The Slusher Estate Historical Park

Palynology Project

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Research Objectives

The study is designed to maximize potentials to compare and contrast pollen records of distinctive, identifiable, time horizons. There are two principle objectives to this comparison: (a) to discern contrasts in the types of exotic and native cultivars (paying special attention to contrasts between the 1880-1940 horizon when the Hawkins-Nimock-Slusher ranches and gardens were established and the Ontiveros horizon reflecting Colonial land use), and (b) to identify regional environmental/climatic variations that may differentiate occupational and preoccupation horizons.

In light of these interests the identification of sediment samples referable to different time horizons is crucial. To insure that an adequate number of unambiguously dated examples will be available, the strategy for sampling the deposits of the study area will be controlled by both the evident stratigraphy and by artifact associations.

Site Stratigraphy

The 1980 season excavation records provide a baseline comprehension of the stratigraphy of the area from the adobe east to and including the bone pits. The stratigraphic picture will undouhtedly become more complex and more complete as excavation proceeds in 1981. Additional depositional units are expected to be definable west of the adobe and south of it if excavation is planned for that area. The stratigraphic picture within the fenced estate area is now totally unknown. I would anticipate the most difficulty will be encountered in linking the depositional histories of the area around the adobe with that of the fenced estate area. Because the latter is higher ground, facies variations may make correlation of data from the north-south transect and that of the east-west transect very difficult unless extensive testing in the fenced estate property is undertaken. Unless there is other archaeological advantage to exten-

sive testing or trenching within the fenced estate area, however, I don't think it would be advisable to do so primarily to clarify the stratigraphic record.

The basal culturally sterile deposits on the east-west line were described in the 1980 tests as light yellow brown silts. Both the bone pits and the foundation trenches of the adobe were excavated into this unit. The foundation trenches were successively filled with a lower irregularly packed course of rock and clay-mud mortar and an upper foundation course of closely set cobbles forming a roughly level surface. The foundation trench fill should he thought of as two depositional events, the latter of which offers potential for pollen sampling as it may have been exposed to the pollen rain for some time before the adobes were superimposed.

The in-fill deposits of the bone pits which contain bone vary as regards color, texture and the relative proportion of burned and unburned debris. There is evidently a good deal of isolated dump lense character to this variation, but 3 sub units of the fill may have temporal value. The basal fill is described as a mixed silty sand with charcoal flecks and refuse. A series of stratified lenses above the basal fill are characterized by ashy texture, high concentrations of charcoal and/or relatively more burned bone. Though a number of depositional events are involved, this set of lenses is most profitably considered the middle sub unit of bone pit deposition. The more recent sub unit is described as "light brown-gray" in color and of a sandy silt texture. The oldest over burden deposit of the bone pits is described as gray-brown sandy silt with orange chunks. Both probably reference the same time period, though the latter contains no bone where sampled in 1980.

Spanish Colonial Unit are somewhat darker than those of the Sterile unit and are sandier. The best clue to their occurrence, however, is Tizon Brownware, Majolica and shell fragments *in situ* unmixed with more recent types of artifacts. Lab workers should be asked to especially be alert for evidence of this horizon and feed information back to the excavation supervisors if it shows up in the lab. There is reason to believe that a depositional sub-unit formed by the "melt" of adobes following abandonment of the Ontiveros residence may be observed west (downslope) of the room block. If it can be located and identified, this would be a very significant stratigraphic record since it would have trapped a surface that could be assigned to the Spanish Colonial horizon with absolute confidence.

The Overburden Unit deposits are the most variable of the sequence. Microstratigraphic assessment will be important in figuring out both their true interrelationships and appropriate locations for pollen sampling. Most of the deposits of this unit are themselves artifacts (layers produced by earth scraping, floors, macadam layers, spoil piles of the 1970's excavations). The deposits themselves are not often likely to contain pollen of much relevance. But a number of these deposits may have been laid down upon surfaces which were pollen traps at the time. The pollen of those surfaces, then, is datable to the time that the deposit trapped it in place. The two asphalt layers west of the adobe, for example, are not samplable deposits. But the sediment which built up on the surface of the lower asphalt layer ostensibly dates about the time the lower asphalt was emplaced, and the upper asphalt layer trapped pollen on a sediment surface which is somewhat younger. Both surfaces offer opportunity for lateral sampling.

A schematic stratigraphic section is attached.

Sampling Strategy

The pollen sampling strategy it seems advisable to employ on this property is one designed

bly be analyzed in the course of this particular project and (b) multiple potential pollen records associated with any given category of artifactual or stratigraphic information. Basically, there are two kinds of sampling opportunities that should be exploited: plan view sampling of all archaeological provenience units, and profile sampling of vertical exposures.

Plan view sampling is a means of insuring that each artifact lot controlled by vertical and horizontal parameters (e.g. each level of each excavation unit) can serve as a temporal

pollen sample. Where within the limits of the provenience the pollen sample is actually collected is not particularly pertinent. What is important is that the sample be representative of the provenience unit. This is why it should be made up of 10 to 20 sub-samples collected throughout the horizontal (if not both the horizontal and vertical) extent of the unit. It is also important that excavators be sensitive to whether or not the provenience unit involves one or more deposition events, since independent depositional events often have distinctive physical, chemical and temporal parameters that affect the pollen they contain. A common situation excavators will encounter at this site is one in which rodent burrows intrude provenience units, so a representative sediment sample contains both native and burrow-fill deposits. This is why those who collect the samples have been asked to identify them as mixed if field evidence supports such an assessment.

Profile sampling offers opportunity to obtain samples of unmixed deposits whose relative stratigraphic relationship is firmly controlled. By column sampling each depositional unit exposed in the profile at its

thickest point at a standard interval (e.g. 5cm or 10cm), the maximum number will be obtained. Sampling the whole profile in a single column may prove warranted more often, however, depending on field logistics.

Two words of warning are relevant to column sampling of profile exposures. First, there is no point to sampling mixed deposits such as rodent burrows, since the objective is to obtain sequential samples of temporally distinct pollen rains. Second, there is no point to sampling a deposit whose relationship to other deposits is unknown or unclear. Before sampling, then, the stratigraphy of the profile to be sampled should be comprehended. The samples of all profiles will have to be interrelated ultimately, and this will be much easier if they are interrelated continuously as work progresses. Assigning the task of stratigraphic analysis, profile description and profile pollen sampling throughout the dig to one or two workers may prove a valuable strategy.

Profile exposures also may be sampled laterally. The contact surfaces interfacing one depositional event with another often will identify surfaces which are temporally controlled by the dates attributable to the distinctive artifact records of the deposits bracketing the surface. Laterally distributed sub-samples of the contact will produce a single representative sample of the pollen rain of that time horizon. When sampling laterally, it is important to realize that the notes should clearly explain what the person collecting the sample believed was being sampled and the lateral extent of the sub samples involved.

The thing to keep in mind when sampling profiles is a recognition of what the collected sediments are supposed to represent. What is desirable is that each sample contain the pollen record of an identifiable, unique, time period. Each sample collected from a vertical column will fulfill this objective, since each has a unique relative stratigraphic position.

Lateral samples should be made up of sub-samples which also represent a single time period. It may also be pertinent to keep in mind the fact that pollen analyses are statistical. One sample cannot be confidently assessed as characteristic of a population. The data of samples from one profile will therefore be combined with the data of samples collected in different units to obtain a statistically adequate reflection of the pollen rain of any particular horizon of time. The more profiles we can sample the more opportunities we generate to obtain sufficient numbers of samples of any particular time interval. There are six time horizons we are trying to compare: the horizon of Gabrieleño occupation prior to construction of the Onitiveros Adobe (if one occurs at the site); the horizon of Spanish Colonial occupation of the adobe; the horizon of post-adobe/pre-Fulton use of the property; the Fulton occupation horizon; the horizon of Hawkins-Nimocks occupation with attendant constructions and changes of land use; and the Slusher occupation horizon. Any opportunity to collect profile samples that can be relegated to one or more of these horizons should be exploited. If previously unrecognized horizons become evident in the course of excavation, these are of equal interest.

Surface Controls

Pollen study of archaeological context samples is routinely criticized on the grounds that the records may be so influenced by human behavior that they are not interpretable as reflections of "natural" floristic, ecological or environmental patterns. The point is well-taken, for in theory every and any item observed in an archaeological context (not excluding the depositional units themselves) must be assumed to be an artifact or to have reached its *in situ* location as a result of human behavior. When excavating and screening, the field archaeologist

is constantly involved in both an observation and an evaluation process. Thus six unmodified stones may be ignored or noted depending on the situation. If they are not of a local or common type of rock they will be noted, since their presence in a site context is less satisfactorily explained by natural processes than as a result of human behavior. If they are observed in a patterned distribution, e.g. in a row arrangement, a similar evaluation will be made. Those observed items which are evaluated as having no attributes of form, association or number which might reflect a behavioral pattern are ignored. All others are (in theory) noted. In practice, of course, the field archaeologists' evaluation process is strongly guided by prior experience and a suite of expectations based upon anthropological knowledge. But the expert worker tends to assume any item observed in an archaeological context is where it is and what it is because of human behavior, and only regards items from that context as irrelevant to archaeological interpretation if there is positive evidence to support this assessment.

Applying the identical methodological principle to the pollen record recovered from an archaeological context requires controls: pollen records unlikely to be affected by human behavior in the same ways, or to the same degree, as those of the archaeological context. The degree of similarity between such control pollen records and the archaeological context pollen records can be taken as an expression of the degree to which the archaeological context pollen record is not behaviorally influenced. This is justified theoretically by the uniformitarian doctrine which subtends all paleoecological research, as well as by the principles of archaeological methodology.

Since pollen analysis is a statistical technique, the reliability of comparisons between the control and site pollen records is directly related

to the numbers of samples analyzed from each population. And, because neither the control nor the site populations are homogeneous, the numbers of samples of identifiable sub-populations are required to be statistically adequate to support any conclusions which are drawn. Obviously, no single program of study can be expected to provide sufficient support for the analysis of all the control samples that might be needed.

But there are two sorts of control samples: surface and subsurface. Surface control samples are collected at locations where the effects of human behavior on floristic and ecological patterns is empirically evaluable. Normally, the focus of concern is on collecting samples from behaviorally un-modified (or little modified) areas as a means of determining the characteristics of the closest available approximations of the "natural" pollen rain of any particular vegetation type. Surface control samples may also be collected from behaviorally modified areas, however, as a means of determining the empirical characteristics of pollen rains of areas affected by specific behavioral patterns.

Subsurface control samples are replicate members of the same sub-population of archaeological context samples; for example, a group of ten samples referable to the same temporal horizon but recovered from different parts of the site. It is an anthropological truism that the various customary behavior patterns of a human group are not undertaken randomly on the landscape. Similarly, we assume a site is made up of "activity areas" of characteristically localized behavior at any given time. Insofar as activity areas affected the pollen record of a horizon, they should have done so differentially in respect to space. The pollen record similarities which we may observe among the ten samples of our example, then, are not likely to be reflections of the behaviors undertaken at activity areas. Either they express the background, "natural", pollen rain or they express

that pollen rain as affected by the randomly distributed behavior patterns of the site's occupants. If we subsequently observe essential similarity in the pollen records of temporally equivalent sites in different districts, we can be pretty much assured that behavioral patterns are not affecting the pollen records of either location. As I have maintained previously, it stretches anthropological credulity to the snapping point to imagine that two site populations in different areas behave in such exactly similar fashions that they similarly affect local pollen rains they have no means to observe.

The two kinds of control samples compliment each other and expand the portion of the record for which statistically adequate interpretive argument may be generated. But the numbers and varieties of control samples of either type which are demanded to satisfy all of the assumptions of statistical adequacy is staggeringly large. Absolute empirically justified control over any given analytic problem would require a professional lifetime of research. What is attempted in actual practice is the best available compromise between a total lack of empirical control data and the ultimate capacity of the project to support this aspect of the research. In the present instance, a suite of 13 surface control samples was collected and a suite of approximately 15 subsurface samples will be selected primarily for their value as providers of control data.

The surface sample controls were collected from 3 locations: Turnbull Canyon, Whittier Narrows Park, and the environs of the Slusher Estate. The Slusher Estate samples were collected to establish the character of the modern pollen rain within the proposed Historic Park. Three of this group of five samples were recovered from undisturbed modern surface locations; the other two (one within the estate and one a quarter mile north) were from disturbed surface locations. Comparison of the garden

flora pollen record of these samples and those referable to the Hawkins-Nimocks occupation horizon should prove particularly interesting.

The suite of six samples collected from Whittier Narrows Park represents the range of sucessional floristic variation occurring in a Riparian Forest plant community. Presumably, a similar vegetation pattern was once supported along the creek below the present estate property. The prehistoric and Spanish Colonial horizon pollen records are thus expectably more comparable to the modern records from Whittier Narrows than they are to those from the modern Slusher Estate. Yet this expectation may be biased by the implicit assumption that the observable distribution of remnant native floras, which is related to the present distribution of climatic patterns, closely approximates conditions of the prehistoric and Spanish Colonial horizons. This is not necessarily justified, since those occupations occurred at the end of the "Little Ice Age" when climatic patterns may have been different.

Today, the Slusher property is located less than two miles from the generally accepted boundary interfacing the relatively warmer "thermal belt" and the relatively cooler "cold air basins" districts of Californian Coastal climate. The surface samples collected from Turnbull Canyon derive from the same thermal belt zone expressed at Whittier Narrows and the Slusher Estate area. But, as they represent conditions at a higher elevation, they potentially reflect the kind of variant pollen record that might be expressed where somewhat cooler conditions prevail within this climate-topographic zone. If cooler conditions occurred in the past than occur today, the relationship of the fossil pollen records to the modern pollen records of the Slusher Estate area should parallel the relationship that exists today between the surface records from the estate and those from Turnbull Canyon.

Summary

The outlines of the palynological research of the Santa Fe Springs Historical Park Project have now become fixed, surface control samples have been recovered, and a sampling strategy has been established. Much of the operational activity should be fairly programmatic until the archaeological field work is completed. The unexpected will no doubt occur, of course. Field data will modify comprehension of the stratigraphic picture revealed by the testing program, and new opportunities to recover samples will arise. But flexibility is a structural aspect of the sampling strategy now being implemented. The profile sampling decisions that must be made demand intellectual flexibility and the plan sampling activity is as flexible as the excavation strategy. The sampling strategy is thorough, and as a result it may create the kinds of logistic difficulties that accompany thorough archaeological research. But it is not rigid because it is rigorous.

Forseeable difficulties will arise when the field and basic laboratory effort has been completed and the pollen samples that have been gathered can be sorted into time horizon sets. Even excluding that very large proportion of samples which cannot be confidently assigned to a specific period, decisions will have to be justified as regards which of the "good" samples we should attempt to analyze at this time. In addition to the 13 surface controls, we will be able to attempt analysis of no more than 65 samples. Of the roughly 80 samples we attempt to extract pollen from we can anticipate about 30 will contain insufficient pollen for analysis. Even if that is not the case, identification and counting problems will practically assure that only about 50 actual pollen counts will be obtained in the two months laboratory time this project can support.

50 pollen counts may seem a small return of the labor and financial investment planned. But it is not, when one considers how depauperate the present Californian pollen record is. In any case, the issue is not quantity but quality. The methodological lessons this project will be able to report on will prove highly significant in Californian pollen study even if no pollen records are ever actually obtained. While the research objectives of the project are to obtain data that will help those whose concern is the development of the historical park, the project also has more abstract scientific functions: to document the potentials of pollen study in archaeological research in Los Angeles County, and to establish multidisciplinary studies as a significant research strategy in Californian historical archaeology. These research objectives will be quite well served even if only a very small fraction of the samples collected produce pollen data.