FIRE-MAKING USING A STONE 'STRIKE-A-LIGHT' IN THE SOA BASIN OF FLORES, INDONESIA

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ABSTRACT

During recent archaeological fieldwork on the island of Flores in eastern Indonesia, the author observed a fire-making technique involving the use of a stone 'strike-a-light' (see Skertchly 1879). The strike-a-light used was a chalcedony flake scavenged from a prehistoric site; hence the fire-making technique has archaeological and in particular, taphonomic, significance.

INTRODUCTION

Flores is situated in the outer arc of the 'Lesser Sunda' island chain (East Nusa Tenggara) in eastern Indonesia. The Soa Basin is located in west central Flores and lies within the administrative territory of the Ngada (Barnes 1972). The Ngada are an Austronesian-speaking people who occupy the basin and surrounding mountainous areas of central Flores down to the southern coast (Djawanai 1983). They are primarily cultivators and graziers. Although predominately Roman Catholic since the 1920s, the Ngada are considered to be among the more 'traditional' cultural groups on Flores. The 1000 km² grasslands of the Soa Basin are used mainly for cattle and buffalo grazing and rice cultivation. Wild pigs and deer are also hunted on foot or on horseback using spears.

In August-October 2005, excavations involving palaeontologists and archaeologists from Indonesia and Australia, along with around 30 local Ngada fieldworkers, were conducted at the 800-880 kyr-old site of Mata Menge in the Soa Basin (see Morwood et al. 1999). It was during these excavations, and at the nearby camp of Mengeruda, that the fire-making technique was demonstrated by two Ngada men: Mr. Kornelis Podhi, aged in his 60s, and Mr. Marcus Lalu, aged in his 40s. Both men are from the nearby village of Soa.

THE FIRE-MAKING TECHNIQUE

The fire-making technique involves the ignition of combustible tinder, which is added to kindling to start the fire. The tinder used is called *moke* and is extracted from an unidentified *Arecaceae* palm that is also named *moke*. The tinder is ignited by sparks generated from percussive contact between a steel hacksaw blade segment (length: 98.9 mm) and the edge of an angular piece of chalcedony (Figure 1). The fire-making equipment, including stone, steel and prepared tinder, is carried around as part of the personal possessions of Mr. Kornelis Podhi. Most of our Ngada workers were aged in their late teens to early 20s and use matches and disposable cigarette lighters. All of them, however, were familiar with the strike-a-light technique for making fire.

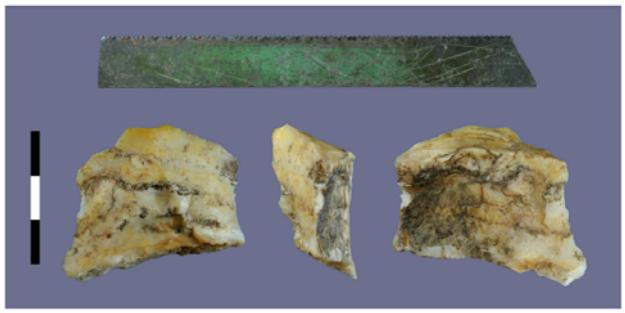

Figure 1: Ngada fire-making kit including chalcedony flake strike-a-light (bottom) and steel hacksaw blade segment. Small scars from percussive contact with the steel are evident along the edges of the flake. The ventral view (right) also shows blackish residue from contact with moke *tinder. Scale 30 mm. (Image courtesy of Mark Moore).*

The *moke* tinder was prepared in the following manner. After ascending the palm, a few handfuls of soft, fluffy, down-like brown fibrous matter were scraped from the exterior of the leaf stem (petiole) using a machete. Once extracted, this downy substance was left to dry in the sun. Meanwhile, a fire was started to which the husk of an old coconut fruit was added. Smoldering ash and charcoal from the charred husk was then scraped into a bowl and, using a wooden pestle, crushed and ground into a fine powder. The dried downy substance was thoroughly mixed with the powder by both stirring with a stick and kneading in the hands; during the process more powder was periodically added to the mixture. After sev-

eral minutes of mixing and kneading, the downy substance took on a much darker colour due to infusion with the ash powder. At this point the *moke* was announced to be ready.

To ignite the *moke*, a small amount of the prepared tinder is held against the edge of the chalcedony strike-a-light with the thumb of one hand. The blunt edge of the hacksaw blade segment, held in the other hand, is then struck rapidly downwards against the edge of the stone[1] (Figure 2). Percussive contact between steel and stone creates a shower of sparks that ignite the *moke*, which immediately starts to smolder (Figure 3). Once the tinder is ignited, it is cupped in both hands and the glowing ember fanned by gentle blowing.

Figure 2: Striking the stone strike-a-light and moke *tinder with a steel hacksaw blade segment. Positioning the tinder against the edge of the strike-a-light with the thumb, the edge of the stone is struck with the hacksaw blade, causing sparks that ignite the tinder.*

Figure 3: Stone strike-a-light with smoldering moke *tinder. The strike-a-light is a prehistoric chalcedony flake and in this instance, the tinder is positioned on the ventral surface near the right lateral margin of the flake.*

ETHNOBOTANICAL SIGNIFICANCE

The collecting and processing of the *moke* tinder is interesting from an ethno-botanical perspective. Direct accounts of the use of the palm product for this purpose are unavailable for Flores itself. Skertchly (1890:447-8), however, observed a very similar practice among the 'Dyak' of northern Borneo, describing how a 'fluffy material...brown...quite soft' was scraped from the outside leaf stem of an unidentified palm tree and used as tinder. Similarly, modern Iban and Kelabit of Sarawak use 'hairs' or 'powder' scraped from the trunks of *Arenga undulatifolia* and *Caryota mitis* palms as tinder (Christensen 2002:177). Glover and Ellen (1975:52-3) also note that tinder used in stone and steel fire-making kits in the southern Moluccas of eastern Indonesia (see below) 'is scraped from the bark of certain palms, particularly the aren (*Arenga pinnata* (Wurmb.) Merr.)'. Finally, Craig (1967:434) mentions that tinder used for fire-making (by percussion using iron pyrites) in western Papua New Guinea consists of 'dried pith' obtained from the base of the black palm branch.

ARCHAEOLOGICAL SIGNIFICANCE

There is a small but relatively detailed archaeological and ethnographic literature concerning the use of stone strike-a-lights in Island Southeast Asia. For example, Bulbeck and Caldwell's (2000:23, 32) excavations at early iron-smelting sites in southern Sulawesi revealed the use of chert strike-a-lights from at least the 1300s onwards – local informants also noted that the objects were in use among certain villagers. Elsewhere in the region, Scheans et al. (1970) describe the contemporary use of stone strike-a-lights on Buad Island in the central Philippines. Pannell and O'Connor (2005:201) have made a similar observation in modern-day East Timor.

Glover and Ellen's (1975, 1977) ethno-archaeological work among the Nuaulu of south central Seram in the southern Moluccas made particularly detailed documentation of the use of strike-a-lights in a modern context. Their account of the Nuaulu fire-making technique suggests an almost identical practice to the Ngada example. According to Glover and Ellen (1975), most of the strike-a-lights used were unmodified or minimally modified chert flakes obtained from prehistoric sites, the Nuaulu having no contemporary knowledge of stone flaking.

The stone strike-a-light used during the Soa Basin fire-making demonstrations was a bend-initiated chalcedony flake produced by hard-hammer percussion (length = 29.7 mm; width = 42.8 mm; thickness = 18.9 mm). It is unretouched, and with the exception of several tiny use-scars (<3-5 mm in maximum dimension) on the edges and some blackish residue (probably from contact with ash-infused *moke*) (Figure 1), has not been modified by its modern users. Presumably the flake was scavenged from one of the many surface archaeological sites in the Soa Basin. It appears to have been in use as a strike-a-light for some time and definitely did not come from the Mata Menge (or other Soa Basin) excavations.

The Ngada men demonstrating the fire-making technique and those observing it did not comment upon the archaeological significance of the strike-a-light. However, one man, upon observing the surface collection of a quadrifacial edge-ground chert axe/adze that had been reworked bifacially as a core, noted that the artefact was definitely an old strike-a-light. The chert axe/adze bears no traces of this use, such as macroscopically visible edge-rounding 'in addition to dense sets of scratches and gloss' (Stapert and Johansen 1999:768). Nevertheless, the informant's comment suggests the degree to which prehistoric sites may provide a ready source of strike-a-lights for the Ngada (see Glover and Ellen 1975 for similar conclusions).

CONCLUDING REMARKS

Some 30 years ago, Glover and Ellen (1975:59) commented that 'ethnographic and historical evidence for [the use of recycled stone artefacts as strike-a-lights in Island Southeast Asia] is not lacking, and ought to be considered when edge-damage patterns of stone tools are being examined'. Recent observations in the Soa Basin of Flores serve to reiterate and expand upon this point. As implied by Glover and Ellen, wear patterns resulting from modern and historical use of recycled stone artefacts as strike-a-lights might easily be confused with prehistoric activities. Experimental research combined with microwear/residue analyses could help to distinguish between the various types of wear patterns and residues produced by particular metals (and/or iron pyrites; see Craig 1967; Stapert and Johansen 1999) available to prehistoric people and those used in recent historical times and today. Glover and Ellen (1977) note with regards to their ethno-archaeological research, however, that some artefacts used as strike-a-lights would be difficult to identify archaeologically because they were used briefly and then discarded. These authors also note that one well-used Nuaulu strike-a-light (made on a prehistoric stone flake) was 'stained with red dye' as a consequence of being carried around in a pouch containing betelnut (Glover and Ellen 1977:239). Thus residue analysts could face potential problems with chronological interpretation if substances that come into contact with recycled artefacts have distinct prehistoric analogues, such as betelnut (see Fairbairn and Swadling 2005).

It seems problematic to attempt to account for the full range of possible contaminants. Given the ethnographic examples cited above, however, ethno-archaeological and ethno-botanical research focused on plant products (and other substances) used as tinders in modern strike-a-light kits might be a useful avenue for further research.

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NOTE

1. A short video of this process can be viewed at: http://rspas.anu.edu.au/~adamb/images/soa331.avi

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