THE BEAKED ADZE IN THE WESTERN PACIFIC: IMPLICATIONS FOR SOCIAL IDENTIFICATION AND LATE PREHISTORIC INTERACTION

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ABSTRACT

Recent investigations of interactions in the western Pacific have focused on post-settlement contact between Micronesia and Melanesia. In the process the presence and importance of the beaked adze, an unique adze form with a pointed cutting edge, have not been given detailed attention.

Using ethnographic and archaeological sources, a distinct, albeit limited, pattern of occurrence, provenance and chronology of beaked adzes is emerging in the western Pacific. The few dated contexts suggest that the presence of beaked adzes in the western Pacific did not occur until the last 500–700 years, spreading rapidly across Micronesia and islands along the northern fringe of Melanesia.

The rarity, workmanship and specific provenances of beaked adzes suggest that at least among many of the Caroline and Marshall Islands they served as symbols of prestige and social identity. Less is known about their function amongst the Polynesian Outliers although an ethnographic account indicates beaked adzes functioned as both utilitarian tools and ceremonial objects. Using oral histories to provide a cultural context, it is argued here this artifact requires more detailed attention and analysis.

INTRODUCTION

Recent investigations of interactions in the western Pacific (e.g., Nagaoka *et al* 2022; Sheppard 2022) have focused on post-settlement contact between Micronesia and Melanesia. Yet detailed attention to the importance of an unique artifact, the beaked adze, which occurs rarely and has a limited distribution across these regions, remains unexplored. It is the distinct triangular bevel and pointed cutting edge that identifies the beaked adze.

The presence of this adze form has long been noted in Island South East Asia (ISEA) (e.g., Evans 1931; Noone 1941; Van Heekeren 1957), Micronesia (e.g., Yawata 1942; Osborne 1966) and on some, but not all, Polynesian Outliers along the northern edge of Melanesia (e.g., Finsch 1914; Sarfert and Damm 1929).

Ethnographic and archaeological evidence suggests that the beaked adze in Micronesia is most often found in locations associated with high status and/or sacred areas. Specific provenance and general distribution may inform us regarding interaction amongst culturally and linguistically diverse areas during the late prehistory in the western Pacific. It is argued here that the beaked adze is a significant artifact and not simply another tool in local artifact assemblages within the western Pacific.

BEAKED ADZE

In his classic typology of stone adzes of Southeast Asia, Roger Duff (1970) described a "beaked-pick adze" (his Type 7) and established five varieties (7A–7E). However, only two varieties (7A, 7D) have a pointed edge (Figure 1). These are differentiated by their geographical distribution; 7A occurs across ISEA and 7D is found on the mainland of Malaysia and southern Thailand. For this paper, a conservative approach was employed to identify beaked adzes; only those blades exhibiting pointed cutting edges are considered.

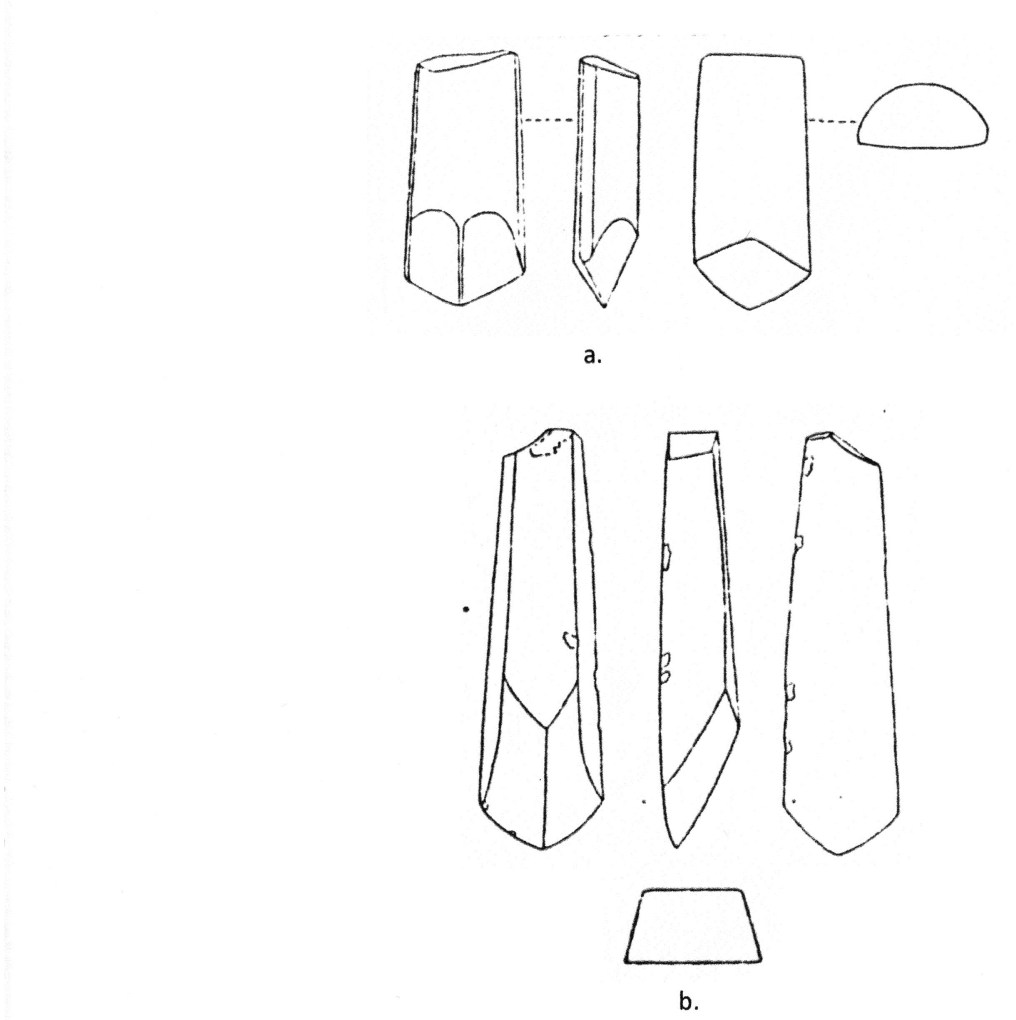
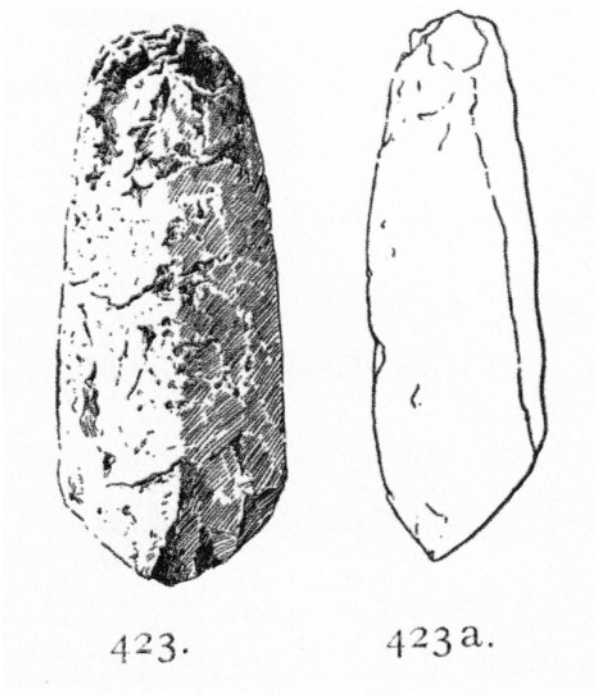


Figure 1. Southeast Asian beaked adzes (from Duff 1970). a. Type 7A, Java (17.0 cm long); b. Type 7D, Malaya (14.5 cm long).

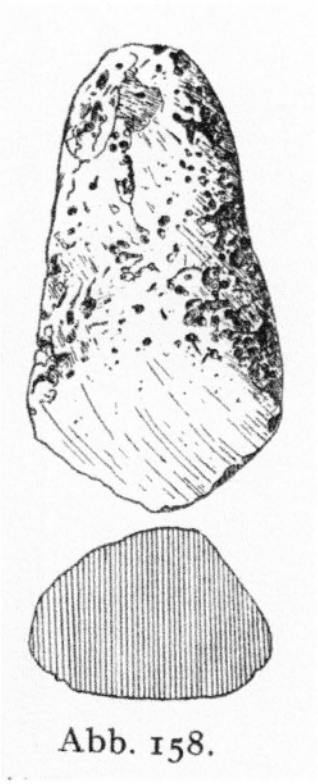
In ISEA beaked adzes are large, well-made blades shaped from semiprecious stone, e.g., agates, chalcedony, chert, serpentine and fine-grained basalts (Duff 1970). Due also to their "uncommon size" (Van Heekeren 1972:161) and workmanship, coupled with the lack of apparent use wear, beaked adzes have been suggested to be specialized artifacts, perhaps used for ceremonial purposes.

These adzes are found across an extensive geographical area in ISEA, from eastern Sumatra, across Java, Bali, western Borneo, Sulawesi, ending at Talaud (now named Karakellang), north of Sulawesi (Van Heekeren 1972:170). Reported occurrences of beaked adzes decrease eastwards within ISEA (Van Heekeren 1957:122, Figure 23). None appear to have been found from the Philippines (Takayama 1982).

Early references of beaked adzes in the western Pacific are largely in the form of illustrations in German ethnographies, e.g., Finsch 1914; Sarfert and Damm 1929; Eilers 1936; Damm 1938 (Figure 2). Corresponding texts rarely describe the morphology or function of this adze form; however, by the time the German Südsee Expeditions occurred (1909–1910) shell adzes were no longer being made.



a.



b.

Figure 2. Micronesian Beaked Adzes illustrated in the Ergebnisse der Südsee -Expedition 1908-1910. a. 423 Ulithi Atoll (Damm 1938); b. Abb 158 Tobi (Eilers 1936).

Beaked adzes in the western Pacific have a morphology identical to Duff's 7A and 7D although virtually all beaked adzes from this region were made from shell, primarily the hinge portions of *Tridacna gigas* and *T. maxima*. A beaked adze made from *Cassis cornuta* from Palau has also been reported (Takayama and Takasugi 1978) and another, possibly manufactured from limestone, is also reported from Palau (David Snyder, pers. comm., 1986).

The use of shell for beaked adzes appears to be an Oceanic innovation. No shell beaked adzes have been reported from ISEA and no beaked adzes made of stone, save the single possible limestone example from Palau, have been reported from the western Pacific.

Tridacna is a genus with several species of large clams; *T. gigas* being the largest living bivalve, measuring up to about 140 cm long. The thick hinge section encompasses about two-thirds of the overall shell mass thus providing a bulk of shell material from which large adzes can be manufactured. An example is the massive beaked adze (23 cm long, 9 cm wide, 6 cm thick, weighing 520 g) from Ulithi Atoll (Figure 3).

A major morphological variable amongst beaked adzes in the western Pacific is size. Nan Madol, Pohnpei has the largest examples, up to 44.7 cm long (Athens 2007:203) and beaked adzes over 20 cm long are reported from Ulithi Atoll in western Micronesia (Craib 1983) and the Marshall Islands in eastern Micronesia (Rosendahl 1987). In comparison, the mean length of beaked specimens from Palau rarely exceeds 11 cm. Osborne (1979:22) described the ten beaked adzes he collected from Ngelong village (his Angaur 19) as "short, thick and stout". He also shows a complete beaked adze that is slightly smaller than a complete *Terebra/Mitra* adze (1979:292, Fig. 208).

Large examples are rare in Palau; however, Williams and Pope (2011:231, Table 62) list a long (16.9 cm), heavy (605 g) shell beaked adze. Using a collection from the Tokyo University Anthropology Department, which included beaked adzes from Palau and the Carolines, Yawata (1942) describes a large (27 cm long) beaked adze labelled as from "Palau" (Dept Specimen B.369). However, this is such an anomaly for this area, being two to three times larger than the length of other Palauan examples, that its provenance may have been misidentified. The size is more consistent with beaked adzes found in the Carolines well to the north and east of Palau, which were also included in this museum collection. Not only is the size of Palauan beaked adzes significantly smaller than those reported elsewhere in the western Pacific, so too are the other adze forms made from the hinge section of *Tridacna* in this archipelago (see measurement data from Osborne 1966, 1977; Beardsely 1996; Williams and Pope 2011).

In Palau, beaked adzes are common and appear to have functioned as tools. The often broken and battered appearance of these tools with their pointed cutting edges suggest that they would have served as specialized cutting implements. Osborne (1966:456) described it as a "corner cutting tool" as it would have produced a relatively narrow groove-like cut. Kubary (1879), who visited Nukuoro in the 1870s, suggested that adzes of "prismatic shape" (presumably referring to beaked forms) on Nukuoro were used as chisels (cited in Davidson 1971:66). The four beaked adzes Davidson lists (1971:63, Table 15) are relatively small, roughly the same size as the Palauan sample, with a mean length of 9.7 cm. To date, neither use wear or residue analysis has been conducted to determine how beaked adzes in the western Pacific were used, if at all.

Moir's (1989) work on the Polynesian Outlier, Takuu Atoll, in northern Melanesia, provides relevant ethnographic analysis of the social use of adzes, which includes beaked examples. The local population identified ten named adze types amongst those "manufactured by their ancestors, which are no longer made today" (1989:362). Three types are considered ceremonial and one, *fakatoro*, is comprised of beaked adzes (Moir 1989:435, note 5).

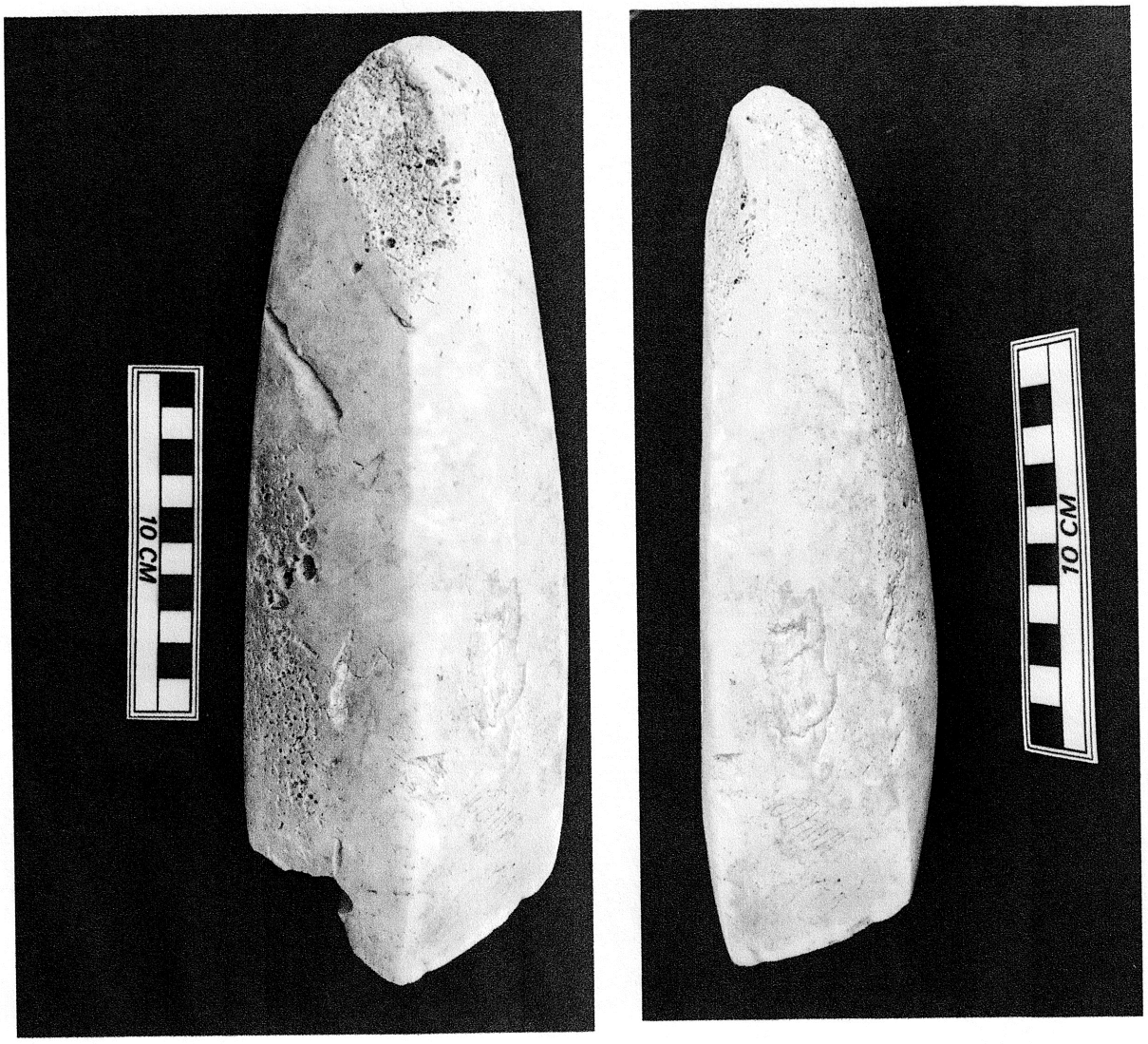


Figure 3. Beaked adze: Mogmog, Ulithi Atoll (photo by author).

These adzes were never used as woodworking tools nor were they hafted even for ceremonial use (Moir 1989:365). Rather, they served as grave goods or were used as bride price. Ceremonial adzes on Takuu were the property of women and kept at family residences. The smaller beaked adzes were used as tools (Moir, pers. comm., 1988).

If used primarily as tools, beaked adzes may be expected to occur in larger numbers in local adze kits across wider portions of Micronesia and Melanesia, similar to the *Terebra/Mitra* adze. This latter adze, undoubtedly a tool, is reported from Micronesia as well as Melanesia and Polynesia (Craib 1977).

DISTRIBUTION, PROVENANCE AND IMPLICATIONS FOR SOCIAL CONTEXT IN THE WESTERN PACIFIC

Beaked adzes occur across Micronesia and on some, but not all, islands along the northern fringe of Melanesia (Figure 4: Tables 1 and 2). Detailed provenance data for beaked adzes in the western Pacific, beyond island name, are limited. The distribution does not extend into the Polynesian Triangle as this adze form is unknown in either shell or stone from this region.

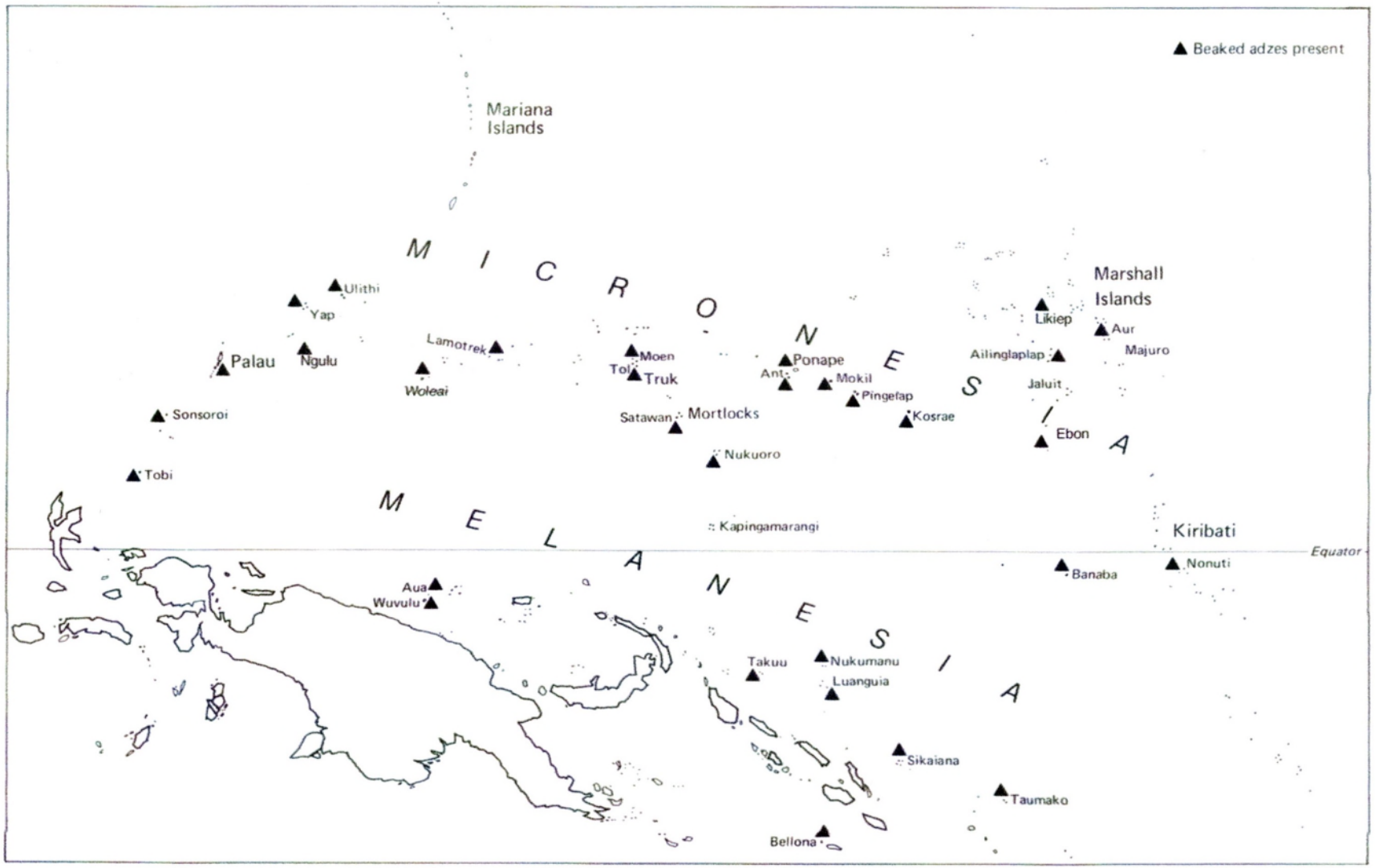


Figure 4. Reported locations of beaked adzes in the western Pacific (illustration for author by Winifred Mumford)

Table 1. Beaked adzes of Micronesia.

Island	Source
Tobi	Eilers 1936; Yawata 1942; Osborne 1979; Black and Osborne 1979
Sonsorol	Eilers 1936
Palau	Yawata 1942
Kayangel Atoll	Takayama, Intoh and Takasugi 1980
Ngerkeklau	Osborne 1979
Babeldaob	Osborne 1966; Liston 2011
Koror	Osborne 1966
Aluptaciel	Takayama and Takasugi 1978
Ngeruktabel	D. Snyder, pers. comm., 1986
Ngemelis	B. Butler, pers. comm., 2020
Macharchar	Osborne 1966, 1979
Pelilieu	Osborne 1979
Angaur	Takayama, Intoh and Takasugi 1980; Osborne 1979
Yap	Finsch 1914
Ngulu Atoll	Eilers 1936
Ulithi Atoll (Mogmog Islet)	Damm 1938; Craib 1983
Lamotrek Atoll	Fujimura and Alkire 1984
Woleai Atoll	Krämer 1937
Chuuk	
Moen	King and Parker 1984
Tol	Takayama and Intoh 1980
Satawan Atoll (Moch Islet)	Yawata 1942; Takayama and Intoh 1980
Nukuoro Atoll	Finsch 1914; Davidson 1971
Pohnpei (Nan Madol)	Hambruch 1936; Athens 1980, 2007; Ayres and Wingate 1983
Ant Atoll	Ayres and Spear n.d.
Mokil (Mwoakilloa) Atoll	Rosendahl 1987
Pingelap Atoll	Rosendahl 1987
Kosrae (Lelu)	Finsch 1914; Cordy 1981
Marshall Islands	Krämer and Neverman 1938; Yawata 1942
Ailinglaplap Atoll	Rosendahl 1987
Aur Atoll	Rosendahl 1987
Likiep Atoll	Dye 1987
Ebon Atoll	M. Weisler, pers. comm.
Banaba (Ocean Island)	J. Davidson, pers. comm., 1973
Kiribati	
Nonuti Atoll	J. Davidson, pers. comm., 1973

Table 2. Beaked adzes of the northern fringe of Melanesia.

Island	Source
Atau Atoll	Crosby 1973, citing Hambruch 1907–08
Wuvulu Atoll	Hinderling 1949
Launguia Atoll	Sarfert and Damm 1929; Crosby 1973
Nukumanu Atoll	Sarfert and Damm 1929
Takuu Atoll	Davidson 1974; B. Moir, pers. comm., 1988
Sikaiana Atoll	Observation by author (Bernice P. Bishop Museum collection)
Taumako	Leach and Davidson 2008
Bellona	J. Davidson, pers. comm., 1973

When specific locations are given, beaked adzes are found in areas having sociopolitical status and/or ceremonial activities. These include Men's houses, meeting houses, ritual areas, tombs and residences of high-ranking persons. Amongst the languages of Nuclear Micronesian speakers, such locations are referred to by terms such as *rolong*, *lolong*, *rang* and *roang* (e.g., Metzgar 2004). Without referring to shape, ethnographic accounts from areas in the western Pacific have noted that large shell adzes were often considered sacred, valuable objects, associated with important places. Emory (1965:223) stated that on the Polynesian Outlier, Kapingamarangi, each regional priest (*Ariki koa*) had a sacred shell adze and that, in one instance, the hafted blade was kept "hung over the wall beam of the house sacred to the god, *Mongotohoro*." Large *Tridacna* adzes were illustrated from another outlier, Tikopia (Firth 1959:150–151). These were used as prime tools for canoe construction, were considered sacred (*toki tapu*) and kept in "the prime temple of the clan" on Tikopia.

While a variety of shell adze forms are common across the western Pacific, the beaked shape is rare and occurs in very low numbers. A notable exception to this pattern is Palau where beaked adzes have been reported from ten islands along the entire archipelago. For example, Osborne (1966, 1979) recovered 26 beaked adzes, from six different islands.

Two beaked adzes are reported from Ulithi Atoll in the western Carolines (Damm 1938:320, Abb 423; Craib 1983). While Damm provided no specific provenance, the other adze was recovered in 1981 by Ulithians during their rebuilding of the men's house platform on Mogmog, which borders an open area identified locally as *Rolong*, (Craib 1983). This location, Ulithians assert, is where the ancestral figure, *Yongelap*, built the first house on the atoll and is recognized as a sacred place throughout the atoll.

In central Micronesia, two high islands—Moen and Tol (Toon)—in the Chuuk group have yielded beaked adzes. One was recovered from excavations near a *wuut* (meeting house) in the village of Mechchitiw on Moen, a village that figures prominently in traditional Chuukese history as the place where the culture hero, *Souwkachaw*, arrived from Kachaw, established this village and brought a new social order to Chuuk (King and Parker 1984: Figure 32d, 1985; Goodenough 1986). Kachaw (the "sky world") figures prominently in origin myths in central and eastern Micronesia, as discussed below. Two adzes, described as beaked, but not illustrated, were surface finds in a basalt paved stone enclosure on a hilltop in Fauba village, Tol island (Takayama and Intoh 1980:18). These enclosures have been interpreted as defensive features although hilltop sites may have also served as sacred areas (Goodenough 1986; Rainbird 1996).

Sinoto (1984:29, Fig 1.18g) reported a beaked adze from excavations at an early, pottery-bearing site on Fefan, Chuuk. However, this adze had been reworked and exhibited a non-beaked, wide curved cutting edge. His identification is further problematic given that it is based entirely on the presence of a center ridge, an attribute not solely restricted to beaked adzes.

Elsewhere in the central Carolines, beaked adzes have been reported from Moch (Mwooch)

islet in Satawan Atoll (Takayama and Intoh 1980). Traditional Mortlockese history indicates the initial inhabitants of the Mortlocks arrived from the village of Mechchitiw, Chuuk with which the Mortlockese maintained their closest visiting and trading ties (Kubary 1879:224–299, cited in Goodenough 1986:566 note 28).

In the eastern Carolines, beaked adzes from the high islands of Pohnpei and Kosrae have only been found within the megalithic shoreline complexes of Nan Madol and Lelu, respectively. None have been reported from the mainland of either island. These sites are two of the most politically prominent areas in eastern Micronesia and served as central places in late prehistory.

The massive complex of Nan Madol, located along the southeast coast of Pohnpei, consists of about 100 artificial islets containing features made from coral boulders and basalt. Oral traditions indicate that this complex was divided into two sections: Madol Pah, where residences of paramount chiefs (Saudeleurs, Namwharki) were located and Madol Powe, the center for rituals and burials (e.g., Athens 2007:195). Despite survey mapping and excavation across much of the Nan Madol, beaked adzes are rare, reported from only four islets: two in Madol Pah, Pahnkadira and Idehd; and another two in Madol Powe, Kahnderek and Nandauwas. Pahnkadira islet is located at the center of Madol Pah and is the chiefly (Saudeleur) residential complex (Ayres *et al* 1983:42). Of the large number of artifacts recovered from Pahnkadira, a single beaked adze was found on the surface of a small platform adjacent to a residential platform (Ayres and Wingard 1983:Figure 36e).

Excavation of a mound on Idehd islet revealed two beaked adzes. This mound was created from discarded oven stones, a product of the annual ritual cooking of turtle (Athens 2007:196). Idehd held a central role in the ritual/religious justification of the Saudeleur social order (e.g., Hanlon 1988:14–15).

Beaked adzes were also found at burial areas (*lolong*) for high status persons in the Madol Powe portion of Nan Madol. The islets of Kohnderek and Nandauwas, each associated with burial rituals, have yielded beaked adzes. Mall, a small natural islet located about a kilometer southwest of Nan Madol, contains a stone tomb; it produced a single beaked adze. Without describing shape, Hambruch (1936:53) argued that large adzes made from *T. gigas* found in Nan Madol were considered symbols of power and used as grave goods and cites Christian (1889) who reported seven *T. gigas* adzes from the middle grave of Nandauwas.

A similar pattern of beaked adze distribution occurs on Kosrae where they have been reported only from Lelu, a megalithic site composed of basalt and coral features. This complex served as the residential and ritual areas for the highest-ranking families within Kosraean society from about 600 years ago (Cordy 1981). Finsch (1914: Abb. 159) and Cordy (1981:347, Figure 119) illustrate beaked adzes from Lelu. Another possible beaked adze was reported from excavation on Lelu (Bath and Shun 1982:75).

A sample of 81 adzes from Ant Atoll, located about 15 km west of Pohnpei yielded one beaked adze. This was from the Pohntipw site, an important place for ritual feasting (Ayres and Spear n.d.:156). This site contained basalt stone pavements of materials imported from Pohnpei. On another atoll, Mokil (Mwoakilloa) situated about 170 km east-southeast of Pohnpei, Rosendahl (1987:72) found a single beaked adze at a location known locally as Roangoanpalarro, a traditional chiefly residence.

In northeastern Micronesia, the Marshall Islands consist of 34 named locations (mostly atolls), which form two parallel chains aligned roughly north-south identified by the Marshallese as Ralik (western) and Ratak (eastern). Rosendahl (1987) visited 12 atolls across both chains and collected over 1600 adzes. Only seven were beaked and came from just three atolls—Ailinglaplap, Likiep and Aur. Subsequently, a beaked specimen was a surface find on Ebon (Weisler, pers comm, 2018). Other fieldwork efforts in the Marshalls have not reported beaked adzes (e.g., Dye 1987; Riley 1987).

Traditional histories associate Ailinglaplap Atoll with great power having controlled most of the atolls in the Ralik chain (Alkire 1977:70). Aur was the most powerful atoll in the Ratak chain, as indicated by tribute it demanded (Hezel 1983:94). Aur is unique in that it was one of the

few atolls in the Marshalls having shrines made from basalt, marking origin places for the clans of paramount chiefs (Finsch 1893, cited in Goodenough 1986:561). Basalt is nonlocal and oral histories suggest Pohnpei as the most likely source (Goodenough 1986:561).

Beaked adzes were reported from one of the two Polynesian outliers within the geographical boundary of Micronesia, Nukuoro Atoll. Finsch (1914: Abb 153, 154) provides two illustrations and Davidson (1971) lists four in her collection of 156 adzes. No report yet of beaked adzes from the other Polynesian outlier in Micronesia, Kapingamarangi Atoll, in either Emory's (1965) ethnographic work or from Leach and Ward's (1981) archaeological fieldwork which produced 52 shell adzes, though that the absence of beaked adzes here may be a product of a small sample size cannot be discounted.

In Melanesia, beaked adzes are found along the northern fringe from Wuvulu and Aua Islands in the west, eastwards across many of the Polynesian Outliers. North to south, these are Takuu Atoll (Davidson 1971; Moir 1989), Nukumanu Atoll (Sarfert und Damm 1929), Luanguia Atoll (Ontong Java) (Sarfert und Damm 1929:Abb 149, 151, 155; Crosby 1973: Radclyffe, pers comm, 2021), Sikiana Atoll (Bernice P. Bishop Museum ethnographic collection, observation by author), Taumako (Leach and Davidson 2008), Bellona (Davidson, pers comm, 1973) and possibly Tikopia (see Shaw 2022).

Beaked adzes are illustrated from the so-called Micronesian Outliers of Wuvulu and Aua, (Hinderling 1949:238, Abb 54-55; Crosby 1973:107, citing Hambruch 1907–8: Pl xxii, Figures 10,11) with no specific provenance. Krämer (1908) characterized these atolls as Micronesian colonies, i.e., "Para-Micronesian", based on the physical attributes of the inhabitants and material cultural similarities. However, linguistic evidence shows that these islands spoke a Western Admiralties language (Lynch *et al*. 2002; Pawley 2018), which is only distantly related to the subgroups of Austronesian languages found in Micronesia (e.g., Blust 2013:10). Hohnschopp (1973) argues that any physical or material similarities with Micronesia may be overemphasized (see also Rainbird 2004).

Leach and Davison (2008:262) report two beaked examples in their collection of over 100 adzes from Taumako. One was a surface find (2008:55, Figure 3, 19D); the other (not illustrated) was a bevel fragment recovered from an excavation within a stone enclosure at the Kahula site along with 11 other adzes. Though broken, the authors state the remaining bevel portion was "…clearly from a beaked adze…" (2008:262). Moir (1989) reports beaked adzes from Takuu, an atoll about 230 km north of the east coast of Bouganville.

Davidson (1974) provides a photo of hafted beaked adze from Takuu in the collection at the Auckland Institute and Museum. Lastly, a single beaked adze has been reported from only a single island in the southern group of Outliers, Bellona (J. Davidson, pers. comm.).

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The easternmost presence of the beaked adzes in Oceania is from Nonuti, an atoll in southern Kiribati and Banaba, a raised coral island, about 500 km west of Nonuti (J. Davidson, pers. comm.). No specific provenance data was recorded.

The westernmost presence of beaked adzes comes from two small, dispersed, raised reef islands, Tobi and Sonsorol (Eilers 1936:197, Abb 154, 158; Yawata 1942; Black and Osborne 1979). These are located at the interface of Indonesia, Micronesia and Melanesia, approximately 500 km northwest of Karakellang in the Talauds, the easternmost island in ISEA to have yielded a beaked adze.

Although part of the modern Republic of Palau, these "southwest islands" are isolated, slightly more than 500 km from the next nearest island, Angaur, in the Palauan archipelago. In fact, Tobi is closer (270 km) to Morotai, Halmahera Group, eastern Moluccas in ISEA. Nevertheless, local oral traditions state that Tobi and Sonsorol were settled by people from Ulithi and

Fais (Intoh 2008:330). At historic contact the inhabitants of these southwest islands spoke a Nuclear Micronesian language, most closely related to Ulithian (Alkire 1977:12), from an atoll at least 1000 km to the northeast.

It is unlikely that the current pattern is a product of uneven sampling across the western Pacific. For example, after about 100 years of archaeological survey and excavation in the Mariana Islands at the northwestern corner of Micronesia, thousands of adzes of both shell and stone have been recovered and none are similar to the beaked form (e.g., Yawata 1942; Craib 1977; Takayama 1982). It should be noted that although Thompson (1932:54; Plate 10K) shows a large *Tridacna* hinge adze, which she describes as having a "pointed edge" (1932:82) she also notes that this artifact was brought from the Caroline Islands "in historic times". Therefore, the pre-contact absence of beaked adzes in the Marianas is more likely a reflection of a different settlement history and subsequent patterns of contact.

Similarly, the limited distribution of beaked adzes in Melanesia is also not a result of uneven sampling since many islands, and island groups, have received substantial archaeological attention. Although large adze samples exist from Vanuatu (e.g., Garanger 1972; Bedford 2006), Vanikoro (Kirch 1983), Banks Islands (Ward 1979), the Santa Cruz region (Radclyffe 2015) and the Polynesian Outlier, Anuta (Kirch and Rosendahl 1973), yet none of the illustrations from these collections contain adzes similar to the beaked form.

TEMPORAL CONTEXT

Dates associated with beaked adzes in ISEA are lacking and are limited in the western Pacific; most of these artifacts have been surface finds. Nevertheless, beaked adzes first appear in Mainland Southeast Asia, associated with Neolithic deposits (e.g., Bellwood 2007). Taha (1991:95) noted that Neolithic burials from the Gua Cha rockshelter in Malaysia were accompanied by grave goods consisting of pottery, stone bracelets, shell ornaments, bark-cloth beaters, beaked adzes and beads of various types. These burials date between 3000–2000 BP (Bulbeck 2001a).

Bulbeck (2001b:86) states that "ground stone axes" were commonly used as grave goods into the Early Metal Age (2500–1500 BP) in ISEA although no specific reference to beaked adzes is made. Bellwood (2017:275) further suggests that "some quadrangular sectioned adzes", in which he included Type 7A (Duff's ISEA beaked adze) might be found in these later deposits. The presence of ground stone adzes, including the beaked variety, appears to have been valuable beyond the Neolithic in ISEA but it remains uncertain if these adzes overlapped in time with post-settlement movement of materials into the western Pacific.

Based on linguistic and archaeological data, the settlement histories within Micronesia are varied. The high islands along the western margin of this vast geographical region were occupied first and from various locations in ISEA. The Mariana Islands were first occupied about 3500 BP (e.g., Bellwood 2017; Rieth and Cochrane 2015) followed by Palau a few centuries later (e.g., Liston 2005). The other western high island group, Yap, was settled by at least 2000 BP and most likely earlier and linguistic evidence suggests that, unlike Palau and the Marianas, initial settlers of Yap arrived from Island Melanesia (Napolitano *et al*. 2019).

Human presence across most of central and eastern Micronesia first occurred later around 2000–1800 BP, most likely from areas in Island Melanesia and deriving out of earlier Lapita populations. Interaction networks were created amongst the high islands and atolls in this region as support networks. Lastly, Polynesian communities settled the atolls of Kapingamarangi and Nukuoro.

Beaked adzes from dated contexts are found at few locations listed in Tables 1 and 2 but they come from across the western Pacific. These include Palau, Chuuk, Mortlocks, Pohnpei and Kosrae west to east across Micronesia as well as Taumako, a Polynesian Outlier in Melanesia. The small number of dates do not vary widely in age and none are suggestive of early occupation. It is unlikely that beaked adzes were brought into Nuclear Micronesia by original settlers. Szabó's (2010) review of Lapita shell working demonstrates a variety of shell artifacts, including

adzes, from New Ireland, Vanuatu, Southeast Solomons, New Caledonia and Fiji but no beaked adzes are reported.

The earliest calibrated dates come from locations in the central and eastern Carolines. In central Micronesia, sites from Satawan Atoll (Takayama and Intoh 1980:57) and Mechchitiw (Chuuk), date between cal AD 1200–1500 (King and Parker 1984:416, Table 153). The only area in Micronesia where beaked adzes occurred in a secure dated stratigraphic context is from Idehd islet at Nan Madol in eastern Micronesia. Two beaked adzes were recovered about a meter deep in a mound above a basal date of cal AD 1271–1376 (700±30 cal BP) (Beta-9688) and below a date of cal AD 1301–1405 (600±65 cal BP) (Beta-12897) (Athens 2007:205, Table 12.2).

A suite of radiocarbon and Uranium-Thorium (^{230}Th/U) dates from several locations within Nan Madol suggest that the monumental construction and use of islets in this complex began about AD 1500. McCoy *et al*. (2016) state that the megalithic wall construction around Nandauwas was built between AD 1172–1186 and the burial vault was constructed between AD 1197–1209. Radiocarbon dates from the four islets where beaked adzes were reported cluster between AD 1150–1480 (e.g., Ayres *et al* 1983; Athens 2007).

No beaked adzes reported from Lelu, Kosrae, came from directly dated contexts; however, Beardsley (2005) argued that construction of the artificial islets and walled compounds did not occur until about AD 1250–1400 with major building efforts occurring about AD 1400–1600 (Cordy 1981; Athens 2018). This is supported by Uranium-Thorium (^{230}Th/U) dates from burial mounds at Lelu showing that Kosrae mortuary construction began around AD 1310 (Richards *et al*. 2015).

The beaked adze may not have reached Palau until about AD 1300, represented by a shell date of cal AD 1325–1430 (530±52 bp), associated with two beaked adzes found together on the Rock Island of Ngeruktabel (David Snyder, pers. comm., 1986). This supports Osborne's (1966, 1979) contention that most sites yielding beaked adzes belonged to his Late Period (AD 1400–Contact).

The only location in Melanesia where a beaked adze was found in a dated deposit was Taumako. The artifact was found above an oven feature at the bottom of a deposit in a stone enclosure at the site of Kahula. This feature was dated to between cal AD 1335 and cal AD 1410 (530±65 cal BP) (SUA-116). Leach and Davidson (2008:259) state that the entire deposit at Kahula accumulated from the early fourteenth or early fifteenth century.

The emerging pattern is that beaked adzes first appeared in the western Pacific during the last 500–700 years, a millennium after initial settlement, and then spread rapidly.

BEAKED ADZE AND SOCIAL IDENTITY

Although rare, specific provenances reported for beaked adzes are found amongst islands inhabited by Nuclear Micronesian speakers in the Caroline Islands. Across much of at least these portions of Micronesia beaked adzes have been found at socially important locations such as: a significant ancestral house (*rolong)* on Ulithi Atoll; tombs (*lolong)* and residences of paramount chiefs at Nan Madol (Pohnpei) and Lelu (Kosrae); a chiefly residence (*roang*oanpalarro, emphasis mine) on Mokil Atoll; as well as at a traditional landing place for a significant ancestor, *Sowukachaw*, at Mechchitiw village, Moen, Chuuk.

These spatial associations and rare occurrences suggest beaked adzes were socially valuable items manufactured from the hinge section of the giant clam *T. gigas*, itself a prized source material. If the modern distribution of *T. gigas* across Micronesia, described by Rosewater (1965), approximates that of 500–700 BP, then this species was rare or absent across much of central and western Micronesia. making it unlikely that large *T. gigas* hinge adzes, including the beaked variety were local products.

Shell adzes shaped from the hinge section of Tridacna clams do not figure prominently in the collections from atolls west of Pohnpei. For example, all but one of 12 *Tridacna* adzes collected from Ulithi Atoll in 1978–1981 were shaped from the dorsal portion of the valves, most likely *T. maxima*. Despite the variety of *Tridacna* species, *T. gigas* may, in fact, have been an exotic

material at least across much of the Caroline Islands; its scarcity likely due to the effect of typhoons upon local populations.

The appearance of beaked adzes in Micronesia coincides with the timing indicated in oral histories from the Caroline Islands, These indicate that in the last several centuries before European contact, "politically important immigrants" arrived on the high islands in central and eastern Carolines from the "Sky World" of Kachaw (Kachau, Katau) (Goodenough 1986). King and Parker (1985) have described this as a "period of ferment" and Hunter-Anderson (1991:18) called it a time of "great settlement expansion and cultural elaborations of the A.D. 1000s-1500s".

Petersen (2006:82) argues that Kachaw involved a "complex of cultural and social practices, including cultivation of hybrid breadfruit varieties, classic matriclan organization and a range of political and religious cult practices". This complex spread from the high islands of eastern Micronesia towards the east and west, influencing ranking within Micronesian social structure, which is based on the order of settlement (e.g., Alkire 1977; Sudo 2006).

Goodenough (1986) argues that Kachaw is more likely a mythical place than an actual island location and suggests that the immigrant movement may not have been an actual event; rather, claiming ancestry through association with Kachaw was used to increase political power. On Pohnpei, both the Saudeleur dynasty and the later Isohkelekel phase claimed connection with Kachaw. Petersen (2006) has characterized this time as the "Breadfruit Revolution" across Micronesia involving population growth and concomitant cultural development due in part to the hybridization of breadfruit varieties, which provided an abundant, more reliable, food supply including a salt-resistant variety which allowed successful cultivation on atolls.

Mechchitiw village (Chuuk) is bound with accounts of the initial arrival of Sowukachaw ("Master of Kachaw"). King and Parker (1984) have documented the occurrence of artifacts and features (e.g., breadfruit fermentation pits) representing a change in subsistence emphasis during their Tonaachaw Pattern which began between 450–650 BP and they further contend that the change in subsistence was not restricted to Chuuk but was part of a larger pattern in eastern Micronesia.

At this same time construction and expansion of the political and religious centers at Nan Madol and Lelu occurred. Beaked adzes have been recovered from both these megalithic sites. Ayres (1990:203) proposed a date of about 450 BP as the beginning of the *Isohkelekel* Phase on Pohnpei as oral traditions indicate that this change was brought about by the culture hero, *Isohkelekel*, said to be from *Kata Pidak*, the "mystical eastern, upwind" place of *Katau*.

Goodenough (1986: 565, note 22) argues that an association existed between basalt and the spirit world of Kachaw, which was found as far west as Chuuk. Beaked adzes in Micronesia are found in locations where features built from basalt occur such as Nan Madol (Pohnpei), Lelu, (Kosrae) and Ant Atoll, offshore Pohnpei, on Tol (Chuuk) and Aur Atoll in the Marshalls. If the beaked adze is associated with basalt, then this adze form should be present on the atolls of Sapwuahfik (Carolines) and Namu (Marshalls) where basalt has also been found.

Micronesian oral traditions suggest that Kachaw linked the islands of Pohnpei, Kosrae, Chuuk group and the Marshalls forming what might be termed the Kachaw interaction zone (cf. Nakayama and Ramp 1974). With the presence of large beaked adzes on Ulithi and Lamotrek, it appears that the influence of Kachaw may, indeed, have extended to the western atolls in Micronesia, which were also important components within the Sawei interaction sphere with Yap. Rainbird (2004) states that oral histories indicate inter-island contact across the Caroline Islands was common and includes stories of visits from Ulithi Atoll in western Micronesia to Nan Madol in eastern Micronesia.

If beaked adzes are associated with Kachaw in western Micronesia, then it is unlikely that these adzes were included in the Sawei interaction network. No ethnographic descriptions of Sawei mention adzes of any form being exchanged (e.g., Hunter-Anderson and Zan 1996; Descantes 2005). Only one unquestionable beaked adze has been reported from Yap (i.e., Finsch 1914:122,

Abb 397-399) though a "beak-like" adze was found from a low-ranking village site in southern Yap (Intoh and Leach 1985:55). Petersen (2009:63) notes that social ranking in the western Carolines where connections to Yap were strongest, "...precedence based on settlement from and ties to Yap is on occasion trumped by status that inheres in later ties to Kachau."

IMPLICATIONS FOR POST-SETTLEMENT INTERACTION

Micronesia, Melanesia and ISEA have a long history of contact and interaction spanning millennia and occurring across hundreds of kilometers of open ocean. Contact began with initial settlements and continued, however sporadically, into the post-settlement period. Tracing such pre-European links, archaeologically, remains a difficult task (Weisler and Kirch 1996). Archaeological evidence of late, post-settlement interaction is limited with very few areas having produced portable artifacts that can be sourced.

Did beaked adzes in the western Pacific originally come from ISEA? While it seems unlikely that such an unique form would appear independently in adjacent geographical regions, a critical temporal gap exists, albeit possibly a product of the lack of associated dates in ISEA and a paucity of linked dates in Micronesia and Melanesia. If Bellwood is correct that beaked adzes may eventually be found in burials from the Early Metal Age in ISEA there would still be a gap of several hundred years between the suspected presence in ISEA and the earliest known occurrence in the western Pacific.

However, there is no lack of other items with ISEA origins in Micronesia. These include glass beads (Napolitano *et al*. 2022), backstrap loom (e.g., Riesenberg and Gayton 1952), rock art motifs (Schmidt 1974; Gregory and Osborne 1979) and statuary (Osborne 1966; Van Tilburg 1991). Despite evidence of cultural materials with definite ISEA origins, genetic evidence (e.g., Liu *et al*. 2022) suggests it is unlikely that these cultural materials were transported by any late movement of people into the western Pacific from ISEA.

Along with beaked adzes, cultural materials shared between Micronesia and Melanesia include obsidian found at Nan Madol (Ayers and Mauricio 1987; Specht *et al*. 2006) and Kapingamarangi Atoll (Nagaoka *et al*. 2022), some forms of rock art (e.g., Rainbird and Wilson; Nagaoka *et al*. 2022) and *Terebra/Mitra* adzes (e.g., Intoh 1999). Specht *et al*. (2006) point out that a grog-tempered pottery found along the western end of New Guinea is similar to that found in Palau and Yap. Kava was grown and prepared on Pohnpei and Kosrae, most likely deriving from Vanuatu, a "major dispersal point for Kava throughout the Pacific" (Crowley 1994). The different patterns of distribution of these items reflect variable post-settlement contacts.

The handful of dated contexts suggest a very late introduction of beaked adzes, occurring perhaps no earlier than about AD 1200 (750 BP) and subsequently distributed across much of Micronesia and along the northern fringe of Melanesia. If this time frame proves accurate, then the question becomes: how did beaked adzes arrive and subsequently disseminate so quickly? To achieve this distribution in a narrow time frame, it is likely these items moved through existing networks (e.g., Torrence and Swadling 2008).

By the time the beaked adze makes an appearance in the western Pacific numerous interaction networks were in operation. In addition to the well documented Sawei network linking Yap, in western Micronesia, with atolls and raised reef islands to the east, ending in the central Carolines, Sheppard (2022) has proposed another connected region, the "Marginal East Melanesia-Central Micronesia (MEMCM) Interaction Zone".

The MEMCM zone incorporated all Polynesian Outliers north of Vanuatu, extending northwards into the central Carolines around Chuuk. Citing Irwin (2008), Sheppard argues this zone incorporates a "safe voyaging field" in a north-south direction depending on seasonal winds. Ethnographies (e.g., Girschner 1912; Gladwin and Sarason 1953) have described a smaller trade network towards the northern end of Sheppard's "zone" involving the high islands of Chuuk and atolls to the southeast, including Nukuoro.

The development of support networks was crucial given the relative geographical isolation and unstable climate (e.g., droughts, typhoons), affecting most islands in Micronesia and

northern Melanesia. Therefore, rapid transmission of items is not improbable given what is known about interaction, especially of atoll dwellers, within Micronesia. Movement was so common in at least the western Carolines, traditional navigators travelled along named sea-lanes (D'Arcy 2001).

CONCLUSION

Beaked adzes occur across a circumscribed portion of the western Pacific. In Palau they were common and used as tools while in Nuclear Micronesia (i.e., Carolines, Marshalls) these adzes were rare and their spatial associations suggest they served as symbols of social identity and authority. Their occurrence also hints at a relationship with places connected to Kachaw, at least within Nuclear Micronesia. Regardless of its the putative association with Kachaw, the beaked adze in western and central Micronesia most likely represents connections to eastern Micronesia.

On Takuu, and perhaps other Polynesian Outliers in Melanesia, beaked adzes served a dual purpose; large non-hafted blades served as ceremonial objects while smaller versions were used as tools. If all Outliers used the beaked adze in the same way as is documented on Takuu, then these artifacts functioned as "social capital" (see Moir 1989) among families in an intra-island context rather than representing regional inter-island connections as found in Micronesia.

While many questions remain unanswered, it has been shown here that beaked adzes are not simply elements of general artifact assemblages and warrant much more specific, detailed attention. Evaluation should include use wear and residue analysis to determine what utilitarian function, if any, theses adzes served. Equally critical is the recording of specific locations of these adzes, even as surface finds, incorporating any local knowledge of such provenances in order to determine possible local significance of find spots.

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