Pollen From The East Rim Site, SBCM 1803, California

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Two samples of surface sediment and two samples of sediment of archaeological context from the East Rim Site were analyzed for pollen content in August, 1972. The site contains materials believed to date in excess of 10,000 B.P. on typological grounds, and the presence of scraping, cutting and chopping tools in this San Dieguito I assemblage, together with blade tools and heavy, pointed, digging tools, argues for a hunting-gathering economic orientation involving medium or large size game and root-tuber collecting. Some tools functionally adapted to wood working have also been recovered. The site is located atop an alluvial fan above a Pleistocene lake basin, which apparently reached its greatest size during the neaximum of the Wisconsin glaciation. Thus, the tool inventory of the site does not appear to reflect an adaptation to the present Creosote Brush Scrub environment of the area. The prospect looms large that the enviroment was not Creosote Brush Scrub during the period of the site's utilization. Pollen analysis seemed the obvious form of paleoecological research with which to demonstrate the occurence of a previously existing environment distinct from that of the locality today.

The two surface samples (Nos. 4 and 6 of Table) were analyzed to serve as controls on interpretation, since they offer opportunity to observe the palynological reflection of modern conditions of environment. The flora of the site vicinity is dominated by creosote bush, with cacti of various genera of major import. These plants reproduce by the process known as zoogamy, such that their pollen is transferred to the female organs of the flower through an insect or animal vector. Pollen of such plants is not expected in quantity in sediment samples, since the adaptation of the species is towards very limited dispersal of its pollen. Pollen of such plants as grasses, bursage, mormon tea and saltbush, which are anamogamous (wind pollinated) plants, is more likely to be widely dispersed and is the sort of pollen expected.

The pollen rain of the modern vegetation as reflected in sample No. 4 incorporates about 25 per cent arboreal pollen (AP) transported from beyond the site locality by the wind, and of the remaining pollen the predominant type is Compositae pollen of the low-spine morphological variety. This probably is attributable to bursage, but other genera of Compositae (the sunflower plant family) produce morphologically similar pollen. The pollen rain of this surface sample compares very favorably with those analyzed by Mehringer (1967:149). At comparable Mohave Desert elevations, on comparable soils, Mehringer determined that low-spine Compositae pollen was the single most abundant type presently produced and arboreal pollen represented 20-40 per cent of the total pollen observed.

The modern pollen rain reflected by sample No. 6 differs from that of No. 4 and those analyzed by Mehringer in having more of the high-spine morphological variety of Compositae pollen than the low-spine morphological variety. Mehringer's data indicate that high-spine Compositae pollen is more regularly encountered in quantity in more elevated Mohave Desert environments. It would thus appear that sufface sample No. 6 reflects a less xeric microhabitat than does surface sample No. 4. Both samples, however, recognizably reflect Mohave Desert vegetation patterns of types found today at elevations below 5,000 feet.

Two samples from archaeological context, Nos. 1 and 3, were processed. The latter reacted uncontrollably to hydroflouric acid, and a portion of the sample was lost through laboratory error. The resultant extract produced almost no pollen at all. It seems unlikely that the low pollen density of this sample is, however, a result of the lab error. One would expect such an error to skew the statistical results of analysis, perhaps, but not to eliminate the pollen contained by the sample.

Sample No. 1 yielded a pollen record in which low-spine Compositae is the dominant pollen type and the AP value is 26.5%. This pollen spectrum is statistically indistinguishable from that of surface sample No. 4 and ostensibly reflects the same creosote bush scrub vegetation pattern observed at the site locality today. The apparent interpretation, given the archaeological context of the sample, is that such a vegetation pattern existed at the site during its period of occupancy.

This interpretation is not in keeping with the functional interpretation of the artifactual assemblage, the proposed antiquity of the site, nor the negative evidence provided by sample No. 3. At the Tule Springs Site, Mehringer (1967) determined that pollen records of the 7000 - 1200 B.P. horizon reflected environmental conditions distinct from those of the Mohave Desert today at elevations below 5000 feet. Particularly, low elevation pollen records of this antiquity consistently evidence significantly higher frequencies of Artemsia pollen than occurs today, reflecting a more mesic paleoenvironment. The pollen record of sample No. 1 is thus not consistent with the proposed antiquity of the site. The fact that pollen sample No. 3 yielded almost no pollen at all, while pollen sample No. 1 provided pollen in an abundance equal to that of the surface pollen samples, also seems pertinent. One would anticipate that such factors as have affected pollen preservation in these ancient sediments in the one case would be at least somewhat represented in the other case.

The most reasonable interpretation of these data seems to be that the pollen record of sample No. 1 very closely approximates that of sample No. 4 because it is, in fact, a sample of modern pollen rain. Despite its archaeological context it would seem that the sediment collected was exposed for the entrapment of modern pollen in some quantity well within historic time. This does not seem to us to be a sample collection error. The quantity of pollen recovered from this specimen is far greater than would be expected simply if the collecting instruments were contaminated by modern pollen or the sample left too exposed to modern contamination during the collecting process. Rather, it seems that modern pollen was collecting in this sample over a period of some years.

The sample was collected directly beneath a large core tool which protruded through the modern surface. Perhaps water, modern dust and pollen drifted downwards through the sediments to this position along the planes of the sides of this tool. Another possibility is that during the process of removing the tool from its positon in order to collect the sediment sample, surficial sediment fell onto the level from which the pollen sample was collected and thus modern sediment and pollen were incorporated in the sample.

Three additional samples of archaeological context were submitted to Warren S. Drugg of the La Habra Laboratory, Chevron Oil Field Research Company. Mr. Drugg's study of these specimens does not constitute a pollen analysis in the formal sense, since the number of grains observed of each identifiable taxon was not included in his report of 11 September 1972. However, Mr. Drugg's report provides a "rough count" assessment of pollen statistics which are wholly adequate for purposes of comparison with the data provided by Mehringer (1967) and that of this laboratory.

One of the three samples investigated by Drugg proved insufficiently polliniferous for analysis. In this regard it is like sample number 1 which we observed. The other two samples provided pollen spectra dominated by pine pollen (65 and 75 per cent of the rough counts) with Compositae pollen of the low-spine variety and Cheno-Am pollen constituting the majority of the remaining grains. Juniper, Abies Onagraceae, and Ephedra are represented in proportions higher than occur in surface samples 4 and 6.

These results exactly concur with those obtained by Mehringer (1967: 174-78) at the Tule Springs site for the horizon dated 22,000 to > 37,000 B.P. Like the East Rim Site, the Tule Springs locality is a low elevation Mohave Desert site. The contrast between the surface pollen spectra at both loci and the fossil pollen spectra containing large amounts of pine pollen is most reasonably interpreted as the distinction between vegetation responding to a xeric-hot climate and vegetation responding to a xeric-cold climate. There seems very little doubt that Drugg's interpretation of the fossil pollen record from East Rim as Pleistocene in age is fully substantiated.

However the Pleistocene covers a great deal of absolute time. While the East Rim fossil pollen spectra correlate well with Tule Springs pollen spectra dated to the last glacial period of the Pleistocene, they need not have this particular antiquity. But though the pollen records involved could date before or after the 22,000 - 37,000+ B.P. interval, we can be assured that they do not date to that last part of the Pleistocene which falls between 7000 and 14,000 B.P. Fossil pollen records of the 7000 - 12,000 B.P. horizon incorporate large quantities of Artemesia pollen and are quite incomperable to those of the East Rim site. Pollen records from Tule Springs of the 12,000 - 14,000 B.P. horizon are characterized by significantly lower frequencies of pine pollen than are observed in the

East Rim samples and higher frquencies of juniper and *Artemesia* pollen.

This date (prior to 14,000 B.P.) applies to the pollen record, and on the basis of the evidence available there is no reason to doubt that it applies to the sediments of which the archaeological site is composed (at least the non-surficial sediments) as well. Whether this date applies to the artifacts occurring as inclusions in the sediment is another matter. We have not been provided data which we are convinced will unequivocably demonstrate that the artifacts and the sediment were deposited contemporaneously. We are sure that the surficial sediment, in which artifacts are entrapped, is not contemporary with the artifacts. We have little assurance that the artifacts have not become associated with the Pleistocene sediment through deflation from a higher surface, or that they may not simply have been laid upon - and intruded into - a Pleistocene deposit which remained surficial many centuries or millenia after its deposition. The argument for application of a date prior to 14,00 B.P. to the artifact assemblage must proceed from detailed analysis of the site's stratigraphy. This question of association cannot be resolved palynologically.

Reference Cited

Mehringer, Peter J., Jr.
1967 Pollen Analysis of the Tule Springs Site, Nevada. *In* H.M. Wormington and D. Ellis, eds. Pleistocene Studies in Southern Nevada. *Nevada State Museum Anthropological Papers* No. 13. Carson city.

EAST RIM SITE, CALIFORNIA

Sample #	Total AP	P. edulis	P. ponderosa	Juniperus	Quercus	Betula	Salix	Total NAP	Cheno-Am	Artemisia	Lo-spine Comps.	Hi-spine Comps.	Gramineae	Ephedra N.	Sarcobatus	Eriogonum	Cactaceae	Onagraceae	Total
1	53	7	37	3	3	2	1	147	24	5	63	38	7	3	1	3	1	2	200 + 2 unknowns
[illegible]	51	12	30		7	2		149	28	9	73	20	9	3	4	1	1	1	200
6	62	7	41	1	10	3		138	35	10	32	43	17					1	200