Archaeological Research in the Novaliches Watershed, Philippines

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W. PETERSON AND THE UNIVERSITY OF THE PHILIPPINES FIELD SCHOOL

INTRODUCTION

IN JANUARY 1978, a field training problem was initiated jointly by the anthropology departments of the University of the Philippines and the National Museum of the Philippines. The field project was designed to complement lectures on theory presented at the university under the auspices of the Fulbright-Hays Exchange Program. Peterson's intent was to provide an accelerated but complete example of the research process by implementing a small-scale research project. The project began with the initial steps of research background and conceptual formulation and proceeded to field technique, analysis, and publication. Faculty and students of the university and employees of the National Museum participated in the field problem. The project was hampered by lack of funds and equipment, but significant gains were made in archaeological research as well as training. Those gains that relate to research are discussed in this paper.

ARCHAEOLOGICAL SURVEY OF NOVALICHES

We surveyed portions of the Novaliches Watershed, Luzon to find a site which could tell us something about our research questions of early village formation and the relationship of sedentism to early horticulture in the Philippines. To this end, we had devised a testable systems model derived from Carl Sauer's (1969) well-known theory of early agriculture in Southeast Asia. Our purpose was to isolate a research domain as well as specific research questions. We adapted Sauer's ideas of agricultural origins to the Novaliches area because the information provided by Beyer's (1948) surveys and his speculations on Novaliches prehistory indicated a strong likelihood of appropriate sites.

W. Peterson is affiliated with the Department of Anthropology, University of the Philippines, Diliman.

The Novaliches area had received a good deal of attention from H. Otley Beyer, who seized the occasion of the construction of the Novaliches Watershed Dam as an opportunity to examine construction excavations for signs of archaeological materials. We selected the Novaliches Watershed as a survey area because of the information available on Beyer's activities there (informants and published sources), its proximity to the University of the Philippines, and because Beyer (1948) had referred to materials recovered from there that indicated possible mesolithic and early neolithic sites in the area. These were the only concrete leads to sites that might have thrown light on early village life and agriculture. Unfortunately, our survey period was cut short by an unavailability of suitable transport.

SUMMARY OF SURVEY

Two days were spent on a foot survey of Area I near the watershed dam (Fig. 1). This area had been Beyer's favorite location for surface collecting, possibly because so much earth was moved there. The survey team found almost nothing, and we concluded that the landscape had been so drastically altered by the dam construction activities that sites no longer existed in Area I.

Area II was surveyed because a Museum employee had seen lithic debris there during public service tree-planting activities the previous year. The location produced abundant evidence of a pleistocene site of the chopper/chopping tool tradition. The materials we retrieved included choppers, core scrapers, and flakes (utilized but amorphous). The tools were made of raw materials that included cryptocrystallines, quartzite, and basalt. No fossil bone was retrieved and only a small number of tools were removed from the surface of erosional zones. The materials were eroding from the surface of a slightly hilly area; the current vegetative cover is *Imperata cylindrica.* The erosion is not yet extensive and it is our opinion that a great deal of this site is still in primary context beneath the surface.

Area III was a survey of a new road cut at the north end of the lake. The road is an unpaved utility road leading to a new Department of Forestry outpost building. It had been recently bulldozed, and we examined the road cut for evidence of archaeological sites. The examination revealed one location where undecorated red-brown potsherds, badly weathered, were eroding from the road cut at a depth of 1.5 m and some 50 m from the site of the Forestry building. These sherds were unaccompanied by other artifacts or cultural residue. Further excavation could reveal tool associations and possibly house form evidence.

Area IV, surveyed on foot, is another chopper/chopping tool tradition locality. The area is again one of *Imperata* vegetative cover, recently burned over by an accidental grass fire. The entire watershed area was denuded of forest some 20 years ago, according to local informants. The locality is between the Montalban Road and a finger of the lake at the northeast point of the reservoir. Surface finds were abundant and included flakes, choppers, chopping tools, cleavers, and scrapers. Occasional fragments of fossilized bone were recovered, but none was complete enough for identification. Much of this site has eroded from primary context, but some portions appear intact. The site gives the appearance of having been a frequentation site.

Area V is immediately adjacent to Area IV, across the finger of the lake at the northeast point of the reservoir. The two localities are on opposite sides of an old streambed, now flooded by the waters of the reservoir lake. During wet periods the stream still flows into

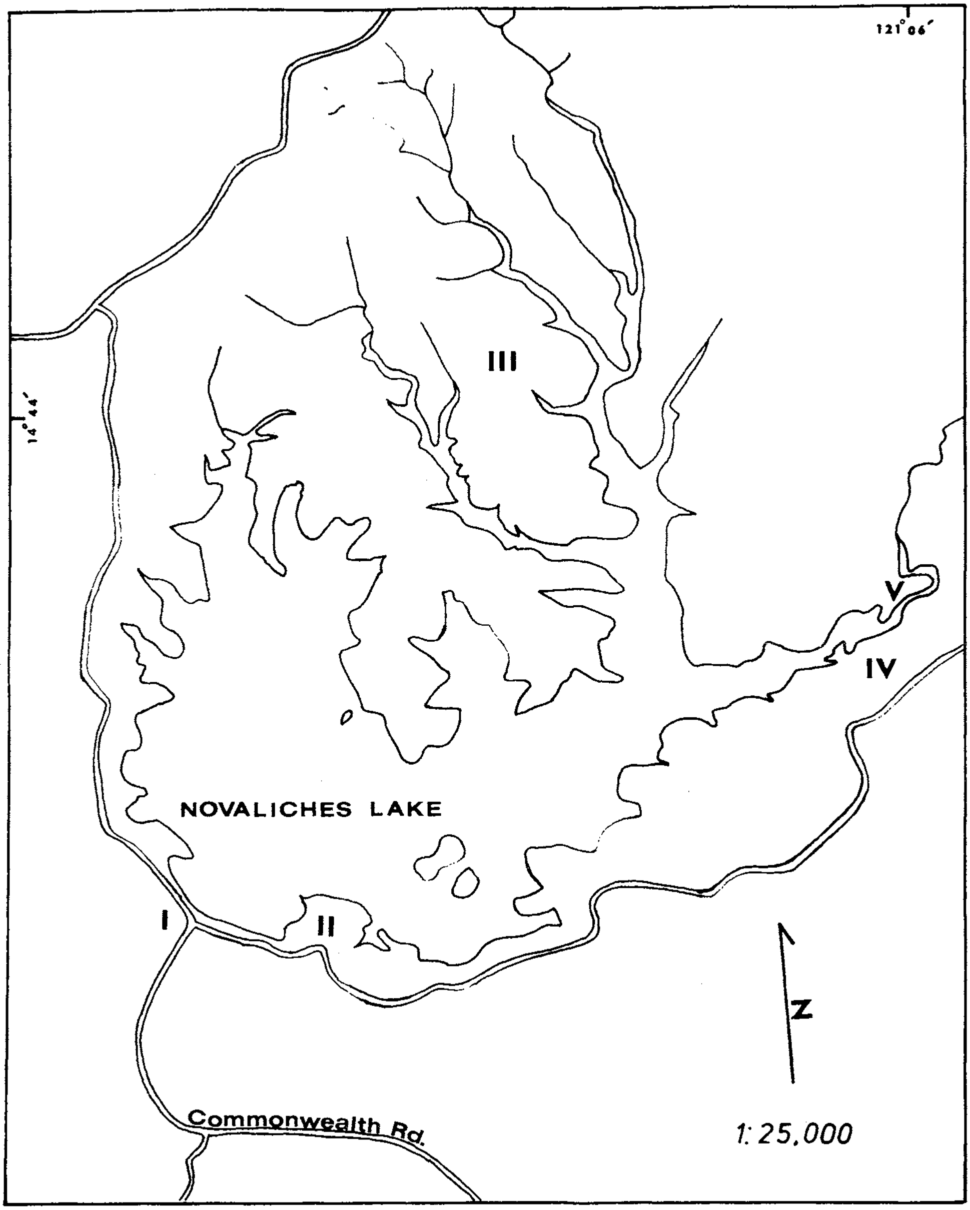

Fig. 1 Map of the Novaliches Watershed.

the lake, which covers its lower reaches. Surface materials were sparse and included one bifacially ground unflaked axe fashioned from flattened, waterworn stream cobble plus assorted irregular flakes. No other materials were found on the surface. We tentatively identified the site as an early neolithic site of Bacsonian expression on the basis of the edge-ground axe.

By this time, the project had run out of the allotted funds and time for survey, and we were forced to select among the sites found for one suitable for excavation. We decided that the Pleistocene localities revealed by survey should not be approached by an inexperienced crew (in fact, such sites should always be approached carefully and by an interdisciplinary team). Of the three remaining survey areas, Area V appeared most likely to produce results that could throw light on the questions of early agriculture and village formation. The a priori model was only partially successful in terms of the functions it performed. It adequately focused the research and motivated the site survey and site selection procedures. The model's fit to the site was not sufficiently close, however, to allow a realistic test of the model's relationship to empirical reality without the construction of supplementary models. In large part, this situation was the obvious result of working in an area where no previous research excavations have been carried out. Thus, too little initial information was available upon which to base specific research problems. Nonetheless, there was a remarkable coincidence of problem and site in terms of the general domain of inquiry.

Because of time pressures, in addition to the need to evolve supplementary models for the solution of specific problems, we decided to shift the research goals toward a general exploration of the similarities between the Payatas site and the Bacsonian-Hoabinhian Period of Southeast Asia. The adoption of this culture-historical goal greatly simplified our methodological approach as well as the analysis of materials. The following paragraphs are a summary of the test excavation results from Area V, or the Payatas site, plus a brief exploration of its significance.

THE PAYATAS SITE

The site is located at 14°44′ north latitude by 121°06′ east longitude, within the confines of Metro Manila. Specifically, the site lies within the Novaliches Watershed at the northeast point of the watershed lake. The site falls between 60 and 70 m altitude, and the immediate environs are rolling hills cut through by numerous streams. Before the construction of the reservoir and dam, the locality was the confluence of two small tributaries of the Novaliches River. These nameless tributaries today discharge into the watershed lake, and flow only during and shortly after the wet season (March to July). To determine if these streams were once permanent is difficult, because the area has been denuded of tropical forest. It is likely, however, that the absence of forest has resulted in drastic shifts in ground water patterns as well as in the invasion of *Imperata*. The tributaries display terraces indicative of considerable age, and their courses follow a meandering pattern even though their origin points are only a few kilometers away. The highest terrace across the stream from the Payatas site is Area IV, the location of a chopper/chopping tool tradition site of possible middle Pleistocene age. In contrast, the Payatas site is located on the youngest terrace of the stream.

The location of the site places it just above the high-water level of the watershed lake. Even though the margins of the site extend to the lake's edge, there is no evidence of past inundation and current flood levels do not reach the site. There has been some surface erosion at the site locality, which has in places uncovered the culture-bearing soil layer. In other places, the erosion has cut through the culture-bearing stratum to underlying layers, and in yet other places the site has not been disturbed by runoff. Insufficient excavation has been carried out to reveal whether or not stream or lake erosion has cut into the southern margin of the site.

The current vegetative cover of the watershed area does not reflect the prehistoric situation. As stated earlier, the region was one of primary dipterocarp forest on rolling hills, with numerous streams. Today no forest remains, and the entire watershed area has been taken by *Imperata*. At the Payatas site, *Imperata* is the principal ground cover, although there are a few trees and shrubs at the southeastern margins of the site. These trees are secondary growth that fringe the lake and the streams. The lack of forest canopy and the seasonal torrential rains have greatly increased surface erosion throughout the watershed area, and there is little doubt that the site is slowly being destroyed. Degree of slope at the location varies between 15° and 8°.

Excavation procedures were simple: we tested six 2 × 2 m squares from a grid pattern (Fig. 2). The squares were selected from surface indications of cultural debris. Excavation was accomplished by trowels and brushes, except where sterile soil or overburden was encountered. All soil removed was screened through a 2 mm mesh screen. Cultural materials retrieved by screening were bagged by natural stratigraphic unit, with depth in centimeters also indicated, and horizontal provenance was recorded by square and quadrant designation. Recording procedures used at the site (i.e., maps, object records, drawings) followed the recommendations and usages of the National Museum of the Philippines (Peralta 1977). Soil samples were kept from each stratum as well as from arbitrary depths. Flotation techniques were applied to samples of soil from each excavation unit and level. Very little other than charcoal was recovered by flotation. Excavation proceeded at a slow rate because only weekends were available to the volunteer crew.

Soils and Stratigraphy

The underlying parent bedrock in the area of the site is a hard and fine-grained sandstone. Southwestern Luzon has much evidence of past volcanic deposits. The culture-bearing soil strata are red-yellow latosols of fluvial origin with volcanic elements. These soils represent stream-margin deposition during exceptionally wet periods of the past. The climate in the Metro Manila region of Luzon is one of alternating hot/dry and humid/wet seasons. "Climatically, southwestern Luzon belongs in the zone sharing the summer rainy season derived from the southwest monsoon" (Wernstedt and Spencer 1967:396). The dry season can begin as early as November and extend through April. The wet season can start with violent thunderstorms in late May and last into November. Precipitation is locally variable in southwestern Luzon, but ranges from 70 to 100 inches per year, with rainfall in Metro Manila falling at the lower end of the range. Until 1950, the Novaliches Watershed possessed a tropical forest cover, as did all of southwestern Luzon until after Spanish influence.

The following discussion of soils and stratigraphy is keyed to Figures 2 and 3; the layers will be considered in order of deposition.

Layer 4 (10YR5/7) represents the deepest and oldest stratigraphic unit reached in excavation. It is a semiconsolidated, unsorted river gravel deposit of undetermined thick-

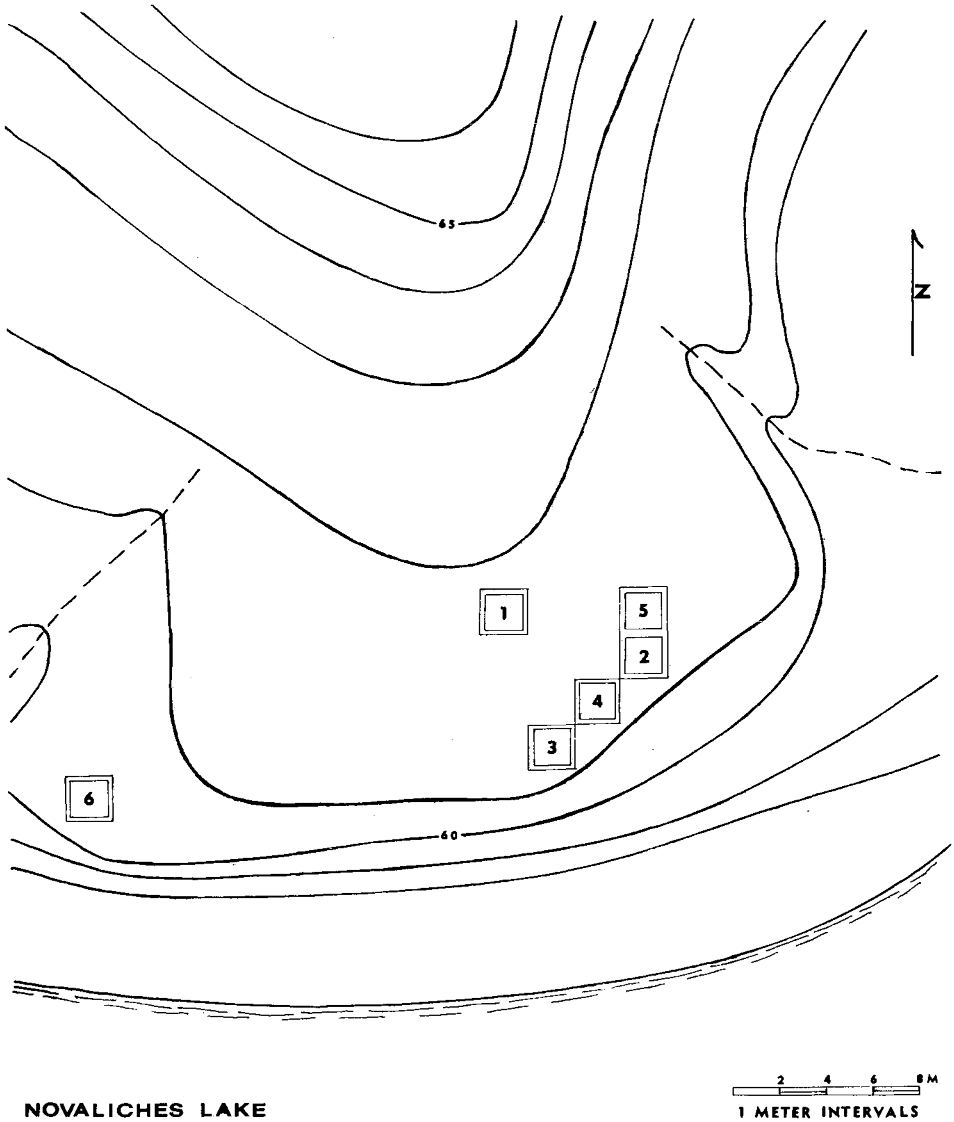

Fig. 2 Map of the Payatas site.

ness, composed of sand, small- to medium-sized cobbles, and elements of volcanic ash and cinder. The particles are rounded rather than angular. The rock material is varied, with limestone, andesite, sandstone, quartzite, and cryptocrystallines represented. In appearance, it is much like streambed material with heavy volcanic elements of ash and small cinders mixed in. The partial consolidation of such highly varied material indicates considerable age. The surface of the stratum is not horizontal but appears to have been affected by tectonic stresses and erosion so that it is very uneven (the surface of the layer was exposed in only three of seven excavation units) and dipped at roughly 4° toward the south. It is sterile.

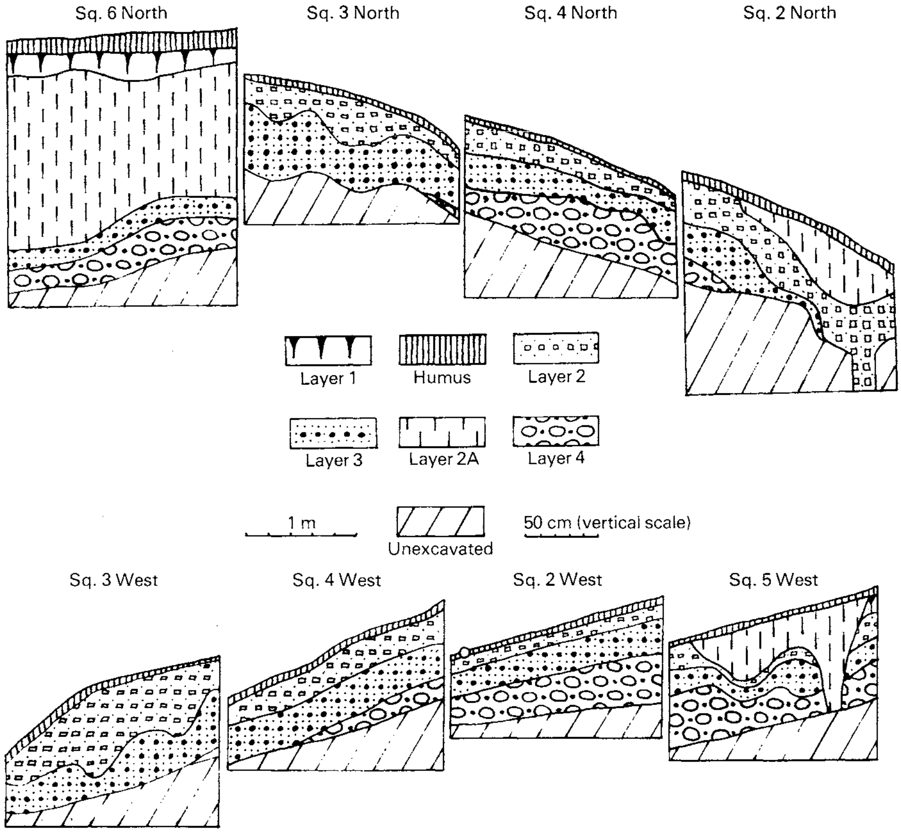

Fig. 3 Composite north and west stratigraphic profiles.

Layer 3 (10YR4.5/4) was deposited by the adjacent stream over the coarser gravels of Layer 4. The stratum consists of well-rounded, coarse sand and small pebbles, plus clay loam soil. Again, many types of rock material are represented, but no limestone is included and there is no identifiable volcanic ash. The layer is better sorted and not nearly as coarse as Layer 4. There are sparse, small, well-rounded volcanic cinders mixed through the deposit. The stratum lenses out as one moves uphill from the stream in an easterly direction and so represents a wet-period depositional action, possibly a very wet interlude. Certainly modern stream action does not deposit sediments uphill from the streambed. Cultural materials are concentrated at the surface of the layer, but some material is scattered through the deposit. Two hearths are clearly associated with the surface of Layer 3; one is located in Test Square 2 and the other in Test Square 3. These hearths were points of concentration for lithic artifacts and botanical materials. The principal tool types recovered from close proximity to hearths were projectile points, small chisels, and a few ground stone needles or small awls.

Layer 2 (10YR3.5/2) lies in apparent conformity on Layer 3. The stratum, like its predecessor, is of fluvial origin and again represents a relatively short depositional period characterized by heavier rainfall. The stratum is very similar to Layer 3 in most respects.

It is composed of soil, coarse angular sands, and subangular small pebbles. It is easily distinguished from Layer 3 by the angularity of particles and color. As with Layer 3, the stratum lenses out on the slope of the lowest stream terrace. The stratum bears cultural materials much like those from Layer 3, but sufficiently different to indicate some major subsistence shifts. The cultural materials are concentrated at the top of Layer 2, but sparse recoveries were made throughout the stratum. The surface of Layer 2 was at some time subjected to violent erosion, which in places entirely stripped away Layer 2 deposits and in other places cut deep narrow erosion channels through Layer 2 and into underlying strata (see Fig. 3, Sq. 2 North). The discovery of the site was due to this erosion, which has exposed Layer 2 in a number of places and left only a thin humus covering.

Layer 2A (10YR5/5) is not present in all squares but is represented in Squares 1, 5, and 6. This is a loamy clay slope wash, carried downhill by surface waters to cover portions of the site. Its color is mixed and variable and it is very fine grained, with no identifiable rock materials. There are a few flaked lithic artifacts scattered through the stratum, which appear to have been carried with the slope wash and redeposited out of context. They display slight rolling and must derive from some point uphill from the site. The stratum is essentially sterile and quite thick in places.

The surface soil layer is a topsoil of relatively high organic content, composed of a humus layer (10YR6/1) of decomposing grasses, grading into a more mature even-grained soil of a darker tone (10YR6/2). The lower component of the topsoil (designated Layer 1) has been eroded from most of the site, very likely since deforestation of the area occurred. The topsoil contained a handful of potsherds of recent (modern) origin and no other cultural debris. The sherds must relate to a nearby occupation from recent history.

LITHICS

Analysis of the lithic material from the site is not yet completed, but we can provide preliminary information and drawings of typical tools.[1] The lithic assemblage has one overriding characteristic: it is predominated by tools fashioned by grinding techniques rather than by percussion techniques. Recurrent form is relatively uncommon because the manufacturers of these tools altered original rock fragments and pebbles as little as possible to achieve a desired tool. In fact, so accustomed were we to lithic tools manufactured by percussion techniques, we found it difficult at first to identify those rocks which had been altered from their original form by grinding. Although recurrent form is unusual in the assemblage, the projectile points appear to have forms that are recognizable within broad limits. The majority are diamond shaped or triangular in plan outline (Fig. 4). The proportion of flaked to ground stone tools is not yet known, but ground stone artifacts predominate (the illustrations reflect the range of tool types, not the proportion of ground to flaked tools). The most common lithic raw materials are a fine-grained sandstone (hardness of 6), a hard shale, andesite, and some basalts. There are no cryptocrystallines represented.

The most numerous tool types are projectile points, small chisels, and small scrapers. Larger scrapers, whittling knives, and burins (Fig. 5, Fig. 6*b,c*) appear to be the only tool categories where flaking techniques rather than grinding techniques are commonly represented in manufacture. The majority of tools are quite small, measuring 5 cm or less in length. The exceptions are large edge-ground axes (e.g., Fig. 7), a single flaked axe (Fig.

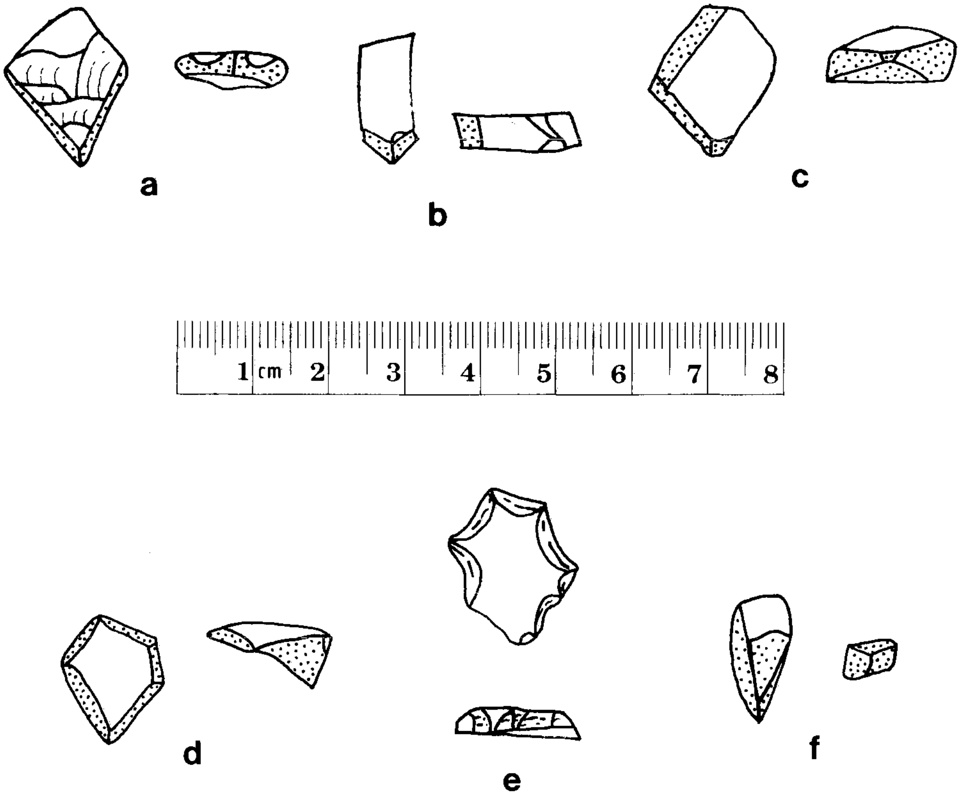

Fig. 4 *(a–d,f)* Assorted ground projectile points; *(e)* a small flaked projectile point.

6*a*), and a single "mortar" fashioned from an andesite boulder. These larger artifacts, the only addition to the assemblage from Layer 3 to Layer 2, represent a significant change in the tool kit over time.

A preliminary tool edge examination carried out with hand lenses indicates that the scrapers, burins, small chisels, spokeshaves, and knives may be related to woodworking activities. The projectile points are assumed to represent hunting activity and the heavy axes may relate to tree-felling activity, but in these tool categories the examination was insufficient for reaching conclusions about function.

Two artifacts appear to have been items of personal adornment. One (Fig. 8*b*) is a very well-made ground stone pendant in the shape of an isosceles triangle. The other (Fig. 8*a*) appears to be a fragment of a ground stone ring that yields a projected diameter of 4.5 cm.

A single large grinding stone or mortar was retrieved from the top portion of Layer 2. Its form was that of a small round boulder (c. 60 cm in diameter) that had been shaped from a nearly rounded boulder by a stone pecking technique. One side had been flattened by grinding activity and could have been used for either food preparation or in tool manufacture (for the grinding of stone tools). Because of the artifact's large size, the upper part protruded above the surface of the ground in Test Square 2, where erosion had stripped away overlying layers. The flattened surface of the artifact was resting in Layer 2. A great deal of energy had been expended in shaping the boulder by pecking.

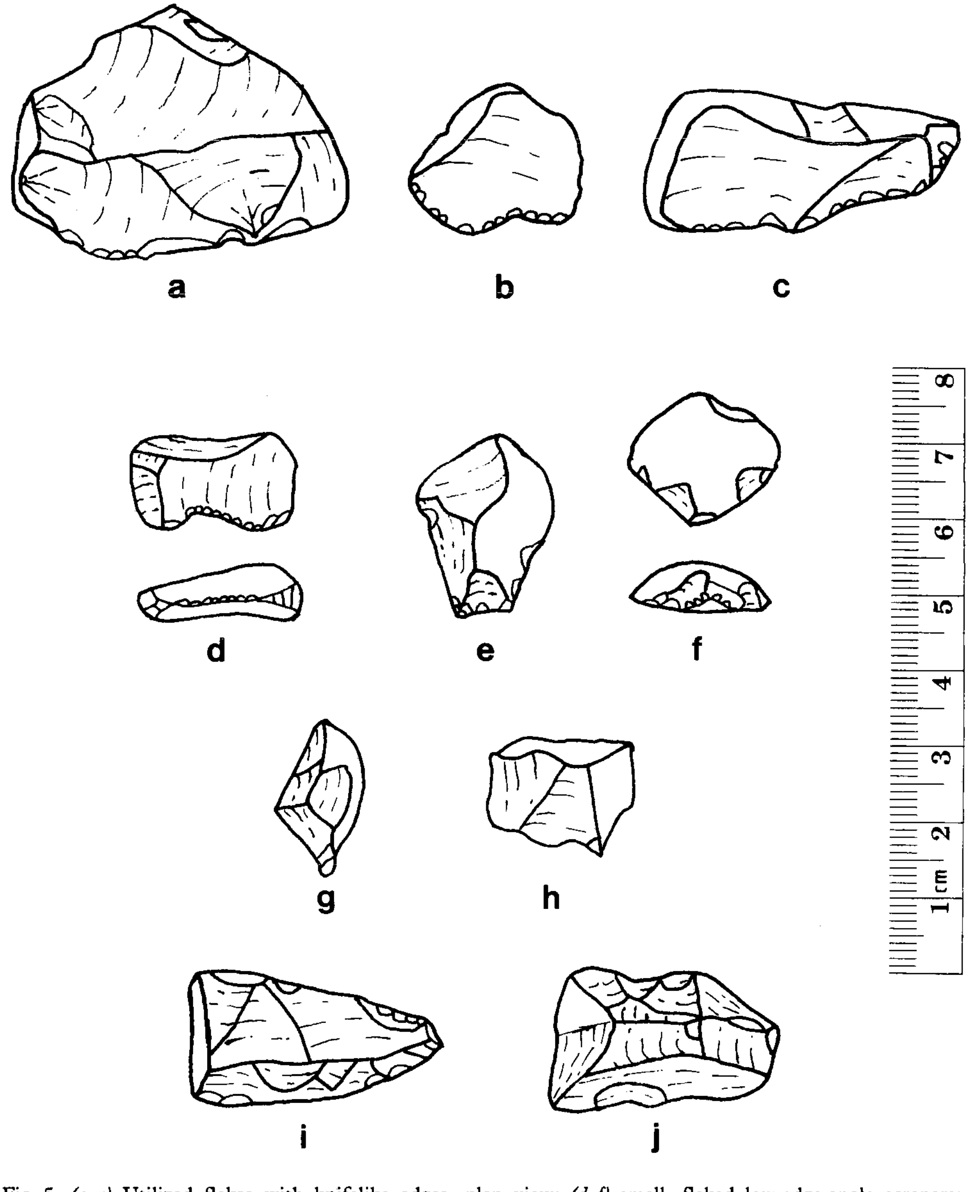

Fig. 5 *(a–c)* Utilized flakes with knifelike edges, plan view; *(d–f)* small, flaked low-edge-angle scrapers; *(g,h)* gravers, plan view; *(i,j)* steep edge-angle scrapers, plan view.

A small number of ground stone needles have been recovered (Fig. 8*c*). Their actual function is not known, but they do not reveal wear patterns typical of awls or drills.

An example is shown of a very small adzelike implement (Fig. 8*d*). A number of these were recovered, all similar in size to the small gougelike tool of Figure 9*c* and the small chisel of Figure 9*d*. They appear from preliminary examination to constitute a tool kit for detailed woodworking.

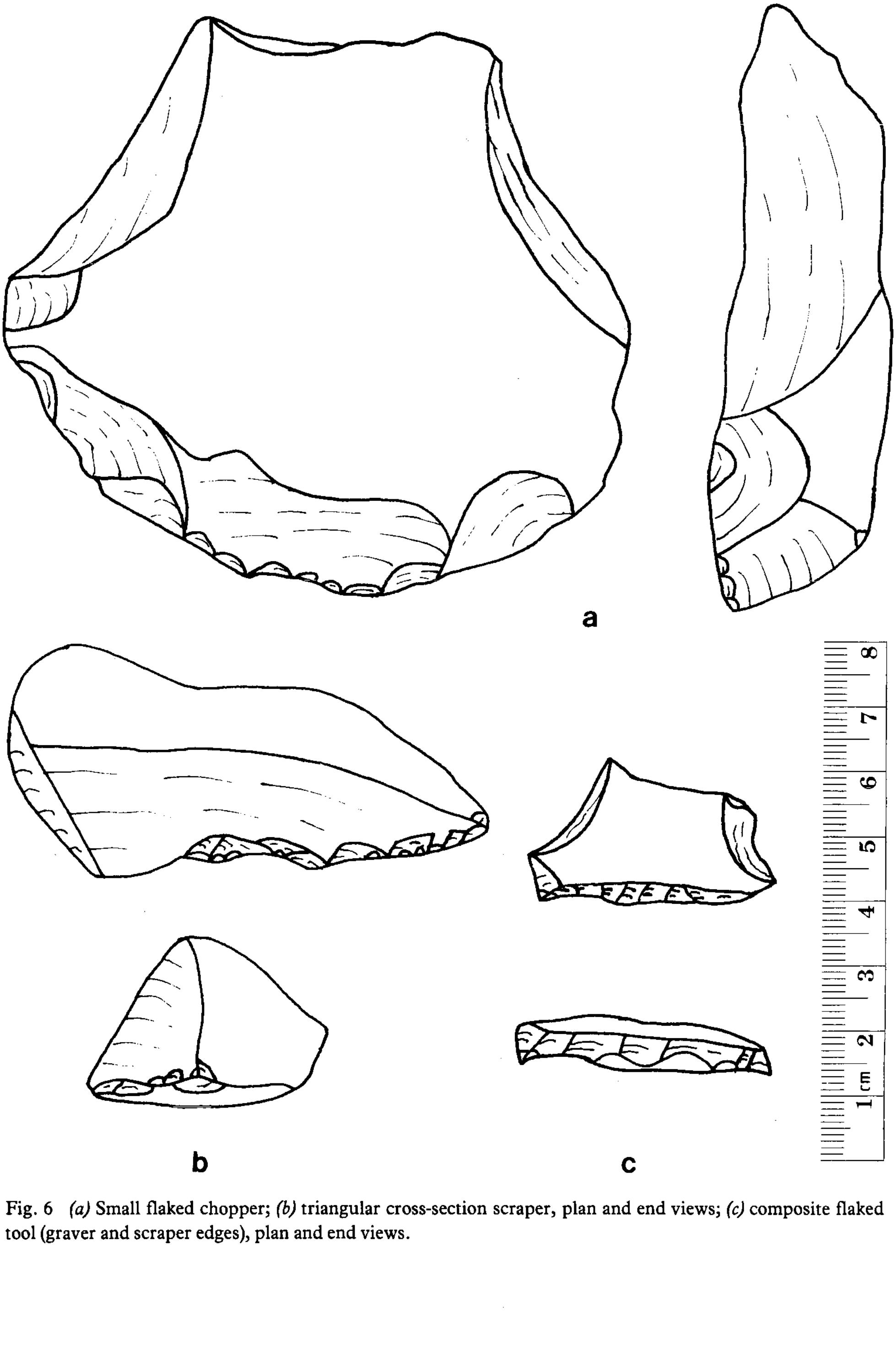

Fig. 6 *(a)* Small flaked chopper; *(b)* triangular cross-section scraper, plan and end views; *(c)* composite flaked tool (graver and scraper edges), plan and end views.

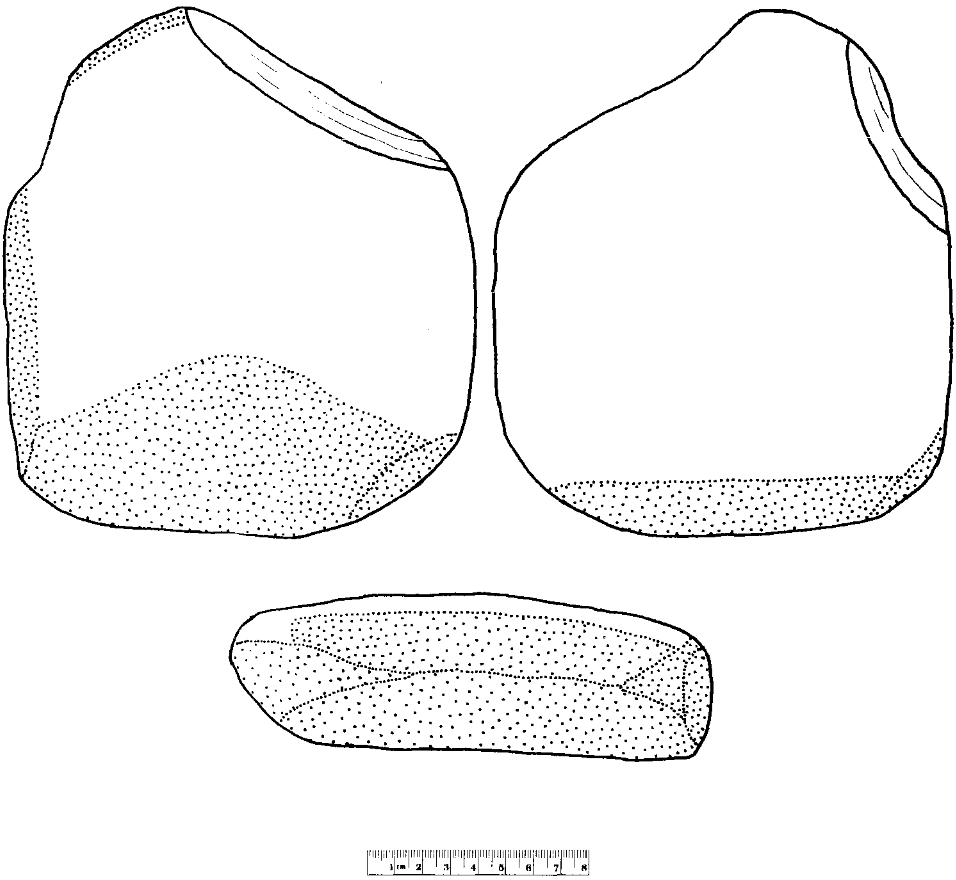

Fig. 7 Plan, obverse, and cutting edge views of edge-ground axe. Stipling represents ground areas.

BOTANICAL RETRIEVALS

An unusually good preservation of seeds (for tropical conditions at an open-air site) resulted in the recovery and identification of a number of plant species. The specimens themselves were either carbonized or partially mineralized, and all were found *in situ* or were retrieved in the screening of soil from the test pits. Flotation techniques, using fresh water only, were applied to soil samples from every layer of each pit with negative results. Only charcoal and ash were recovered from the flotation samples.

The following botanical materials were retrieved and identified. From the interface of the topsoil and Layer 2 in Test Square 3, four seeds from the genus *Ipomoea* were identified. There is no way of knowing whether the association is with the culture-bearing Layer 2 or with the topsoil, nor was a species identification made. Modern distributional information would indicate the latter. A positive identification of two seeds as *Quisqualis indica* was made from specimens for Layer 2, Test Square 3. Multiple specimens of *Tinospora* (Menispermaceae) were identified from Layer 3 and the Layer 3/Layer 2 interface in

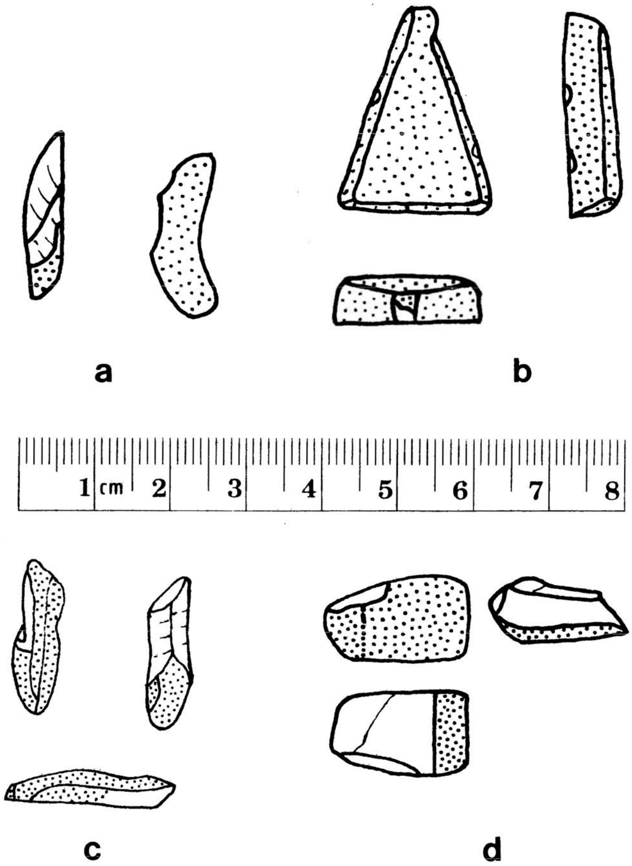

Fig. 8 *(a)* Plan and side views of ground stone ring fragments; *(b)* plan, side, and end views of pendant; *(c)* plan, obverse, and side views of ground stone needle; *(d)* plan, obverse, and side views of small ground stone adze. Stipling represents ground areas.

Test Squares 4 and 7. The Layer 2/Layer 3 interface of Test Square 5 produced an identification of *Syzygium* (Myrtaceae) and *Lauralae.* The genus *Cyperus* or *Scleria* was identified from the top portion of Layer 2, Test Square 4.

Of these identifications, the sedge *(Cyperus/Scleria),* the *Ipomoea* sp., and the Javanese apple *Syzygium* may represent food resources. No species identification was made for the *Ipomoea* specimens, however, and many members of the genus are poisonous or inedible. The use of sedges for food prehistorically or ethnographically is not known to the authors. The Javanese apple and other members of the genus *Syzygium* are commonly used as a food resource. The Lauraceae are a family of trees and shrubs, some of which are used medicinally. *Tinospora* is a genus that contains plants with a high alkaloid content which are often used as fish poisons and occasionally for abortion. *Quisqualis indica* is very widely used as a medicine for parasites. Again, the recovery of these seeds from the soil layers of the site does not ensure that they were used by the occupants of the site, only that they may have been. That most were recovered from hearth areas strengthens the possibility. A note of caution is necessary here. Archaeologists retrieve botanical specimens that are

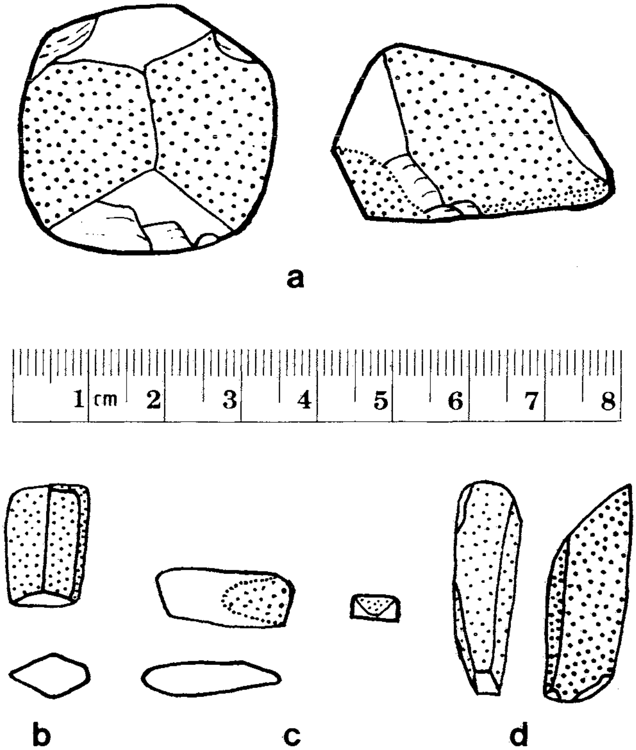

Fig. 9 *(a)* Plan and side views of a ground stone scraper; *(b)* plan and cross-section of ground stone blade, dulled from use; *(c)* plan, side, and end views of small gouge, concave cutting edge; *(d)* plan and side views of ground stone chisel. Stipling represents ground areas.

hundreds or thousands of years old. Often the specimens are few, fragmentary, badly preserved, or distorted. Occasionally, phenotypic change makes identification from modern specimens difficult. Because of these problems, identifications are always somewhat difficult and in general should be considered provisional or tentative. On the other hand, extreme reactions such as that displayed by Harlan and de Wet (1973) are neither constructive nor realistic. The inherent limitations on retrieval and identification of plant materials from most archaeological sites do not preclude tentative identifications within the bounds of reason.

DWELLING EVIDENCE

Plate I and Sq. 2 North, Figure 3 show indications of probable dwellings at the Payatas site. Evidence of postholes was recovered from Test Squares 2, 3, and 4. It was impossible to uncover a complete dwelling pattern because of time limitations, but from Test Square 2 we uncovered a portion of one side of the dwelling pattern. The postholes indicated that the posts were c. 20–25 cm in diameter and had been sharpened to crude points. They had been sunk into unexcavated strata below Layer 4 to a depth of 40–50 cm and originated in Layer 2. As Plate I indicates, some construction excavation is associated with the postholes. Since there was an 8–10° slope here, we suspect some excavation was carried out to level a surface for the dwelling. Alternatively, we may be observing some form of semisubterranean construction. Evidence of only single postholes was recovered from Test Squares 3 and 4. Both were of similar dimensions and one was near a hearth; both originated in Layer 2. There was no evidence of associated excavation in these excavation units. Because of the distance from the dwelling evidence in Test Square 2, it is likely that this represents a second dwelling or structure rather than part of the same dwelling. The soil of Layer 2 in Test Square 3 is very compacted around a hearth, far more so than in other squares, indicating considerable human activity.

Obviously, more excavation is required to reveal entire dwelling patterns. Nonetheless, there is evidence enough to point to the presence at the Payatas site of substantial dwellings associated with Layer 2.

SIGNIFICANCE

Within that realm of archaeological research known as culture history, classificatory approaches are commonly used to provide a comparative basis for the reconstruction of prehistory. These comparative procedures have been somewhat abused in Southeast Asia, and tentative or even speculative conclusions have been presented as established facts. We preface the following discussion with these comments because the statements to be made are tentative (preliminary) as well as subject to all the limitations of the methods of culture history.

The basic artifact resemblance appears to be related to the Bacsonian of Vietnam (Mansuy 1924, Mansuy and Colani 1925), based on the high percentage of ground stone arti-

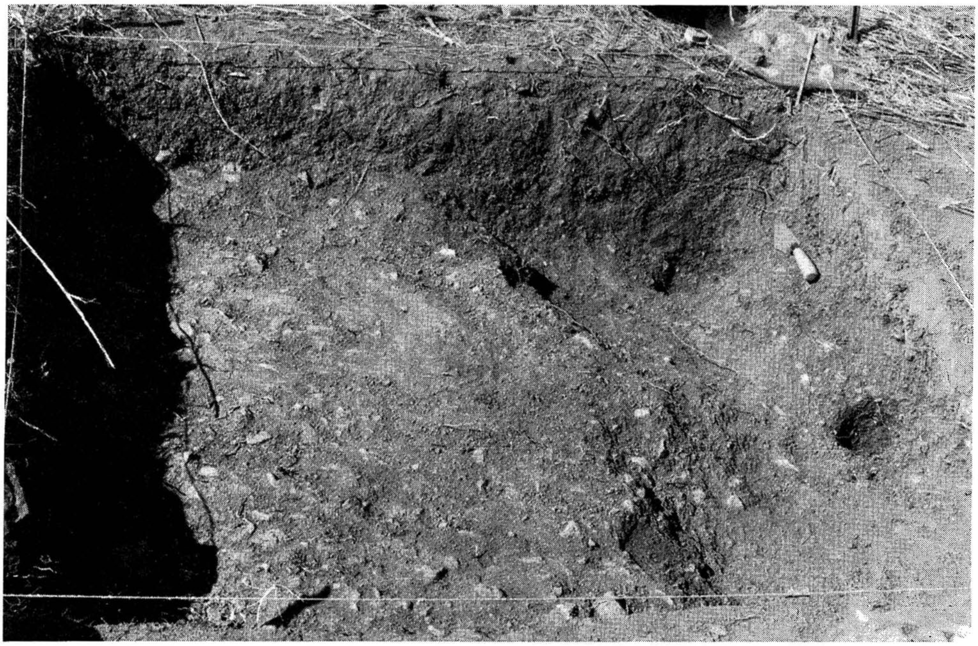

Plate I Evidence of postholes from Square 2, Layer 2, extending into Layer 5. Note associated depression dug into Layer 5.

facts, as opposed to flaked artifacts, and on the artifact forms. The Bacsonian, however, is a poorly defined stage of prehistory. It has come to be regarded as a very regionalized (Vietnamese) variant of the Hoabinhian (Heekeren 1972:83) or Mesolithic of Southeast Asia. It, like the Hoabinhian, is characterized by the occupation of rockshelters, a subsistence style based on shellfish collection, and hunting of small- to medium-sized game. The technology of the Bacsonian (the "nêolithique infêrieur") is often characterized as having a very high percentage of ground stone tools found in association with crude utilized flake and core tools. There are inconsistent associations with pottery and polished stone tools such as adzes. The Bacsonian is often thought of as a localized early neolithic expression that occurs later in time than the Hoabinhian.

In point of fact, the Bacsonian is poorly described and defined, and its relationship to other kinds of sites is poorly understood. The following quote referring to the French archaeology sums up the situation nicely: "This assumption [of a Bacsonian category] is based entirely on typological grounds. No stratigraphic evidence has so far been produced to prove the validity of such a sequence. No distinct strata have been detected in the excavation of the deposits of these caves. It is true that the depth of finds has been quoted to prove the correctness of this alleged sequence, but no reliance can be placed on these figures" (Dani 1960:106). In short, there is no clear sense of the relative age of the Bacsonian,[2] nor is there a truly clear distinction between the Bacsonian and the Hoabinhian on one hand, and the Neolithic on the other. Edge-ground tools, for example, are found in Hoabinhian as well as neolithic assemblages, although they are not numerous in either context. The sites excavated in the Bac-son area of Vietnam display a great deal of variation in terms of tool assemblages. Most of the caves (Dani 1960:127–147) produced several "classes" of stone tools, ranging from flaked, retouched tools to ground rectangular adzes which have been formed by stone-sawing techniques. Some sites, such as Keo-Phay, have virtually no edge-ground tools. The closest resemblances in tool morphology appear to be from Dan-Thuoc (Mansuy 1924) and Nache (Mansuy 1925). In these sites, almost all tools are edge ground. No pottery is associated with the Nache assemblage, and only a few sherds appear in the upper level of Dong-Thuoc. There are differences as well: retouch flaking is common at these sites, but virtually nonexistent at the Payatas site. There are numerous small, well-worked tools fashioned by grinding at the Payatas site, and these are not common in the sites of the Bac-son region. They do occur in some sites—Pho Binh Gia, for example. They also appear in the late period of the Hoabinhian (Dani 1960:126). Some of the small ground stone tools from the Payatas site very closely resemble the "sêrie de petits instruments" described by Mansuy (1902) as chisels from the Somrong Seng site, but that is as far as the resemblance goes.

The closest resemblances from Malaysia to the edge-ground axes recovered from Payatas appear to be from Gua Kerbau, Perak (Callenfels and Evans 1928). Edge grinding seems to be more unusual in the assemblages of Malaysia, but the state of the literature makes accurate comparison impossible. Surprisingly, since it is represented in the Philippines, no "Bacsonian" is reported from Indonesia (Heekeren 1972). Harrisson (1957) reports edge-ground tools from Niah Cave, Sarawak dating from 7000 B.C.

Within the Philippines, reports on a Bacsonian period started with Beyer's research and survey of the Rizal, Bulakan, and Bataan Provinces (Beyer 1948:17–19). His research procedures did not involve excavation, only survey and the collection of surface artifacts. Much of Beyer's surveying was conducted at the Novaliches Watershed area during the construction of the dams, when archaeological materials were uncovered by the construction work. Among the recoveries were "Bacsonian-type Mixed Protoneolithic" tools with a close resemblance to those retrieved from the Payatas site. Beyer (1948:81) postulated, from surface finds and comparison to archaeological information from researchers in Southeast Asia, a Bacsonian horizon for Luzon. Beyer estimated the age for the Luzon Bacsonian at "about 6000–4000 B.C. or later" (1948:81). He believed it to be the result of contact between early neolithic agriculturalists and nomadic microlith-using Negrito hunters. Beyer's postulated Bacsonian horizon was not tested by actual excavation until 1969, when Kress (1977) excavated Guri Cave on the island of Palawan. He identifies a Hoabinhian subphase at Guri Cave which is defined by the presence of numerous edge-ground tools. He says, "There is a great deal of variability in the size and morphology of these implements depending on the shape of the original boulder" (1977:43). Kress states that Sa-gung and Duyong rockshelters also have this Hoabinhian subphase. Dates from Duyong for the edge-ground tools run between 4000 and 2500 B.C. The associated faunal material from these indicated a broad-spectrum hunting and collecting way of life, with a heavy dependence on marine and freshwater shellfish and wild pig.

There appear to be affinities, then, between Payatas and some of the Bacsonian/Hoabinhian area sites of Vietnam, and between the Payatas site and at least three sites in the Quezon area of Palawan. If it is assumed that the resemblances in tool types are close enough to project some statement about subsistence, then the Payatas site would have had a broad-spectrum hunting and collecting subsistence base. Radiocarbon dates have not been run for the site, but they could be expected to fall somewhere between 6000 and 2500 B.C.

There are, however, some major differences between the Payatas site and other Hoabinhian/Bacsonian sites. First, Payatas is an open site and not a cave or rockshelter. Second, evidence from Layer 2 indicates the presence of dwellings. Third, there is no evidence of the shell middens normally associated with Hoabinhian/Bacsonian sites. These differences, plus stratigraphic information and a consideration of the changes in assemblages between Layer 2 and Layer 3, lead us to make the following tentative interpretation of the Payatas site. We think it will be borne out by subsequent analysis and excavation.

Layer 3, the oldest culture-bearing stratum, represents a dry season camp area where locally available plants and animals could be exploited with ease. We would predict cave and rockshelter expressions of related Bacsonian/Hoabinhian sites (with shell middens) in the same area. Perhaps a seasonal round is indicated, with areas rich in game, specific plant resources, and aquatic resources being used in the dry season; and cave/rockshelter habitation characteristic of the wet season, with shellfish resources the significant staple. The tools recovered from Layer 3 represent primarily two basic activities, hunting and woodworking. We assume the woodworking is also related to food procurement, possibly in the form of trap manufacture and nonlithic tools related to hunting.

Cultural materials from Layer 2 represent a basic continuity through time. That is, most tool types remain the same. There are important changes, however, that represent a basic shift in subsistence pattern. The axes may, because of their large size, be related to forest clearing. The stratigraphic evidence of erosion after the deposition of Layer 2 would support this interpretation, as would the presence of substantial dwellings. We think that a shift to a partial dependence on forest-fallow cultivation, supported by a primary reliance on broad-spectrum hunting and collecting, may be indicated.

If our tentative interpretations are borne out, the Payatas site, as well as the "Bacsonian" sites of Palawan, has considerable significance for Southeast Asian culture history and also promises insight into the research domains of early village formation and agricultural origins.

Recent interpretations of Southeast Asian culture history (Solheim 1969; Heekeren 1972; but see Jocano 1975) do not identify any Hoabinhian or "Bacsonian" sites in the Philippines. Most interpretations (e.g., Heekeren 1972) regard the Bacsonian as a Vietnamese variant of the Hoabinhian, and all restrict the distribution of this variant to Indochina. Quite clearly, there is now enough information available from controlled excavation to suggest that the Hoabinhian does occur in the Philippines and that there is a difference between Hoabinhian and Bacsonian assemblages. That difference is expressed by the presence of higher percentages of edge-ground and ground stone tools in Bacsonian assemblages (stone grinding as a technique of manufacture is not represented in many Hoabinhian sites) and by apparent chronological differences. Peterson (1974) has excavated a Hoabinhian site as well as the Payatas site, and in his view the differences between Hoabinhian and Bacsonian assemblages of the Philippines are considerable. Not only are edge-ground axes and other ground stone artifacts rare in the Hoabinhian, but there is a totally different orientation to lithic tool manufacture. The tools from Philippine Bacsonian assemblages are fashioned primarily by grinding rather than percussion and, of course, raw materials amenable to grinding dominate the assemblages. Gorman (personal communication) does not accept the evidence for Hoabinhian sites in the Philippines. The defining characteristics for the Hoabinhian (Gorman 1970) "technocomplex," however, are represented in the Philippine sites. Bacsonian assemblages occur later in time than some Hoabinhian assemblages (Kress 1977).

The Payatas site is different from the Bacsonian of Palawan because it is open. We do not find the idea of multiple expressions of the Bacsonian surprising; indeed, we think that cave and rockshelter sites have received much more attention in Southeast Asia because they are much easier to locate, and that a sampling bias exists. The Payatas site is one of few open sites to be excavated in the Philippines, and we anticipated that it would have both familiar and unfamiliar aspects. The evidence from the Philippine provisional "Bacsonian" sites suggests that at least two expressions of the period are represented: one, the occupation of caves and rock shelters; the other, an open site expression. This evidence indicates that some adjustments must be made in the reconstructions of culture history that now exist.

We suggest that the "Bacsonian" be provisionally treated as a separate class or category of sites which developed from the Hoabinhian between 8000 and 6000 B.C. and persisted until c. 2500 B.C. The Bacsonian period represents a land-use intensification from the broad-spectrum hunting and collecting characteristic of the Hoabinhian to a scheduled, seasonal exploitation of different biotopes (with different resource sets) through an annual cycle. We anticipate additional Bacsonian expressions, related to other biotopes. We also think that the Payatas site hints at the development of village life in the latter half of the Bacsonian and that plant manipulation or even horticulture constituted a portion of the subsistence strategy. These suggestions are tentative and are presented as one of several possible interpretations.

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Notes

[1]Time limitations restricted the amount of laboratory analysis and illustration preparation. The materials and records are being curated at the Anthropology Museum, University of the Philippines. Additional analysis and excavation are underway.

[2][Vietnamese archaeologists now have dates for the Son Vi Culture, which was ancestral to the Hoabinhian, of 18,390 ± 128 B.P. to 11,330 ± 180 B.P.; for the Hoabinhian, of 10,875 ± 175 B.P. to 7665 ± 65 B.P. (Hoang Xuan Chinh, "A few remarks on Hoabinh Culture basing [sic] on new documents," in *Recent Discoveries and New Views on Some Archaeological Problems in Viet Nam,* Hanoi: Institute of Archaeology, 1979, pp. 9–13); and for the Bacson, from about 10,000 B.P. to about 6000 B.P. (Nguyen Van Hao, "Neolithic age in Viet Nam and its evolution," in *Recent Discoveries and New Views of Some Archaeological Problems in Viet Nam,* Hanoi: Institute of Archaeology, 1979, pp. 21–26).—Ed.]

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