

NOTES ON HINKSON PALYNOLOGY

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July 1992

ABSTRACT

Seven pollen records have been recovered from sediment samples collected from cultural context at the Hinkson site. Analysis suggests the sampled deposits date to the AD 1249 - 1275 and the AD 1275 - 1315 intervals of the Colorado Plateau Pollen Chronology (Schoenwetter 1970). This result differs by roughly a quarter century from that suggested by Kintigh's ceramic analysis (Kintigh 1992:8). Though the distinction does not affect the thrust of his argument, it is not entirely minor since the pollen record suggests construction occurred during decades the ceramic record suggests the site was not occupied at all. The difference can be explained as both a measure and a function of the independence of the two techniques for dating a site's occupation.

Pollen samples collected from test excavations in the Hinkson Site and the artificial terraces located nearby were analyzed as an undergraduate classroom project late in 1989 (Schoenwetter 1992:87-91). Overall, the effort had two archaeological goals: to estimate the antiquity of sediment samples from the site through application of the Colorado Plateau Pollen Chronology (Schoenwetter 1970), and to determine if the antiquity and/or cultural function of the terrace deposits could be suggested through pollen analysis. Since the latter issue was not well resolved, only the former will be dealt with here.

The Colorado Plateau Pollen Chronology (CPPC) was developed to provide estimates of the antiquity of archaeological site-context and alluvial samples deposited between AD 200 and 1900. It is directly controlled by a few radiocarbon and

dendrological dates, but both its accuracy and precision are principally controlled by dendrochronometric cross dates for Anasazi pottery types associated with pollen samples from a few Colorado Plateau locations. The CPPC identifies a sequence of changes in a pollen statistic (the adjusted arboreal pollen frequency, or adj. AP%) thought to monitor broadly scaled patterns of effective moisture (moisture available for plant growth). Dean has determined that the timing and directions of positive and negative changes in this statistic in the CPPC "are fairly closely matched by intervals of negative or positive growth relationships that are especially evident in the 25 year mean-index [tree ring growth] series." (Dean 1988:145). Changes in the adj. AP%, then, may be conveniently thought of as reflections of the initiation of episodes of relative drought, of relatively greater effective moisture receipt, or of effective moisture conditions similar to those that prevail today.

Though the CPPC has been tested a number of times since it was developed (e.g. Buge' and Schoenwetter 1976; Scott 1977, 1978; Peterson 1983), it is not regularly employed as a dating technique at Anasazi sites. The chronometry of Colorado Plateau sites that contain pottery is normally sufficiently controlled by in situ dendrological records, archaeomagnetic records, architectural and community styles that are well dated at a regional scale, and ceramic assemblages that incorporate dendrologically cross-dated types and styles. The additional expense of applying the CPPC to provide information on inter-

and inter-site chronology is only occasionally clearly justified (e.g. Schoonwetter 1987, Limon 1988). Because the Binkson ceramic assemblage yields a date some may consider inconsistent with that expected for Chacoan architectural features observed at the site, Binkson seems to be the sort of unusual situation which calls for application of the independent means of estimating site antiquity provided through

DATING INDIVIDUAL POLLEN RECORDS

The CPPC provides estimates of the antiquity of individual pollen samples (so called "pollen dates") within temporal intervals; e.g. AD 1075 - 1125, 1125 - 1215, 1215 - 1240, 1240 - 1275. However, different intervals of the CPPC are palynologically characterized by the same set of adj. AP% values, representing recurrences of the same sort of effective moisture pattern. For example, pollen records cross-dated to AD 1125 - 1215 are indistinguishable from those cross-dated to AD 1240 - 1275. The adj. AP% pollen statistic suggesting moisture conditions similar to those of today characterizes both intervals. So the pollen dates provided for individual samples are expressed as alternative possibilities: AD 1125 - 1215 or 1240 - 1275. Selection of the most probable alternative is normally not difficult because the antiquity of most samples is usually estimable from their site context situations. Architectural and ceramic style associations, for example, would normally allow recognition of the probability that a sample dated to the tenth, eleventh or twelfth century.

The true antiquity of a sample within an interval to which

it is assigned is not assessable from the palynological record itself, but may sometimes be deduced from the relative stratigraphic position of sampled deposits. The AD 1125 - 1215 interval of effective moisture conditions similar to those of today is preceded by one (AD 1075 - 1125) of drought conditions and succeeded by one (AD 1215 - 1240) of wetter conditions. Alternatively, the AD 1240 - 1275 interval of effective moisture conditions is preceded by one of wetter conditions (AD 1215 - 1240) and succeeded by one of drier conditions (AD 1275 - 1315). Where the stratigraphic relationships of sampled deposits are known, the directions of sequential changes in the adj. AP% value can be plotted and the most probable temporal position of any individual sample is usually quite clear.

Only ten sediment samples were collected during the course of excavations of portions of three of the 26 masonry room blocks at Hinkson. Though few, they adequately represent the range of time for deposition of the deposits exposed, which is the matter of relevance here. The ceramic assemblage studied to establish the dates of probable site occupation and abandonment was primarily recovered from the site's surface. Excavations were not designed to recover more than sufficient in situ pottery to test the hypothesis that a significantly earlier assemblage lay obscured from view. Excavation at a significantly increased scale for the purpose of recovery of additional pollen samples was certainly not warranted, and the collection of additional samples to be curated for their

possible value to future study was not necessary since the site is not presently threatened.

Three of the ten sediment samples failed to yield sufficient pollen for analysis. Two aliquots of a pitfill sample from a room at HKSN 15 were processed as part of the pollen study, and the educational structure of the course resulted in independent observations of three other samples by two or more students. As most of the raw data of the analysis have no relationship to the problems discussed in this report, and as I have applied palynological techniques that minimize the affects of misidentifications and local overrepresentation events in the analysis, figure 1 graphs only the data I am prepared to argue may be significant and meaningful to the immediate purpose of this paper.

The sole productive sample recovered from HKSN 17, sample 1157, was collected from a midden deposit laid down subsequent to or very late in the history of room occupation. It contained a ceramic assemblage recognized to "date early" in the occupational history of Ojo Bonito, a that was occupied later than the general occupation of Hinkson (Kintigh, pers. comm.). Sample 1157's adj. AP% value of 7.1 is consistent with dates falling in the AD 1075-1125 or the 1275-1315 intervals of the CPPC.

Two samples (1496 and 1118) were collected from Room 2 at HKSN 15. Both the former, which sampled the floor deposit, and the latter, which sampled sediment that had in-filled the hearth, yielded adj. AP% values (15.7 and 16.7, respectively)

consistent with dates in the AD 1075-1125 or 1275-1315 intervals.

The four samples from BRN 12, the Great House structure, derive from two different architectural units. Sample 1483 was collected beneath a hatchcover resting upon the floor of the kiva and sample 1484 was recovered from the deposit sealed by a shelfstone capping the surface of the kiva's bench. Their relative stratigraphic positions suggest that sample 1483 represents a later period of the kiva's use and sample 1484 was sealed at the time the kiva was constructed. Sample 1080 was recovered from a pit inside what evidently was a structure in the plaza. Sample 1079 was recovered from a loam mould associated with that structure. The adj. AP% values of samples 1484, 1483 and 1079 (14.9, 17.0 and 5.9, respectively) are consistent with dates falling in the AD 1075-1125 or the 1275-1315 intervals of the CPPC. The adj. AP% value of sample 1080, however, (22.4) is not. It suggests a date in the AD 1125-1215, 1240-1275 or the 1315-1335 intervals of the CPPC.

DATING OCCUPATION AND ABANDONMENT

Kintigh's analysis (1992) suggests Hinkson was occupied mainly between AD 1200 and 1250, with limited occupation as early as AD 1175 and as late as AD 1275. Application of the CPPC to individual pollen records identifies possible pollen dates for site-context deposits ranging from AD 1075 to 1335. The stratigraphic relationships of some samples, however, argue the probable range of deposition within the period bracketed by the dates AD 1240-1315. Though it seems not unlikely that one

or two samples dated to the 1275-1315 interval were deposited subsequent to site abandonment, others of that date are associated with relative humidity of safe humidity.

The relationship between samples 1080 and 1079, from the pitfill and postmound of the plaza structure at the Great House, strongly argues that the former was deposited prior to the latter. Even if the pit deposit accumulated after occupation of that portion of the Great House, pollen was not likely to have been incorporated into the postmound fill until the subsequent horizon of dismantling or decomposition of the structure of which it was an element. The earlier sample of the sequence, 1080, yielded an adj. AP% value suggesting an interval of effective moisture conditions like those prevailing today. The later sample, 1079, suggests an interval of drought conditions. The only sequential pattern of this sort that occurs in the CPFC covers the period AD 1240 - 1315. It seems unlikely to be coincidence that the adj. AP% value of the later sample in this sequence falls in the same range as those of sample 1157, which is associated with a relatively late ceramic assemblage, and sample 1488, which probably was laid down late in the occupational history of the kiva at the Great House. Given the lack of any other sort of indication that such late instances of deposition might date as early as AD 1075 - 1125, the prior probability is that all date to the AD 1275 - 1315 interval of the CPFC, as do the deposits sampled at HRSN 15 (samples 1496 and 1118) and the sample sealed beneath the shelfstone capping the bench of the Great House kiva (sample

Kintigh's ceramic analyses then suggests occupation of the sampled portions of Hinkson between 1250 and 1250, with abandonment by 1275, while the pollen study suggests occupation by 1240, with occupation of Hinkson 15 and placement of shelfstones on the bench of the Great House kiva after 1275 and abandonment at or prior to 1315. The distinction is not significant to the thrust of Kintigh's argument that the organizational foundations of Pueblo IV towns are expressed at post-Chacoan sites of a Transitional Phase not recognized in the Pecos chronology. However, the difference is not entirely minor. Failure to account for it could support suspicions that one or both dating techniques have yielded erroneous results. I think this is not the case. Rather, I suggest that the difference exists because both of the techniques used to estimate the dates for occupation and abandonment relate to their dendrological controls in opposing ways. One overestimates antiquity and the other underestimates it.

EXPLAINING DISTINCTIVE RESULTS

In this case, the interval Dean (1978:228) calls the Target Event was begun when site construction commenced at Hinkson and ended at the point that occupancy was so minimal as to leave no physical record of its occurrence. What Dean calls the Reference Events are the interval of manufacture and use of ceramic types and styles cross-dated by tree-ring associations, on the one hand, and the intervals of deposition of pollen records characterized by particular adj. 39% values, on the

other. The latter are dated through association with cross-dated ceramic types and styles, but are also known to correspond with intervals defined by complementary changes in the modal dendroclimatic record of Colorado Plateau dendrological sequences.

The period of use of a ceramic type may be considerably longer than the period within which it was manufactured, and antique ceramic types commonly make up significant fractions of assemblages which contain types manufactured more recently. The affect on analysis is to overestimate the antiquity of the assemblage; that is, to extend the estimate of antiquity somewhat further back in time because the most recently manufactured pottery types occur too rarely to be incorporated in sample collections. Thus a ceramic assemblage estimated to date not later than the third quarter of the thirteenth century might actually date to some point in the last quarter.

Alternatively, pollen is incorporated into a sediment sample as deposition occurs and/or when transported from the surface of the deposit subsequently through the process known as downwash (Dimbleby 1985:2-3). The pollen of a sample is thus very likely to have been included in the deposit significantly subsequent to the initial manufacture date (and possibly late in the use life) of even the most recently manufactured pottery type incorporated in the deposit. Though downwash is thought not to have much affect upon site-context pollen records in arid regions, it would only exacerbate an existing tendency of the pollen dates provided by the CPPC to underestimate the antiquity

of the sampled deposit. That is, to generate a date more recent than the termination date for the use life of the youngest ceramic type present. The temporal correspondence of dendroclimatically evidenced and palynologically evidenced changes in effective moisture curbs extreme underestimates of antiquity. In this case, however, site context deposits that have been dated to the final quarter of the thirteenth century might actually date to the third quarter.

Pollen analysis suggests that the Hinkson site was abandoned after AD 1275 but before the second decade of the following century. This result is not inconsistent with Kintigh's conclusion that the site was abandoned in the early 1300s. The dating technique is likely to provide wholly accurate dates for the target event involved. In any case, the kind and degree of distinction that exists between the estimates for the abandonment is exactly the sort expected if both dating techniques are accurate within their respective limitations. Indeed, the difference in dates suggested by the pollen and ceramic analyses may be recognized as both a function and a measure of their independence.

Facies non omnibus una,
Nec diversa tamen, qualem decet, esse
sorum - Ovid

Their faces were not all alike,
 Nor yet unlike, but such as those of sisters
 ought to be

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