Research Report

The Bais Anthropological Survey: A First Preliminary Report

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In this preliminary report, the authors concentrate on a range of archaeological phenomena found within a region and during a given period of time by means of a probability sampling survey, a first in Southeast Asian archaeology.

Introduction

This paper reports on anthropological field work conducted by a team of Filipino and American archaeologists[1] in southeastern Negros from May through August, 1979. The project concentrated on an archaeological survey in an area of 315 square kilometers in the municipalities of Bais, Tanjay, Pamplona, Amlan, and San Jose (see Fig. 1). Concurrent with the archaeological work, some team members also engaged in ethnobotanical, ethnozoological, and ethnoarchaeological research.

The work reported here represents the first phase of what we hope will become a long-range, interdisciplinary research program; the results of this year's survey form the foundation of that program. The present account is only preliminary in nature as we have just completed fieldwork and the survey results are still being evaluated. A more extensive report is in preparation, which we hope to be available within the year. However, we take this opportunity to outline the rationale for the research program as a whole as well as the methodological approach of this year's survey.

General Background

Much of Southeast Asian archaeology has been concerned with individual sites as the unit of research and analysis. This is even true for some regional surveys, in which the primary concern was with the discovery of sites held to be typical of certain cultural developments or periods.

By contrast, the Bais Anthropological Project is concerned with the diversity of archaeological phenomena that are found within a region and that can be interpreted as being articulated with each other in

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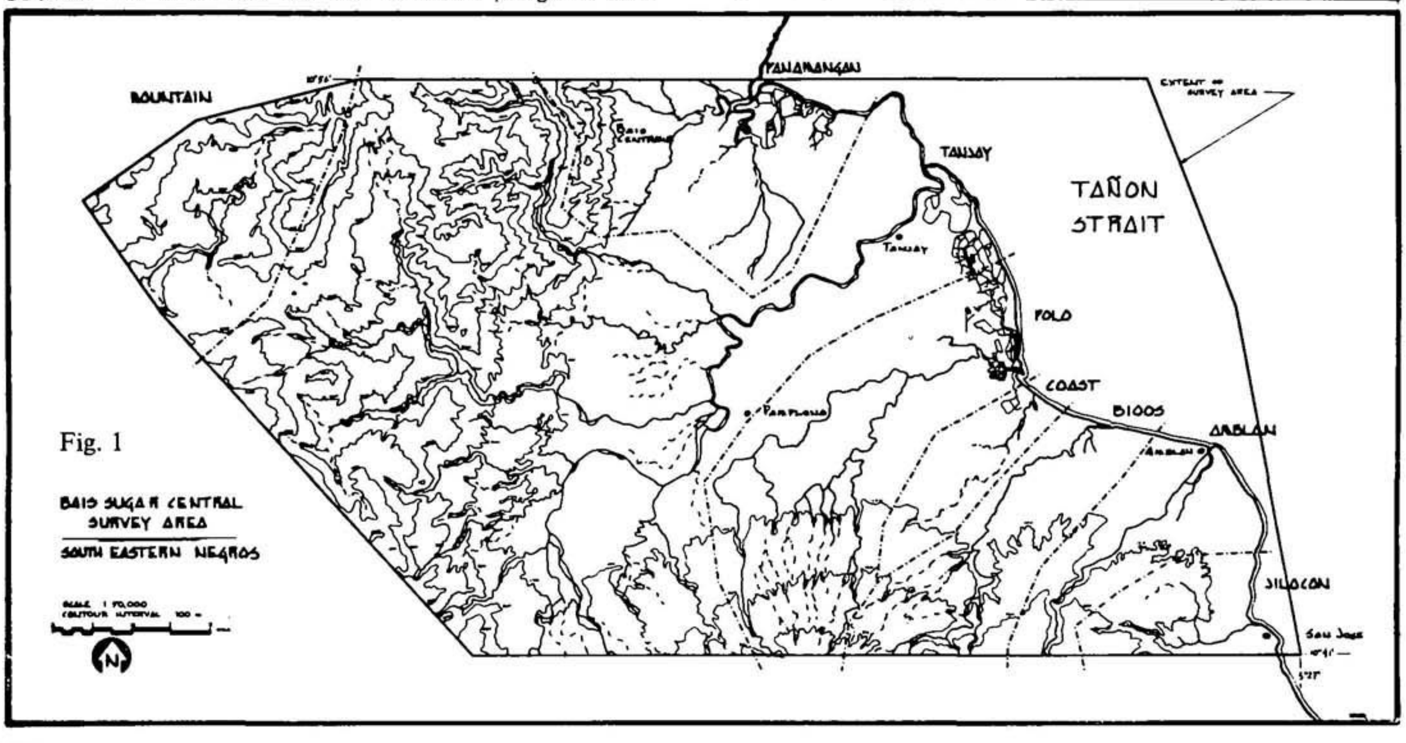

Fig. 1

NOTE: The broken lines indicate the boundaries of the seven survey "blocks" settlement patterns and settlement systems. The notion of settlement pattern takes into account that past societies as well as contemporary ones establish themselves in a given geographical space through a variety of often diverse but interrelated settlements. For example, a society of hunter/gatherers may live in small fishing camps along the coast during one season, in small hunting camps in the interior forest during another season, and a number of bands may congregate in larger camps for the purpose of carrying out communal rites involving the use of red ochre as paint during a few days every few years. The archaeological remains in any one of the three kinds of sites created in this way may differ greatly and could well mislead an archaeologist into believing that he is dealing with three distinct peoples or cultures: perhaps a "shell mound culture" at the coast, a "cave culture" in the interior, and an enigmatic "red ochre culture."

More complex societies will arrange themselves in complex settlement patterns, which may include towns, villages, hamlets, specialized industrial sites, as well as other types. These settlements and the archaeological sites deriving from them may differ in many ways, yet they are all expressions of the same society, and it would be difficult to understand the society as a whole by considering just one kind of site (or, even worse, just a single house site) as typical.

The settlement approach then discards the notion of "typical" or "key" sites and concentrates instead on a range of archaeological phenomena found within a region and during a given period of time. The notion of settlement system goes one step further by considering the relationships between the different archaeological sites in a region as an expression of a social system. That is, the number, sizes and densities of sites, their spacing with regard to each other, the difference in their internal organization, the differing activities carried on in them with their characteristic sets of artifacts, are taken to be expressions of a social system. In other words, the notion assumes that social systems involve a highly structured set of interrelationships between individuals and social groups and that this expresses itself in the structure of the material remains which form the archaeological record. The focus of archaeological research is, therefore, on the formal nature of the variability of archaeological phenomena which constitutes a "fossil record of the actual operation of an extinct society" (Binford 1972:136).

Probability sampling is the most logical and efficient procedure in regional archaeological surveys.

It is clear that, if an archaeologist wants to collect information on this kind of variability, he cannot rely on a haphazard search. Rather, he must devise some means that will allow him some comprehensive and systematic insight into the variability of archaeological phenomena within the region of interest. Developing effective and efficient archaeological techniques through which this goal can be achieved has been a lengthy process and is, in fact, still under way. After some experimentation, a number of archaeologists working in Mesoamerica carried out some extensive surveys in which they systematically searched virtually every square meter of their survey area. While such complete coverage would, in some ways, be ideal, it was already felt early on that this approach was prohibitively expensive in terms of time, labor, and money and that more economical methods were needed. In 1964, L. Binford (1972) suggested, therefore, that the most logical and efficient procedure was the use of probability sampling in regional archaeological surveys. Probability sampling is familiar to many social scientists (and others) as a way of making statements about a whole — called population — on the basis of an intensive analysis of a portion of the population — the sample. And archaeologists, of course, are always dealing with a sample, since much of material culture is inevitably lost to the archaeological record long before excavation takes place (e.g. baskets only rarely survive in archaeological sites in the Philippines although they were surely used in prehistoric times).

The information gained from a probabilistic sampling survey, of course, is of a different type from that which results from a more traditional reconnaissance survey, even though the latter also looks only at a portion of the area an archaeologist might be interested in. In the reconnaissance survey, the sample is selected on the basis of completely different and frequently only implied criteria: for instance, hunches about where particular kinds of sites might be found, information by local inhabitants, accessibility, etc. The different types of survey are carried out for different purposes, with different questions in mind. A probabilistic survey is not inherently better than a reconnaissance survey: the two are simply aimed at eliciting different kinds of information from the archaeological record. In designing the Bais Anthropological Project, we chose a probabilistic sampling survey strategy because it was most appropriate to the questions we had in mind. The data that would have resulted from a reconnaissance survey would not allow us to answer those questions.

Rationale

Since the design of a research project is dictated by one's theoretical assumptions and the associated problems to be investigated, our next step must be to outline the rationale for the Bais Anthropological Project. If our approach to archaeological research is new in the Philippines (and Southeast Asia), it is because the theoretical framework within which we work and the questions we wish to investigate are new.

Our theoretical position is both evolutionary and ecological. This means that we conceive of human populations, in the past as well as the present, as forming social systems which evolve and change in interaction with the environment and each other. This concept involves the further assumption that social evolutionary processes are both orderly and, once certain major variables are understood and controlled, predictable. Among these variables are the natural and social environment and the internal dynamics of social organization. In other words, we look at prehistoric peoples in a way similar to that of social scientists working with contemporary groups: individuals must be investigated within the context of their communities, communities within the context of the larger society, and both of these within the context of the natural environment. The particular organization and basic social/cultural norms of a society can be understood by reference to a set of environmental conditions (e.g., climate, resources) and conditions that a society tends to create internally (e.g., demographic conditions and past history). As the basic conditions change, so must the organization of a society. Note, that we are not talking about specific social and cultural features (e.g., color of mourning dress, architectural style, kinship terms) but about general regularities in social arrangements.

Applied to an archaeological approach, then, our theoretical assumptions mean that we cannot view the evolution of a social system in terms of a single unit of that system (a site, a class of artifacts) but that we must look at the system as a whole. Since social systems occupy an extended geographical space, we have to consider, even at the beginning stages of our research, the region as the unit of research and analysis.

Given this theoretical framework, our research is aimed at the investigation of two specific problems: the nature of the social evolutionary process under tropical conditions as it might contrast with that under other major environmental conditions, and the role massive long-distance trade played in the evolution of social systems in the Philippines. Both of these problems were first raised in the context of an archaeological project carried out in southwestern Samar in 1968-69 and 1971 (Tuggle and Hutterer 1972, Hutterer 1974, 1976). The Samar project involved reconnaissance surveys and excavations, primarily of caves and rockshelters, along the Basey River. The rather unexpected results of that project led to the initial formulation of several hypotheses concerning both general characteristics of the processes of cultural evolution in the tropics (Hutterer 1976) and specific developments in the cultural evolution of Philippine lowland societies (Hutterer 1974).

The Samar excavations concerned two clusters of sites which overlapped chronologically for an estimated 1,000-2,000 years: habitation sites of stonetool-using hunting and gathering populations and burial sites of iron-using agricultural populations involved in foreign trade with China, with some indications of interactions between the two populations (Tuggle and Hutterer 1972). Information from these sites, together with archaeological and ethnohistoric data from elsewhere in the Philippines, led to the conclusion that Philippine lowland societies do not represent a late Malay migration, as had traditionally been believed (Beyer and de Vera 1947), but are the result of an internal amalgamation of diverse ethnic elements within the Philippines and their transformation into new social entities, organized on a level of higher social complexity (Hutterer 1974). It was argued that this process was intimately related to the presence of foreign trade, but the precise causal relationships were left open, as was the question of the specific evolutionary status of the emergent lowland societies.

This hypothesis, as well as some other archaeological observations from Southeast Asia, were then subsumed under a more general consideration of cultural evolutionary processes in the humid tropics (Hutterer 1976). It is argued that the complex interrelationships existing within the natural ecosystem of the humid tropics and the diffuse distribution of resources necessary for human existence exert adaptive pressures favoring the maintenance of small social units with increasing specialization and interdependence. It was proposed that this situation largely accounted for the great diversity of human ecology in tropical regions. It was recognized from the beginning, however, that these hypotheses needed further refinement and testing, and for that purpose more extensive systematic archaeological work was necessary.

Thus, the Bais Anthropological Project was designed to provide archaeological information for the further investigation of these problems. Besides the two major theoretical goals, there are also two subsidiary and more empirical ones, which, however, have to be realized first before the theoretical problems can, in fact, be logically addressed. These subsidiary goals consist of the construction of a regional cultural sequence for southeastern Negros, and the definition of diagnostic artifact categories with the help of which a cultural sequence can be defined. Both of these latter objectives fall within the range of traditional archaeological interests.

"We must look at the system as a whole."

1. Social evolution in the tropics: the changing nature of interaction among socio-economic systems:

In a recent paper, one of us (Hutterer 1976) pointed out that the human ecology of humid tropical areas is characterized by a tendency towards small socio-economic units exhibiting a high degree of interdependence and intensity of interactions between them. This tendency appears to be related to aspects of environmental adaptations distinctive of the humid tropics and is manifest in certain peculiarities of specific evolutionary sequences in the tropics. Among these peculiarities is one for which Hutterer (1976) has tentatively introduced the concept of "lateral transformation." These may involve either survival of groups with "archaic" forms of socio-economic organization combined with a loose articulation with more complex social entities (e.g., in the ethnographic present, hunter/gatherer bands existing in mutualistic interrelationships with cultivators and adopting, at least peripherally, certain principles of tribal organization; cf. Dunn 1975; Fox 1969; Peterson and Peterson 1977); or, conversely, it may entail a partial transition of social units towards levels of lesser organizational complexity (e.g., a change of tribal agriculturalists to a predominantly hunting and collecting economy and adoption of band-type aspects of social organization; cf. Lathrap 1968). In either case, such lateral transformations seem to be characterized by a certain degree of economic (and social) specialization and appear to be adaptations to difficulties encountered within tropical environments in maintaining social systems of large size and a high degree of complexity. Lateral transformations thus play a major role in the creation of the extant social and cultural diversity of tropical regions. If we grant the assumption of extensive interactive networks between socio-economic groups of widely divergent levels of organization, it is immediately clear that there should be qualitative differences in these interactions both synchronically and diachronically, and, in fact, the changing nature of these interactions should form a major aspect of any evolutionary sequence. In order to test these propositions, however, it is necessary to delineate the nature of the interacting socio-economic systems within a temporal and spatial framework.

2. The role of trade in the evolution of Philippine lowland societies:

Increased long distance trade has been cited as causal to the evolution of complex socio-economic systems in the Near East (e.g., Lamberg-Karlovsky 1972 Kohl 1979), in Mesoamerica (e.g., Rathje 1972) and – of more immediate concern to us here – in Southeast Asia (e.g., Hutterer 1974; Wheatley 1975). These arguments, however, have recently been called into question on theoretical as well as empirical grounds (Flannery 1976; Hutterer 1977; Kennedy 1977; Wright and Johnson 1975). With specific regard to the Philippines, it is widely assumed that trade with the large, complex state of China was relatively well established by the time of the Sung Dynasty (AD 960-1279). While some have argued that this trade is simply a continuation and increase over the preceding T'ang Dynasty trade (AD 618-906) (e.g., Beyer 1947; Jocano 1975), others have proposed that an extensive trade existed among the islands of Southeast Asia themselves, which resulted in interaction with India and mainland Southeast Asia and brought materials from these areas to the Philippines by the second century AD (e.g., Evangelista 1965).

In order to test hypotheses concerning the role of long distance trade in the evolution of complex societies, it is, of course, necessary to elucidate the nature of the societies in question prior to and following the influx of imported goods. This is not possible with the present state of archaeological research in the Philippines (Hutterer 1977:178-83): we lack adequate characterizations of the organizational matrix of socio-economic systems at various times; as noted below, there is a dearth of well-defined archaeological phases of sufficiently short duration. In short, we lack the archaeologically defined temporal and spatial units necessary for the task of evaluating the role and impact of the import trade on societies in the Philippines.

> *"Philippine lowland societies ... are the result of an internal amalgamation of diverse ethnic elements within ... and their transformation."*

3. Construction of a regional cultural sequence for southeastern Negros:

The importance of constructing a regional sequence should be evident from what has been said above. Unfortunately, it is a fact that at least one out of every two archaeological projects in Southeast Asia results in the discovery of "unique" or "aberrant" sites, that is, sites which are archaeologically unlike any others known in the region. The uniqueness of these sites is, of course, an artifact of the erratic nature of past archaeological research. However, this creates serious problems for archaeological interpretation since archaeological methodology must rely on the patterned nature of human behavior as a major heuristic premise. The problem is further exacerbated by the fact that Southeast Asia does seem to have a higher index of social and cultural diversity than many other, particularly temperate, regions of the world. The construction of workable cultural sequences within a settlement systems framework for small contiguous areas is, therefore, a sine qua non before archaeological research can make progress on either a local or regional level.

Note that the construction of a sequence is not taken to be the final goal of research but rather a practical necessity. We need cultural sequences of material remains in part so that we can begin to ask more interesting questions, so that we can group our sites into reasonably contemporaneous units.

4. Definition of diagnostic artifact categories:

The need tor well-defined artifact sequences is evident from everything that has been said above but needs to be stressed in the context of Southeast Asian archaeology: there is not one area in the whole of Southeast Asia for which there exists a well worked-out artifact sequence of relatively short phases.

Consider, for example, the pottery analysis of W. Solheim (1958, 1964, 1972, and many other papers). Solheim has outlined several pottery traditions/complexes for Southeast Asia, the two most important ones being named Bau-Malay and Sa-Huynh-Kalanay. According to Solheim, the Sa-Huynh-Kalanay complex is the more wide ranging of the two, occurring from southern China throughout mainland and insular Southeast Asia, and is thought to be related to the Lapita pottery complex, which, itself, is spread over a vast area in the central and western Pacific. Solheim (1964: 208) sees the Sa-Huynh-Kalanay complex as particlarly characterized by great variability; in fact, his description of the pottery could encompass much of the prehistoric pottery of the world. Both the relative lack of geographic discrimination and the formally unbounded character of the Sa-Huynh-Kalanay concept severely reduce its usefulness for specific archaeological analysis.

Here again it is necessary to emphasize the relationship between the problems under investigation and the methodological tools devised to examine them. In the construction of the Sa-Huynh-Kalanay concept, Solheim was not interested in the definition of a small-scale sequence useful in the chronological characterization of specific sites within a particular part of Southeast Asia. Rather, he was interested in the synthesis of a huge amount of data from the whole of Southeast Asia. The Sa-Huynh-Kalanay concept is thus (as Solheim would certainly point out) not appropriate to the tasks which we had in mind when planning the Bais Project. It is a tool for another job.

Research Strategy

Choice of Research Area

We believe that the questions and problems raised above are not only important for an understanding of the past in the Philippines but are also directly relevant to general processual questions of interest to the discipline of anthropology as a whole. It was with these broad questions in mind that we designed the Bais project and determined how, and, to some extent, where we would best carry out the project. We did not believe that these questions could be resolved with a single season's work and have operated on the assumption that several years will be necessary in order to collect sufficient information of the quantity and quality needed.

One of our first tasks, then, was to choose an area in which to work: we had to define an area manageable in size, which contained the potential for diversity which we hoped to investigate. Since we are interested in the nature of interactions between socioeconomic units with differing modes of subsistence organization, it seemed logical to select an area within which there was a diversity of environments which would, it seemed to us, encourage the presence of such differing modes of subsistence organization. We wanted an area which had roughly equal proportions of hills and plains, for example, in order to examine interactions between people exploiting these different environmental situations.

Because we are interested in the role of trade it seemed logical to select an area with an at least passable harbor and with sufficient rivers to insure adequate transportation potential within the selected area. These requirements made the task of selection somewhat easier.

Initially, we considered returning to Samar since we were already somewhat familiar with that area and had begun our research which prompted our questions there. Political considerations, however, made the choice of Samar appear unwise.

There were other, practical considerations as well. We wanted an area not too far from a city and an academic community from which we could draw provisions and, if possible, students to assist us, but far enough so that we could be relatively certain of minimal disturbance by looters. We did not wish to deal with looted sites nor did we want, by our presence, to encourage the practice.

Finally, we wanted an area that was rather centrally located within the Philippines – hence the choice of the Visayas – with at least potential access to the rest of the country. We hope that extensions will be made from our work into other islands and that we can connect the various geographical portions of the country in more encompassing statements of interaction as our work progresses.

Thus, after studying maps of the Philippines, we chose Negros and the area we call the Bais Survey Area in particular. We believe that this area most closely fulfills all of the requirements for a research area called for by our research questions. Our research questions in turn determined the manner in which we would carry out the project. While we have already mentioned our methodology above, it seems worthwhile to detail the strategy more fully prior to outlining the preliminary results of the first season's work.

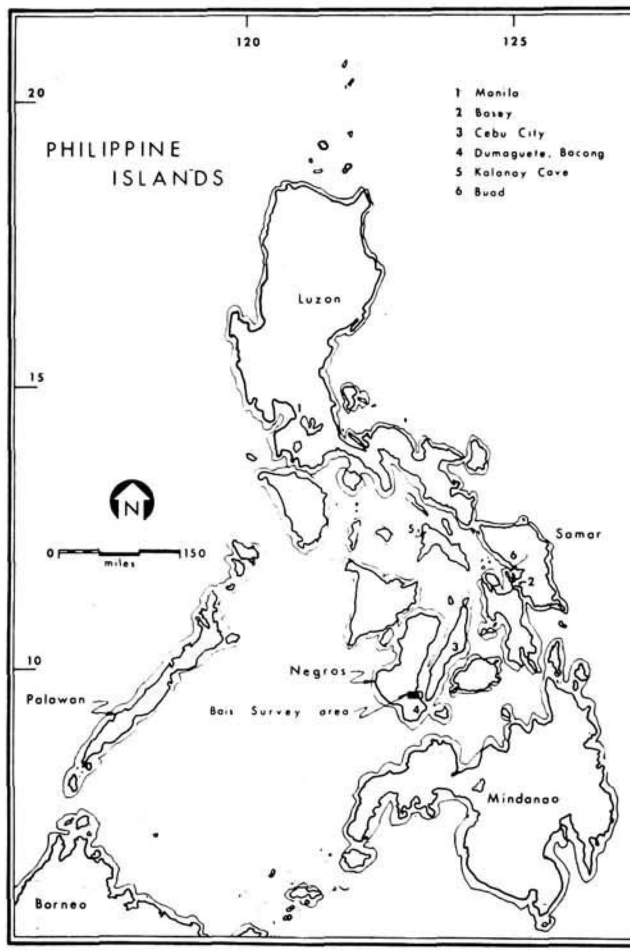

Fig. 2. Map of the Philippine Islands showing archaeological sites referred to in the text.

Sampling design

As noted above, probability sampling surveys are a relatively recent addition to archaeological procedure and have yet — as far as we know — to be carried out in Southeast Asia. Purposive surveys, or reconnaissance surveys, aimed at the location of as many sites of a given type as possible, are also rare but somewhat more common in the region (cf. e.g., Bayard et al. 1974; Coutts and Wesson 1978; Higham and Parker 1970; Schauffler 1976; Solheim and Gorman 1966; Solheim et al. in press). As argued above, this situation is the result of the types of problems under consideration by various researchers: it is not the primary goal of a probability sampling survey to locate sites but rather to demarcate and evaluate their proportional distribution, density and interrelations (Flannery 1976:135). The increasing popularity of probability sampling strategies in American archaeology directly reflects the changing perspectives of archaeology in that country. Witness, for sample, the increasing concern for the delineation of settlement and subsistence systems (Peebles et al. 1976; Read 1975).

The problem facing the archaeologist who wishes to understand the past is very much the same as that facing a sociologist who wishes to study some aspect of present-day social life. The individuals in the study, or sites in the archaeological situation, must be chosen so that the range of variability in the population is represented in the sample. This can be done through probability sampling. Take, for example, the contemporary settlements in the Bais area: there are 5 nucleated settlements (towns) and say, 100 smaller villages and hamlets which, we will assume, taken together comprise 105 sites. We can assign an identifying number to each site and choose a sampling of a given size at random (that is, so that each site has an equal probability of being chosen); if we proceed in this way we can specify the probabilities that our sample accurately reflects the parameters of the population as a whole. Say we choose a sample size of 20 percent, or 21 out of 105 sites, then any randomly selected sample should include 1 town and 20 sitios since the probability of choosing a town is 5/105 = .05, or about 1 in 20, while the probability of choosing a sitio is much greater, about 19 in 20. The important point is that, with random selection, there is every reason to expect that the proportions in the sample will match the proportions of the population. That is, in our 20 percent example, if we have 1 town in a 20 percent sample we can predict with a fair amount of confidence that there are about 5 towns in the population as a whole.

> *"..... The primary goal of a probability sampling survey [is] to demarcate and evaluate [sites'] proportional distribut-ion density and interrelations."*

Now let us take an archaeological case: We have a map of an area on which there are located no known archaeological sites and we wish to determine the number of sites for several, as yet undefined, chronological periods. In addition, we wish to know what the ratio of large sites to small sites is for each period, since this will allow us to make inferences concerning economic interactions and political structure. The manner of undertaking such a study is, essentially, as Binford outlined it in his program in 1964: We grid the map into areas of convenient size and survey a random sample of these areas.[2]

Since a major goal of the project entails consideration of socio-economic interactions among different social units, which are assumed to be reflected in the archaeological settlement system, it is logical to create strata within the survey area which could be assumed to have some bearing on the organization of social units. Unfortunately, as our work was carried out in what is archaeologically a virtual terra incognita, the only bases for stratification to which we could turn were gross environmental zones. The purpose of defining strata — relatively homogeneous subdivisions within the sample area — is simply to reduce the amount of variation present within a given stratum and increase the variation between different strata. We chose our area, as noted above, to include both hill and plain segments; each of these gross segments has unique properties which affect the characteristics of the social systems which we hope to measure. Although some sort of covariation between environmental and socio-cultural factors can usually be assumed, the nature of this covariation cannot. Nor is it possible to assume that socio-cultural variation is fully congruent with variation of only one two environmental dimensions. We wished, therefore, to obtain an adequate sample of both types of area by stratifying the sample. We did this proportionately: that is, we divided the sample area into strata and each stratum was sampled in proportion to its areal contribution to the survey area as a whole. For example, we used elevation as a stratifying criterion; the area below 100 meters in elevation comprised 48 percent of the total sample area. Thus, 48 per cent of our sample was located within the area below 100 meters.

Before taking to the field, three bases of stratification were selected a priori as being of some use in reducing heterogeneity within the sample universe — river drainage, elevation, and present patterns of vegetation. The first of these criteria follows directly from our interest in population interactions. River systems in Southeast Asia seem to channel interaction between groups, and the river drainage is a basic geographic unit which frequently has ethnic meaning as well. In order to test the validity of this notion in the Bais area it is necessary to control within our samples for river drainages.

Seven discrete river systems are contained within the survey area. Polygons were drawn around these drainage systems and each was considered as a separate unit, referred to as "block," in the sampling strategy (see map, p. 116). The extent to which rivers

Plate 1. Aerial photograph showing sampling quadrats in the Tanjay block.

promote interaction can thus be tested: The distribution of size of settlements within each block can provide a test of the manner in which differential interactions were carried out.

Patterns of vegetation according to the maps available to us prior to reaching the field were also used to create strata within each of the blocks noted above. We reasoned that patterns of vegetation are indicative of a variety of environmental conditions which would presumably also have affected prehistoric societies. We quickly learned, however, that massive changes had occurred in vegetation between the time when the maps were made and the time we arrived in the field: large areas which were shown as forested on our maps had been logged over, some had been planted to corn and sugar, and much of the rest had reverted to grassland which is presently being used for pasture. As a result we dropped this criterion of stratification.

The final criterion of stratification has already been mentioned above – elevation above mean sea level (AMSL). Initially, 100 meter contour intervals were plotted on our base map of the region but these were later recalculated in the field to include 0-100 m AMSL, 100-300 m AMSL and 500-700 m AMSL. The area above 700 m AMSL was so small as to be negligible in our sample and was not surveyed as part of the sampling program.

Field Procedures

Since our archaeological survey represents a new approach, it may be worthwhile to give a brief account also of the actual procedures used in selecting the sample and executing the survey on the ground. One of the first decisions to be made concerned the shape and size of the sampling units we wanted to use. We decided on quadrats measuring 500 meters on each side since an area of this size seemed small enough to be manageable in the field, yet large enough to accommodate most types of sites we could expect to find. The outlines of the selected survey area were then drawn on a 1:50,000 topographic map and this area was overlaid with a grid, the lines of which were spaced 1 cm (the equivalent of 500 m) apart. The entire area was thus covered with squares, each one representing an area of 500 by 500 meters. With the help of a table of random numbers, we then selected 64 squares (amounting to a total area of 15.72 km^2, a 5 per cent sample) in such a way that every stratum was represented to the extent that it contributed to the total survey area. The selected squares were marked on the map and also transferred to aerial photographs to help us find them on the ground (see Plate 1).

The next step was to organize survey teams of four to five persons who would drive or walk to an area where a sampling unit was situated and, after locating one corner of the sampling unit on the ground, systematically start walking across the designated area along lines of 10 m distance from one another. When archaeological remains were spotted, the area was searched to delineate the extent of the scatter of archaeological materials, and after this all of the artifacts, or in cases of particularly large or dense scatters, a given proportion of them were collected. Extensive notes were taken on environmental conditions, present land use, and the condition of the site (i.e., evidence of erosion or other disturbance).

If a certain sampling unit could not be surveyed because it was, for instance, under water (fishponds, rice fields) or completely covered by forest, this sampling unit was dropped from the sample and replaced by a new one, also chosen with the help of a table of random numbers. In some cases, when a portion of a sampling unit could not be surveyed, this was simply noted so that we could correct for such factors in computing our data later on. Similarly, the visibility of the ground varied between and within sampling units. This was also noted to allow for later correction of differential coverage.

In this way, we have accumulated a set of data which is so far unique in Southeast Asian archaeology. We have collected systematic information on the archaeological phenomena and their variability within a 315 km^2 area which will allow us to compare our survey results statistically between 15 subdivisions within the survey area: between elevation zones and, within these, between river systems. With this information we can begin the task of resolving some of the problems we set for ourselves and the project and we will be able to plan with more confidence and greater effectiveness further stages of the research program.

Results

In the pages that follow we will begin to outline some of the statements that we are able to make on the basis of the information collected during the 1979 field season. It must be understood, however, that this report is only preliminary since the field processing of these data is still incomplete and the process of sorting and evaluating each of the sites recorded during the survey has hardly begun. For instance, we have not yet corrected the figures for site densities reported below for differences in ground visibility and coverage within sampling units. These corrections, we believe, will increase the density figures somewhat while, at the same time, they will result in a slightly lower sampling fraction. We use the figures below for illustrative purposes and to begin the task of outlining the strategies for the coming year's work. The figures quoted below should therefore be taken with caution.

In the blandest of terms, we have recorded a total of 190 find locations. They range from fairly large areas of scatter (the largest, T V 171 A/B, measured about 30,000 m^2) to finds of single artifacts. As concerns the physical nature of the finds, they include pebble tools, flake tools, blades, polished stone tools, earthenware, Asian trade ceramics, iron, as well as historic artifacts. These kinds of artifacts occur in a variety of combinations. We are at present still working on the problem of separating the sites into chronological phases. The only diagnostic artifact classes that were at our disposal at the outset of the project were pre-Hispanic Asian trade ceramics and historic ceramics from Asia and Europe. During the present field season, we conducted three very small test excavations for the specific purpose of recovering stratigraphic information that might be helpful in defining a chronological series of earthenware pottery groups. We have taken the first steps in this direction, but further analysis is needed, and probably further excavation as well, before we reach this goal. A number of the sites we located, particularly in the higher elevations, contain only flaked stone tools but no ceramics. We are resisting the temptation to fall back on the traditionalist assumption that these sites are earlier in time than those which contain pottery. Earlier work on Samar has provided clear indication that this assumption can be (and probably quite frequently is) unjustified and false.

Some of the unsolved problems of Philippine prehistory concerning settlement patterns and cultural sequences in a tropical environment are approached globally and systematically.

In calculating the density figures given below we have disregarded for the present all isolated finds — spot finds — which must be dealt with cautiously and separately. We have also not used data from some 3 km^2 of area surveyed but not part of the 5 per cent sample; it should be noted, however, that the density of the sites in these areas is somewhat higher than in our sample. Further, several types of ceramics which appear in that area do not — as far as we can tell at this point — show up in our sample. This is not surprising, however, since all that the sample allows is the prediction of distribution based on probabilities. Some types of sites may just be too rare to be included in a 5 percent sample of the area as a whole. This does not mean that these sites will be ignored in our analysis or in our future research; this becomes a question which we will explore as the project progresses.

In the sample used below we have recorded 104 sites and for the time being we will treat these as equivalent entities; no chronological separation will be yet attempted, nor will we deal at this time with differences in size of sites or densities of archaeological remains within these sites. For the present we wish only to consider the densities of sites in the survey area as a whole.

Summary statistics at this level of analysis are given in Table 1. Our 5 percent sample entailed the traversing of 64 sampling units. Thus the 104 sites recorded suggest an overall density of sites in the survey area of 1.65 per sampling unit (S.U.) or about 6.60 sites per km^2. Potentially, then, there are some 2000 sites in the survey area as a whole, a rather sobering thought for any one planning future work in the area. But, as we said earlier, we are interested in the distribution of sites within the area and so we may first ask: To what extent are the sites within the area as a whole distributed in random fashion? Is there any evidence in the sample of clustering of sites? And to what environmental variables may any such clusters be related?

In order to test briefly for the presence of clustering in the survey data we make use of the variance mean (v/m) ratio, a simple statistic aimed at denoting the presence or absence of randomness of distribution (Grieg-Smith 1965). While a full exposition is given in the cited reference, it may be worthwhile here to outline briefly the rationale for the v/m ratio since we refer to the statistic several times below.

Assume a map which has been gridded into 16 quadrats of equal size, the quadrats representing our s.u., and sites located in the quantities indicated in figure 3a. It is obvious that there are clusters of sites in two areas of the grid and that one result of this pattern is a high variance relative to the mean. If, on the other hand, the distribution of sites were perfectly even then the variance would be very small relative to the mean. Thus the v/m ratio can be used as a measure of the extent to which elements distributed across space are in perfectly even distribution (in which case the variance will equal zero and the v/m will also = 0), the extent to which the distribution is random (in which case the v/m ratio will approximate 1.0), or the extent to which clustering is the evidence. The v/m ratio thus varies from 0.i.e., perfectly even distribution, through 1.0, essentially random distribution, to very large numbers; the higher the number the greater the departure from random distribution.[3]

Fig. 3

0	0	0	0
1	10	0	0
0	0	0	0
0	0	8	9

N = 16 quadrats

n = 28 sites

$\bar{X}$ = 1.75 site/quadrat

$\bar{V}$ = 13.14

$V/\bar{X}$ = 7.51

(a) clustered distribution

1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1

N = 16 quadrats

n = 16 sites

$\bar{X}$ = 1.0

V = 0

$V/\bar{X}$ = 0

(b) even distribution

NOTE: The following abbreviations have been used:
"# U.S. un sample" presents the number of 1/4 km^2 sampling units traversed during the course of the 1979 field season.
"# sites" refers to the number of sites, exclusive of spot finds, recorded during the 1979 season.
"$\bar{X}$" is the calculated number of sites per sampling unit.
"Variance" is the variance of sites per sampling unit.
"$V/\bar{X}$" is the variance divided by the mean as described in the accompanying text.
Pa = Panamangan block, T = Tranjay block, P = Polo block, C = Coast block, B = Bioos block, A = Amlan block, J = Jilocon block, M = Mountain block

With a variance of 2.81, a mean of 1.65 and a v/m ratio of 1.70, it seems reasonable to suggest the presence of some tendency to clustering of sites in our sample. We may now begin the task of examination within our strata; first by elevation alone (see Table 2).

Table 1. Bais Anthropological Survey, summary statistics.

Survey area	315 km^2
Total number of sampling units in survey area	1260
Number of sampling units in 5% sample	64
Number of sites recorded in 5% sample	104
$\bar{x}$ sites/sampling unit	1.65

NOTE: This and subsequent tables in this paper reflect preliminary field estimates and are thus tentative; we feel, however, that there will be only minor revisions of these estimates.

In Table 2, it can easily be seen that there is a rather clear inverse relationship between elevation and the degree of clustering as indicated by the v/m ratio. We must be careful, however, about attributing causal relationships to this situation: two random patterns overlaid may result in the appearance of clustering; similarly, several highly clustered patterns overlaid may appear as random or evenly distributed pattern. In this case, however, although we have not yet attempted to control for variation through time, it seems that there is a good probability that sites are clustered in the 0-100 and 100-300 zones to a high degree and that there has been stability in this pattern through as long a time as is recorded in our sample. The 300-500 zone is somewhat equivocal in this regard (see also Table 5 below) and the higher elevations seem to lack any indication of site clustering, coming quite close in fact to an almost perfectly even distribution. Again, we must be somewhat cautious in interpreting this latter lack of pattern but it might be the case that hunter/gatherer populations, following a rather opportunistic strategy without a clear seasonal round of activities, might leave a pattern of almost even distribution of sites. More interesting, however, is the strength of the clustering in the lower elevations of the survey area.

Table 2. Bais Anthropological Survey, Summary statistics by elevation strata.

		Sample				
Stratum	%	# S.U.	#sites	$\bar{X}$/S.U.	Variance	V/$\bar{X}$
0-100 m	4.9	30	37	1.23	1.99	1.62
100-300 m	5.0	16	32	2.00	3.75	1.87
300-500 m	5.3	12	30	2.50	2.35	.94
500-700 m	6.1	6	5	.83	1.93	.43
		64	104			

Table 3 gives summary statistics by river drainage for the 0-100 m AMSL zone. Since the coverage is known to be quite good and visibility problems minimal, we will use here only the sites in the Panamangan (Pa), Tanjay(T) and Bioos (B) strata. Although, the overall v/m ratio is quite high, it is apparent that there is a lack of clear patterning in the Pa and B strata and that the overall clustering tendency is a result of the strength of this pattern in the Tanjay block. Here again it seems that there is a pattern of site clustering which has continued throughout the period covered by the sites that we have discovered. This pattern is much less clear in the other strata but we suspect that, although it may be less robust than in the Tanjay stratum, chronological separation will result in the clearer appearance of site clustering.

Table 3. Bais Anthropological Survey, 0-100 m AMSL stratum, summary statistics by block

	Pa	T	P	C	B	A	J	Total
# S.U. in sample	3	16	5	1	3	1	1	30
# sites	2	25	4	0	2	4	0	37
$\bar{X}$	.67	1.56	.80	–	.67	–	–	1.23
Variance	.22	2.26	2.25	–	.33	–	–	1.99
V/$\bar{X}$ ratio	.33	1.45	2.81	–	.50	–	–	1.62

This cluster patterning can also be seen in the Tanjay stratum for the 100-300 evelation zone (Table 4). but decreases with increasing elevation (Tables 5 and 6). The necessity for chronological phases of relatively short duration should now be clear: we must be able to separate our sample sites into periods in order to allow comparison across time as well as space. Since the spatial patterning of sites is an important element of a society's organization, we must be able to see the changes of spatial patterning through time, if we want to study social evolution. As indicated above, we have taken the first steps toward defining chronologicallv diagnostic pottery types which will help in assigning relative dates to many of the sites. We hope to report on the progress of this work in the near future in the context of a series of more specialized papers which are presently being prepared by the various members of the team and which will deal with all aspects of the Bais Anthropological Project.

The papers will include reports on the small test excavations that we conducted as well as an analysis of the lithic artifacts collected during the season. They will also include reports on several specialized investigations in ethnoarchaeology, ethnobotany, and ethnozoology. One study concerns the manner in which earthenware pottery manufactured in different

Table 4. Bais Anthropological Survey, 100-300 m AMSL stratum, summary statistics by block.

	T	P	B	A	Total
# S.U. in sample	10	2	2	2	16
# sites	20	2	3	7	32
$\bar{X}$	2.00	1.00	1.50	3.5	2.00
Variance	4.44	3.82	2.25	3.87	3.75
V/$\bar{X}$ ratio	2.22	3.82	1.50	1.11	1.87

Table 5. Bais Anthropological Survey. 300-500 m AMSL stratum, summary statistics by block.

	T	M	Total
# S.U. in sample	8	4	12
# sites	20	10	30
$\bar{X}$	2.50	2.50	2.50
Variance	2.57	2.45	2.35
V/$\bar{X}$ ratio	1.03	1.02	.94

Table 6. Bais Anthropological Survey, 500-700 m AMSL stratum, summary statistics by block.

	M	T	Total
# S.U. in sample	2	4	6
# sites	5	0	5
$\bar{X}$	2.5	0	.83
Variance	.50	0	1.93
V/$\bar{X}$ ratio	.20	0	.43

centers in southeastern Negros was distributed throughout our region and the kinds of market mechanisms which affected their distribution. It was found that different centers of manufacture varied greatly in size as well as complexity of their economic and social organization and that the range of distribution of wares from different centers is related not only to distance but also the size and organization of the pottery industry in a given center.

A second study made was that of a single household in our survey area in an attempt to visualize the present house as an archaeological site in the future. It was found, for instance, that the house expanded physically while the young family grew but contracted again as the grown children married and left the household. It may be a fruitful notion that houses in the Philippines have life cycles of their own which match some of the characteristics of the families that occupy them. Another interesting result was derived from a complete inventory of material items in the house, which showed that about 60 per cent of them would leave archaeological traces (the great maiority of these items could be classified as food utensils). This is surprising for a traditional rural household in the Philippines, as there has been a common belief that the majority of household utensils were made of perishable materials that would leave no trace in the archaeological record.

Such ethnoarchaeological studies are of great importance as they help in constructing a base line for the understanding of the archaeological record. Studies of contemporary ethnographic situations can

Two goals to pursue further: the study of diagnostic artifact classes and that of functional site classes.

provide models for the interpretation of archaeological variability, if they concern themselves with the relationship between the organization and patterning of material culture.

Ethnobotanical research concentrated on two aspects: the collection of contemporary plants, seeds, and pollen as an aid in the future identification of archaeological specimens; and research on changing patterns of plant use in the course of agricultural intensification from the first penetration of the rain forest by pioneers to the conversion of the land into intensively used permanent agricultural fields. Similarly, ethnozoological research was pursued along two parallel lines: collection of a range of contemporary animals, the skeletons of which will be needed to help in the identifications of whatever animal bones we will recover in future excavations; and research on the patterns of use of wild and domestic animals for protein. It was found that protein derived from forest game and from freshwater streams and lakes still provides a substantial contribution to the food requirements of upland farmers in our survey area, but that there is also much variability between individuals as well as communities in the extent to which wild protein sources are used and how they are exploited.

The biological research, far from constituting a minor sideline of the Bais Anthropological Project, is an integral part of it. As the project operates within the framework of ecological theory, a knowledge of environmental conditions, as they changed and interacted with human populations through time, is absolutely necessary. The ethnobotanical and ethnozoological studies conducted this year laid the first groundwork by providing some of the tools with which prehistoric communities of animals and plants and their use by human groups can be reconstructed. At the same time, the two studies contribute directly to our understanding of tropical ecosystems and the interaction of human populations with them.

Future Plans

From the discussion above it will have become clear that several intermediate goals need to be pursued during the next season of the Bais Anthropological Project. One of them is a further elaboration and extension of the regional archaeological sequence through the study of diagnostic artifact classes, primarily earthenware pottery. Another important goal will be the study of functional site classes. As pointed out above, sites within a settlement system differ not only in number, density and size but also with regard to their internal organization and the specific role they play within the larger system. In more complex systems, one might, e.g., distinguish between administrative centers, ritual centers, agricultural settlements, specialized manufacturing and service centers, trading posts, and so on. In the analysis of settlement systems it is important to control for functional differences between sites as they constitute a major organizational element of the system and provide important insights into the structure of the society.

It will be necessary to pursue these two goals through a varied strategy, involving both a series of small-scale excavations and further surveys. It is at this point that purposive surveys, the search for sites of a specific kind, will play a significant role. Through purposive surveys it will be possible to amplify the quantitative information accumulated this year, for instance, by searching for sites which occur in such low frequencies that they did not show up in the five percent survey sample. It is also necessary to increase the precision of our estimates of density and clustering through additional probability surveys.

It will further be necessary to continue and broaden our research along environmental lines. We plan to continue biological work and add investigations in geology and sedimentology. An understanding of the geological history of our survey area will be essential to an understanding of environmental variables (e.g., soils, certain natural resources), as well as site formation and preservation.

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Footnotes

[1] Participating members in the research team were from the Philippine National Museum (Jesus Tidalgo),

the University of San Carlos (Josefina Lucagbo, Dorothea Saligan, Amalia de la Torre), Silliman University (Prof. Lionel Chiong, Artemio Merecido, Betsie Patrocinio), the University of Michigan (Ellen Hoffman, Karen Mudar, Masao Nishimura, William Parry and the authors); in addition, two volunteers made major contributions to the research effort: Nancy Hutterer and Jane Rosegrant.

2 it should be pointed out that fifteen years after publication of that article, very few such projects have been carried out anywhere.

3 It should be noted that the v/m is in part related to sample size. It must also be understood that the use of this statistic involves certain assumptions about the nature of the sample, i.e., it presumes a randomly drawn sample.

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