

TITLE:

Palynological Analysis of the Tohatchi-Crownpoint Project:
Preliminary Report

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Twenty-eight soil samples were submitted for pollen analysis from the four sites excavated in 1964. Of these four were surface samples, of which one represented the only collection from LA 2988. At LA 2990 one subsurface collection was made, at LA 2989 four were made, and at LA 2987 nineteen samples were taken. Subsurface sampling was only undertaken effectively at LA 2987 since the other sites were small and did not yield enough archaeological materials to justify the expense of pollen analysis. Of these twenty-eight samples twenty contained sufficient pollen for analysis.

The surface samples that yielded pollen counts were those from LA 2987 and LA 2990. Both contain arboreal pollen frequencies of the range indicating a prairie ecology, but that from 2990 evidences a position somewhat closer to the lower margin of the juniper or piñon-juniper savanna. Both sites are presently located in grassland

The lack of results from the surface of LA 2988 and LA 2990 is disconcerting, but not completely unexpected. A certain percentage of surface samples do not yield to analysis, and in this case the law of averages has caught up with us. In any case, the sample from LA 2989 was collected in a much disturbed area near a modern orchard, and would not have been of value as a control sample even if it had given a legitimate pollen count.

LA 2987 (Fig. 1)

The stratigraphic sample series collected from feature 10 shows three major palynological variations through time. The lowermost sample, though collected below the lowest floor of the feature, contains maize pollen so it is highly probable that it was deposited during the occupation of the site. This sample contains 41.5 per cent arboreal pollen (AP) which is a significantly higher frequency than that obtained from the surface sample and indicates a condition somewhat moister than now occurs, with trees closer to the site. The series of samples collected between the second floor and the first floor contain AP frequencies between 20.0 and 32.0 per cent, which is on a par with the surface sample and indicate conditions like the present. One sample from the first floor, one from the vent fill and one from the structure fill above the second floor but below the surface yield AP frequencies between 11.0 and 17.0 per cent. These are significantly lower values than the surface sample and indicate drier conditions than present. It is interesting to note that the sample from the fill of the firebox located on the first floor and the sample of the first floor itself are distinctive, the former indicating conditions like the present and the latter indicating drier ones. This is most likely explained as due to the environmental change involved occurring during the time this floor was being utilized*

A second indicator of chronological position is evident in the occurrence of Ephedra pollen. Ephedra only shows up in the sequence in the sediments which are as young or younger than the upper floor of the feature.

*The possibility must not be ruled out that the pollen analysis is completely wrong and these samples, which should be of the same time horizon, do not agree because the palynological technique is faulty.

It should be emphasised that this sequence of environmental changes probably did not affect the vegetation growing at the site itself. Throughout the range of time involved, the site remained located in a prairie vegetation zone similar to that of the present. However, the margin of the savanna seems to have been progressively retreating upslope from the area near the site, and the causal factors for this condition may have played an important role in the cultural ecology of the site's inhabitants. The occurrence of willow and cottonwood pollen associated with sediments from the upper floor would indicate that at the time that floor was in use water tables were sufficiently high along the local drainage to support flood plain farming. But the progressive deficiency in moisture evidenced in the pollen record was probably accompanied by headward erosion of nearby arroyo, with consequent disastrous effects on site's croplands.

The samples from feature 4 and feature 7 appear to be of the later time horizons evidenced in the kiva sequence. The sample from feature 4 contains an AP frequency of only 11.5 per cent, and while those from feature 7 contain AP frequencies in the range of the modern sample they also contain Ephedra pollen and therefore are more like the samples of the upper kiva horizon than the horizon between the floors. This would indicate that the kiva at the site was constructed some time before features 4 and 7, if not some time before the entire room block, and that the occupation of the site as a habitation area may be a later usage of it than its use as a ceremonial area. From the variation in architecture between the upper and lower levels of the kiva, it is not impossible that in its later usage feature 10 was not a ceremonial structure at all.

The samples from features 15 and 16 are practically identical, and their AP frequencies and lack of Ephedra pollen would indicate that they are somewhat older than the samples from the room block. This accords well with the stratigraphic evidence from feature 15, as the sample was collected from the charcoal fill below the slabs which form a floor midway between the bottom of this pit structure and its surface. It would thus appear that the area of the site where features 15 and 16 are located is somewhat earlier than the area around the room block. This may be corroborated by the ceramics.

Dating of this site by reference to the pollen chronology so far developed for New Mexico allows a series of alternatives. There are five dates on the pollen curve which correlate with the pollen sequence obtained at LA 2987, of which only one can be correct (if any are). The selection among these possibilities will have to be made after the ceramics from the site have been analyzed. The dates could be A. D. 775-800, 800-850, 900-950, 1075-1125, or 1225-1250. From the preliminary ceramic evidence, 1075-1125 seems most probable.

LA 2989 (Fig. 2)

The sampling program at this site was hampered by a considerable amount of rain with consequent muddy floors and disruption of routine. As rain efficiently washes pollen out of the air, sampling a rain-soaked floor or stratigraphic horizon is not profitable because of the high probability of contamination with modern pollen. Thus sampling was limited to the fills of pit-like structures, three from feature 3 and that of feature 4.

The samples are effectively identical in pollen content. Some variations occur in the frequencies of Chenopodiaceae and Zea pollen but the former (while statistically significant) are not ecologically significant and the latter are no doubt due to cultural manipulations. The arboreal pollen frequencies are between 51.0 and 58.0 per cent. By comparison with modern surface samples this is indicative of a juniper or pinyon-juniper savanna ecology. The present ecology of the area is quite disturbed, and there is an orchard planted nearby, but it was probably a prairie area until recently.

It is unusual to obtain pollen frequencies indicative of a savanna ecology from sites dating younger than the beginning of the Pueblo Period, unless they are Navajo or Spanish-Mexican sites. Usually when such conditions occur pueblo sites are abandoned unless the condition does not last for a period of more than 25 years, and we have never yet come across a pollen record from a site indicating that it was purposely settled in a savanna ecology. I would suspect, then, that this horizon is not the earliest at site and that the inhabitants may have abandoned the locality soon after these firepits and containers were utilized.

Pollen dating again leaves a series of alternatives: A. D. 750-775, 1025-1075, 1125 or 1225. As the preliminary ceramic dating places the site earlier than LA 2987, either A. D. 1025 or 1075 seem the most likely possibilities. I would not be surprised if much of the ceramics of the site are somewhat older than the pollen date, since I feel the pollen is probably from a late occupational horizon.

LA 2990 (Fig. 3)

The surface and the subsurface samples from this site are almost identical - even to their both containing maize pollen and their both containing re-bedded pollen from Tertiary sediments. Thus the surface sample becomes highly suspect, and may not be a good indication of present conditions in the area.

The AP frequency of the subsurface sample (46.0%) is in the range of both prairie ecology (ranging from 10 to 50%) and savanna ecology (ranging from 35 to 60%) so may represent either condition. If the surface sample, which also falls in this range, is to be trusted as a control the indications are of a prairie ecology at the time of deposition. Samples with AP frequencies in this range occur on the pollen curve at dates of A. D. 800, 900, 1000, 1075, 1125, 1225, 1275 and 1375. Selection from this series of possibilities will depend on the independent dating of cultural materials from the site.