Prehistoric Investigations at Tianko Panjang Cave, Sumatra

AN INTERIM REPORT

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PREFACE

THE PROJECT described below was originally conceived after an attentive reading of Robert van Heekeren's *Bronze-Iron Age of Indonesia* (1958) and the first edition of his *Stone Age of Indonesia* (1957). While the Indonesian author had long been a student of van Heekeren's, the American author's first personal contact with him took place in February of 1972, when his advice played a major part in establishing the scope and goals of the project. Subsequent correspondence and conversations with van Heekeren continued to influence our plans, culminating in two weeks of intensive discussion in Jakarta in May 1973, just before our crossing to Sumatra to begin an initial season of archaeological survey. The results of that survey were again discussed with van Heekeren while plans were being laid for excavations in 1974. Our final communication from him arrived in Palembang in early August of 1974; it consisted of a xerographic copy of the virtually unobtainable report by Zwierzycki on Tianko Panjang Cave, the site we proposed to begin excavating within five days of the receipt of his letter. News of van Heekeren's death reached us simultaneously with our return to Jakarta in September. All our team, Indonesians and Americans alike, were grief-stricken. Had we not liked him we would still have owed much to the man who had almost single-handedly bridged the gap between colonial and modern studies of prehistory in Indonesia. But we did like him, in common with a vast assembly of farmers, diplomats, servants, soldiers, professors, and children. We too saw him as a compound of humanity and legend, as spellbinding storyteller, hero, friend, and scientific pioneer. So we were desolated that he died, being consoled only by feeling that the work he carried on so

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long alone was now in the hands of a numerous generation of followers, ourselves among them.

INTRODUCTION: THE ARCHAEOLOGICAL INSTITUTE/PENNSYLVANIA SUMATRA PROJECT

The 1973 Sumatran survey of the Indonesian Archaeological Institute and the University of Pennsylvania Museum had located (or re-located) about twenty possible prehistoric sites in the course of a two-month survey covering parts of six of the seven provinces in the island (Bronson and Wisseman 1974). None of these sites was even approximately datable, since virtually no work had been done in the region since the 1920s and much of that had been defective even by the then prevailing standards of Southeast Asian prehistoric research. However, both library research and on-the-spot reconnaissance indicated that two localities were most promising from the standpoints of surviving *in situ* deposits and of reasonably certain antiquity: the coastal area of northern Sumatra, where a small number of shell middens are still in existence (i.e., Sungai Iyu—Bronson et al. 1973), and the western part of Jambi Province in the central part of the island, where a number of sites producing obsidian flakes and potsherds had been observed in former years (Sarasin 1914, Zwierzycki 1926, van der Hoop 1941*a*, Dinas Purbakala 1955). Since we intended to investigate one of these prehistoric localities at the same time that members of our group were excavating in the vicinity of Palembang in southern Sumatra, the western Jambi sites became the logical choice, and the best-looking of these was the unnamed cave that Zwierzycki tested in the early 1920s, which we called Tianko Panjang Cave.

The Tianko Panjang excavation of 1974 was performed under the joint auspices of the National Archaeological Institute of Indonesia and the University Museum of the University of Pennsylvania, with support from the Field Museum of Natural History. Actual excavations lasted two weeks and involved four small trenches, located so as to provide a representative sample of the cave's contents while preserving a continuous block of undisturbed deposits—since the explorations were meant to be exploratory, we felt obliged to leave the site in a condition to be reexcavated on a larger scale, by ourselves or others, at some future date. Some twenty other caves and rock-shelters were explored while excavations were in progress. The authors of this paper served as codirectors of a four-person staff which, at the close of work at Tianko Panjang, returned and rejoined the historic-period excavations then in progress in Palembang.

BACKGROUND AND OBJECTIVES

Patchy though our knowledge is of Indonesian prehistory, it may be said that the prehistory of Sumatra is poorly known even by comparison with that of neighboring land masses. Unlike Java, Sumatra has produced no early hominids. Unlike Java, Borneo, the Malay Peninsula, Sulawesi, Flores, and Luzon, it contains few if any nonmarine fossiliferous deposits of identifiably pre-Holocene and post-Mesozoic date; indeed, as of the time of writing, Sumatra has not been shown to contain remains of any extinct mammalian species (Hooijer 1975: 39). The island has done no better with respect to artifactual remains (Fig. 1). Except for a handful of sites marked by large core and flake tools of silicified limestone and wood—Bunga Mas/Kikim, Mungkup River, and Kedaton Rubber Estate (see Dinas Purbakala 1955: 23–24; Houbolt 1940; Hooijer 1969: 26; van Heekeren 1957: 59)—no Sumatran site has even the appearance of an Early or Middle Pleistocene antiquity. The "Sumatralith"-producing shell middens of the northern coast (Schurmann 1931; Kupper 1930) are fixed to a comparatively recent period by virtue of their apparent Hoabinhian connections and the absence of extinct faunas. The few sites where ground stone adzes are known to have been found (i.e., the adze workshop at Lubuk Layang—Bronson et al. 1973: 9—and Kebon Baru Lolo at Lake Kerinci; none of the specimens cited by Duff 1970 have a precise provenience) may even postdate the introduction of metal. And the obsidian sites, while mostly premetallic, are not necessarily much earlier. Kebon Baru Lolo (the "Danau Gadang Estate" of van der Hoop 1941*a*) has produced several bronzes, including a kettledrum. The nearby Lolo Hilir (Bronson et al. 1973: 13) is of similar age. Ulu Tianko Cave (Sarasin 1914) and the upper levels of Tianko Panjang Cave contain earthenware sherds in association with the obsidian flakes. And the apparently aceramic sites, including the lower levels at Tianko Panjang, Karang Berahi, Bangko, and two little-known localities in Lampung Province (catalogued in van der Hoop 1941*b*: 169), are none of them so atypical as to justify speculations about a dating earlier than the Terminal Pleistocene.

Thus, we are constrained to consider any lithic site in Sumatra in terms of recent problems and processes. It is pointless, for instance, to aim research at problems of human macroevolution or of long-term environmental adaptation. Given our almost complete ignorance of the area, it is also unprofitable to hanker after large syntheses and tests of complex processual models. The questions that loom largest are the elementary ones of chronology and location, the raw elements of a time-space frame to which existing data can be pegged. Next in line are questions of artifact identity and assemblage connectivity, since at present we can scarcely describe a single artifact in any meaningful terms, or usefully differentiate it from any other. And third come the more straightforward kinds of questions that specialists in better-established archaeological regions are able to ask, not to mention tests of advanced hypotheses of cultural and natural interactions, socioeconomic organization, and the mechanics of social change. Such research objectives as these are still some years beyond our present grasp.

Our purposes were therefore uncomplicated. The first priority went to chronological information, since no absolute (and precious few relative) dates existed for any site in Sumatra. The second priority went to information that might serve to clarify the similarities and differences between Tianko Panjang and the other sites mentioned above. The third went to data bearing on ancient subsistence and materials-processing methods, to the extent that these could be determined from excavations on such a modest scale. Definitive conclusions are not as yet available, as laboratory research is still underway. But prehistoric researchers on Indonesia are currently in such serious need of information that it seems worthwhile to place even these preliminary data on record.

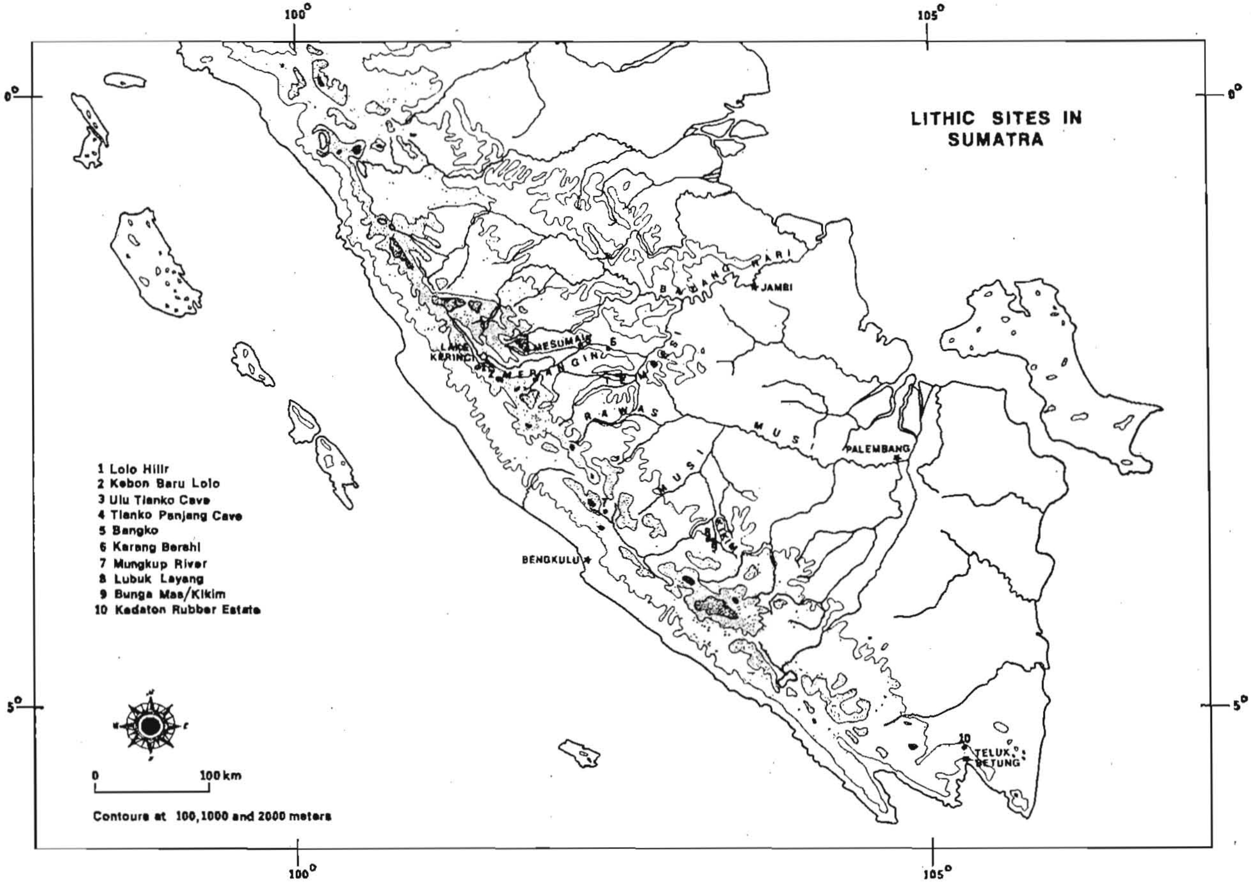

Fig. 1 Known lithic sites in southern Sumatra, 1975.

The Tianko Valley

Tianko Panjang Cave is at the distal end of an abrupt limestone promontory that projects southeastward from the north-south oriented limestone ridge which forms the western edge of the valley of the Tianko River. The river is a minor tributary of the Mesumai, joining it at the town of Sungai Manau, capital of the *kecamatan* of the same name on the road between the capitals of the two westernmost *kabupatens* in Jambi Province, Bangko and Sungai Penuh at Lake Kerinci. The surrounding landscape is geologically complex, consisting of an isoclinally folded series of phyllitic shale, quartz, and limestone layers assigned by van Bemmelen (1949: 663–667; see also Tobler 1917: Table 1) to the Lower Carboniferous; the ridge on the west side of the Tianko Valley is one of these thin limestone layers. Immediately south of Tianko is the wide break in the northeastern wall of the Barisan Mountains through which the Mesumai, Merangin, and Tembesi drain the actively volcanic region around Kerinci (see Verstappen 1973: 82); the sediments which spread from here out onto the plains of the northeast coast contain numerous obsidian cobbles, a resource for which the Tembesi drainage is unique in Sumatra.

The half km-wide floor of the Tianko Valley is flat and is devoted to wet rice grown in the Minangkabau fashion, with a mixture of rain-fed and ditch-fed paddies, the latter often supplied with water by elaborately constructed rattan waterwheels. Despite the sophistication and age of the valley-bottom farming, the steep sides of the valley are still densely forested; such swiddening as exists (mostly cash-cropping of cinnamon) is of recent inception. All agriculture ceases 2 km further up the valley. Beyond that point, reasonably primary forest frequented only by tiger hunters and Kubus extends north and westward for many kilometers, far past the place where the Tianko tunnels through a limestone hill and forms Tobler's site, Ulu Tianko Cave. Whether the biota of the modern forest can be completely identified with that of the prehistoric period is still unclear (see the discussion in Verstappen 1975 and van Steenis 1965). While paleoclimatological studies have at least begun in upland Central Sumatra (e.g., Morley, Flenley, and Kardin 1973), no results are yet available from the work of the Morley-Flenley group or from analyses of material we recovered from Tianko Panjang Cave. Zwierzycki did find a number of animal bones during his digging at Tianko Panjang; these included such forest species as deer and pangolin (Zwierzycki 1926). Several varieties of molluscs that we found in the cave deposits, the bulk of them edible *Brotia* and *Pila* species, still inhabit the waters of the Tianko River; while these are not necessarily indicators of a forested environment, their persistence may point to a certain stability of local conditions during the later Holocene.

The site itself (Fig. 2) is rather removed from these conditions, being about 13 m above the valley floor and 30 m below the top of the promontory. The face above the entrance is steep; indeed it overhangs the entrance by several meters. The descent to the valley floor is less precipitous but difficult enough to make the location secure from unwanted intrusions. In form the cave is a solution tunnel some 24 m long and a minimum of 5 m wide and high. The rear (northwestern) end is now open due to collapse of the roof; whether the collapse occurred before or after the time of ancient inhabitation is not known. With almost 200 m^2 of floor space, much headroom, good ventilation, a well-lighted and sheltered courtyard, and a

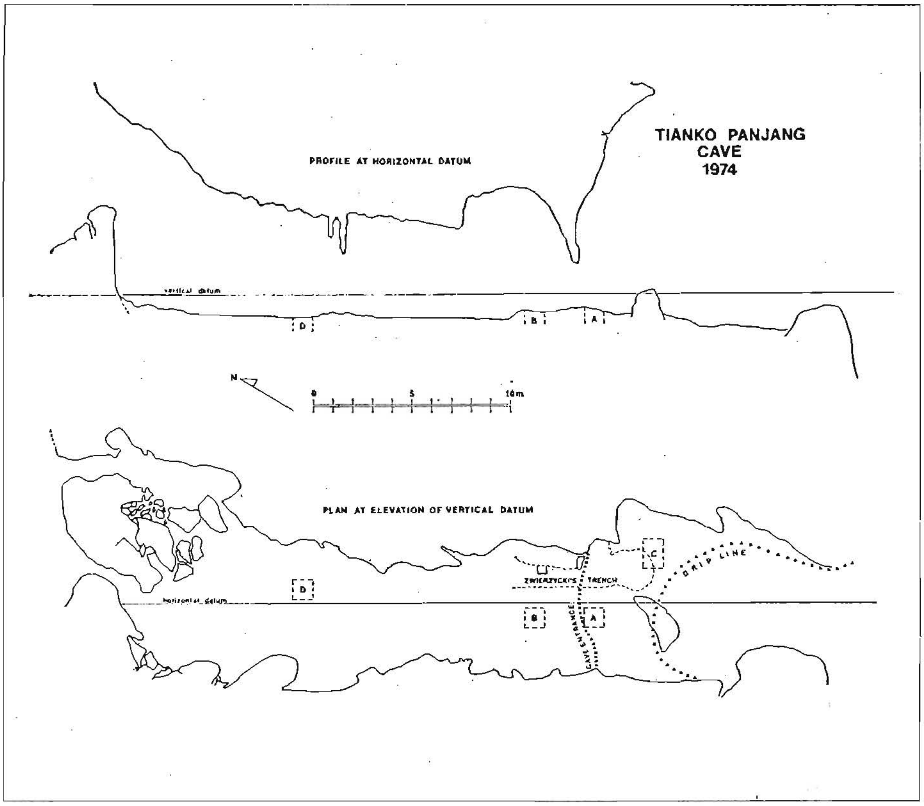

Fig. 2 Tianko Panjang Cave: plan and profile.

secure location, the cave would seem to be a desirable dwelling, its only disadvantage being the need to descend some distance to obtain water.

The present floor of the cave is composed of clayey soils more than 2 m deep, apparently derived more from bat guano and decomposed bedrock than from water- or wind-transported debris. The acid bat guano has dissolved most of the limestone fragments which over the years have fallen into the cave's interior, so sections through the soil show none of the limestone chips and calcareous concretions often seen in deposits in other caves. The soils of the sheltered area outside the entrance are more limey and less deep, partly because one cannot dig far without encountering fallen limestone blocks in large numbers. Here bone and shell is preserved which has long since disappeared from the cave's interior. A steep pothole connects this sheltered area with a second cave, 25 m southeast of and 5 m below the main cave's entrance. This second cave, Tianko Panjang Lower, is almost filled with collapse but contains some inwashed soil which is comparatively rich in (secondarily deposited?) artifacts.

EXCAVATION

Four trenches were dug: Square C in the shelter area outside the cave, Square A directly under the entrance, Square B 3 m inside, and Square D 20 m inside. Each was sited in conformity to a 1.5-m grid laid out along the main axis of the cave. Each measured 1 × 1 m in area; Square C was later extended 50 cm farther to the northeast. The western corner of C intersected one corner of the partially back-filled trench dug here by Zwierzycki in the early 1920s. Tianko Panjang Lower remained unexcavated except for a hasty 50 × 50 cm trench dug there on the last day of excavation in hopes of obtaining some potsherds suitable for thermoluminescence dating.

Each excavated square produced distinctive groups of finds. Square C, the most exposed and well-lit of the trenches, proved to contain more than a meter of midden deposit composed of animal bone, snail shell, obsidian flakes and chips, potsherds, and microscopic quantities of charcoal, all underlying a 30–40 cm deep stratum of spoils from Zwierzycki's excavation. Square A proved to be less rich in all respects. Its surface strata included only 10 cm of Zwierzycki debris and another 30 cm of soil containing small quantities of pottery and obsidian along with one or two fragments of bone and shell; beneath this the remaining meter of nonsterile soil had nothing in it save obsidian and almost imperceptible amounts of charcoal. Square B resembled A in having almost no pottery and no bone or shell at all except for a single human molar. However, its obsidians were noticeably (and significantly) larger than those in A and C, and its charcoal comparatively abundant. B produced many times as much carbonized plant material as all other squares combined and contained a greater depth of nonnatural soil. Square D in the rear of the cave contained no soil that was demonstrably nonnatural. It was quite empty of sherds, shells, bones, obsidians, and all other humanly manufactured or transported objects.

The excavations reached natural strata only in Square A and Square D; in the former this point was reached at a depth of 1.4 m, while bedrock occurred at 2.1 m. In Squares B and C, digging was halted in artifact-containing soils at 1.9 m and 1.2 m respectively. It therefore remains possible that the lowest levels of the deposits contain cultural material earlier than and different in kind from the material reported here.

Despite their differences in content the squares had one trait in common: the strata in them were uncommonly hard to read. Those in C could be made out, although with difficulty, and thus could be excavated by standard stratigraphic methods. The same was true for D in the rear of the cave, where the strata were rather obscured by vertical bands and pockets of ashy-feeling earth formed *in situ* by decomposing limestone. But in Squares A and B the deeper strata were simply invisible. Below several thin surface layers the yellow clay soils extended downward for more than 150 cm without any discernible change or discontinuity except for a few horizontal alignments of charcoal flecks. The situation was unique in the experience of the excavators. Either the soils at and just inside the entrance of the cave (i.e., in Squares A and B) had accumulated with unusual speed and homogeneity, or the combination of wetness, heat, and guano-induced chemical activity had acted to clean the soil of all original color and texture differentials. While the latter hypothesis seemed preferable on a priori grounds—one has difficulty conceiving of a mechanism capable of quickly depositing several meters of such uniform and artifact-containing soil at a location well above the reach of any possible floods—we could devise no field method for demonstrating the truth of the hypothesis that the soils had been deposited slowly and that the usual stratigraphic markers had subsequently disappeared. We were obliged to excavate by arbitrary 5-cm levels, trusting that laboratory methods, especially radiocarbon dating and analysis of obsidian hydration layers, would enable us to confirm one or the other hypothesis.

Of the cave's total sheltered area of some 225 m² (175 inside and 50 more outside), our group excavated only 2 percent, or 10 percent of the area believed to contain the bulk of ancient cultural material. If the 5 to 10 percent dug by Zwierzycki is added, we can estimate that a minimum of 80 percent of the artifact-bearing deposits at Tianko Panjang Cave are still in their original condition. We are hopeful that these will remain undisturbed for some time in the future. The cave is protected both by the regional government and by a ghost of formidable local reputation; with luck these will suffice to preserve it from the depredations of those lime-, fertilizer-, and treasure-hunters who have sterilized the vast majority of cave sites in Southeast Asia.

PROCESSING AND ANALYZING THE FINDS

Special attention was paid to recovering as much biological and cultural material as possible from the limited area under excavation. All excavated soil was picked through twice by hand in order to remove larger finds; when feasible it was passed through a 1 cm screen as well. Next, samples of picked-over and screened soil were placed in buckets and carried to the foot of the hill where they were subjected to flotation and two stages of wet-screening, with 0.4 and 0.04 cm sieves. The finds so recovered were thus separated into three fractions: floating, nonfloating between .04 and 0.4 cm, and nonfloating between 0.4 and 1 cm. The fourth fraction, the nonfloating material smaller than 0.04 cm, included the bulk of the silt and clay and was discarded except for a few small samples. Several other kinds of samples were set aside before the commencement of dry-screening, flotation, and wet-screening. Among these were (1) charcoal for radiocarbon dating; (2) sherds with associated soil and stone for thermoluminescence analysis; (3) vials of soil to be tested for the presence of pollen; and (4) samples of concreted cultural material which were chopped from a cave wall near Square C and saved for separation by palaeontological methods.

Analysis of these biological and cultural finds is well advanced, having been only slightly delayed by our decision to do as much post-excavation work as possible in Indonesia, so as to save shipping costs and risks and to promote close collaboration between Indonesian and American participants. Much of the initial work on the attribute analysis of obsidians was accomplished while we were still in the field and has been continued through the generous assistance of the Computer Studies Center of the University of Indonesia in Jakarta. Identification of faunal remains has begun with the cooperation of the Museum Zoologicum in Bogor and the Field Museum in Chicago. Petrological examination of sherd temper and stone will also be done in Indonesia.

As for materials shipped back to the United States for study, analyses on most are underway but not yet completed. Radiocarbon testing is in the hands of the Museum Applied Science Center for Archaeology at the University of Pennsylvania. Preliminary experiments at Field Museum have failed to find either pollen in the soil samples or measurable hydration layers on the obsidians, but testing for both is currently underway at more experienced laboratories. Identification of carbonized plant material and thermoluminescence testing of pottery has not yet begun; because of the small size of the sherds in question, it may not be possible to obtain a satisfactory T-L date.

Radiocarbon Dates (Table 1)

All datable charcoal at Tianko Panjang came from Square B, from different depths within the unstratified yellow clay. Each sample submitted to the laboratory was made up from several concentrations of carbonized wood fragments; these concentrations tended to be in the form of diffuse horizontal lenses measuring between 30 and 170 cm^3 in volume. The combined samples were all well below the 25-cm lower limit of identifiable pottery in Square B but were closely associated with utilized obsidian flakes. Small numbers of rootlets were present in all three laboratory samples, none of which was large enough to permit NaOH pretreatment.

TABLE 1. Carbon-14 Dates for Tianko Panjang Cave (5730 half-life)

LAB NO.	SQUARE	DEPTH FROM SURFACE	DATE
P-2248	B	94–116 cm	9210 ± 130 B.P.
P-2249	B	119–130 cm	9580 ± 130 B.P.
P-2250	B	135–161 cm	10250 ± 140 B.P.

That the dates are well-clustered and in stratigraphic order lends them plausibility, although they are of course too few to be absolutely convincing. Their chief interest is their age. They compare well with dates for other early small flake-implement sites in Insular Southeast Asia: Uai Bobo 1 and 2 (Glover 1969: 110–114) and Lie Siri (Glover 1969: 108) on Timor and Ulu Leang on Sulawesi (Mulvaney and Soejono 1971: 32). They are within the range for the lowest dated general layer of the early/middle Hoabinhian site, Spirit Cave in northern Thailand (Gorman 1972: 99).

Obsidian Artifacts

The bulk of the artifacts recovered at Tianko Panjang Cave were obsidian fragments, including some 270 waste or unused flakes, 190 flakes which may have been utilized, and 130 flakes once used as tools. Several hundred more chips measuring less than 1 cm long were recovered during wet-screening. Because the wet-screened soils represent a 1 percent sample of the total soil excavated, it is evident that these miniature chips, although of little significance for present purposes, are numerically the most important artifact at Tianko Panjang. About 5 percent of the flakes show traces of cortex on their surfaces, while only one obsidian fragment was found which seems to be a core. These two facts suggest that the original nodules from which the flakes were struck were small and that preliminary flaking was done elsewhere than at the cave. That some secondary knapping did occur in the cave's courtyard is shown by the high proportion of miniature chips in Square C.

For the sake of comparison a substantial surface collection of obsidians was also made at Tobler's old site of Ulu Tianko Cave, 5 km to the north of Tianko Panjang Cave. Since virtually all of these were found in a single shallow pocket of earth outside the north entrance of Ulu Tianko Cave, some doubt attaches to the representativeness of the collection—indeed, it seems possible that the deposit is either a casual hoard accumulated by one of the hunters who occasionally camp at Ulu Tianko or else a pile of discards which Tobler in 1908 for some reason elected not to keep. But the Ulu Tianko material does resemble that from Tianko Panjang closely enough to provide a useful comparison.

The raw material from which both groups of artifacts were made is closely similar: a bubble and flaw-free obsidian colored a faint even mauve or a streaky gray. The same varieties appear in natural deposits at Muara Panco on the Mesumai, 4 km southeast of Tianko Panjang, in the form of small water-rolled cobbles. However, since numerous other alluvial deposits of obsidian occur in the Merangin-Tembesi drainage, it remains possible that the ancient knappers gathered their raw material from several separate findspots. While all the flakes at Ulu Tianko and Tianko Panjang caves are small enough to have been made from Muara Panco cobbles, the knappers could have obtained larger pieces of obsidian by going westward to the border of Bangko and Kerinci Kabupatens or to the primary deposits near the complex of volcanoes immediately south of Lake Kerinci.

We have based our approach to the morphological analysis of the obsidians on a strong subjective impression that they do not easily fall into such whole-artifact classes as "shouldered scrapers," "borers," "gravers," and "arrowheads" (see, however, Sarasin 1914 and Zwierzycki 1926). While such taxonomic procedures do seem to have utility in some parts of Indonesia (e.g., in southern Sulawesi and Timor—see van Heekeren 1972: 113–116; Mulvaney and Soejono 1971: 31–32 and Glover 1973: 60), we are convinced they will not work in central Sumatra or for that matter in some parts of Java, despite the valiant efforts of traditional classifiers like Bandi (1951) and van Heekeren himself, who elsewhere recognized the challenge posed by assemblages with very low percentages of intentionally shaped and retouched artifacts (1972: 139–140). When our work has been completed, we hope that the analytic methods developed at Tianko Panjang will find wider utility in Indonesian archaeology.

We claim no originality for these methods, however. We have followed such specialists as Wilmsen (1968), White (1969), and Stiles, Hay, and O'Neil (1974: 294–304) in selecting quantifiable and semiquantifiable attributes as the basis for analysis, and have assumed with Gould, Koster, and Santz (1971: 150–151), White and Thomas (1972: 285), and Sheets (1974: 8) that the characteristics of individual edges were often more important in the eyes of the ancient tool-users than were overall sizes and shapes of pieces of stone. Our only new departure has been to devote extra effort to making such an approach understandable to and replicable by the average Indonesian archaeology student.

Table 2 presents several summary statistics for definitely utilized flakes from Tianko Panjang Cave and Ulu Tianko Cave.

TABLE 2. SUMMARY STATISTICS OF UTILIZED OBSIDIAN, TIANKO PANJANG AND ULU TIANKO

	TIANKO PANJANG			ULU TIANKO		
	N	$\bar{M}$	S.D.	N	$\bar{M}$	S.D.
Length	110	23.0	7.3	45	24.7	7.8
Thickness	110	5.2	2.5	45	6.2	1.7
Perimeter	110	63.1	20.1	45	70.3	16.9
Length of utilized edge	140	14.3	9.3	60	15.7	7.1
Angle of utilized edge	140	39.1°	15.5°	60	41.1°	12.7°

NOTE: all $\bar{M}$s and S.D.s are in mm except angle of utilized edge.

Other detailed data cannot be included here. However, it is worth noting that the length-width index of all flakes falls below 0.50 in only 5 percent of cases, indicating that one would be rash to call the collection "blades." Whether the traditional term "microlithic" should be retained for a group of stone tools with a mean length of approximately 1 inch is a matter of taste; our own preference would be to reserve the term for other uses. We might also note that preliminary results indicate possibly significant differences between or within sites with respect to (a) the shape of utilized edges; (b) the degree of wear on utilized edges; (c) the length-width index of whole flakes; and (d) proportions of ventral and dorsal wear. The most striking of the within-site differences is that between Squares B and C, respectively inside and outside the cave at Tianko Panjang; whereas B produced 25 definitely utilized and 19 unused flakes, C produced 59 utilized and 191 unused flakes, not counting chips smaller than 1 cm in the longest dimension. It is evident that the cave's ancient inhabitants worked or stored their obsidian outside the entrance.

Thus far we have been unable to devise a workable method of recording or quantifying kinds of use-wear. No silica sheen can be discerned on the glossy surface of the flakes. We have also not succeeded in isolating clusters of attributes which might correspond to specific functions, to anciently recognized tool types, or to cultural and chronological differences within or between sites.

As for comparisons with obsidian assemblages known from elsewhere in Sumatra or in other parts of Indonesia, these are rendered difficult by inadequacies in sampling technique and the small samples available for study. Van Heekeren (1972: 139) stated that the obsidian flakes found by van der Hoop (1941*a*) at Danau Gadang Estate (=Kebon Baru Lolo) south of Lake Kerinci were generally "much larger than those found in the caves." Although van Heekeren's statement is based on published measurements of two unsystematic samples (in van der Hoop 1941*b*: 168–169) and is not firmly supported by measurements made on surface material collected by our group in 1973 at "Danau Gadang" and the nearby Lolo Hilir, it is worth noting that the obsidian-associated pottery of the Kerinci area (Bronson et al. 1973: 13) is very different from that of the Tianko Valley. As for the known obsidians from the middle Merangin sites (i.e., Bangko and Karang Berahi—Bronson et al. 1973: 11), these are too few and poorly preserved for meaningful comparisons to be possible, although the a priori probabilities might favor a relationship of some kind between sets of artifacts found less than 70 km apart. Obsidian-producing sites farther away cannot be meaningfully discussed at present, since the available material is either defective in quantity (e.g., that from Talang Padang in Lampung —Van der Hoop 1941*b*: 169) or still unstudied (the obsidians from Bandung, Leles, and Leuwiliang in West Java, from north-central Flores, and from Paso in northern Sulawesi—Bandi 1951, Erdbrink 1943, Sutayasa 1969, Teguh Asmar 1971, van Heekeren 1972: 146–147, Bellwood 1974: 7). The most that can be said is that collections from several of these sites (e.g., Bandung and Paso) present the same range of size and form (or rather of relative formlessness) as the obsidians from Ulu Tianko and Tianko Panjang caves. It is unlikely that analytic techniques will soon reach that degree of precision needed to demonstrate a more definite cultural or choronological relationship.

We might comment here that the problem of the relationship of Indonesian obsidian-producing sites is part of a larger problem, that of the "Mesolithic" in Southeast Asia. Indonesianists have traditionally considered that industries characterized by small and somewhat elongated flake tools, produced if not by a true blade technique then at least by working around a semiprepared core, are intermediate in time between the large core/flake industries of the Palaeolithic (see, however, Bartstra 1974) and the often elegant ground stone adzes that persist down to the metal-using period. We concur with Fox (1970: 60) and Marschall (1974: 85–88) in their distaste for the "mesolithic" nomenclature. However, we would be willing to go further than Marschall and to deny that the present evidence warrants any presumption of contemporaneity or connectedness among these small flake industries except within very limited areas. The Toalean material from Sulawesi (Mulvaney and Soejono 1971: 32; van Heekeren 1972: 115), although made on elongated flakes, bears little resemblance to the obsidians of Sumatra. Other small flake traditions may look more like the Sumatran ones, but these similarities are in most cases highly nonspecific. While it seems probable that most of the small-flake traditions date from the post-Pleistocene (see, however, Harrisson 1964: 83), no good reason exists at the moment for assuming any other connection among them, whether of an ethnic, linguistic, or commercial kind.

CERAMICS AND LITHIC FINDS OTHER THAN OBSIDIAN

Aside from the obsidians, the most numerous group of artifacts at Tianko Panjang Cave consists of 31 gritty, soft potsherds among which were 6 fragments of rims. These are too few and undistinctive to permit more than several general observations.

Form

All rimsherds came from somewhat constricted medium-sized vessels with erect, slightly everted rims and rounded lips. The lower bodies were round-bottomed and without carinations.

Fabric

Most sherds belong to a single fabric group characterized by a rather variable coarse mineral temper containing translucent yellow inclusions. Four body sherds have finer temper and appear to come from somewhat thinner-walled vessels. All are orange-buff-brown in color, with some hand smoothing but no slip.

Decoration

Most body sherds preserved faint impressions made by a bound paddle. While in most cases the paddle had been wrapped with a flexible material like thick straw or thin rattan, producing the "mat"-marking characteristic of much ancient (and modern) hand-built Sumatran pottery, on at least two sherds the flexible material had been twisted before being wrapped in the paddle. The resulting "cord"-marking is extremely rare in Sumatra, although it is a common feature of prehistoric and historic pottery elsewhere in Southeast and East Asia. In addition, one sherd found on the surface of the cave floor preserved traces of a resinous coating, probably one of the highly resistant dammars still used as an adhesive and waterproofing in the Tianko region. Several of the 14th–17th century sherds we found at Palembang have similar resin coatings.

Connections with Other Sites

The Tianko Panjang ceramics are not distinctive enough to be promising as indicators of cultural connections. The handful of sherds collected at Ulu Tianko Cave are equally undistinctive but fall into the same general range of size, form, and manufacturing technique. Both groups of sherds can be easily distinguished from the punch-decorated and complexly designed ceramics found in surface association with obsidians at Lake Kerinci.

Relative Dating

Although we are inclined to be cautious because of the size of the sample and the generally poor conditions for the preservation of artifacts, we feel there are grounds for believing that pottery appeared later in the period during which the cave was occupied. All sherds found in Squares A and B occur in the upper 40 cm of deposits. The 100–150 cm of artifact-containing soil underneath these near-surface levels are apparently aceramic. The sherds in Square C, in the sheltered area outside the entrance, do continue down almost to the lower limit of excavation, the deepest being found at 103 cm in the middle of a stratum of friable dark brown soil quite different from the clayey yellow soils of Squares A and B. This difference in soil could be used to argue for a younger date. While time was too short to allow us to excavate the 5 m of deposits between Squares C and A, and hence too short to allow any kind of stratigraphic proof, it seems quite possible that the 1-m deep dark brown stratum in C is younger than the upper part of the yellow aceramic level in A and B, despite its relative shallowness. That pottery should appear late in the history of the site would be unsurprising and no certain indication of any great antiquity. Aceramic levels are often encountered at small-flake sites elsewhere in Indonesia (e.g., at PattaE in Sulawesi; van Heekeren 1972: 116), and we have as yet no reason for believing that the use of pottery is as old or universal here as it seems to be on the Asian mainland.

Artifacts which are neither pottery nor obsidian are scarce. The upper levels of Square A produced two flat oval stones with grooves around their longer circumference; these may be net weights. Square C produced two rather dubious bone points, perhaps simply broken fragments of long bone. All squares except D produced small quantities of broken quartz pebbles and occasional flakes of greenish siliceous limestone with a subconchoidal fracture. The latter look like tools but are rather soft; the former do not look like tools (they show no obvious signs of use-wear, purposeful shaping, or deliberate selection out of the large amounts of small quartz chips found in alluvial deposits in most parts of the Tianko valley) but would have been effective in some tool roles if so employed. The upper levels of A and B also produced a few fragments of a hard black igneous rock and a number of flat, badly worn pieces of orange ocher. It appears probable that most of these objects, if they are not actual artifacts, are at least manuports. None seems to occur naturally within the cave limestone or the karst cliff that rises above the cave's entrance.

A last artifact that should be mentioned here is a badly corroded iron strip, apparently a fragmentary knife blade, found in a yellow clay stratum of Square C at a depth of 30 cm. Since this stratum is part of the spoils heap from Zwierzycki's excavation, the iron strip is in all probability modern.

BIOLOGICAL FINDS

Work on the floral and faunal materials recovered during the excavations at Tianko Panjang is still at an early stage. Only a few preliminary comments can be made here.

All vertebrate remains are from Square C with the exception of a single human tooth, a much-worn molar, from an aceramic level in Square B; preliminary information from Teuku Jacob indicates that the tooth is rather larger than the average for modern Javanese and Sumatran populations. Other vertebrate material includes (a) a few teeth of medium-sized ruminants such as large deer or young bovids; (b) a few long bone fragments, usually burned, from mammals of a similar size; (c) numerous jaw fragments and isolated molars of bats, presumably the same species that still inhabits the cave; (d) substantial numbers of turtle shell fragments, most of them also partly burned; (e) moderate numbers of bird vertebrae and long bones, the majority within the size range of the small chickens presently raised in the Tianko area; (f) a few reptile vertebrae; (g) a moderate number of fish vertebrae; (h) numerous fragments of burned and unburned thin, cylindrical long bones which may come from frogs; (i) moderate numbers of incisors of rat-sized rodents; and (j) quantities of very small bones that have still to be studied. Zwierzycki (1926: 65) found several additional kinds of animals in his excavations, including pig and pangolin, which we have not yet managed to identify from our excavations.

Except for a few intrusive beetle wings in the squares inside the cave, all invertebrate remains also came from Square C. These include large quantities of snail shells, the great bulk of them from two edible freshwater species, *Brotia costula* and *Pila* sp. Only the operculum of the *Pila* species has survived. The inner tip of the spiral of the *Brotia* shells tends to be missing; presumably this was broken off in antiquity to facilitate the extraction of the contents. While *Pila* is not now common in the immediate vicinity of the cave, *Brotia* is well known to local people, who call it "puyung" and consider it a delicacy. The cave produced no marine shells except for a single limestone-impressed fossil.

Scattered plant remains in the form of charcoal appeared in all three nonsterile squares, but only in B were they abundant enough to provide reasonable samples. Little can yet be said about the kinds of plants involved. A cursory inspection in the field with a binocular microscope revealed nothing that looked like a carbonized seed, whether cereal or otherwise, in the flotated and wet-screened samples. Most of the charcoal comes from twigs and small branches of dicotyledonous plants. Somewhat surprisingly for a Southeast Asian site, identifiable bamboo fibers are rare or absent from the samples. Of course our own amateurish impressions have not been confirmed by an experienced paleobotanist, so bamboo and seeds may not in fact be absent from the site. But at a minimum it would appear that the people of the prehistoric Tianko Valley were not as involved with seed gathering or seed farming as either their modern successors or the early agricultural and nonagricultural societies of temperate regions. It may be significant in this regard that no possible querns or mortars have been found at Tianko Panjang or Ulu Tianko Caves.

As we say, much work remains to be done on the biological finds. Analysis of some kinds of samples (soil and pollen, among others) has not even begun. However, two preliminary conclusions are worth presenting now.

First, the plant and animal remains are distributed very unevenly within the site, with almost all the former coming from just inside the cave entrance and all the latter from the sheltered area outside. The absence of bone and shell from Squares A and B might be partly explained by the nature of the within-cave soils, which seem to destroy limestone and bat bones within a few years. However, the presence of a human tooth in Square B suggests that larger animal teeth might have survived the cave environment if they had been present originally, and the hypothesis of differential preservation is no help at all in explaining the abundance of charcoal throughout Square B and its scarcity at and outside the cave entrance. It is thus plausible that the distribution of biological remains reflects differences in the way various parts of the site were used, a conclusion already suggested by the relative absence of obsidian-working debris in Squares A and B.

Second, the biological remains from Tianko Panjang are quite different from what one generally finds at Metal Age and Protohistoric sites in Southeast Asia. While most settlements of these later periods produce conspicuous amounts of bovid, pig, and dog bones, and often carbonized grains or impressions of rice as well, such obvious domesticates are scarce or absent at Tianko Panjang. Whether other domesticates or semicultigens are present is not yet known, but it is surely significant that seeds and large mammal bones of all kinds are as uncommon there as they seem to be. The ancient inhabitants of the site cannot have been farmers of an ordinary kind. They can hardly have been even borderline protocultivators of the same sort as the seed-collecting and large-mammal-killing inhabitants of Spirit and Banyan Valley Caves. If they experimented at all with food production, they concentrated on protocrops and protostock of a kind which would not leave abundant archaeological remains. The Tianko Panjang adaptation might be most profitably compared with that of the cave-dwellers of the prehistoric Philippines, who are believed (Hutterer 1974) to have been successful enough at exploiting wild forest produce to have resisted true agriculture until long after other peoples of the region had fully entered the Neolithic.

Conclusion

In summary, Tianko Panjang Cave is a site of considerable interest: premetallic, partly preceramic, perhaps preagricultural. The excavations, limited though they were in scope, indicate a clear differentiation of activity areas within the site, with cooking being accomplished indoors and tools fabricated in the sheltered area outside. The fact that charcoal is disproportionately abundant at all depths in the within-cave deposits, and that debris from obsidian knapping is similarly abundant in the external deposits, does pose certain problems. Is it likely that such a degree of differentiation would persist for any great period of time? Or is this apparent persistence illusory, the 2 m of deposits having been built up within fifty or a hundred years? The various laboratory analyses now in progress should provide an estimate of the site's time depth as well as of its absolute date. However, as of the moment almost any dating and temporal extension could be credibly entertained.

The problem of spatial extension remains equally unsolved. The site exists in a cultural vacuum, tied to one other site, Ulu Tianko Cave, by artifactual resemblances and physical proximity but tightly linked with nothing else in the region. It may eventually prove possible to fit Tianko Panjang into a regional sequence containing most of the small flake industries of Java and Sumatra, and even to specify the nature of the adaptations and interactions which generated that sequence. But to do this we need much more research than has yet been carried out: surveys, surface collections, excavations, and reports of newly discovered sites. The great majority of known lithic stations in Sumatra were found (by amateurs) more than fifty years ago. Since then—since well before Indonesian independence—Sumatran prehistoric research has been at a virtual standstill. Real progress will not resume until work by professionals grows in volume and until nonprofessionals become reaccustomed to reporting their finds.

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