7. SAMPLES FROM THE EXCAVATIONS

7.1 Paleobotanical samples from the City Wall — Kathleen F. Galvin

Two samples of plant remains were examined.

7.1.1 Sample One (K1.2)

This sample (from K1, Locus 4, Feature 5) consisted of a clean bagged sample of carbonized grain. 147 grains, mostly complete, were present. All identifications were made under 10x magnification with the aid of published drawings and photographs.

Triticum aestivum L. (Domestic Bread Wheat)

Quantity:	140 grains, mostly complete
Percentage of total:	93%

Ten complete grains were selected for measurement. The results of these measurements were:

Range of Length:	5.0 - 7.7 mm.
Range of Breadth:	2.5 - 3.0 mm.
Range of Thickness:	2.0 - 3.0 mm.
Mean Length:	6.12 mm.
Mean Breadth:	2.70 mm.
Mean Thickness:	2.32 mm.
Thickness:Breadth Index:	85.9 mm.
Breadth:Length Index:	44.1 mm.

Discussion: The ranges fall a bit short compared to fresh samples of *aestivum*, but tend to approximate more closely this species than any other, considering the expected shrinkage upon carbonization.

Similarly, the Breadth:Length index falls a bit short, while the Thickness:Breadth index is exactly what would be expected in trying to distinguish between *Triricum aestivum* and *T. compactum*. Hence, this sample has been classified as *aestivum*.

Triticum boeoticum Boiss. em. Thiem. (Wild Einkorn)

Quantity:	3 grains
Percentage of total:	2%

Only one whole grain was measurable, but all three showed convex curvature on the ventral furrow in section favoring the choice of *boeoticum* over *dicoccoides* in species identification. The one measurable grain yielded the following measurements:

Length:	7.0 mm.
Breadth:	2.0 mm.
Thickness:	2.0 mm.

Hordeum spontaneum Koch. (Wild Barley)

Quantity:	3 - 4 grains
Percentage of total:	3%

The state of the barley recovered made it difficult to be sure there were three or four grains represented. Only one whole grain was measured. The measurements are as follows.

Length:	6.50 mm.
Breadth:	2.20 mm.
Thickness:	1.75 mm.

Discussion: The decision to classify this material as *spontaneum* is based primarily on overall lack of traits characteristic of domestication in the grains represented. The sample is too small to suggest firmly any domestic species or subspecies.

7.1.2 Sample Two (K1.14)

This sample (from K1, Locus 4) consisted of free grains in loose soil, as well as several large clumps of sandy earth which when floated yielded many grains. Total count was 119 grains. The unstabilized mass of the soil samples containing grains had been subjected to percussive forces following recovery and many grains were crushed in the process. This sample contained many fibrous rootlets, which on microscopic examination were clearly attached to the carbonized grains.

Triticum aestivum L. (Domestic Bread Wheat)

Quantity:	111
Percentage of total:	93%

A sample of ten grains was selected for measurement. The results of these measurements were:

Range of Length:	5.2 - 7.3 mm.
Range of Breadth:	2.0 - 3.0 mm.
Range of Thickness:	1.9 - 2.5 mm.
Mean Length:	6.14 mm.
Mean Breadth:	2.60 mm.
Mean Thickness:	2.19 mm.

Discussion: Some variance from the first sample can be expected simply because of the difference in the number of identifiable grains. This sample contained a much higher proportion of broken grains. Nevertheless, the results are virtually identical, hence the identification to species level as *aestivum.*

Triticum boeoticum Boiss. em. Thiem. (Wild Einkorn)

Quantity:	2
Percentage of Total:	1%

As in the first sample, there was a very limited number of *boeoticum* recovered. One grain was measurable at:

Length:	7.0 mm.
Breadth:	1.9 mm.
Thickness:	2.0 mm.

Hordeum spontaneum Koch. (Wild Barley)

Quantity:	2
Percentage of Total:	1%

As in the first sample these grains tend to approximate *spontaneum.* This sample consisted of between 6 and 7 individuals, but all were so fragmentary that consideration as *spontaneum* seemed most reasonable. One measurable grain yielded the following:

Length:	7.0 mm.
Breadth:	2.1 mm.
Thickness:	2.0 mm.

7.1.3 Cultural inferences

Both small samples indicate nothing unusual, but in fact, reflect a much expected dependence on domestic bread wheat by the population. Field weeds, represented by wild forms of wheat and barley, are in low enough frequency as to suggest no problems of soil overexploitation or exhaustion.

7.2 ^{14}C Determinations — Linda Mount-Williams

Several radiocarbon samples were collected during the first two seasons. Three charcoal samples were prepared for radiocarbon counting during the Spring of 1987 at Mt. Soledad Radiocarbon Laboratory in San Diego, under the auspices of Dr. Hans Suess of the Department of Chemistry, University of California, San Diego. Two of these samples, B1.10 and B1.86 contained too few grams for a reliable count (6 grams of cleaned sample being considered the minimum necessary), and therefore were not used. Charcoal sample B1.87 (laboratory number LJ 5761), located on the floor of the stone building in Area B, next to a hearth, contained 6.1 dry grams of carbon material, just enough to use in the small counter.

The preparation of this sample was done in four stages: cleaning, drying, burning, and counting. This sample needed extensive cleaning because of the many root hairs visible in the sample. The largest hairs were removed with sterilized forceps. The remaining recent organic matter was dissoved with hydrochloric acid (HCl), which removes contaminating tissue, but does not attack the charcoal. The sample was then further cleaned with sodium hydroxide (NaOH), then allowed to settle. The remaining charcoal was decanted and rinsed in boiling distilled water several times. After the final decanting, the sample was placed in a covered petrie dish and set in the laboratory's automatic dryer. Two days later, the carbon fragments were placed into the center of a glass tube, and burned into CO_2, then acetylene. This gas was stored for two weeks before being placed into the counter. A specific amount of acetylene is injected into the counter, which measures the amount of radioactive decay, thus determining the ratio of ^{14}C to ^{12}C.

The resulting date obtained from this sample is 5480 +/- 150, or 3370 +/- 150 B.C. Dr. Suess, who has developed the calibration curve now used to correct ^{14}C dates, places the Mozan sample within the 44th to the 42nd centuries B.C. According to the calibration table, however, the sample could be as recent as the 39th century B.C. This is due to the large error factor at this time period.

These dates are much earlier than the general chronological frame provided by the archaeological setting of the sample, i.e. the stone building in Area B, which belongs to the end of the third millennium. Since obviously a ^{14}C determination can only reflect the age of the wood, the time differential of about 2000 years between our sample and its archaeological context may be accounted for either by assuming that the wood recovered from the building was that much older than the building itself, or that some contamination has occurred. As for the latter, the most frequent skewing of sample dates is caused by the inclusion of modern organic debris, such as body hair, grease, cigarette ash, or packaging materials. The analysis of further samples, to be expected from future work at the site, will help provide an answer to these questions.

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