable seed		5	28	58	1	92
Unidentifiable seed C		33	12	8	1	54
Unidentified seed coat/nutshell			1			1
Unknown plant parts				51		51
Total remains in sample	8	8183	19184	34195	770	62340

[1] C indicates partially or fully carbonized.

Table 6. Estimated Whole Counts by Feature (Except for Catalog Number 86-36/13-194) for the Market Street Chinatown Macrobotanical Specimens. (Item is a seed unless labeled otherwise.)

Category Feature Taxon or plant part	85-31/ 1	85-31/ 2	85-31/ 6	85-31/ 9	85-31/ 10	85-31/ 11	85-31/ 12	85-31/ 13	85-31/ 18	85-31/ 20	85-31/ 24	85-31/ 28	86-36/ 5	86-36/ 6	86-36/ 7
Grain/*fan*															
Oryza sativa floret													1		
Oryza sativa spikelet															
Sorghum bicolor C															
Triticum durum/aestivum C								1					1		
Zea mays cob C															
Vegetable/*ts'ai*															
Allium sp. cf. leaf sheaths C									1						
Bulb/shoot base C									1						
Capsicum sp.															
Solanum lycopersicum													7		
kua (mainly cucurbits)															
Benincasa hispida var. *chiehqua*			4					1					41		
Benincasa hispida var. hispida			23						2				67		
Cucumis sativus cf.															
Cucumis sp. frag.															
Cucurbita maxima cf.								1							
Cucumis melo											1				
Cucurbita moschata cf.															
Cucurbitaceae frag.										1					
Cucurbitaceae seed kernel															
Momordica charantia					10		1	2		2		1	17		
Momordica cochinchinensis															
Siraitia grosvenorii		11						3					1		
Siraitia grosvenorii C		1													
Trichosanthes anguina													1		
tou (legumes)															
Cicer arietinum C		1													
Phaseolus vulgaris/Glycine max cf. C													8		
Pulse C		1											3		

Table 6. (Continued)

Category Feature Taxon or plant part	85-31/ 1	85-31/ 2	85-31/ 6	85-31/ 9	85-31/ 10	85-31/ 11	85-31/ 12	85-31/ 13	85-31/ 18	85-31/ 20	85-31/ 24	85-31/ 28	86-36/ 5	86-36/ 6	86-36/ 7
Fruit and nut/*kuo*															
Arachis hypogaea															
Arachis hypogaea shell			2												1
Canarium cf. *album*			3					2	7						
Canarium cf. *album* C	1	2	4		1			1	9				2	2	
Citrullus lanatus		1						2					16		
Citrullus lanatus C			1										1		
Cocos nucifer endocarp															
Dimocarpus longan								2							
Dimocarpus longan C		2	7	2			1		10						
Dracotomelon dupperreanum									2						
Dracotomelon dupperreanum C			1						5	1				1	
Ficus carica													7		
Fragaria sp. *Ginkgo*													11		
biloba cf. *Juglans*													1		
hindsii nutshell *Juglans*										1					
regia nutshell													2	2	
Juglans regia nutshell. C													1		
Juglans sp. nutshell C			2												
Litchi chinensis			1						1	1				3	
Litchi chinensis C		2	2						5	1				4	
Malus/Pyrus sp.															
Olea europaea															
Olea europaea cf. fruit C									2						
Opuntia sp.															
Prunus armeniaca C									3						
Prunus persica									3	1	2	2	1		
Prunus persica C	1	1				3		2	7	1					
Prunus persica kernel C						2									
Prunus (apricot/plum)	1							1							
Prunus (apricot/plum) C	1				2			3	1					3	
Prunus sp. (cherry)															
Prunus sp. (cherry) C									2						
Prunus sp. (plum)									2						
Prunus sp. (plum) C		1						1		1				2	
Ribes sp.															

Table 6. (Continued)

Category / Feature / Taxon or plant part	85-31/ 1	85-31/ 2	85-31/ 6	85-31/ 9	85-31/ 10	85-31/ 11	85-31/ 12	85-31/ 13	85-31/ 18	85-31/ 20	85-31/ 24	85-31/ 28	86-36/ 5	86-36/ 6	86-36/ 7
Rubus sp.									1				1625		
Sambucus sp.													1		
Vitis vinifera			1						34				42		
Vitis vinifera C			1												
Vitis vinifera fruit C										3					
Other															
Acer negundo cf.									1						
Bract cf. (modern?)													3		
Brassicaceae															
Capsule (loculicidal)															
Claytonia perfoliata															
Euphorbia spathulata cf.															
Lycium chinense cf.															
Malva sp.													2		
Medicago cf. *polymorpha* pod													1		
Monocotyledon leaf															
Physalis sp.															
Polygonum orientale															
Polygonum sp.															
Root cf. C								1							
Setaria sp. cf. lemma & palea															
Solanaceae															
Thorn															
Ulmus minor cf. fruit (modern?)															
Xanthium strumarium cf.															
Unknown Type G															
Unidentifiable seed															
Unidentifiable seed C	1				1				1						
Unknown fruit C															
Unknown plant parts			1												
Total remains in sample	5	23	53	2	14	5	2	23	100	13	3	3	1863	17	1

Table 6. (Continued)

Category / Feature / Taxon or plant part	86-36/ 8	86-36/ 9	86-36/ 12	86-36/ 13	86-36/ 13-194	86-36/ 14	86-36/ 15	86-36/ 17	86-36/ 18	86-36/ 19	86-36/ 20	88-91/ 26	All samples
Grain/*fan*													
Oryza sativa floret				15	1								17
Oryza sativa spikelet				8									8
Sorghum bicolor C												2	2
Triticum durum/aestivum C												1	3
Zea mays cob C									1		1		2
Vegetable/*ts'ai*													
Allium sp. cf. leaf sheaths C													1
Bulb/shoot base C													1
Capsicum sp.				1									1
Solanum lycopersicum				3	196		1						207
kua (mainly cucurbits)													
Benincasa hispida var. *chiehqua*	5			12	16		1		4	44		10	138
Benincasa hispida var. hispida	6			21	22		2		5	28	3	115	294
Cucumis sativus cf.					2								2
Cucumis sp. frag.				1									1
Cucurbita maxima cf.					3								4
Cucumis melo					9								10
Cucurbita moschata cf.						1							1
Cucurbitaceae frag.				2	3								6
Cucurbitaceae seed kernel				2			10						12
Momordica charantia	25			20	13		2		1	15		4	113
Momordica cochinchinensis									1				1
Siraitia grosvenorii									6				21
Siraitia grosvenorii C													1
Trichosanthes anguina													1
tou (legumes)													
Cicer arietinum C													1
Phaseolus vulgaris/Glycine max cf. C				1								1	10
Pulse C				2									6

Table 6. (Continued)

Category Feature Taxon or plant part	86-36/ 8	86-36/ 9	86-36/ 12	86-36/ 13	86-36/ 13-194	86-36/ 14	86-36/ 15	86-36/ 17	86-36/ 18	86-36/ 19	86-36/ 20	88-91/ 26	All samples
Fruit and nut/*kuo*													
Arachis hypogaea										1			1
Arachis hypogaea shell		3		1	1				1	1	1	1	12
Canarium cf. *album*				9	7			7	1	1		2	39
Canarium cf. *album* C				1					1	1		1	26
Citrullus lanatus				71	105		1		2		2		200
Citrullus lanatus C													2
Cocos nucifer endocarp				3									3
Dimocarpus longan													2
Dimocarpus longan C										1		2	25
Dracotomelon dupperreanum					2			1					5
Dracotomelon dupperreanum C									1				9
Ficus carica				19	85		5						116
Fragaria sp.				46	63								120
Ginkgo biloba cf.													1
Juglans hindsii nutshell									1				2
Juglans regia nutshell		1	1		1	1							8
Juglans regia nutshell. C													1
Juglans sp. nutshell C													2
Litchi chinensis				1	2								9
Litchi chinensis C										1			15
Malus/Pyrus sp.				1	2								3
Olea europaea		5											5
Olea europaea cf. fruit C													2
Opuntia sp.				1	57							1	59
Prunus armeniaca C													3
Prunus persica				9	6				1		1		26
Prunus persica C										1	1	1	18
Prunus persica kernel C													2
Prunus (apricot/plum)				1	2		1						8
Prunus (apricot/plum) C		1										3	12
Prunus sp. (cherry)				2	3				1	1		1	8
Prunus sp. (cherry) C													2
Prunus sp. (plum)				2	3					2			9
Prunus sp. (plum) C										2			7
Ribes sp.				1	78								79

Table 6. (Continued)

Category / Feature / Taxon or plant part	86-36/ 8	86-36/ 9	86-36/ 12	86-36/ 13	86-36/ 13-194	86-36/ 14	86-36/ 15	86-36/ 17	86-36/ 18	86-36/ 19	86-36/ 20	88-91/ 26	All samples
Rubus sp.				51	4270		15						5962
Sambucus sp.					10								11
Vitis vinifera				332	958		55		3			10	1435
Vitis vinifera C												1	2
Vitis vinifera fruit C													3
Other													
Acer negundo cf.													1
Bract cf. (modern?)													3
Brassicaceae					2								2
Capsule (loculicidal)											1		1
Claytonia perfoliata					1								1
Euphorbia spathulata cf.				1									1
Lycium chinense cf.					20								20
Malva sp.													2
Medicago cf. *polymorpha* pod													1
Monocotyledon leaf						1							1
Physalis sp.					1								1
Polygonum orientale					1								1
Polygonum sp.					1								1
Root cf. C													1
Setaria sp. cf. lemma & palea				1	1								2
Solanaceae					1								1
Thorn					1								1
Ulmus minor cf. fruit (modern?)		1											1
Xanthium strumarium cf.					1								1
Unknown Type G					4								4
Unidentifiable seed		2		4	2								8
Unidentifiable seed C												1	4
Unknown fruit C									2				2
Unknown plant parts													1
Total remains in sample	36	13	1	645	5956	3	93	8	32	99	10	157	9181

Table 7. Relative Proportions[1] of Taxa (Combined Carbonized and Uncarbonized) by Feature and Summary Data for the Market Street Chinatown Matrix Samples.

Category	Feature					
Taxon or plant part	85-31/13	85-31/18	86-36/5	86-36/13	86-36/18	All samples
Grain/*fan*						
Cereal C			0.2%		3.13%	0.02%
Hordeum vulgare C		0.4%				0.04%
Oryza sativa C	17%	0.9%	0.4%			0.14%
Oryza sativa floret			0.2%	0.01%		0.02%
Setaria italica cf. C		0.1%				0.01%
Triticum durum/aestivum C	17%	0.4%	1.1%	0.01%		0.15%
Triticum sp. cf. C	17%					0.01%
Vegetable/*ts'ai*						
Capsicum sp.				0.04%		0.03%
Lentinula edodes C		0.1%				0.01%
Raphanus sativus cf. C		0.1%				0.01%
Rumex sp.			0.1%			0.01%
Sesamum indicum		0.9%	3.5%	0.67%	21.88%	0.97%
Solanum lycopersicum		19.7%	42.5%	15.81%		18.42%
Zanthoxylum sp.		0.5%	0.3%	0.07%	9.38%	0.16%
kua (mainly cucurbits)						
Benincasa hispida var. *chiehqua*			1.5%	0.71%		0.70%
Benincasa hispida var. hispida		0.3%	4.7%	0.56%		0.87%
Cucumis melo				0.01%		0.01%
Cucumis sativus cf.				0.01%		0.01%
Cucumis sp.				0.09%		0.07%
Cucurbitaceae			0.4%	0.58%	3.13%	0.52%
Cucurbitaceae rind cf. C		0.1%				0.01%
Momordica charantia C/UC	17%	0.1%	2.2%	0.36%	3.13%	0.50%
tou (legumes)						
Phaseolus vulgaris/Glycine max cf. C			0.9%	0.01%		0.08%
Pulse C		0.2%	1.0%	0.04%		0.14%
Vigna sp. C		0.1%				0.01%
Vigna sp. cf. C		0.1%			3.13%	0.01%
Fruit and nut/*kuo*						
Arachis hypogaea shell		0.1%				0.01%
Canarium cf. *album*				0.04%		0.03%
Citrullus lanatus C/UC		1.2%	0.3%	2.43%		2.12%
Dracotomelon dupperreanum				0.02%		0.01%
Ficus carica		1.6%	6.3%	1.10%	6.25%	1.60%
Fragaria sp.		0.4%	4.4%	4.89%		4.38%
Ginkgo biloba cf. C/UC		0.1%		0.01%		0.01%
Juglans regia nutshell C/UC			0.1%	0.01%		0.01%
Litchi chinensis C		0.1%		0.02%		0.02%
Malus/Pyrus sp. C/UC		0.2%	0.2%	0.13%		0.15%
Opuntia sp.		0.1%	0.4%	0.73%		0.63%
Prunus mume		0.1%		0.02%		0.02%

Table 7. (Continued)

Category Taxon or plant part	Feature 85-31/13	85-31/18	86-36/5	86-36/13	86-36/18	All samples
Prunus persica C/UC		0.1%		0.04%		0.04%
Prunus sp. (apricot/plum)				0.01%		0.01%
Prunus sp. (cherry)		0.1%		0.02%		0.02%
Prunus sp. (plum)			0.1%	0.01%		0.01%
Ribes sp. C/UC			5.5%	0.82%	3.13%	1.13%
Rosaceae		0.2%		0.05%		0.07%
***Rubus* sp. C/UC**	**25%**	**83%**	**94%**	**67%**	**96%**	**78%**
Sambucus sp.		0.6%	0.6%	0.73%		0.70%
Vitis vinifera C/UC		65.8%	15.5%	67.07%	9.38%	62.44%
Ziziphus sp.	17%		0.1%	0.15%		0.14%
Other						
Abutilon theophrasti			0.2%			0.01%
Acer macrophyllum cf.				0.01%		0.01%
Arctostaphylos sp.		0.1%				0.01%
Asteraceae		0.1%				0.01%
Bromus sp. cf. C		0.2%				0.02%
Bud				0.30%		0.24%
Calandrinia sp.				0.08%		0.07%
Cupressaceae leaves					3.13%	0.01%
Cyperaceae C		0.1%				0.01%
Ericaceae				0.01%		0.01%
Fabaceae C					3.13%	0.01%
Fruit stem C		0.3%				0.03%
Hordeum sp. C		0.1%				0.01%
Leonurus sp.			0.3%			0.03%
Lilliaceae cf				0.07%		0.06%
Lupinus sp.		0.1%	0.1%			0.01%
Lycium chinense cf.			0.1%	0.37%		0.31%
Malva sp. C/UC	17%	0.3%	1.0%		6.25%	0.14%
Medicago sp.			0.8%	0.08%	3.13%	0.14%
Melilotus sp. cf.					15.63%	0.04%
Panicum sp. cf. lemma & palea				0.01%		0.01%
Platanus racemosa cf.			0.3%			0.03%
Poaceae frag. C		0.1%				0.01%
Poaceae large C/UC		0.9%	0.3%			0.12%
Polygonum sp. C/UC		0.1%		0.01%		0.01%
Portulaca sp.				0.05%		0.04%
Potamogeton sp.			0.1%			0.01%
Rhus sp. C			0.1%			0.01%
Robinia pseudoacacia			0.2%			0.01%
Scirpus sp. C/UC			0.3%	0.14%		0.15%
Setaria sp. cf. lemma & palea				0.01%		0.01%
Solanaceae				0.01%		0.01%
Solanaceae C		0.3%		0.01%		0.04%

Table 7. (Continued)

Category Taxon or plant part	Feature 85-31/13	 85-31/18	 86-36/5	 86-36/13	 86-36/18	 All samples
Solanaceae cf. C		0.1%				0.01%
Xanthium strumarium cf.				0.01%		0.01%
Unknown Type 7				0.01%		0.01%
Unknown Type 10				0.07%		0.06%
Unknown Type 14A				0.29%		0.23%
Unknown Type 14B				0.14%		0.12%
Unknown Type 15				0.01%		0.01%
Unknown Type 16 C		0.1%				0.01%
Unidentifiable seed C/UC		2.7%	3.5%	0.59%	6.25%	1.06%
Unidentified seed coat/nutshell			0.1%			0.01%
Unknown plant parts				0.46%		0.37%
Number of Types	7	45	40	58	16	92
Percentage carbonized	38%	1.18%	0.59%	0.03%	0.52%	0.36%

[1]*Rubus* proportion was calculated based on all remains. Other proportions were based on the total remains minus *Rubus*.

Table 8. Relative Proportions of Taxa (Combined Carbonized and Uncarbonized) by Feature (with Two Exceptions) and Summary Data for the Market Street Chinatown Macrobotanical Specimens.

Feature Category Taxon or plant part	85-31/ 1	85-31/ 2	85-31/ 6	85-31/ 9	85-31/ 10	85-31/ 11	85-31/ 12	85-31/ 13	85-31/ 18	85-31/ 20	85-31/ 24	85-31/ 28	86-36/ 5	*86-36/ 5 No Rubus*	86-36/ 6
Grain/*fan*															
Oryza sativa floret													0.1%	*0.4%*	
Oryza sativa spikelet															
Sorghum bicolor C															
Triticum durum/aestivum C								4%					0.1%	*0.4%*	
Zea mays cob . C															
Vegetable/*ts'ai*															
Allium sp. cf. leaf sheaths C									1%						
Bulb/shoot base C									1%						
Capsicum sp.															
Solanum lycopersicum													0.4%	*2.9%*	
kua (mainly cucurbits)															
Benincasa hispida var. *chiehqua*			8%					4%					2.2%	*17.2%*	
Benincasa hispida var. hispida			43%						2%				3.6%	*28.2%*	
Cucumis sativus cf.															
Cucumis sp.															
Cucurbita maxima cf.								4%							
Cucurbita moschata cf.															
Cucurbitaceae										8%					
Cucurbitaceae seed kernel															
Momordica charantia					71%		50%	9%		15%		33%	0.9%	*7.1%*	
Momordica cochinchinensis															
Siraitia grosvenorii C/UC		52%						13%					0.1%	*0.4%*	
Trichosanthes anguina													0.1%	*0.4%*	
tou (legumes)															
Cicer arietinum C		4%													
Phaseolus vulgaris/Glycine max cf. C													0.4%	*3.4%*	
Pulse C		4%											0.2%	*1.3%*	

Table 8. (Continued)

Feature Category Taxon or plant part	85-31/ 1	85-31/ 2	85-31/ 6	85-31/ 9	85-31/ 10	85-31/ 11	85-31/ 12	85-31/ 13	85-31/ 18	85-31/ 20	85-31/ 24	85-31/ 28	86-36/ 5	*86-36/ 5 No Rubus*	86-36/ 6
Fruit and nut/*kuo*															
Arachis hypogaea															
Arachis hypogaea shell			4%												
Canarium cf. album C/UC	20%	9%	13%		7%			13%	16%				0.1%	*0.8%*	12%
Citrullus lanatus C/UC		4%	2%					9%					0.9%	*7.1%*	
Cocos nucifer endocarp															
Cucumis melo											33%				
Dimocarpus longan C/UC		9%	13%	100%			50%	9%	10%						
Dracotomelon dupperreanum C/UC			2%						7%	8%					6%
Ficus carica													0.4%	*2.9%*	
Fragaria sp.													0.6%	*4.6%*	
Ginkgo biloba cf.													0.1%	*0.4%*	
Juglans hindsii nutshell										8%					
Juglans regia nutshell C/UC													0.2%	*1.3%*	12%
Juglans sp. nutshell C			4%												
Litchi chinensis C/UC		9%	6%						6%	15%					41%
Malus/Pyrus sp.															
Olea europaea															
Olea europaea cf. fruit C									2%						
Prunus armeniaca C									3%						
Prunus persica C/UC	20%	4%				60%		9%	10%	15%	67%	67%	0.1%	*0.4%*	
Prunus persica kernel C						40%									
Prunus (apricot/plum) C/UC	40%				14%			17%	1%						18%
Prunus sp. (cherry) C/UC									2%						
Prunus sp. (plum) C/UC		4%						4%	2%	8%					12%
Ribes sp.															
Rubus sp.									1%				87.2%		
Sambucus sp.													0.1%	*0.4%*	
Vitis vinifera C/UC			4%						34%				2.3%	*17.6%*	
Vitis vinifera fruit C										23%					

Table 8. (Continued)

Feature Category Taxon or plant part	85-31/ 1	85-31/ 2	85-31/ 6	85-31/ 9	85-31/ 10	85-31/ 11	85-31/ 12	85-31/ 13	85-31/ 18	85-31/ 20	85-31/ 24	85-31/ 28	86-36/ 5	*86-36/ 5 No Rubus*	86-36/ 6
Other															
Acer negundo cf.									1%						
Bract cf. (modern?)													0.2%	*1.3%*	
Brassicaceae															
Capsule (loculicidal)															
Claytonia perfoliata															
Euphorbia spathulata cf.															
Lycium chinense cf.															
Malva sp.													0.1%	*0.8%*	
Medicago cf. *polymorpha* pod													0.1%	*0.4%*	
Monocotyledon leaf															
Opuntia sp.															
Physalis sp.															
Polygonum orientale															
Polygonum sp.															
Root cf. C								4%							
Setaria sp. cf. lemma & palea															
Solanaceae															
Thorn															
Ulmus minor cf. fruit (modern?)															
Unknown Type G															
Xanthium strumarium cf.															
Unidentifiable seed C/UC	20%				7%				1%						
Unknown fruit C															
Unknown plant parts			2%												
Number of types	4	9	11	1	4	1	2	12	17	8	2	2	23		6
Percentage carbonized	80%	48%	34%	100%	29%	100%	50%	39%	47%	54%	0%	0%	1%		71%

* Total without catalogue number 86-36/13-194

Table 8. (Continued)

Feature Category Taxon or plant part	86-36/ 7	86-36/ 8	86-36/ 9	86-36/ 12	86-36/ 13 Total *	86-36/ 13-194	*86-36/ 13-194 No Rubus*	86-36/ 14	86-36/ 15	86-36/ 17	86-36/ 18	86-36/ 19	86-36/ 20	88-91/ 26	All samples
Grain/*fan*															
Oryza sativa floret					2.3%	0.02%	*0.1%*								0.19%
Oryza sativa spikelet					1.2%										0.09%
Sorghum bicolor C														1%	0.02%
Triticum durum/aestivum C														1%	0.03%
Zea mays cob . C											3%		10%		0.02%
Vegetable/*ts'ai*															
Allium sp. cf. leaf sheaths C															0.01%
Bulb/shoot base C															0.01%
Capsicum sp.					0.2%										0.01%
Solanum lycopersicum					0.5%	3.29%	*11.6%*		1%						2.25%
kua (mainly cucurbits)															
Benincasa hispida var. *chiehqua*		14%			1.9%	0.27%	*0.9%*		1%		13%	44%		6%	1.50%
Benincasa hispida var. hispida		17%			3.3%	0.37%	*1.3%*		2%		16%	28%	30%	73%	3.20%
Cucumis sativus cf.						0.03%	*0.1%*								0.02%
Cucumis sp.					0.2%										0.01%
Cucurbita maxima cf.						0.05%	*0.2%*								0.04%
Cucurbita moschata cf.								33%							0.01%
Cucurbitaceae					0.3%	0.05%	*0.2%*								0.07%
Cucurbitaceae seed kernel					0.3%				11%						0.13%
Momordica charantia		69%			3.1%	0.22%	*0.8%*		2%		3%	15%		3%	1.23%
Momordica cochinchinensis											3%				0.01%
Siraitia grosvenorii C/UC											19%				0.24%
Trichosanthes anguina															0.01%
tou (legumes)															
Cicer arietinum C															0.01%
Phaseolus vulgaris/Glycine max cf. C					0.2%									1%	0.11%
Pulse C					0.3%										0.07%

Table 8. (Continued)

Feature Category Taxon or plant part	86-36/ 7	86-36/ 8	86-36/ 9	86-36/ 12	86-36/ 13 Total *	86-36/ 13-194	*86-36/ 13-194 No Rubus*	86-36/ 14	86-36/ 15	86-36/ 17	86-36/ 18	86-36/ 19	86-36/ 20	88-91/ 26	All samples
Fruit and nut/*kuo*															
Arachis hypogaea												1%			0.01%
Arachis hypogaea shell	100%		23%		0.2%	0.02%	*0.1%*				3%	1%	10%	1%	0.13%
Canarium cf. album C/UC					1.6%	0.12%	*0.4%*			88%	6%	2%		2%	0.71%
Citrullus lanatus C/UC					11.0%	1.76%	*6.2%*		1%		6%		20%		2.20%
Cocos nucifer endocarp					0.5%										0.03%
Cucumis melo						0.15%	*0.5%*								0.11%
Dimocarpus longan C/UC												1%		1%	0.29%
Dracotomelon dupperreanum C/UC						0.03%	*0.1%*			13%	3%				0.15%
Ficus carica					2.9%	1.43%	*5.0%*		5%						1.26%
Fragaria sp.					7.1%	1.06%	*3.7%*								1.31%
Ginkgo biloba cf.															0.01%
Juglans hindsii nutshell											3%				0.02%
Juglans regia nutshell C/UC			8%	100%		0.02%	*0.1%*	33%							0.10%
Juglans sp. nutshell C															0.02%
Litchi chinensis C/UC					0.2%	0.03%	*0.1%*					1%			0.26%
Malus/Pyrus sp.					0.2%	0.03%	*0.1%*								0.03%
Olea europaea			38%												0.05%
Olea europaea cf. fruit C															0.02%
Prunus armeniaca C															0.03%
Prunus persica C/UC					1.4%	0.10%	*0.4%*				3%	1%	20%	1%	0.48%
Prunus persica kernel C															0.02%
Prunus (apricot/plum) C/UC			8%		0.2%	0.03%	*0.1%*		1%					2%	0.22%
Prunus sp. (cherry) C/UC					0.3%	0.05%	*0.2%*				3%	1%		1%	0.11%
Prunus sp. (plum) C/UC					0.3%	0.05%	*0.2%*					4%			0.17%
Ribes sp.					0.2%	1.31%	*4.6%*								0.86%
Rubus sp.					7.9%	71.69%			16%						64.94%
Sambucus sp.						0.17%	*0.6%*								0.12%
Vitis vinifera C/UC					51.5%	16.08%	*56.8%*		59%		9%			7%	15.65%
Vitis vinifera fruit C															0.03%

Table 8. (Continued)

Feature Category Taxon or plant part	86-36/ 7	86-36/ 8	86-36/ 9	86-36/ 12	86-36/ 13 Total *	86-36/ 13-194	*86-36/ 13-194 No Rubus*	86-36/ 14	86-36/ 15	86-36/ 17	86-36/ 18	86-36/ 19	86-36/ 20	88-91/ 26	All samples
Other															
Acer negundo cf.															0.01%
Bract cf. (modern?)															0.03%
Brassicaceae						0.03%	*0.1%*								0.02%
Capsule (loculicidal)													10%		0.01%
Claytonia perfoliata						0.02%	*0.1%*								0.01%
Euphorbia spathulata cf.					0.2%										0.01%
Lycium chinense cf.						0.34%	*1.2%*								0.22%
Malva sp.															0.02%
Medicago cf. *polymorpha* pod															0.01%
Monocotyledon leaf								33%							0.01%
Opuntia sp.					0.2%	0.96%	*3.4%*							1%	0.64%
Physalis sp.						0.02%	*0.1%*								0.01%
Polygonum orientale						0.02%	*0.1%*								0.01%
Polygonum sp.						0.02%	*0.1%*								0.01%
Root cf. C															0.01%
Setaria sp. cf. lemma & palea					0.2%	0.02%	*0.1%*								0.02%
Solanaceae						0.02%	*0.1%*								0.01%
Thorn						0.02%	*0.1%*								0.01%
Ulmus minor cf. fruit (modern?)			8%												0.01%
Unknown Type G						0.07%	*0.2%*								0.04%
Xanthium strumarium cf.						0.02%	*0.1%*								0.01%
Unidentifiable seed C/UC			15%		0.6%	0.03%	*0.1%*							1%	0.13%
Unknown fruit C											6%				0.02%
Unknown plant parts															0.01%
Number of types	1	3	6	1	31	39		3	10	2	15	11	6	15	67
Percentage carbonized	0%	0%	8%	0%	1%	0%		0%	0%	0%	16%	6%	20%	8%	2%

* Total without catalogue number 86-36/13-194

Table 9. Plant Taxa Presence by Feature for the Matrix Samples (M) and Macrobotanical Specimens (B) from Market Street Chinatown.

Feature gory Taxon or plant part	85-31/ 1 B	85-31/ 2 B	85-31/ 6 B	85-31/ 9 B	85-31/ 10 B	85-31/ 11 B	85-31/ 12 B	85-31/ 13 B	85-31/ 13 M	85-31/ 18 B	85-31/ 18 M	85-31/ 20 B	85-31/ 24 B	85- 2
n/*fan*														
Cereal C														
Hordeum vulgare C											x			
Oryza sativa C									x		x			
Oryza sativa glume														
Oryza sativa spikelet														
Setaria italica cf. C											x			
Sorghum bicolor C														
Triticum durum/aestivum C								x	x		x			
Triticum sp. cf. C									x					
Zea mays cob C														
etable/*ts'ai*														
Allium sp. cf. leaf sheaths C										x				
Bulb/shoot base C										x				
Capsicum sp.														
Lentinula edodes C											x			
Raphanus sativus cf. C											x			
Rumex sp.														
Sesamum indicum											x			
Solanum lycopersicum											x			
Zanthoxylum sp.											x			
kua (mainly cucurbits)														
Benincasa hispida var. *chiehqua*			x					x						
Benincasa hispida var. hispida			x							x	x			
Cucumis melo													x	
Cucumis sativus cf.														
Cucumis sp.														
Cucurbita maxima cf.								x						
Cucurbita moschata cf.														
Cucurbitaceae rind cf. C											x			

Table 9. (Continued)

Feature	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-
gory	1	2	6	9	10	11	12	13	13	18	18	20	24	2
Taxon or plant part	B	B	B	B	B	B	B	B	M	B	M	B	B	I
Cucurbitaceae seed												x		
Cucurbitaceae seed kernel														
Momordica charantia					x		x	x	x		x	x		x
Momordica charantia C											x			
Momordica cochinchinensis														
Siraitia grosvenorii		x						x						
Siraitia grosvenorii C		x												
Trichosanthes anguina														
tou (legumes)														
Cicer arietinum C		x												
Phaseolus vulgaris/Glycine max cf. C														
Pulse C		x									x			
Vigna sp. C											x			
Vigna sp. cf. C											x			
and nut/*kuo*														
Arachis hypogaea														
Arachis hypogaea shell			x								x			
Canarium cf. *album*			x					x		x				
Canarium cf. *album* C	x	x	x		x			x		x				
Citrullus lanatus		x						x			x			
Citrullus lanatus C			x								x			
Cocos nucifer endocarp														
Dimocarpus longan								x						
Dimocarpus longan C		x	x	x			x			x				
Dracotomelon dupperreanum										x				
Dracotomelon dupperreanum C			x							x		x		
Ficus carica											x			
Fragaria sp.											x			
Ginkgo biloba cf.														
Ginkgo biloba cf. C											x			

Table 9. (Continued)

Feature	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-31/	85-
gory	1	2	6	9	10	11	12	13	13	18	18	20	24	2
Taxon or plant part	B	B	B	B	B	B	B	B	M	B	M	B	B	I
Juglans hindsii nutshell												x		
Juglans regia nutshell														
Juglans regia nutshell C														
Juglans sp. nutshell C			x											
Litchi chinensis		x	x							x		x		
Litchi chinensis C			x							x	x	x		
Malus/Pyrus sp.														
Malus/Pyrus sp. C											x			
Olea europaea														
Olea europaea cf. fruit C										x				
Opuntia sp.											x			
Prunus armeniaca C										x				

	Prunus mume											x			
	Prunus persica										x		x	x	x
	Prunus persica C	x	x				x		x		x	x	x		
	Prunus (apricot/plum)	x							x						
	Prunus (apricot/plum) C	x				x			x		x				
	Prunus sp. (cherry)											x			
	Prunus sp. (cherry) C										x				
	Prunus sp. (plum)										x				
	Prunus sp. (plum) C		x						x				x		
	Ribes sp.														
	Ribes sp. cf. C														
	Rosaceae											x			
	Rubus sp.									x	x	x			
	Rubus sp. C											x			
	Sambucus sp.											x			
	Vitis vinifera			x							x	x			
	Vitis vinifera C			x								x			
	Vitis vinifera fruit C												x		

Table 9. (Continued)

gory	Feature Taxon or plant part	85-31/ 1 B	85-31/ 2 B	85-31/ 6 B	85-31/ 9 B	85-31/ 10 B	85-31/ 11 B	85-31/ 12 B	85-31/ 13 B	85-31/ 13 M	85-31/ 18 B	85-31/ 18 M	85-31/ 20 B	85-31/ 24 B	85- 2 I
	Ziziphus sp.									x					
	Ziziphus sp. C														
r															
	Abutilon theophrasti														
	Acer macrophyllum cf.														
	Acer negundo cf.										x				
	Arctostaphylos sp.											x			
	Asteraceae frag.											x			
	Bract cf.														
	Bromus sp. cf. C											x			
	Brassicaceae														
	Bud														
	Calandrinia sp.														
	Capsule (loculicidal)														
	Claytonia perfoliata														
	Cupressaceae leaves														
	Cyperaceae C											x			
	Ericaceae														
	Euphorbia spathulata cf.														
	Fabaceae C														
	Fruit stem C											x			
	Hordeum sp. C											x			
	Leonurus sp.														
	Lilliaceae cf														
	Lupinus sp.											x			
	Lycium chinense cf.														
	Malva sp.									x					
	Malva sp. C											x			
	Medicago sp.														
	Medicago cf. *polymorpha* pod														
	Melilotus sp. cf.														
	Monocotyledon leaf														
	Panicum sp. cf. lemma & palea														

Physalis sp.														

Table 9. (Continued)

Feature gory Taxon or plant part	85-31/ 1 B	85-31/ 2 B	85-31/ 6 B	85-31/ 9 B	85-31/ 10 B	85-31/ 11 B	85-31/ 12 B	85-31/ 13 B	85-31/ 13 M	85-31/ 18 B	85-31/ 18 M	85-31/ 20 B	85-31/ 24 B	85- 2 I
Platanus racemosa cf.														
Poaceae C											x			
Poaceae large											x			
Poaceae large C											x			
Polygonum orientale														
Polygonum sp.														
Polygonum sp. C											x			
Portulaca sp.														
Potamogeton sp.														
Rhus sp. C														
Robinia pseudoacacia														
Root cf. C								x						
Scirpus sp.														
Scirpus sp. C														
Setaria sp. cf. lemma & palea														
Solanaceae														
Solanaceae C											x			
Solanaceae cf. C											x			
Thorn														
Ulmus minor cf. fruit														
Xanthium strumarium cf.														
Unknown Type G														
Unknown Type 7														
Unknown Type 10														
Unknown Type 14A														
Unknown Type 14B														
Unknown Type 15														
Unknown Type 16 C											x			
Unknown fruit C														
Unidentified seed coat/nutshell														

Table 9. (Continued)

Feature gory Taxon or plant part	86-36/ 5 B	86-36/ 5 M	86-36/ 6 B	86-36/ 7 B	86-36/ 8 B	86-36/ 9 B	86-36/ 12 B	86-36/ 13 B	86-36/ 13 M	86-36/ 14 B	86-36/ 15 B	86-36/ 17 B	86-36/ 18 B	86-36/ 18 M	86-36/ 19 B	86-36/ 20 B	8
n/*fan*																	
Cereal C		x												x			
Hordeum vulgare C																	
Oryza sativa C		x															
Oryza sativa glume	x	x						x	x								
Oryza sativa spikelet								x									
Setaria italica cf. C																	
Sorghum bicolor C																	
Triticum durum/aestivum C	x	x							x								
Triticum sp. cf. C																	
Zea mays cob C													x			x	

etable/*ts'ai*																
Allium sp. cf. leaf sheaths C																
Bulb/shoot base C																
Capsicum sp.								x	x							
Lentinula edodes C																
Raphanus sativus cf. C																
Rumex sp.		x														
Sesamum indicum		x							x					x		
Solanum lycopersicum	x	x						x	x		x					
Zanthoxylum sp.		x							x					x		
ua (mainly cucurbits)																
Benincasa hispida var. *chiehqua*	x	x			x			x	x		x		x		x	
Benincasa hispida var. hispida	x	x			x			x	x		x		x		x	x
Cucumis melo								x	x							
Cucumis sativus cf.								x	x							
Cucumis sp.								x	x							
Cucurbita maxima cf.								x								
Cucurbita moschata cf.										x						
Cucurbitaceae rind cf. C																

Table 9. (Continued)

Feature	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	88
gory	5	5	6	7	8	9	12	13	13	14	15	17	18	18	19	20	
Taxon or plant part	B	M	B	B	B	B	B	B	M	B	B	B	B	M	B	B	
Cucurbitaceae seed		x						x	x					x			
Cucurbitaceae seed kernel								x			x						
Momordica charantia	x	x			x			x	x		x		x	x	x		
Momordica charantia C																	
Momordica cochinchinensis													x				
Siraitia grosvenorii	x												x				
Siraitia grosvenorii C																	
Trichosanthes anguina	x																
u (legumes)																	
Cicer arietinum C																	
Phaseolus vulgaris/Glycine max cf. C	x	x						x	x								
Pulse C	x	x						x	x								
Vigna sp. C																	
Vigna sp. cf. C														x			
and nut/*kuo*																	
Arachis hypogaea															x		
Arachis hypogaea shell				x		x		x					x		x	x	
Canarium cf. *album*								x	x			x	x		x		
Canarium cf. *album* C	x		x					x					x		x		
Citrullus lanatus	x	x						x	x		x		x			x	
Citrullus lanatus C	x																
Cocos nucifer endocarp								x									
Dimocarpus longan																	
Dimocarpus longan C															x		
Dracotomelon dupperreanum								x	x			x					
Dracotomelon dupperreanum C			x										x				
Ficus carica	x	x						x	x		x			x			
Fragaria sp.	x	x						x	x								
Ginkgo biloba cf.	x								x								
Ginkgo biloba cf. C																	
Juglans hindsii nutshell													x				

Table 9. (Continued)

Feature	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	86-36/	88
gory	5	5	6	7	8	9	12	13	13	14	15	17	18	18	19	20	
Taxon or plant part	B	M	B	B	B	B	B	B	M	B	B	B	B	M	B	B	
Juglans regia nutshell	x		x			x	x	x	x	x							
Juglans regia nutshell C	x	x															
Juglans sp. nutshell C																	
Litchi chinensis			x					x									
Litchi chinensis C			x						x						x		
Malus/Pyrus sp.		x						x	x								
Malus/Pyrus sp. C																	
Olea europaea						x											
Olea europaea cf. fruit C																	
Opuntia sp.		x						x	x								
Prunus armeniaca C																	
Prunus mume									x								

Prunus persica	x							x	x				x			x
Prunus persica C															x	
Prunus (apricot/plum)								x	x		x					
Prunus (apricot/plum) C			x			x										
Prunus sp. (cherry)								x	x				x		x	
Prunus sp. (cherry) C																
Prunus sp. (plum)		x						x	x						x	
Prunus sp. (plum) C			x												x	
Ribes sp.		x						x	x							
Ribes sp. cf. C		x												x		
Rosaceae									x							
Rubus sp.	x	x						x	x		x			x		
Rubus sp. C																
Sambucus sp.	x	x						x	x							
Vitis vinifera	x	x						x	x		x		x	x		
Vitis vinifera C																
Vitis vinifera fruit C																
Ziziphus sp.									x							
Ziziphus sp. C		x														

Table 9. (Continued)

Feature gory Taxon or plant part	86-36/ 5 B	86-36/ 5 M	86-36/ 6 B	86-36/ 7 B	86-36/ 8 B	86-36/ 9 B	86-36/ 12 B	86-36/ 13 B	86-36/ 13 M	86-36/ 14 B	86-36/ 15 B	86-36/ 17 B	86-36/ 18 B	86-36/ 18 M	86-36/ 19 B	86-36/ 20 B	88
r																	
Abutilon theophrasti		x															
Acer macrophyllum cf.									x								
Acer negundo cf.																	
Arctostaphylos sp.																	
Asteraceae frag.																	
Bract cf.	x																
Bromus sp. cf. C																	
Brassicaceae								x									
Bud									x								
Calandrinia sp.									x								
Capsule (loculicidal)																x	
Claytonia perfoliata								x									
Cupressaceae leaves														x			
Cyperaceae C																	
Ericaceae									x								
Euphorbia spathulata cf.								x									
Fabaceae C														x			
Fruit stem C																	
Hordeum sp. C																	
Leonurus sp.		x															
Lilliaceae cf									x								
Lupinus sp.		x															
Lycium chinense cf.		x						x	x								
Malva sp.	x	x												x			
Malva sp. C																	
Medicago sp.		x							x					x			
Medicago cf. *polymorpha* pod	x																
Melilotus sp. cf.														x			

Monocotyledon leaf										x							
Panicum sp. cf. lemma & palea									x								

Table 9. (Continued)

Feature gory Taxon or plant part	86-36/ 5 B	86-36/ 5 M	86-36/ 6 B	86-36/ 7 B	86-36/ 8 B	86-36/ 9 B	86-36/ 12 B	86-36/ 13 B	86-36/ 13 M	86-36/ 14 B	86-36/ 15 B	86-36/ 17 B	86-36/ 18 B	86-36/ 18 M	86-36/ 19 B	86-36/ 20 B	8
Physalis sp.								x									
Platanus racemosa cf.		x															
Poaceae C																	
Poaceae large																	
Poaceae large C		x															
Polygonum orientale								x									
Polygonum sp.								x	x								
Polygonum sp. C																	
Portulaca sp.									x								
Potamogeton sp.		x															
Rhus sp. C		x															
Robinia pseudoacacia		x															
Root cf. C																	
Scirpus sp.									x								
Scirpus sp. C		x															
Setaria sp. cf. lemma & palea								x	x								
Solanaceae								x	x								
Solanaceae C									x								
Solanaceae cf. C																	
Thorn								x									
Ulmus minor cf. fruit						x											
Xanthium strumarium cf.								x	x								
Unknown Type G								x									
Unknown Type 7									x								
Unknown Type 10									x								
Unknown Type 14A									x								
Unknown Type 14B									x								
Unknown Type 15									x								
Unknown Type 16 C																	
Unknown fruit C													x				
Unidentified seed coat/nutshell		x															