

MESOLITHIC AND NEOLITHIC CULTURES OF THE KARST LANDSCAPE AT JIMBARAN, SOUTHERN BALI, INDONESIA

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INTRODUCTION

Bali Island is a part of Sundaland, and also close to the Lesser Sunda islands of Wallacea, such as Lombok, Sumbawa, Sumba, Flores and Timor. As such, it could have served as a direct step towards the Lesser Sunda islands during the Pleistocene, especially during the last glacial maximum about 20,000 years ago. Bali and the Lesser Sunda islands are separated by Lombok Strait, which forms part of Huxley's Line, separating the Sunda Shelf from Wallacea.

The Southern Bali District of Kuta Selatan, Badung region, was mountainous karst during the Late Pleistocene through Early Holocene periods. Potential habitation caves, perhaps similar in date to those in the Gunung Sewu mountains of Java other parts of the Indonesian archipelago, have been found there (Sartono 1964; Intan and Truman 2002; Barker *et al.* 2005). In general, karstic zones in Indonesia had important roles in the processes of human and cultural development during the Mesolithic, Neolithic and Protohistoric periods.

This research is focused on Mesolithic and Neolithic material culture at Jimbaran. It will also discuss relationships between these cultures and their contemporaries in North Maluku and South Sulawesi.

ARCHAEOLOGICAL RECOGNITION AND DISTRIBUTION OF SITES

Thirty one potential prehistoric cave settlements were found during the exploration of the eastern, southeastern and southern parts of the Jimbaran karst. Three of these caves, i.e. Selonding, Karang Boma I and Karang Boma II, were found in 1961 and excavated by Soejono (1963). Exploration in 2005 – 2006 yielded 23 more cave sites, of which seven, i.e. Saka I, Saka II, Timpalan, Tegal Wangi, Pondok Pemuda and the shelter of Gong Barat are rich in archaeological finds, with the most abundant being in Zenith Cave (Bawono 2006). Excavations were conducted at that time in Saka I and Timpalan caves (Bawono 2005). Two other caves, Kekep (east of Saka I) and Tegal Wangi were excavated in the research reported upon here.

Based on their locations, the Jimbaran caves can be grouped into eight complexes, i.e. Pondok Pemuda, Gong Cave, Udayana University Campus, Tukad Peteng Cave-Balangan beach, Pura Tegal Wangi, Pura Batu Paged-Bali Cliff, Mertasari Kutuh beach, and Uluwatu.

MATERIAL CULTURE

Stone Tools

Stone tools found during the surface survey and excavations comprise cores, flakes, blades, points and hammerstones, made of limestone, volcanic tuff and andesite (Figs 1 and 2). Most were produced by flaking, with no intention of retouching for shaping the cutting edge.



Figure 1. Pebbles and pebble tools from the Jimbaran caves.

A stone point, 8 cm long with a rounded base, was found in the excavation at Gua Tegal Wangi. The point was flaked bifacially and is the only example of its type. Other pointed tools were found in Saka I, Timpalan, Gong Barat and Pondok Pemuda caves. Such tools are 2-4 cm long.

Unworked volcanic pebbles in various size were found in Tegal Wangi, Saka I, Pondok Pemuda and Gong Barat. Such tools were also recovered at Pasu Lumut, Tapadong (Sabah), and in Tanjung Pinang Rockshelter and Daew Cave on Morotai in North Maluku (Bellwood 1988, 2000).



Figure 2. Flaked lithics from the Jimbaran caves.

Flakes were abundant in the richest sites, mostly of andesite and volcanic tuff. Flakes made on andesite pebbles still retain cortex. These flakes have various shapes and most appear to have been used as scrapers, with end, side, concave and denticulated categories being recognisable. The denticulated scrapers were found in Gong Barat shelter.

Hammerstones of andesite and limestone were found in Pondok Pemuda, Tegal Wangi and Saka I. Limestone hammers from Tegal Wangi Cave show concave working surfaces with traces of grinding.

Shell Tools



Figure 3. Shell tools from the Jimbaran caves.

Many shell scrapers (Fig. 3) were found in the cave that lie close to the coastline, such as Saka I, Gong II, Gong Barat, Tegal Wangi, Pondok Pemuda and Pura Batu Pageh. Compared to stone scrapers, shell scrapers were easier to make and the materials easier to find. Most were made from bivalve shells, and some were retouched on their working edges. In some sites, long scrapers or blades

were also found among the shell tools, as at Mertasari Kutuh shelter, Gong II, Tegal Wangi and Saka II caves. Use-wear scars are present on their cutting edges. Shell points, which may have been used to extract shellfish meat or bone marrow were found in Saka I, Gong I, Gong Barat, Tegal Wangi and Timpalan.

Tridacna shell adzes were found in Gong Barat shelter and Zenith cave, similar to the shell adzes from Uattamdi on Kayoa Island, Golo Cave and Buwawansi Cave on Gebe Island, North Maluku (Bellwood 2000). Besides the shell tools, shell beads made by perforating and grinding were found in FPTI-Mapala WD shelter and Tegal Wangi Cave.

Bone and deer antler tools



Figure 4. Bone and antler tools from the Jimbaran caves.

Bone points (Fig. 4) were made by shaping and grinding the ends of bone fragments, and can be classified into monopoints and bipoints. The bipoints are 2 – 6 cm long and specimens have been found in Selonding, Saka I, Tegal Wangi, Gong Barat and Pondok Pemuda. Bipoints have also been recovered from Panganreang Tudea and Ulu Leang (South Sulawesi), Gedeh Cave (Tuban) and Brahola Cave (Gunung Sewu) (Heekeren 1972; Sutaba 1980; Bellwood 2000; Prasetyo 2002).

Excavations in Selonding, Saka I and Tegal Wangi caves yielded bone spatulas. In Saka II Cave some were found during surface survey. Spatulas are abundant in Indonesia, especially among the bone tools of the Sampung assemblage at Gua Lawa, East Java. Deer antler tools were found at Selonding, Gong Barat, Saka I and Tegal Wangi.

Pottery

Pottery sherds were abundant in Saka I, Saka II, Timpalan, Kekep, Tegal Wangi and Zenith caves. All are plain, and most too small to determine vessel shape and

size. Most were produced by using a slow wheel technique.

An interesting find in the FPTI-Mapala WD shelter was a fragment of pottery with two everted rims one above the other. This kind of pottery has never been found before in Bali. Most of pottery found in Bali has direct, everted or inverted rims. Therefore, further investigation needs to be done in the future.

DISCUSSION

Artefacts from the Jimbaran karst vary in terms of shapes and materials. Some of the artefacts show a degree of similarity to other sites, which may reflect cultural relationships. Such artefacts include the pebble tool assemblages, which are widely distributed in Southeast Asia, especially in Indo-Malaysia. The absence of chert and obsidian led to a use of volcanic pebbles for making stone tools, as in other parts of Indonesia such as northern Maluku. In Niah Cave, Sarawak, more elaborate pebble tool technology with grinding and polishing produced edge-ground axes. But such tools have not yet been found in Jimbaran.

The *Tridacna* shell adzes from the shelter of Gong Barat and Zenith cave resemble those from Uattamdi on Kayoa Island, Golo Cave and Buwawansi Cave on Gebe Island, North Maluku. The shapes of the Jimbaran shell adzes are very simple, made by edge flaking. The shell adzes from North Maluku were made of *Tridacna*, *Hippopus* and *Cassis cornuta* shells, which were ground along their edges. Such techniques are dated back to 15,000 years ago.¹

Bipoints are typical finds at Jimbaran. They are similar to those in Toalian sites, South Sulawesi, such as Panganreang Tudea and Ulu Leang. Bipoints have also been found in Gedeh Cave (Tuban), Braholo Cave (Gunung Sewu), and in Australia (Heekeren 1972; Soejono 1984; Bellwood 2000; Prasetyo 2002; Forestier 2007). According to Heekeren, the relative chronology of bipoints places them in the Late Toalian, along with winged and serrated arrow heads (Maros points). The Late Toalian is dated to about 4000 years ago. From the end of this period, Austronesian speaking populations presumably settled the region (Bellwood 2000; Bulbeck *et al.* 2000). Relationships between the Toalian in Sulawesi and Jimbaran in Bali should be examined in the future, especially in terms of dating.

The shell scrapers in the Jimbaran assemblages are similar to those of the Sampung culture, as described by Heekeren (1972), and dated to the Middle Holocene (Bellwood 2000). Hopefully, remains of burials in the Jimbaran karst can be found in the future.

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¹But recent AMS dating of the Golo and Buwawansi shell adzes only supports a Holocene date (editors).