A REVIEW OF THE LATE PLEISTOCENE/EARLY RECENT STONE TOOL ASSEMBLAGES OF JAVA

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INTRODUCTION

Over the past 100 years, prehistorians trained in European Palaeolithic archaeology have introduced many biases into interpretations of the Indonesian past. More recently the sources of these biases, the uses of inappropriate classifications and concepts, typological dating, and the confusion of technology with racial type have been criticised. Such criticisms, in combination with new field studies, have allowed the reclamation of at least the early portion of Indonesian prehistory (Allen 1991; Bartstra and Basoeki 1989; Bellwood 1987, 1990; Hutterer 1985; White 1977).

There has been less appreciation that interpretations of the later periods of Indonesian prehistory have also suffered from the inappropriate application of European concepts and expectations. An exception to this is the work of Glover (1973, 1977, 1979), who has attempted to replace the terms Palaeolithic, Mesolithic and Neolithic with an alternative set of Early and Late Stone Age concepts that he regards as being more appropriate for Southeast Asia.

In the context of the Late Pleistocene/Early Recent stone assemblages of Java, the idea that these assemblages belonged to a Mesolithic or Sub-Neolithic technological stage (Heekeren 1972:79-155) has confused the issues of their dating and relationships. Dutch archaeologists, such as Stein Callenfels and Heekeren, drew on two sets of information to define a Mesolithic for Indonesia. These were, firstly, knowledge of the European late Palaeolithic and Mesolithic, a period characterised by the use of bone artifacts, microliths, arrowheads, and shellmiddens, within a hunter-gatherer-fisher context (Clark 1965:50-72); and, secondly, ethnographic and archaeological observations of the Australian Aborigines, who were thought to represent both the race and the economic stage of Mesolithic man.

This information worked to produce a set of expectations into which the Indonesian archaeological data were fitted. Such expectations included the presence of a macrodont Austro-Melanesoid human population, flexed burials, shell middens, bone tools, mortars

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and pestles, microliths and stone arrow heads, the use of caves and rockshelters, rock art, ochre, and, at least for some of the more recent sites, edge ground axes with oval or lenticular cross-sections (Heekeren 1972:149-153). The presence of one or more of these traits at a site was sufficient to determine its status and age as belonging to a Mesolithic culture.

Archaeological discoveries in Java, Sumatra, and Sulawesi, appeared to confirm the picture of a Mesolithic or Sub-Neolithic stage of Indonesian prehistory associated with an Australo-Melanesoid human population. This equated well with the idea that Island Southeast Asia had been colonised by successive waves of peoples at different stages of technological development.

RE-EXAMINING THE MESOLITHIC IN ISLAND SOUTHEAST ASIA AND JAVA

As noted above, the currently accepted chronological system for a succession of stone implement assemblages during the Late Pleistocene/Early Recent period in Java and southern Sumatra rests on a technological and typological foundation. The Sampung Bone Industry (Heekeren 1972:92) for instance, was used, together with round and hollow-based stone points, to link rockshelter sites across eastern Java within the Mesolithic period. Soejono (1982:26) has commented on weaknesses within this technological/chronological system arguing that more detailed research within each prehistoric period is necessary, particularly as regards dating and environmental reconstructions for the Pleistocene.

Recent archaeological studies in Java and south Sumatra (Bronson and Asmar 1975; Subagus 1979:35-41; Hardjasasmita and Mulyana 1985; Bartstra and Basoeki 1989:241-44) have increased the number of stone implement assemblages that do not fit within the accepted framework. Museum studies of bone and stone artefacts excavated from the Javan rockshelters confirm that there is considerable variability within the stone and bone implements claimed to characterise the Sampungian.

This paper documents the first phase of a study of the Late Pleistocene/Early Recent stone tool assemblages of Java, being carried out in association with the National Research Centre of Archaeology, Indonesia. Up until now, this study has consisted of a literature review, examination of museum collections, and some limited surveying of archaeological sites in east Java. In 1992, it is hoped to continue the survey of sites and to carry out excavations at Song Agung, a rock shelter near Punung, Pacitan District (Goenadi 1989).

The time period to be discussed here lies between the Late Pleistocene (c.50,000 BP) and the Middle Holocene (c.4,000 BP). In Southeast Asia during this time there were fluctuations in sea levels, and significant changes in climate, vegetation, land area, land fauna, economy and stone artifacts. As yet, these changes are poorly understood and dated. For Indonesia, as a whole, only in a few areas such as Sabah and Sarawak (Bellwood 1987:194-195), Sulawesi (Bellwood 1976, 1985b; Glover 1981; Mulvaney and Soejono 1971), and Timor (Glover 1986) does the information go beyond the bare essentials. The limits of the period under consideration have been set by the results of

other archaeological studies. Bartstra, working in conjunction with the National Research Centre of Archaeology, Indonesia, has demonstrated the lateness of large core tool and flake assemblages previously thought to be Middle Pleistocene in age (Bartstra and Basoeki 1989:243). The inconspicuous flakes and cores associated with the Solo humans from the High Terrace at Ngandong probably date between 50,000 and 100,000 BP (Bartstra *et al.* 1988). The Javan hominids (*H. erectus erectus*) have yet to be positively equipped with any stone tools (Bartstra 1982:319).

Leaving aside for now questions of the appropriateness of the concept of a Neolithic for Island Southeast Asia, recent reviews of the arrival of material cultural items such as plain or red-slipped pottery and polished quadrangular-sectioned stone or shell adzes suggest a relatively late, mid-Holocene date (c.4500 BP) for this technology in the region (Bellwood 1985a:222-233; Spriggs 1989). Agriculture in some form was also likely to have been present by this time.

LATE PLEISTOCENE/EARLY RECENT ASSEMBLAGES IN JAVA AND SOUTH SUMATRA

In Java and south Sumatra, a number of sites and stone tool assemblages have been relegated to the Late Pleistocene/Early Holocene period on the basis of their technological appearance, stratigraphic situation or, most rarely, absolute dating. These assemblages are: firstly, the obsidian flake artifacts from south Sumatra and west Java; secondly, the Pacitanian flake and core assemblages from central south Java; and finally, the stone tool assemblages from central and east Java described by Heekeren (1972:92-106) as belonging to the "Sampungian".

South Sumatra and West Java

In south Sumatra, at the cave of Tianko Panjang, an obsidian flake assemblage was associated with cord-marked pot sherds in the upper levels of the site, and with dates between 8900 and 9900 BP in its preceramic lower layers (Bronson and Asmar 1975:133-140).

While some of the obsidian flake collections from west Java relate to undated higher lake levels at Bandung and Cangkuang (Leles) (Heekeren 1972:133-135; Subagus 1979:35-41), others occur on the Lembang Plateau at 1000-1500 m above sea level (Heekeren 1972:135). There is a low frequency of small, asymmetric backed points and blades in these surface collections from Bandung (Bellwood 1985a:201; Heekeren 1972:134-135). However, the majority of artifacts from Leles consist either of unretouched flakes (c.93%) or irregularly retouched flakes or blades (3%) (Subagus [Anggraeni] 1978). The flakes at Leles were associated with a few plain and cord-marked potsherds, broken quadrangular adze pieces and beads (Subagus 1979:40).

There is then, in south Sumatra and west Java, regional, temporal, and technological continuity in the use of high quality obsidian for the production of largely unretouched flakes from irregular cores. This spanned the period from c.10,000 BP through to the introduction of microliths, pottery and rectangular sectioned adzes. Whether this continuity contains any cultural meaning cannot be determined on the evidence presently

available. Apart from the use of obsidian, these assemblages fit easily into the broader picture of Late Pleistocene Southeast Asian stone technologies (Bellwood 1985a:176-190).

Central and Eastern Java: the Pacitanian

Bartstra's demonstration that the large core tools and flakes from the Baksoko terraces, the Pacitanian, cannot be the work of Middle Pleistocene *H. erectus* leaves these artifacts in chronological limbo (Bartstra 1978:65-66). The fact that similar large core tools can be found on Neolithic working floors in the Punung area, these being open sites strewn with implements (including flakes and/or partially finished quadrangular adzes and hollow-based or winged points), cores and debitage, increases this chronological uncertainty. Bartstra (1978:66) notes that there is obviously a long local tradition in the use of silicified tuffs and limestones as easily accessible raw materials.

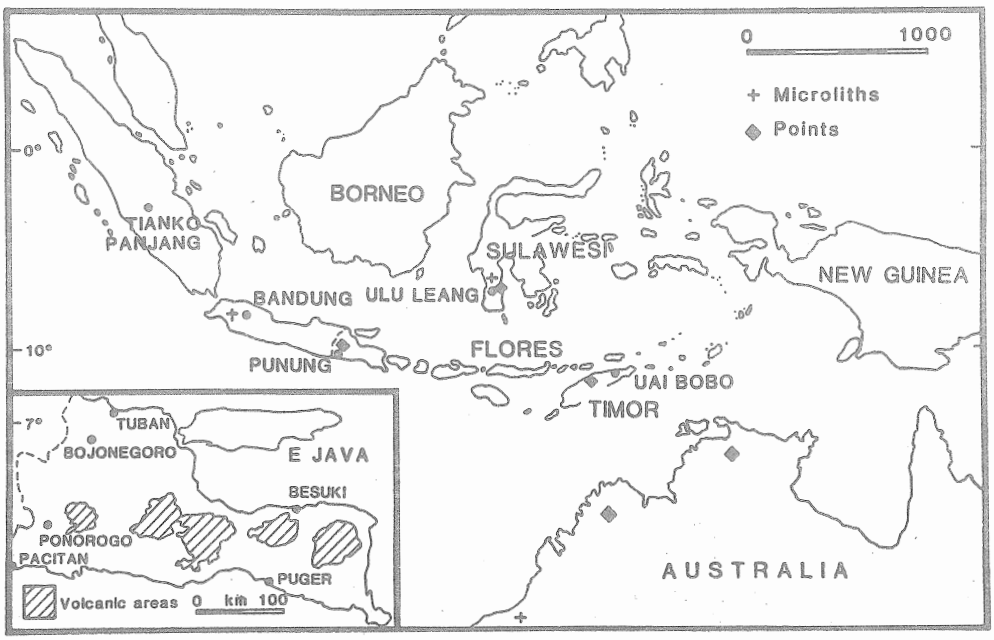

FIGURE 1: LOCATIONS OF SITES AND AREAS DISCUSSED IN TEXT, WITH INSET OF EAST JAVA

Of related interest are the irregular cores and small flakes excavated by Bartstra 1.5 m beneath a surface Neolithic site at Padangan (Bartstra 1978:66). These artifacts are similar to the unretouched flakes excavated at a rock shelter (Song Agung) at Gunung Cantelan, near Punung, by von Koenigswald in 1936 (Erdbrink 1954:297; Goenadi 1989). Considerable site variation is to be expected in an area where quarrying for raw materials and artifact manufacturing were major activities. Nonetheless, it might be that the

Pacitanian should be cast into the melting pot of the Hoabinhian, as Bartstra (1982:319) and Heekeren (1972:47) have suggested. On the other hand, Anderson (1987:193-196) has demonstrated at the Lang Rongrien site in Southern Thailand that the Hoabinhian core tools occur quite late in the Upper Pleistocene, preceded by an irregular core and flake assemblage.

Central and Eastern Java: the Sampungian

Between 1926 and 1937, archaeologists excavated 19 caves or rock shelters in central and eastern Java , which Heekeren (1972:105) claimed belonged to the Sampungian industry on the basis of the presence of bone tools. Five areas of limestone on the northern and southern coast of Java were surveyed. These were near Ponorogo and Puger in the south, in the Rembang Hills near Bojonegoro and Tuban in north, and also a small limestone area east of Besuki (Fig. 1). The location of these limestone areas is mostly away from the areas covered by great depths of volcanic ash.

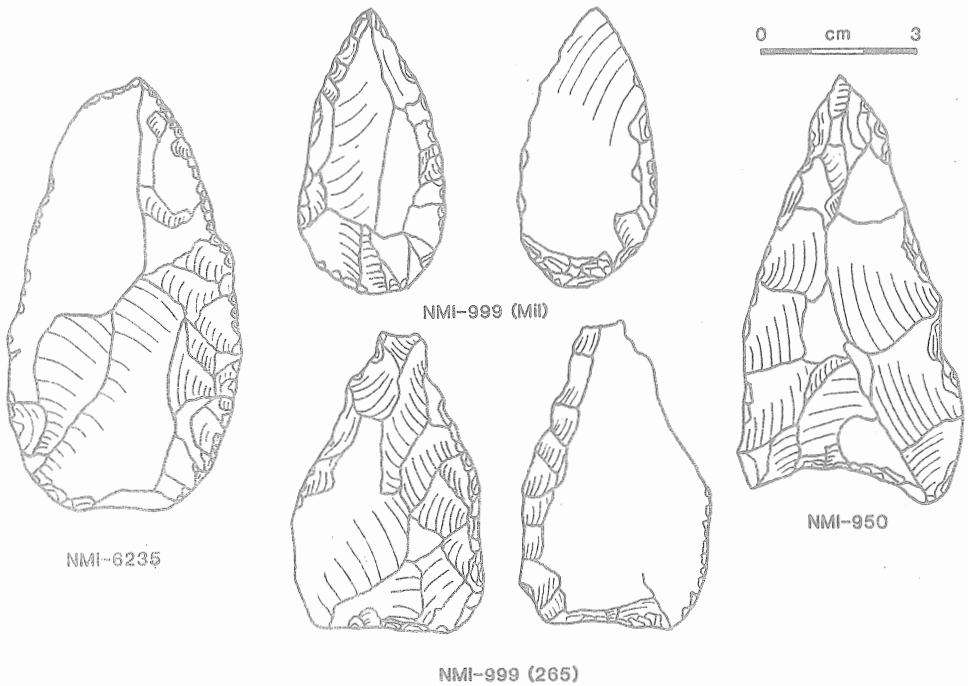

FIGURE 2: STONE POINTS FROM THE COLLECTIONS OF THE NATIONAL MUSEUM OF INDONESIA (SEE NOTES AT END OF PAPER)

The type site of Gua Lawa, located on the slope of Gunung Wilis, east of Ponorogo, was excavated by van Es and later by van Stein Callenfels. Apart from the presences of bronze, iron and modern potsherds and rectangular adzes in the surface layers, the other

artifacts - bone spatulas, beautifully finished fish-hooks, awls, hollow-based or winged stone points (Fig. 2), pestles, mortars, shell artifacts and a few potsherds - were organised into a questionable sequence that has persisted in the literature. Of particular importance in the interpretation of the remains from Gua Lawa is the scale of the finds; for instance, there were 99 bone spatulae and 79 mortars and pestles recovered (Heekeren 1972:94). Recent attempts by the Indonesian National Research Centre of Archaeology to re-excavate this site have failed to discover any non-disturbed deposits (Tanudirjo 1985; Hardjasasmita and Mulyana 1985).

The status of the different sites included in Heekeren's Sampungian varies. The presences of hollow-based or winged stone points in association with bone spatulae at the Bojonegoro and Tuban sites convincingly link them with Sampungian (Heekeren 1972:99). Other sites can only be fitted into the Sampungian with difficulty. Part of the problem here lies in confusion about the original sequence from Gua Lawa, in particular the status of the supposed round-based stone points excavated at the base of the deposit. Van Es (1929:337) thought that they were the oldest stone implements at the site, despite the occurrence of hollow-based or winged points at about the same level (Es 1929:337). However, bifacially-worked round-based spear points occur on surface working floors at Pacitan in association with hollow-based or winged points and rectangular adzes. The largest of these points have been described as bifacial handaxes, thought to be part of a Pacitanian handaxe assemblage.

Supposed confirmation that the round-based points represented a type and an early Mesolithic stage occurred when McCarthy (1940) gave a paper to the Third Congress of Far Eastern Prehistorians in Singapore comparing Australian and Indonesian stone artifacts. After this the terms *pirri* for stone points and *muduk* for bone bipoints began to feature in the Indonesian literature. The belief that Sampung Man was predominantly Melanesian with some Australoid features (Heekeren 1972:98) added to the evidence for an Australian connection and the assumption that the pre-Neolithic population of Indonesia was composed of a mainly macrodont population of Australo-Melanesoid affinities (Koenigswald 1952:96).

The claimed presence of round-based stone points was used to link Sampung with von Koenigswald's site at Gunung Cantelan (Song Agung), and also with Gua Sodong to the east where *pirri* points, *muduk* bone bipoints and macrodont human remains were listed in the published list of site contents (Heekeren 1972:99,104-105). However, some of these claims and the supposedly Sampungian character of the finds at Cantelan and Gua Sodong can be questioned. Examination of flakes from Gunung Cantelan in the collections at the National Museum of Indonesia, and comparison with the illustration of points from Cantelan (Erdbrink 1954:plate 1), showed 4 irregular shaped or possibly broken flakes, one with some bifacial flaking. There were no definite stone points. The small collection of flakes from Gua Sodong in the National Museum, and comparison with Heekeren's (1972: plate 54) illustrations also failed to reveal definite points but some pointed flakes.

Although bone spatulae and awls are present at sites in both central and eastern Java, no site in eastern Java has yet demonstrated an assemblage of stone and bone artefacts comparable with those from Gua Lawa. The identification of unretouched flakes as worked projectile points has unnecessarily clouded this issue. Consequently, the bone and shell artifacts and irregularly-flaked stone implements from Betpuruh, Sodong and Mardjan caves in eastern Java are insufficient to prove any association with the Sampungian.

The dating of these stone assemblages remains problematical. While quadrangular adzes and potsherds occur in the deposits at Gua Lawa, Bojonegoro, and Gua Sodong, they occur either in the upper levels or are assumed to be intrusive. This is probably not true of the bone fish-hooks. Bellwood (1985a:200) sees these sites as representing a late preceramic assemblage with a mid-Holocene date. It is clear, however, that the hollow-based or winged points continued into the period of manufacture of the distinctive rectangular adzes on the workshops of Punung.

In the Pacitan-Sampung area the round-based points are most likely a variant of the hollow-based or winged bifacial points or else a stage in their manufacture. Examination of field and museum specimens of hollow-based points reveals that the concave base is the result of percussion retouch on irregular shaped flakes.

CONCLUSION

The Sampungian assemblage of hollow-based arrowheads and bone implements cannot be taken as exemplifying a Mesolithic technological stage for central and eastern Java. Rather, it appears to have been a late and specialised development, one that was restricted to the Pacitan-Ponorogo-Bojonegoro-Tuban region, a corridor that joined the north and southern coasts of Java. Outside this corridor, the rest of Java appears to have retained a simple core and flake technology (albeit with a few microlith-like artefacts in the Bandung region) from the Late Pleistocene right up to the Metal Period.

The origin of the hollow-based bifacial points may be connected with the Maros points of the Toalian of Sulawesi with which they share some similarities, except for the obvious absence in central Java of backed flakes and geometric microliths (Bellwood 1985a:200). The main period for Maros points at Ulu Leang 1 occurs between c.4000 and 2000 BP (Glover and Presland 1985:192). Sampungian arrow points also continued to be manufactured until recent times, associated with workshops in the Punung area where pottery was used and with very large numbers of polished rectangular stone adzes manufactured from silicified tuff.

The artefacts from Song Agung and Song Terus in the Punung region and from the sites in east Java (Gua Sodong, Mardjan and Betpuruh) consist of simple retouched and unretouched flakes and irregular cores. The Pacitanian artefacts and those from Song Agung (Gunung Cantelan) are likely to be older than the winged arrowheads and bone spatulae from Gua Lawa, though this has yet to be demonstrated archaeologically. The unretouched flakes and cores from east Java may well represent an artifact tradition that is contemporaneous with, but unrelated to, the Sampungian. Museum and local surface

collections do not indicate that hollow-based or winged arrowheads were distributed to the east. Again, further controlled excavations and some dates from east Java are necessary to test these conclusions. There are considerable areas of eroded limestone in southeast Java, between Puger and the Blambangan Peninsula, where rockshelters are present but have not as yet been archaeologically surveyed.

The east Javan and the Pacitanian artifacts are consistent with the majority of Late Pleistocene to mid-Holocene stone tool assemblages recovered from Island Southeast Asia thus far. In the main, these assemblages consist of irregularly shaped cores and unretouched flakes - assemblages that Bellwood (1987:193) has described as belonging to a 'pebble and flake technocomplex'. Within this technocomplex, regional differences are likely to be the product of differing raw materials, site functions, local environmental circumstances, and more rarely, differing flaking technologies. These regional differences appear to persist through many thousands of years (Glover 1979:173-4; Presland 1980:43-45).

On Flores, simple core and flake artefacts continued to be manufactured until c.3500 BP at Liang Toge (Heekeren 1972:141) and at Liang Bua until the introduction of metal (Soejono pers. comm.). Except for some rather distinctive tanged stone points from Timor, introduced c.5000-4000 BP at the same time as pottery and animals such as pig (Glover 1986:197), there is continuity of simple core and flake technologies on the islands of eastern Indonesia - Bali, Flores, Sumba, Roti and Seram - almost until the beginning of the historic period. Microliths are entirely absent from this region (Glover and Presland 1985:189).

Even in regions where new artefactual forms were introduced, such as Sulawesi (microliths after 6000 BP, Maros points at c.4000 BP and probably agriculture by 4500 BP), the manufacture of simple retouched and unretouched flakes continued largely unchanged. Bellwood (1985a:175) comments:

> ...the older flaked stone technologies continued with no obvious changes until they finally faded in the face of metal tools from the late first millennium BC onwards. The flaked stone traditions do not in themselves record the spread of an agricultural lifestyle in the region.

Leaving aside the question of the Hoabinhian for the moment, the major artifact changes in the Southeast Asian region during the mid-Holocene (microliths in west Java, hollow-based points in central Java, microliths and Maros points in south Sulawesi and tanged points in Timor) do not, where they occur, transform these stone technologies but rather were an addition to them. Glover and Presland (1985:194) interpret their presence as reflective of a change in fashion or style, rather than representing an increase in adaptive ability on the part of their manufacturers. The presence of microliths and stone projectile points in these assemblages cannot be taken as marking the beginning of a Mesolithic stage. In fact,the Late Pleistocene/Early Holocene stone artifact assemblages do not provide a basis for dividing Indonesian prehistory into a sequence of ethnic, economic or technological stages. Future studies of these artifact changes must provide

more information on the social and economic context prevailing before reasonable interpretations of their meaning can be advanced.

Regional Considerations

The apparent closeness in time of the various occurrences of microliths and projectile points across Indonesia together with their discontinuous, sporadic distribution suggests that some related but diverse process was in operation. The fact that the microliths and points differ from area to area supports this conclusion.

The microliths and points are probably the reflection of sporadic communications within Indonesia, and between Indonesia and elsewhere in Asia, during the period 6000-1000 BP. This period saw the introduction of these stone artefacts, pottery, rectangular adzes and eventually new peoples. The presence of maritime technology in the region at this time is an essential factor in any explanation of these late Holocene archaeological changes (Dunn 1970:1048-9).

That the Neolithic and pre-Neolithic cultures of Island Southeast Asia bear little relationship to those of Peninsular Malaysia and Mainland Southeast Asia has been noted on a number of occasions (Bellwood 1985a:258; Glover 1973:55; Spriggs 1989:588). Following van Steenis, Muller (1972:9) and Verstappen (1975:12-13) argue that two areas of everwet rainforest - North Sumatra, Borneo and the Malaysian Peninsula to the west and New Guinea to the east - created a barrier to the dispersal of plants across the region. This barrier also appears to have reduced human contacts and to have stimulated the development of specialised economies for the exploitation of the rainforests and the extensive estuarine mangrove swamps that formed during the Holocene. Bailey *et al.* (1989:72:260) note that, with the exception of Hoabinhian sites dated between 10,000 and 3000 BP, human utilisation of these rainforest areas was rare during pre-agricultural times. Environmental differences then are likely to be behind Glover's (1973:61) distinction between the predominantly mainland distribution of Hoabinhian sites and the various flake and blade traditions found in Island Southeast Asia.

By contrast, the drier more seasonal areas of Island Southeast Asia formed a north-south corridor of migration, from south China, Taiwan and the Philippines through the islands of Wallacea to tropical northern Australia. Certainly it was down the Taiwan-Philippines-Sulawesi-Sunda Islands corridor that Bellwood (1985a:121) and Spriggs (1989:608) see the expansion of Austronesian speaking Neolithic peoples. Furthermore, it was within this same corridor of seasonally dry islands, including tropical northern Australia, that the sporadic distribution of microliths and points occurred.

Bellwood (1985a:202) sees Japan as one likely source of the blade and stone point traditions in Sulawesi and Java from about 7000 yr BP. If we allow the probability of connections by sea, then there is no reason to rule out communications to the north to Japan. However, the existence of microlith and point assemblages in eastern Africa, Peninsular India and Sri Lanka prior to 10,000 BP would also seem to indicate connections to the west. The timetable of occurrences of microliths and points across an arc from East Africa to Australia shows a chronological horizon that slopes from west to

east, with Africa at 20-30 kyr BP (Clark 1985:98-99), Sri Lanka at 10-28 kyr BP (Deraniyagala 1986:7-10), south India at 4-16 kyr BP (Gardner and Martingell 1990:11), Indonesia at 2-6 kyr BP (Glover and Presland 1985:193), and finally Australia at 1-5 kyr BP (Allen 1989:111 and 115). Within this timetable, it is interesting to note that the earliest Indonesian and Australian microlith and point assemblages occur just before the cessation of their manufacture on the Indian subcontinent at 4 Kyr BP (Gardner and Martingell 1990:11).

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NOTES FOR FIGURE 2

NMI (National Museum of Indonesia) 6235, ht 79.4 mm, reddish chert or jasper, a large unifacially flaked point, surface collected from the Pacitan area, classified as Palaeolithic.

NMI 999 (Mil), ht 63 mm, slate or mudstone, predominantly unifacially flaked with step flaking on the ventral surface to remove the bulb and reduce thickness, excavated from Gua Lawa, Sampung.

NMI 999 (265), ht 55 mm, chert, predominantly unifacial flaking, flakes on the ventral surface to shape margin, point broken on distal end, step flaking on proximal end to flatten or hollow base, excavated from Gua Lawa, Sampung.

NMI 950, ht 74 mm, chalky chert, large bifacially worked hollow-based point, surface collected from Gandasari, Punung area. Bifacial battering, step flaking to trim margin and produce hollow base.

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