The Batanes Archaeological Project and the "Out of Taiwan" Hypothesis for Austronesian Dispersal

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ABSTRACT

This paper summarises the archaeological results of the Batanes fieldwork undertaken between 2002 and 2005 by teams from the Australian National University, the National Museum of the Philippines, and the University of the Philippines.(1) *The evidence is believed to support a Neolithic settlement of the Batanes from Taiwan before 4000 BP, followed by continuing contacts, lasting until at least 1300 BP, that involved a movement of slate and nephrite from Taiwan (possibly via Ludao and Lanyu Islands) to Batan and Itbayat. Evidence that initial Neolithic settlement of the Batanes came from the south, via Luzon, is not indicated in the assemblages so far excavated.*

Key Words: Batanes Islands, Philippine and Taiwan archaeology, Malayo-Polynesian languages, C14 dating, nephrite

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(1) This research has been conducted with permission from the National Museum of the Philippines and has been funded by the National Geographic Society (twice) and the Australian Research Council. Reports on the Batanes project published so far are:

a) Bellwood *et al*. 2003, which is concerned mainly with the Sunget and Naidi phases on Batan and also carries a report by Janelle Stevenson on Paoay Lake (Ilocos Norte) palaeoenvironmental data.
b) Szabo *et al*. 2003, which details prehistoric subsistence strategies in sites excavated in 2002 on Batan. It should be noted that this report does not contain results obtained from 2003 to 2005, and thereby underestimates the significance of marine dietary items in Batanes subsistence.
c) An unpublished but detailed report on the 2002 and 2003 results from Batan and Sabtang, including a survey of Savidug Ijang, was compiled in 2003 for submission to Unesco to support the nomination of the Batanes Islands as a World Heritage Site (Unesco 2003). This report is now being incorporated into a full report on all the sites excavated in 2002-2005.

THE BATANES ISLANDS

The Batanes Islands lie on the northern edge of the tropics, 150 km from the southern tip of Taiwan and 200 km from the north coast of Luzon (Fig. 1). They are separated from Luzon by the Balintang Channel and the Babuyan Islands, and from Taiwan by the open sea of the Bashi Channel. The group consists of three inhabited islands; dumb-bell shaped Batan, 18 km long and the most densely populated island of the group (Fig. 2); 10 km long Sabtang; and 18 km long Itbayat, the largest island in land area (Fig. 3).

In terms of the human environment, Batan is by far the most fertile island in the group, particularly its central "neck" of volcanic ash soils between the Iraya and Matarem volcanoes. Most Batan archaeological sites occur in this area, both on the coast and inland. On Itbayat, all archaeological sites occur inland to a degree, owing the presence of a rampart of massive limestone cliffs that completely surrounds the island. This paper is focused on discoveries on Itbayat and Batan.

Despite a great deal of "received wisdom" in the older literature that the Batanes and Babuyan Islands were part of a Pleistocene land bridge from Taiwan to Luzon, there is absolutely no geological or faunal evidence to demonstrate that this was ever the case (Heaney 1985; Bellwood 1997). Sea bed depths in the Bashi channel attain at least 1000 m —clearly far too deep to be affected by Pleistocene sea level fluctuations. Early humans never walked from Taiwan to Luzon, and so far, during three seasons of archaeological fieldwork in Batanes, excavations in 6 caves and rock shelters (amongst other sites) have failed absolutely to give any sign of preceramic occupation. All sites are sterile culturally below the lowest sherds. In all of our excavations, over three years, we have found no trace of a flaked lithic industry, related to those found so widely elsewhere in Island Southeast Asia, that could indicate pre-Neolithic hunter-gatherer occupation (apart from flakes struck off polished adzes). The Batanes Islands were seemingly first settled by Neolithic populations, presumably the ancestors of the present Ivatan and Itbayaten populations, with a fully-fledged polished stone technology. Where did they come from? We return to this question later.

THE BATANES CULTURAL SEQUENCE

In the initial report on the 2002 research on Batan Island (Bellwood *et al*. 2003), the Batan sequence was divided into three provisional chronological phases, each with distinctive characteristics. These phases were named after sites on Batan Island and began with the *Sunget Phase*, then tentatively dated to between 3500 and 2700 BP. The Sunget assemblage reveals many clear connections with eastern coastal Taiwan during the Late Neolithic Beinan Phase (3500 to 2500 BP—see Hung 2004 for Taiwan periodization), visible in the presences of artifacts of Taiwan nephrite and slate(2), red slipped and non-cord

(2) See Koomoto 1982: Fig. 25. The existence of the Taiwan slate and jade artifacts from Sunget only became known in 2005, when the artifacts were returned from Kumamoto University to the National Museum in Manila, through the assistance of Dr. Hidefumi Ogawa.

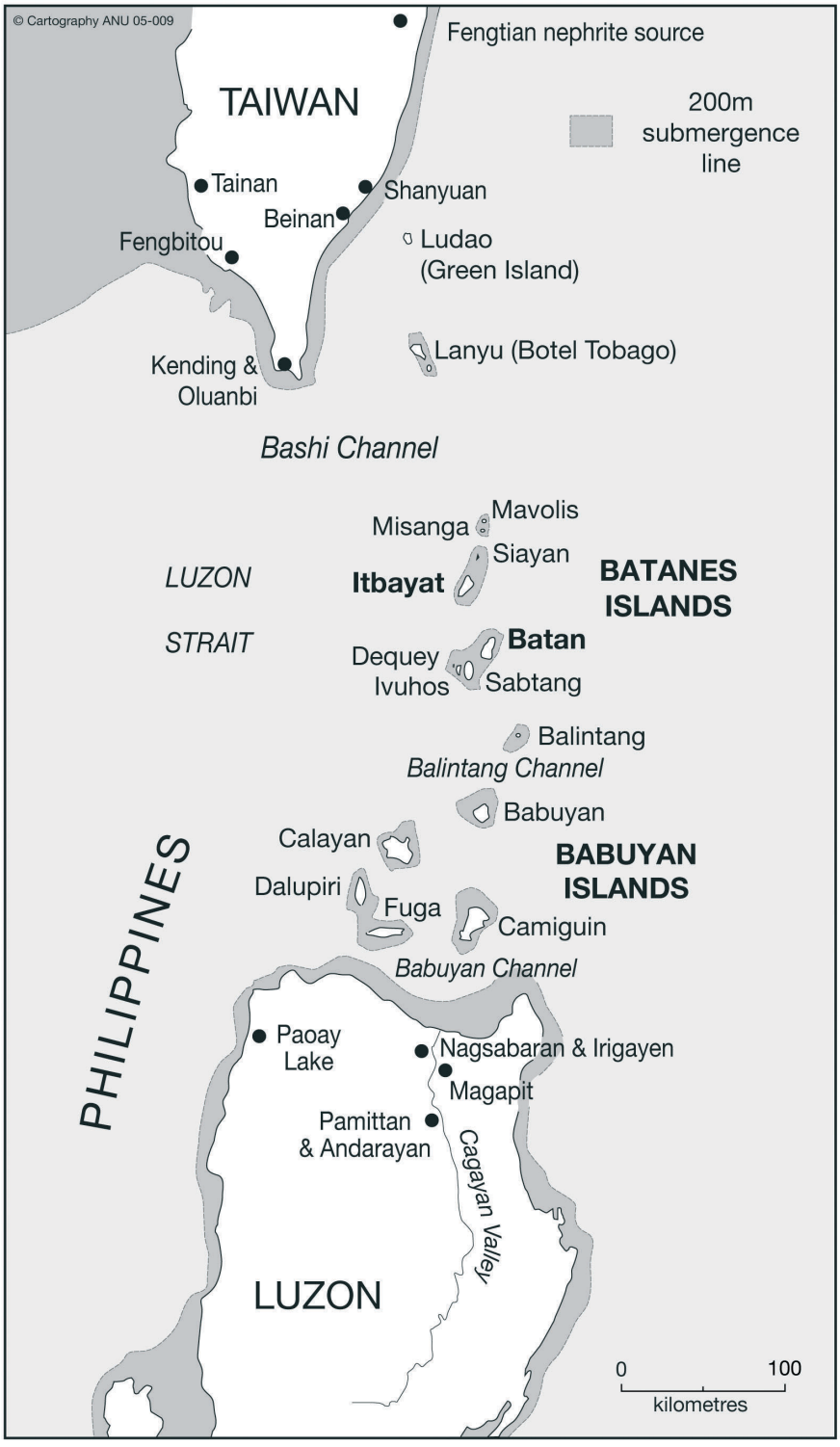

Fig. 1. The Batanes Islands, and their location between southern Taiwan and northern Luzon.

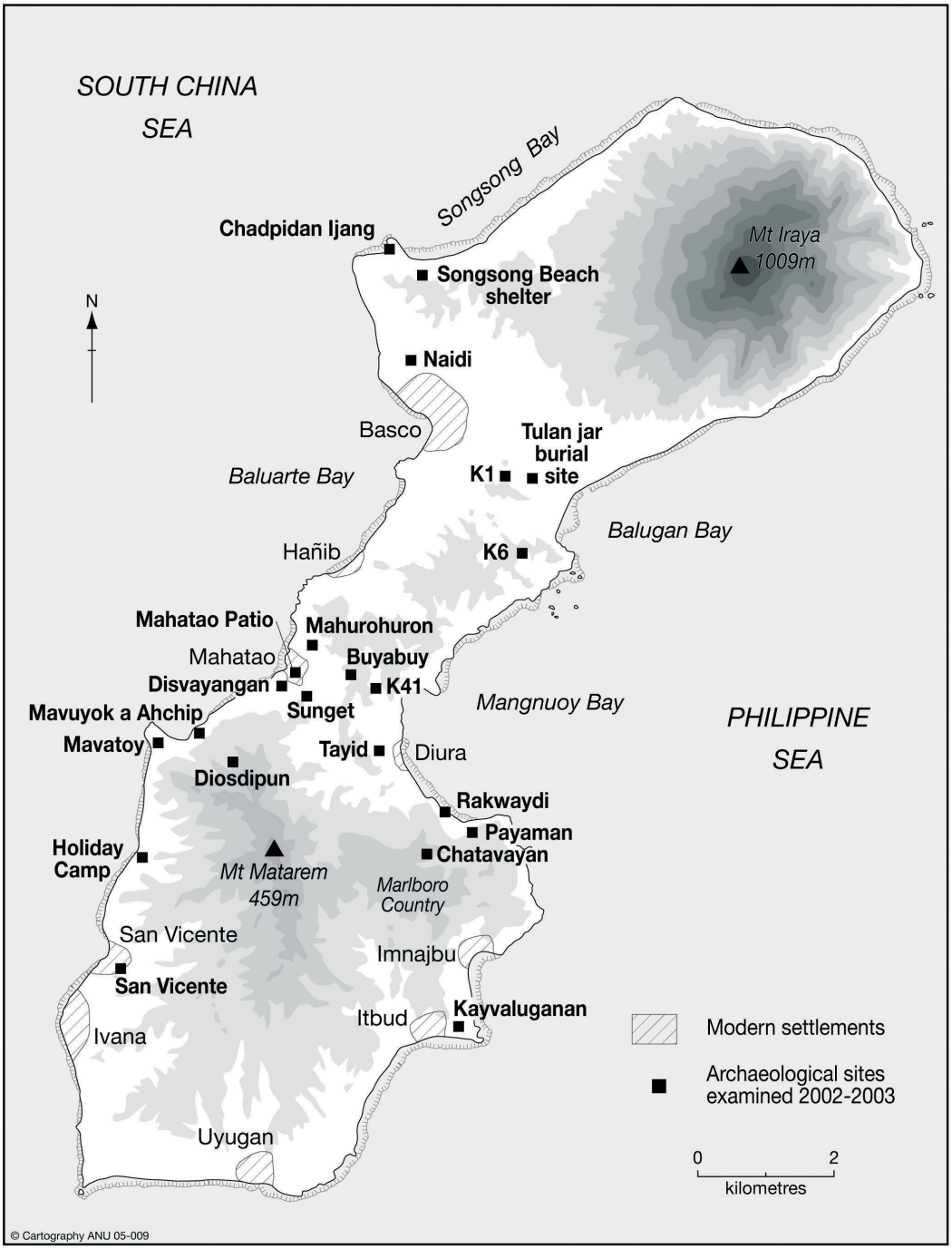

Fig. 2. Archaeological sites investigated on Batan Island. Names of archaeological sites are in bold. Sites labelled K1, K6 etc. are from Koomoto 1983, with his original numbering system.

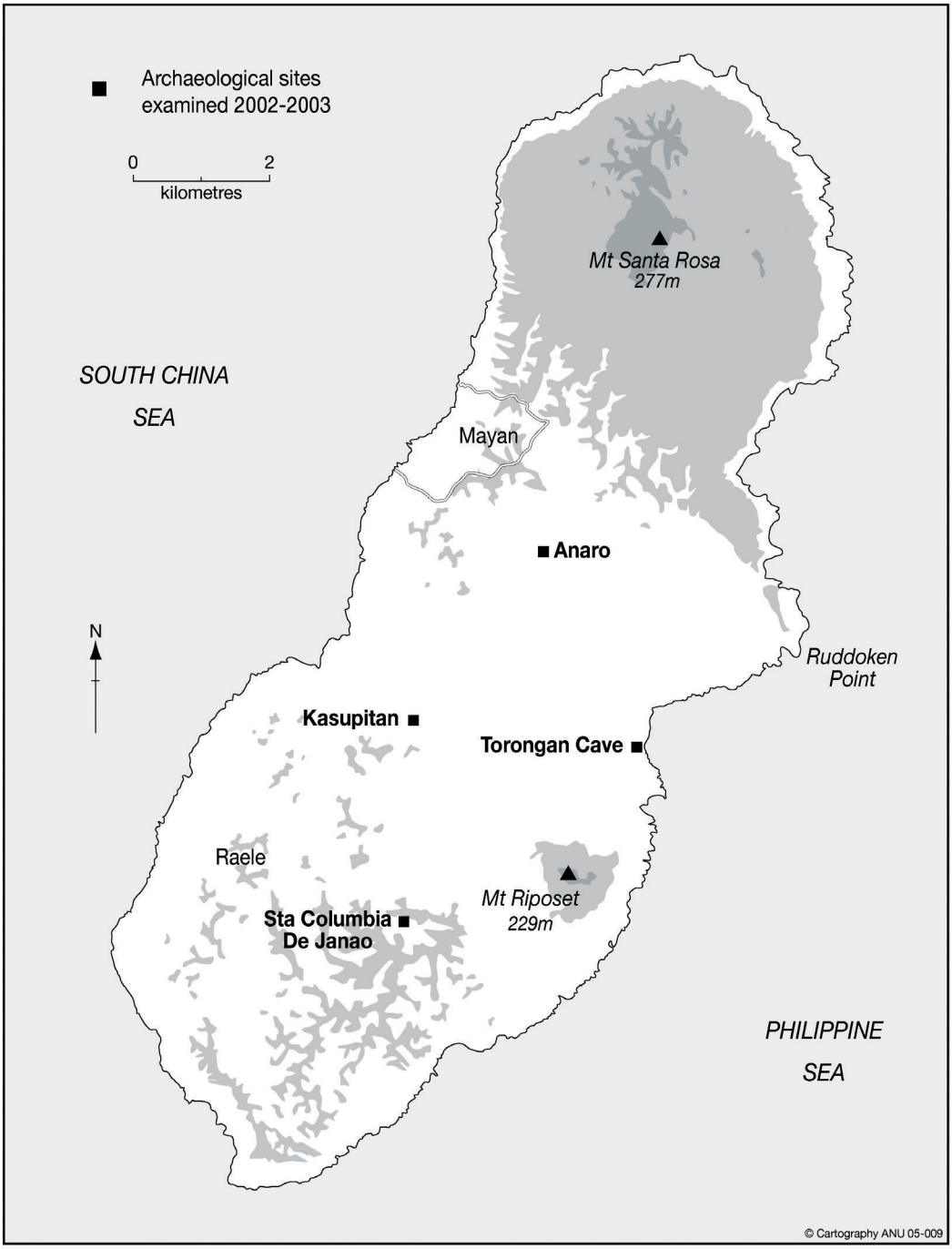

Fig. 3. Map of Itbayat, showing investigated archaeological sites.

marked pottery with tall vertical handles, biconical baked clay spindle whorls, and bi-notched stone fishing sinkers (Bellwood *et al*. 2003). Sunget also has a presence of pigs.(3)

The following Naidi Phase (tentatively dated 2500 to 1500/1000 BP) contained assemblages from many sites on Batan, both inland and coastal (including Naidi itself), but the pottery rim forms from this phase differ from those of the Sunget Phase (albeit with some overlap) in being shorter and often more complex in cross-section. A phase of catastrophic volcanic eruption and landscape burial then occurred on Batan between 1500 and 1000 BP (with no obvious volcanic repercussions on Itbayat or Sabtang), burying sites of the Sunget and Naidi Phases in northern and central Batan. The precise impact of all this devastation wrought by Mt. Iraya on the inhabitants of Batan Island can only be guessed at, but if there was any hiatus in occupation it was probably short-lived and localised.

The *Rakwaydi Phase* continued after the eruption on Batan from about 1000 BP to ethnographic times, with very similar undecorated (apart from occasional red-slipped) pottery forms being present at this time right across Batan, Sabtang and Itbayat (Rakwaydi Phase sites are not discussed in this paper). Fortified ijang and boat-shaped stone grave enclosures are characteristic of the Rakwaydi Phase in the Batanes (Dizon 1998-2003)(4), and the final stage of pre-Spanish life on Batan and Ivuhos Islands was described with remarkable clarity by William Dampier in 1687 (Blair and Robertson 1903-9, Vol. 39, pp. 95-112).

Until the commencement of research on Itbayat Island it was thought that this three-phase Batan sequence could perhaps be applied to Itbayat as well. But with the latest period of fieldwork (2005), our fourth since the research began, it is becoming apparent that Itbayat had many cultural trends of its own in prehistory, not the least being a quite phenomenal phase of interaction with Lanyu and Taiwan between 2500 and 1500 BP, a phase that might have witnessed the movement of the ancestors of the Yami people to Lanyu Island from their Itbayat homeland (Kano and Segawa 1953; and see Malcolm Ross, *forthcoming issue*). Itbayat also has an assemblage from Torongan Cave that is older than that from Sunget, so use of the term "Sunget Phase" for the oldest period of Batanes occupation is no longer appropriate.

Because of this, we now favour a separate three-phase sequence for Itbayat, parallel to that for Batan, with successive Torongan, Anaro and Garayao phases on Itbayat running parallel to the Sunget, Naidi and Rakwaydi phases on Batan. However, we have

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(3) Presumably *Sus scrofa*, and therefore from mainland Asia or Sundaland since the native Luzon pig, *Sus philippensis* according to Groves (1997), is not reported ever to have been domesticated. Unfortunately, a recent survey of ancient pig mtDNA from Island Southeast Asia and Oceania omitted to consider any samples from the Philippines (Larson *et al*. 2005), and so is not relevant for any consideration of the origins of Batanes pigs (see Bellwood and White 2005).

(4) Many papers on the archaeology of the Rakwaydi Phase can be found in issues of the *Ivatan Studies Journal*, particularly combined issues II-IV (1995-7) and V-X (1998-2003).

decided not to put firm chronological boundaries on these phases in the present state of our knowledge, because no major breaks are apparent anywhere within the Batanes sequence, not even after the Iraya eruption of c. 1000 BP. These phase names are used for chronological guidance only and should not be taken as representing clearly separate stylistic entities. Because they are not essential for the subject matter of this paper they will not be discussed below in further detail.

A summary of the current state of Batanes C14 chronology is shown in Table 1. To summarise the situation so far:

- Pre-4500 BP - no evidence for a human presence in Batanes;
- The oldest human activity (pottery) in Torongan Cave is now dated 4450-4080 BP (OZH 771). Sunget was occupied from c. 3200 BP.
- The Torongan and Sunget occupations continued into the first millennium BC, with Taiwan nephrite and slate occurring at Sunget but not yet found in Torongan Cave.
- The Anaro and Naidi Phases commenced, in terms of pottery rim form changes, after 2500 BP, and continued to 1500/1000 BP. Slate and nephrite continued to be imported from Taiwan (possibly via Lanyu) to Itbayat for local manufacture into artifacts. The Batanes by this time were surely in frequent contact with northern Luzon, although precise documentation of this is currently elusive (a program of sourcing adze rocks is required);
- Garayao and Rakwaydi Phases 1000 BP to AD 1687—ethnographic Itbayaten and Ivatan cultures, widely established on Batan after the Iraya eruption of c. AD 1000.

THE EXCAVATED SITES

Torongan Cave, Itbayat (Figs. 4-6)

The oldest assemblage known so far in Batanes comes from Torongan cave on the east coast of Itbayat. Given the verticality and height of the Itbayat cliffs and the difficulties of landing boats, it is quite possible that Torongan Cave, which opens at sea level, would have provided a landing place for early settlers who could have beached their canoes in the lower cave (Fig. 6)(5), and then climbed up through the interior to emerge eventually on the top of the island. The cave system is a 30 m high tunnel about 120 m long, with both seaward and inland entrances, and at one time it must have been occupied by the Torongan River, which now flows underground before it reaches the cave. The archaeological deposit is located about 13 m above the base of the cave, near the top of a

(5) The lowest portion of Torongan Cave is so close to sea level that shallow water might have penetrated into it during any putative period of mid-Holocene higher sea level (not actually attested for Itbayat, but likely from a regional perspective). The lower part of the cave wall has a marked overhang, perhaps due to wave action. Were this the case, then boats could have been brought inside during summer periods of quiet sea. The sea does not penetrate the cave today.

high cone of fallen rock and soil piled against the southwestern wall of the inland mouth. On excavation in 2004 and 2005, an inwashed layer of exterior topsoil was found at about 40-65 cm depth, presumably released by forest clearance and occupational activity on the land surface above the cave, where traces of a former site were noted in 2005, alas virtually all eroded away down to the culturally sterile clay subsoil.

This inwashed soil contained sherds of plain and red-slipped pottery, otherwise undecorated, with everted rims paralleled closely in the newly-discovered (April 2005) site of Chaolaiqiao above Shanyuan Bay, near Taidong, in eastern Taiwan (Fig. 7). Chaolaiqiao has predominantly red-slipped and painted pottery with a C14 date of c. 4000 BP (WK 17011, charcoal, 3736±43 uncal. BP). This site is discussed in more detail in the adjoining paper by Hung Hsiao-chun—its discovery establishes the existence in eastern Taiwan of a culture characterised by the use of red-slipped and non-cord-marked pottery, dating between the earlier fine cord-marked (Fushan) and later Beinan phases.

The C14 dates from Torongan Cave point to a chronology for the inwashed topsoil layer between 4450 and 3300 cal. BP (Table 1), although there are younger dates from higher in the profile suggesting that the site was visited over a long period, indeed into the Ming dynasty according to a coin of the emperor Wan Li (AD 1583-1620) found just below the surface. Torongan also has four circle-stamped sherds with white lime or clay infilling amongst the otherwise undecorated plain and red-slipped sherds (Table 2), similar to the sherds with stamped circles from Sunget and Anaro (below). These appear to be relatively late in the Torongan sequence. One specific item from Torongan with Taiwan affinity, found amongst the early plain and red slipped pottery, is a waisted stone hoe of igneous or metamorphic rock (Fig. 8, bottom row, second from right; for comparative pieces see National Museum 2004: plates 39-46).

Sunget, central Batan

The importance of the Sunget site (Site 56 in Koomoto 1983: 55), on the limestone ridge that rises immediately behind the central part of Mahatao township in central Batan (Fig. 9), was first indicated by a Japanese survey in 1982. The site was discovered during road construction buried under a metre or more of volcanic ash, and three excavations there since 2002 have identified two areas of occupation about 100 metres apart, termed Sunget Top Terrace and Sunget Main Terrace. Details of the 2002 and 2003 excavations on the Top Terrace are given in Bellwood *et al*. 2003, and in 2004 we excavated a 2 by 2 metre square on the Main Terrace (Fig. 10).

The cultural deposit in both locations lies about 10-30 cm below the surface of an old palaeosol buried by the Mt. Iraya ash, and we have two almost identical AMS dates on food residues inside potsherds that indicate a basal calibrated date for the assemblage between 3200 and 2950 BP (Table 1—note that ANU 11817 and Wk 14640 are from two different labs, a circumstance that supports their combined validity). Other dates on scattered charcoal particles suggest continuing use of the site until late in the first millennium BC.

Fig. 4. The location of Torongan Cave and the eastern coastline of Itbayat, looking north.

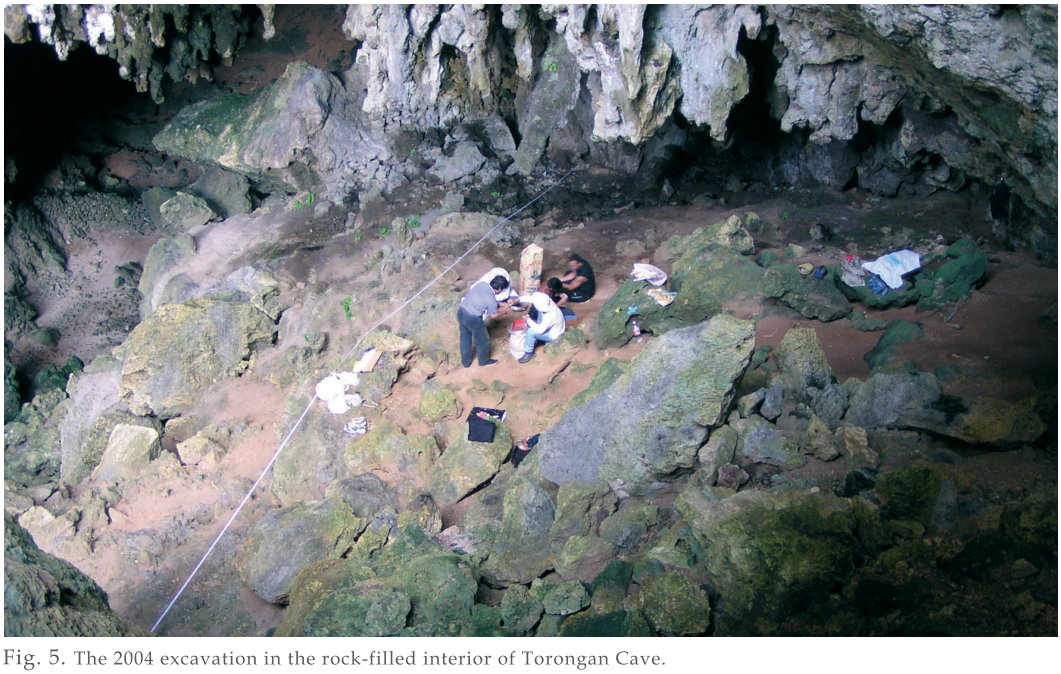

Fig. 5. The 2004 excavation in the rock-filled interior of Torongan Cave.

Fig. 6. The Torongan Cave landing, photographed from inside the cave.

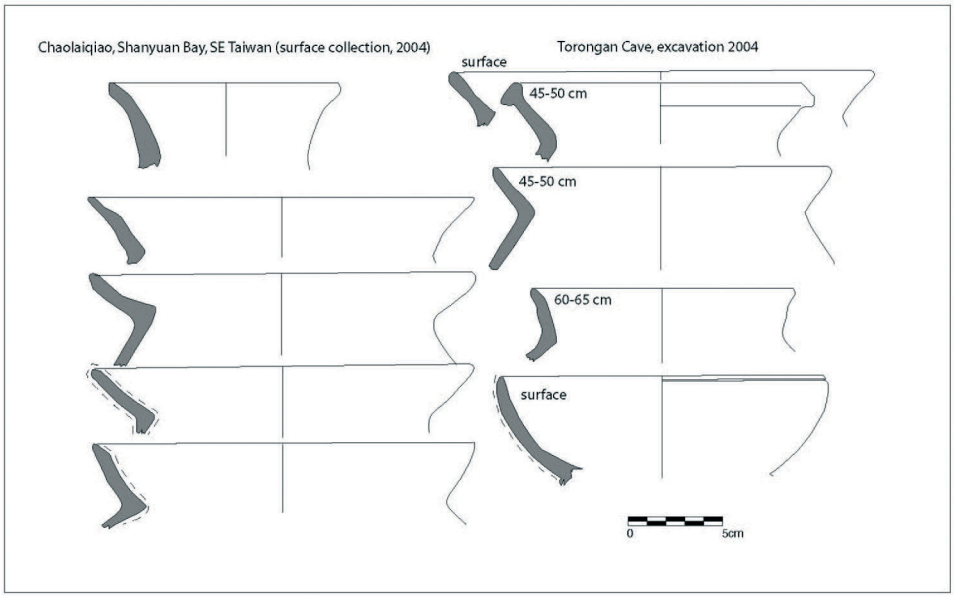

Fig. 7. A comparison of rim forms from Torongan Cave and Chaolaiqiao (c. 4500-3500 BP). Dotted lines indicate surface resin or red slip.

- Open bowls with direct rims, mostly round-based but with a few probably on pedestals or ring feet (*cf*. Ogawa 2002: Figs. 5-6). Some bowls were externally decorated with zones of close-set stamped circles, forming rectangular meanders running horizontally around the upper external surface of the pot (Figs. 12-13). The site of Anaro on Itbayat (see below) also has one specimen (out of several hundred with circle stamping) with the same rectangular meander design, suggesting that Sunget and Anaro overlapped in date close to 3000 BP (although Anaro has a younger date range overall—see Table 1).
- Circular-sectioned lugs or handles, attached either horizontally or vertically to the sides of globular restricted vessels. The tall vertical ones resemble the handles on northern and eastern Taiwan pottery (*e.g*. Yuanshan and Beinan) dating between 3500 and 2500 BP (Sung 1991; Sung and Lien 1987: Plates XXIV-XXV). Interestingly, these vertical handles are not present in the Anaro or Naidi assemblages, nor in Cagayan Neolithic sites—they are a distinctive cultural sharing between Sunget and Taiwan. Neither do they occur in older sites such as Torongan, Chaolaiqiao, nor in the Dabenkeng culture in Taiwan. They presumably track secondary connections between Taiwan and Batanes, after initial settlement occurred.

An important absence in Sunget, and for that matter in all Batanes sites so far, is cord-marking or any kind of paddle-impression on pottery. In this regard it should be noted that such surface finishing also disappeared in parts of eastern Taiwan after about 4500 BP, as at the site of Chaolaiqiao referred to above. Sunget has yielded no dentate stamping of the type found in Magapit, Nagsabaran and Irigayen in the Cagayan Valley.

Sunget has also produced two biconical spindle whorls, one decorated with stamped circles, perhaps used to spin strong fibres such as those from the leaves and hard leaf stems of *Musa textilis* (*abaca*, Manila hemp) or ramie (*Boehmeria nivea*) (Judy Cameron pers. comm.). The biconical morphology links the whorls to many contemporary Neolithic sites in northern and eastern Taiwan (as well as Anaro on Itbayat—see below). Rare but similar biconical whorls also occur in c. 3500-2500 BP Cagayan Valley sites such as Andarayan, and possibly Arku Cave and Magapit (Cameron 2002; and see Hung Hsiao-chun, adjoining paper).

Other Sunget artifacts include large numbers of notched and flat ovate pebble "sinkers" of a type also common all over Taiwan from Dabenkeng Early Neolithic times onwards (Fig. 14); pitted anvil stones; and a very intriguing array of stone adzes, including stepped ones, with quadrangular or trapezoidal cross-sections (found in 1982—see Fig. 15). Stepped adzes occur in the Yuanshan and Beinan cultural horizons (3500 to 2500 BP) in Taiwan, as well as in the Cagayan Neolithic sites (Hung Hsiao-chun, pers. comm.). Indeed, it is possible that many of these adzes were brought to Batanes from Luzon, and a program of adze stone sourcing is clearly required (*cf*. Hung 2004 for a sourcing program on Taiwan adzes). One very small Sunget quadrangular adze returned from Japan to Manila in 2005 is almost certainly of Fengtian nephrite, and there is also a tanged quadrangular adze and a point of black slate, both presumably from Taiwan (see Fig. 15).

Fig. 8. **Stone and shell adzes and other stone tools from Itbayat sites, all surface finds apart from the barkcloth beater from Anaro 2 and the waisted hoe from Torongan Cave. Scale is in cm.**

Top row, left to right:

- Duff 2A trapezoidal cross-sectioned (c/s) adze of dark grey igneous rock, found by local people in a small pot under a limestone overhang in northwestern Itbayat. For a similar specimen from Lanyu, see Duff 1970:116;
- Anaro 2 surface, flaked and partially ground chisel, with damaged cutting edge, of pale grey metamorphic rock. C/s is thick oval and this specimen is very similar to the two shown in Bellwood 1997, Plate 34, top right hand corner, from Uattamdi, Moluccas (c.3200 BP) and Pitcairn Island (undated);
- Anaro 2 surface, tanged adze of pale grey metamorphic rock, triangular to trapezoidal c/s. For a related specimen see Duff 1970:115 (bottom right, type 1A, Taipei City). The Anaro specimen is more triangular in mid c/s, cf. Duff 1970:138 (type 3A, Albay);
- Eastern Itbayat, found on trail, small adze of Duff type 1A, pale grey metamorphic rock, cf. Duff 1970:115 (Taipei City and Yuanshan), 138 (Albay). This adze was made by a grooving and snapping technique, as used on nephrite;
- Piece of unidentified rock, thin, with one smooth and flat edge, that could have been used as a grooving tool for working slate or nephrite;
- Fragment of a large adze(?) of igneous rock, used post-breakage as a scraper or awl. Pivalan ijang, near Anaro (surface);
- Anaro 2, adze section, trapezoidal c/s, unidentified rock;
- Anaro 2B, 40-45, excavated barkcloth beater of igneous rock, see Fig. 17.

Middle row:

- all items in this row are butt, middle or bevel and blade sections of adzes of pale grey metamorphic rock, mostly with trapezoidal to triangular cross-sections. All are flaked and partially polished, many have been battered, perhaps by post-breakage use for hammering. All from Anaro, surface. The piece second from right has a sub-triangular c/s and appears to be part of a chisel; cf. second from left in top row above, also Duff 1970:144, type 6A, Batangas.

Bottom row, left to right:

- Bevel and blade of adze with triangular c/s, pale grey metamorphic rock, Anaro 2 surface. (Duff type 3?);
- Bevel and blade of adze with trapezoidal c/s, pale grey metamorphic rock, Anaro 2 surface;
- Adze mid-section, damaged, pale grey metamorphic rock, Anaro 2 surface;
- Butt end of an adze of apparent fossilised shell, oval c/s. Anaro 2 surface;
- Notched sinker of a coarse-grained pebble, from Anaro, surface (similar to the ones found commonly at Sunget, but quite large);
- 2 mid-sections of what appear to be bifacially flaked and partly ground "hoes", of a type common in Taiwan;
- The waisted stone hoe from Torongan Cave (see text);
- Shaped butt end of a large hoe-like tool, termed "*patu*-type hoe" by Duff (1970:120) and found in Taiwan in small numbers in what appear to be Iron Age contexts (unpublished materials from Tainan Science-Based Industrial Park, SW Taiwan)

Table 1:

Radiocarbon dates older than 1000 BP (except OZH 775) from Itbayat and Batan Islands, 2002 to 2005 fieldwork, with selected dates for red-slipped pottery excavated in northern Luzon related to that of Sunget. Calibrations use Oxcal version 3.8, but owing to uncertainties over reservoir effects we have decided not to calibrate marine shell dates. Asterisked dates are AMS.

LOCATION, SITE	CONTEXT	DATE BP	LAB NO.	OXCAL, 2 SIGMA
ITBAYAT ISLAND	**TORONGAN AND ANARO PHASES**			
Torongan Cave*	Food residue on sherd at 55-60 cm (base of cultural layer)	3860±70	OZH 771	2500-2130 BC
Torongan Cave*	Tectarius shell at 55-60 cm	3880±40	OZH772	
Torongan Cave*	Food residue on sherd at 55-60 cm	3320±40	Wk 14642	1690-1510 BC
Torongan Cave*	Turbo shell at 55-60 cm	2496±37	Wk 15795	
Torongan Cave*	Turbo shell at 50-55 cm	3352±35	Wk 14641	
Torongan Cave*	Thais shell at 45-50 cm	3663±41	Wk 15794	
Torongan Cave*	Marine shell at 40-45 cm	3470±50	OZH773	
Torongan Cave*	Food residue on sherd at 15-20 cm	520±70	OZH775	AD 1280-1500
Torongan Cave (not C14)	0-5 cm. Coin of the Ming ruler Wan Li	not applicable		(AD 1573-1620)
Anaro hilltop site*	Area 3, 95-105 cm, food residue on sherd	2770±50	OZH774	1040-810 BC
Anaro hilltop site*	Area 2A, 15-20 cm, food residue on sherd	1876±41	Wk 14643	AD 50-240
Anaro hilltop site*	Area 3, 90-95 cm , food residue on sherd	1360±39	Wk 14645	AD 600-730
Siayan Island, Mitangeb beach site	Turbo shell from Test Pit 1, 50-55 cm	1659±32	Wk 14646	
BATAN ISLAND	**SUNGET PHASE**			
Sunget Main Terrace*	Layer 5, 15-20 cm within layer, resin coating on sherd exterior	5790±150	OZH776	Not calibrated (fossil resin)
Sunget Main Terrace*	Layer 5, 20-30 cm within layer, food residue in pottery	2910±190	ANU 11817	1700-500 BC
Sunget Main Terrace*	Layer 5, 15-20 cm within layer, food residue in pottery	2915±49	Wk 14640	1270-970 BC
Sunget Top Terrace	Layer 5, 20-30 cm within layer, charcoal concentration	2630±30	ANU 11693	840-760 BC
Sunget Main Terrace*	Layer 5, 30-35 cm within layer, scattered charcoal fragments	2383±35	Wk 15649	760-380 BC
Sunget Top Terrace*	Squares A/D, layer 5, 20-30 cm within layer	2000±140	ANU 11707	400 BC - AD 350
	NAIDI PHASE			
Naidi	Charcoal in A2, 0-10 cm within layer	2240±140	ANU 11708	800 BC - AD 50
Naidi	Charcoal in road section	1590±210	ANU 11694	50 BC - AD 900
Naidi	Charcoal in road section	2620±30	ANU 11695	835-760 BC
Mahatao town*	Charcoal in palaeosol below volcanic ash (with sherds)	2090±60	ANU 11710	500 BC - AD 350
Mahatao town*	Charcoal in palaeosol below volcanic ash (with sherds)	1829±180	ANU 12071	250 BC - AD 650
Payaman	North square, layer 3, charcoal at 10-25 cm within layer	1988±47	Wk 13092	110 BC - AD 130
Payaman	South square, layer 3, charcoal at 20-25 cm within layer	1486±185	ANU 12068	AD 100-1000
Tayid*	Beneath main ash deposit, food residue on sherd	1842±215	ANU 12069	400 BC - AD 650
CAGAYAN VALLEY, LUZON	**RED-SLIPPED POTTERY PHASE (all charcoal)**			
Pamittan	Layer II (Tanaka & Orogo 2000:132; Spriggs 2003:67)	3390±100	Gak 17967	1940-1440 BC
Pamittan	Layer III	3810±200	Gak 17968	2900-1700 BC
Andarayan	AMS date on rice husk (Snow et al. 1986)	3400±125	Unknown	2050-1400 BC
Andarayan	(Snow et al. 1986:3)	3240±160	SFU 86	1950-1050 BC
Nagsabaran	Level 16 (Hung Hsaio-chun, pers comm)	3050±70	GX 28379	1450-1050 BC
Nagsabaran	Level 19	3390±130	GX 28381	2050-1400 BC
Irigayen	Layer 3 (Ogawa 2002:95)	3025±20	NUTA2-914	1380-1130 BC
Irigayen	Layer 3	2925±20	NUTA2-912	1260-1020 BC
Irigayen	Layer 3	3165±25	NUTA2-913	1520-1390 BC
Irigayen	Layer 3	3185±25	NUTA2-917	1520-1410 BC

Table 2:

The distribution of cultural materials in Torongan Cave, 2004-5 excavations, squares A to D. Note the very high density in the inwashed topsoil layer (shaded). Counts for red-slipped pottery are only indicative in the absence of careful sherd cleaning—these figures must be considered absolute minima.

Torongan A-D	Body sherd no.	Body sherd weight gm	Red slipped*	Circle-stamped
0-5	129	444	6	1
5-10	184	802	15	
10-15	130	553	13	
15-20	151	890	11	
20-25	178	524	13	1
25-30	193	616	21	
30-35	204	626	21	
35-40	281	934	19	
40-45	**361**	**1723**	**50**	**2**
45-50	**413**	**1759**	**50**	
50-55	**362**	**1342**	**33**	
55-60	**173**	**744**	**11**	
60-65	**165**	**442**	**7**	
65-70	58	142	4	
70-75	37	148	5	
75-80	3	5		

The Sunget material found by the Kumamoto team in 1982 was Neolithic (no metal was found), related to assemblages of Neolithic date in Taiwan (especially Yuanshan and Beinan), and to assemblages of stamped and red-slipped pottery in the Cagayan Valley and other areas of northern Luzon. All of these linkages fall generally into the period between 3500 and 2500 BP (see Table 1). The Sunget pottery is mainly red-slipped and includes:

- Globular restricted vessels with everted tall and unthickened rims, some being internally quite concave in profile, perhaps to take lids (Fig.11). Some lips have thin shallow external grooves, and some of these vessels were probably placed on tall ring feet. Neolithic parallels for this pottery can be seen in the Irigayen, Nagsabaran and Magapit red-slipped pottery assemblages from the lower Cagayan Valley, especially the concave rim profile and the external lip groove (Ogawa 2002: Figs. 3-4; and see adjoining paper by Hung Hsiao-chun).

Fig. 9. The Mahatao landscape, showing the location of Sunget Ridge behind and above Mahatao township. The Sunget sites are marked by white stars; Top Terrace to the left, Main Terrace to the right.

Fig. 10. The Sunget Main Terrace excavation, 2004. The archaeological layer lies within the old topsoil buried beneath the yellowish mantle of volcanic ash.

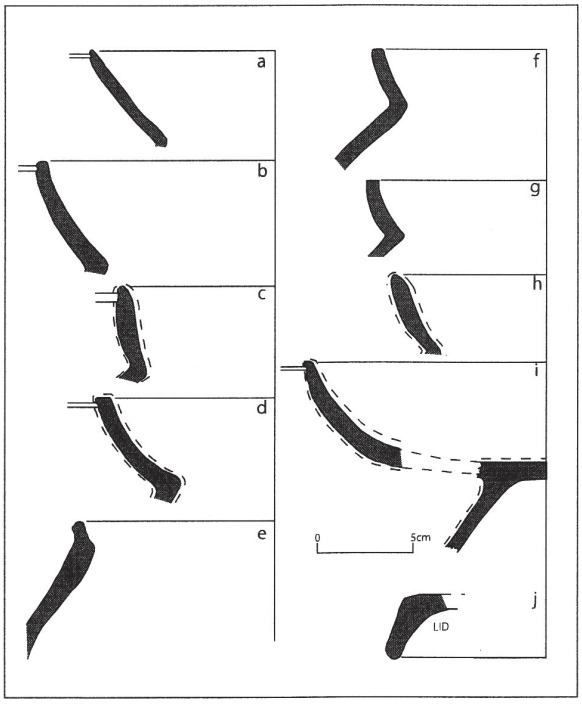

Fig. 11. Vessel forms from Sunget. Dotted lines indicate surface resin or red slip.

Fig. 12. Stamped circle decoration on a red-slipped carinated sherd from Sunget, 5 cm maximum dimension. The stamping was done after application of the slip, and contains traces of white clay or lime infill.

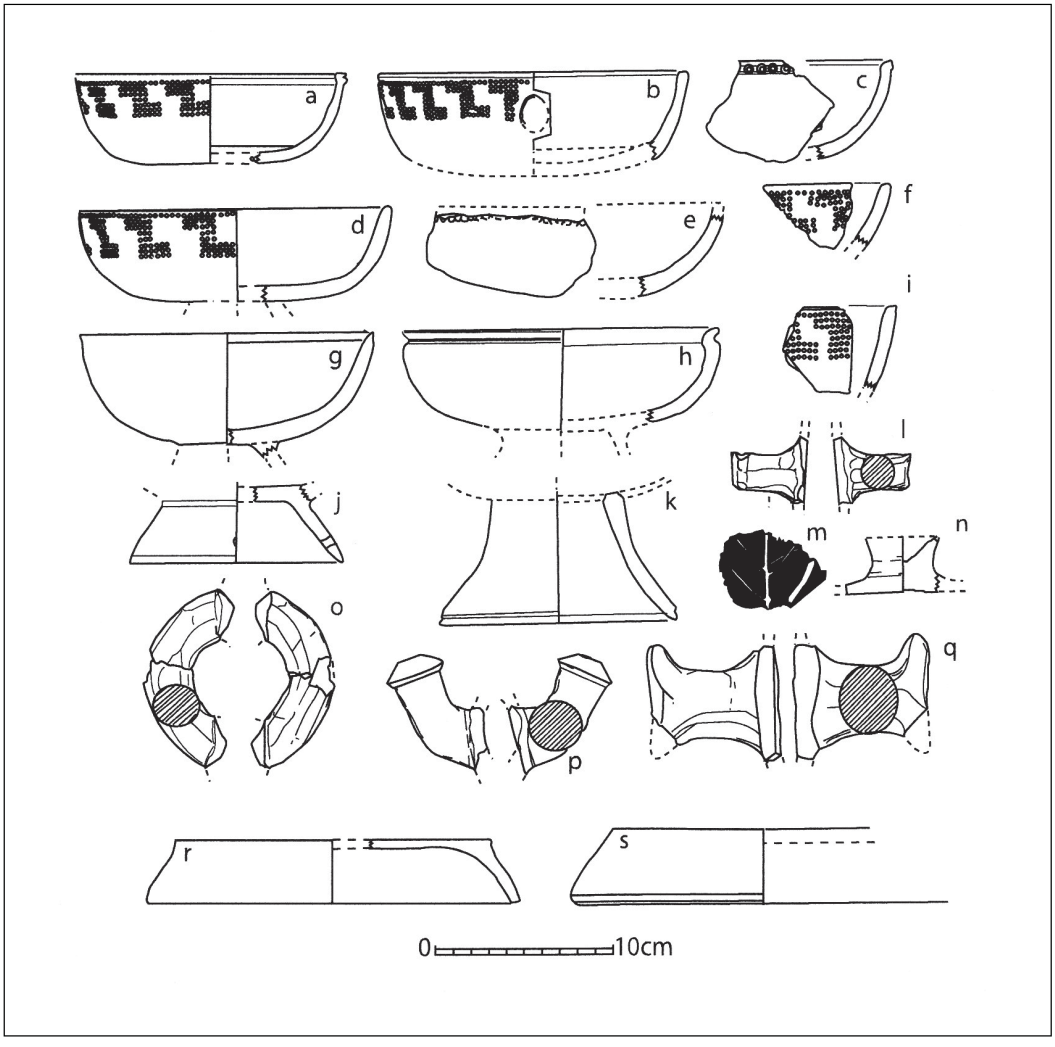

Fig. 13. Pottery found during the first investigations at Sunget in 1982, reproduced with permission from the University of Kumamoto (Koomoto 1982: Figures 16 and 17).

However, one remarkable lithic absence from Sunget, indeed in all Batanes sites, is any evidence for a use of flaked stone tools—presumably chert-like materials were so scarce that the community depended almost entirely on polished stone. It is also of course likely that these people belonged to a cultural tradition that had long since lost interest in purely flaked stone technology, as in much of Neolithic China and Taiwan. To those accustomed to excavating Neolithic sites in eastern Indonesia or Melanesia this absence of flaked lithics seems strange, and it obviously emphasises that in the latter areas there was considerable carry-over of indigenous preceramic lithic technology into

the Neolithic. We have also never found Sunget Phase materials in caves or rock shelters, except for one sherd in Mavatoy shelter on Batan; such sites were apparently only occupied in late prehistory when there was a need for defense or concealment.

Torongan, Sunget, and problems with dating: $\delta^{13}C‰$ and Reservoir Effects

In his forthcoming paper, Atholl Anderson suggests that the Torongan and Sunget dates are contaminated by uptake of ancient radiocarbon in the food residue and marine shell samples that were dated, and are thus too old, by at least 800 years in the case of Torongan Cave. He accepts the second millennium BC dates for the sites in the Cagayan Valley on Luzon, and adopts the hypothesis that Neolithic settlers from Taiwan sailed directly to Luzon in the first instance, and then came back to settle the Batanes islands later. Anderson quotes from a recent paper by Fischer and Heinemeier (2003), who note that freshwater foods from limestone-rich environments in northern Europe, as well as marine foods, can contain reservoir effects sufficient to increase C14 ages for food residues on sherds by up to 500 years.

Fig. 14. Left: notched pebbles from various sites in Taiwan, including Suogang, Penghu, c. 2500 BC; Kending, Southern Tip, c. 2000 BC; and Guishan, southwestern Taiwan.
Right: seven notched pebbles from Sunget Top Terrace layer 5.

We acknowledge that radiocarbon dates can often be "wrong", for many reasons connected with contamination, reservoir effects, and often simply poor context. The world archaeological literature is peppered with problems of this type. But for Torongan and Sunget, we offer the following observations:

1. The Batanes Islands have no significant freshwater fish and shellfish resources and virtually no permanent surface water, so we can discount the major problem (fish and shellfish from lakes over limestone) discussed by Fischer and Heinemeier.
2. Although there are limestone outcrops in the vicinity of Sunget, the Main Terrace in particular lies over a volcanic ash sequence that is at least 5 metres deep (we ran out of rods while augering, before hitting bedrock). Furthermore, the Mahatao shoreline is of volcanic rock, not limestone. So we feel that the possibility of any major error from a limestone effect on the two Sunget food residue dates, while perhaps present, is not overwhelming.
3. Two of the AMS dated samples of food residues from Sunget and Torongan Cave (Wk 14640 and 14642) have laboratory-measured $\delta^{13}C‰$ values of –26.0 and –25.3 respectively, close to the terrestrial average of Fischer and Heinemeier (2003:462). Neither are strongly indicative of a marine source, or a limestone-terrain fresh-water source.
4. The dates accepted here also receive strong support from the overall cultural sequence of the Batanes Islands, in that the assemblages of Torongan and Sunget, with their strong Taiwan and Cagayan Neolithic affinities, are clearly older in stylistic terms than those of the Naidi Phase, which tend to resemble Iron Age assemblages in the Cagayan Valley in terms of pottery rim forms.

Fischer and Heinemeier do comment on the possible uncertainty with all food residue dates, whatever their origins. But at this point the Torongan Cave and Sunget dates can only be presented as received, and we prefer the residue and marine shell dates owing to their absolutely direct and unequivocal connection with the objects being dated.

Anaro and Naidi, 2500 BP to mid/late first millennium AD

Naidi Phase assemblages continue on Batan Island with red-slipped but unstamped pottery, with rim forms differing from those of the Sunget Phase (Bellwood *et al.* 2003:153-5 and Fig. 16). Quite sharp carinations are now present, and vessel rims are generally much shorter vertically than at Sunget, with lips that are quite often rolled or thickened externally. External lip grooving continues. The notched pebble "sinkers" disappear, possibly by 2000 BP.

So far, pottery of the Naidi Phase seems to be very widespread on Batan Island, occurring certainly beneath the major ash fall in sites all over central Batan, both coastal and inland (Fig. 2). This suggests that a large population was already in occupation on Batan by c. 2500 BP, although if first settlement in Batanes occurred before 3600 BP, as now seems highly likely, this would come as no surprise.

Fig. 15. Adzes and other stone items recovered from Sunget in 1982, reproduced with permission from the University of Kumamoto (Koomoto 1982: Figure 25). 45 is a point of black slate, 48 an adze of apparent Fengtian nephrite, and 55 is a stepped adze of a quadrangular-sectioned type that could come from Taiwan (Hung Hsiao-chun, pers. comm.).

Anaro, Itbayat

The most remarkable site of the Naidi Phase, discovered in 2004 on Itbayat Island and excavated in 2004 and 2005 (this report deals mainly with the 2004 information), is the elongated limestone hilltop of Anaro, about 1 km inland from the modern capital town of Mayan and 2 km inland from the sea. Anaro is a flat-topped limestone "mesa", about 200 m long and 30 m wide, left upstanding between a series of surrounding stream courses (Fig. 16). Heavily eroded archaeological layers occur on top of the hill, and on the natural limestone terraces that run around the sides—this site obviously served as a defended ijang from its earliest occupation at around 3000 BP. The deposits have been washed downhill in many places, and on the lower slopes of the hill a remarkable density of strewn artifacts can be found in a number of fields cleared for modern cultivation. These surface artifacts include pottery sherds, many broken untanged and stepped adzes of pale grey metamorphic rock with trapezoidal cross-sections (Fig. 8), pig bones, objects of Taiwan slate (including fragments of projectile points and knives), and pieces of worked Fengtian nephrite (Fig. 17, 18).

Three locations around the top of Anaro were excavated in 2004.(6) That termed Anaro 1 yielded only recent materials, but Anaro 2 and 3 produced pottery similar to that of the Naidi phase on Batan, together with a "horned" barkcloth beater of volcanic rock from Anaro 2 (Fig. 19), sealed below a C14 date of AD 50-240 (Wk 14643). Anaro 3, an excavation of only one square metre in 2004, produced a remarkable density of items imported from Taiwan; pieces of Taiwan slate probably used to groove and snap the nephrite using quartz sand, two cores of green Fengtian nephrite seemingly drilled out of *lingling-o* ornaments, and several other pieces of worked nephrite (Fig. 17). Additional nephrite pieces excavated from Anaro 3 in 2005 are added to Table 3, and nephrite surface finds collected by Rodobaldo Ponce and the 2004 and 2005 field teams from the cleared fields below the Anaro summit include fragments of rings, discs, and many cut fragments (see Figs. 17 and 18).

Some of this nephrite, especially the green variety with black speckles, has been sourced to the Fengtian source near Hualien, in eastern Taiwan, by Yoshiyuki Iizuka in the Institute of Earth Sciences, Academia Sinica (Taipei). Dr. Iizuka has used a non-destructive low-vacuum scanning electron microscope with an energy dispersive X-ray spectrometer, and his results are presented in an adjoining paper. Much of the worked nephrite from Anaro would appear to be associated with the younger of the two Anaro 3 dates, suggesting that the peak intensity of nephrite working could have been during the Iron Age (iron tools and slag were found in the site in 2005).

Although the rim forms of the Anaro 2 and 3 pottery resemble those of the Naidi Phase of Batan (c. 2500 to 1500/1000 BP), the Anaro pottery differs in being prolifically

(6) Several new locations were excavated at Anaro in 2005, including Anaro 4, 5, 6, 7 and 8, plus a larger area at Anaro 3. Details of these new excavations will be presented elsewhere.

Fig. 16. The site of Anaro from the northwest. Anaro 2 is in the middle of the summit line above and to the right of the cleared garlic field on the lower slope, and Anaro 3 is behind the right-hand end of the hill.

decorated with stamped circle motifs, rather like the older pottery from Sunget, although at Anaro the motifs tend to flow diagonally over the pottery surfaces, rather than horizontally as at Sunget. The Anaro stamped pottery is concentrated in the lower part of the Anaro 3 profile, associated with AMS dates on sherd food residues of 2770 and 1360 uncal. BP. In Anaro 2 it occurs mainly below an AMS date on sherd food residue of 1876 uncal. BP (see Table 3). The basal layer of Anaro 3 has also produced a sherd of circle stamped pottery with net-like decoration almost identical to some from Yingpu in western central Taiwan, where it appears to be dated to about 2500 BP (Hung 2004) (Fig. 20). Anaro 3 has also produced several biconical baked clay spindle whorls from various depths.

In 2005, a newly-cleared field strewn with pottery with Sunget rim styles was found below the area termed Anaro 4, although no discrete stratified layer of this phase has yet been found in the excavations. The Sunget and Naidi Phase similarities of much of the Anaro pottery make it unlikely that the site will predate 3000 BP, and in reality the hilltop area is so large that we can expect a complex palimpsest of quite different ages. Our

suspicions from all the pottery recovered are that the Anaro site as a whole contains many separate but overlapping occupations that date overall to between 3000 and 1000 BP, with Taiwan slate and nephrite probably present throughout. Indeed, much younger pottery is present in a small upper occupation at the Anaro 1 end of the site, with occasional occurrences of imported Chinese ceramics.

A most striking point about the Anaro assemblage is that the nephrite was actually imported and worked there into artifacts that included rings of types large enough to have served as bracelets and small enough to have served as penannular earrings. The Anaro material is fragmentary, but a number of the forms illustrated by Lien Chao-mei from Beinan (Lien 2002:59) could have been made there, and one shell ear pendant of a Beinan form was found in 2005 at the base of Anaro 3 (similar to the two nephrite specimens from Beinan illustrated in Bellwood 1997: Fig. 7. 7, bottom right). However, it must be remembered that most of the reported Philippine nephrite earrings are of a form different from those in Beinan (as also noted by Hung and Iizuka in their adjoining papers). The Philippine specimens have three circumferential projections and belong to a type termed *lingling-o* by Philippine archaeologists (*e.g.* Fox 1970). As Hung points out, *lingling-o* earrings are found widely in the Philippines, Sarawak(7), and southern Vietnam (Sa Huynh, and related sites in the Ho Chi Minh City area, such as Giong Ca Vo). They have not been found in Taiwan proper, apart from Lanyu, and do not occur in the very large nephrite assemblage from Beinan (Lien 2002). Most of these ear ornaments are of Early Metal Phase (Iron Age) date, and one wonders if the Anaro site was involved in manufacturing nephrite artifacts, of Taiwan nephrite, but for the demands of Philippine and Sa Huynh (Chamic) markets? At this stage, only future research will tell, but one of the Anaro drilled cores of green nephrite (Fig. 17. N) looks like a discard from drilling out a central hole in a *lingling-o* earring, and two pieces found in 2005 (Fig. 18. A,B) look like discards after drilling multiple discs of *lingling-o* size from much bigger circular blanks. Anaro also has broken pottery (rather than nephrite) penannular ear ornaments, without projections, as found in some of the Cagayan Neolithic sites such as Nagsabaran (Hung, pers. comm.). Presumably, the finished nephrite examples that might have been made here were all exported.

Hung Hsiao-chun has also been able to show in her adjoining paper that other artifacts of Taiwan nephrite, such as bracelets and beads, occur in a number of Neolithic sites in the Philippines dating back as far as 3500 BP, including Nagsabaran in the Cagayan Valley, sites in Batangas Province, and possibly Dimolit in Isabela. The movement of Taiwan nephrite into the Philippines was thus occurring as early as 3500 BP, and might have continued, expressed in changing artifact fashions, for two millennia or more. The nephrite raw material appears to have been imported to Anaro for on-the-spot manufacture, using drilling and grooving/snapping techniques closely related to those used in Neolithic Taiwan and China (and, for that matter, Maori New Zealand, even though Maori ancestors can hardly have reached New Zealand before AD 1000).

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(7) A *lingling-o* from Niah Cave tested by Yosi Iizuka in April 2005 is of Fengtian nephrite. A report on this is in preparation.

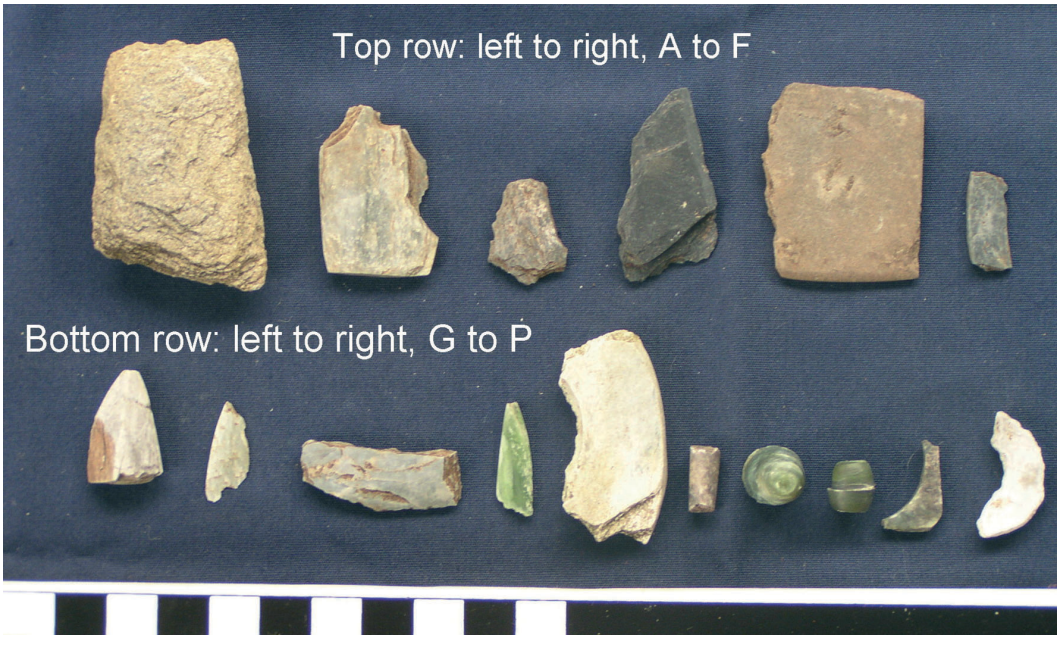

Fig. 17. **Slate and nephrite artifacts from Anaro, 2004 research. Scale is in cm.**

Top row, left to right:

- Kaxanggan (below Anaro 3), surface, piece of cut coarse slate;
- Below Anaro, 2 surface, possible base of a perforated projectile point with two ground edges;
- Below Anaro 2, surface, slate fragment;
- Anaro 3, 90-95, slate fragment with one straight ground edge;
- Anaro 3, 85-90, end of a rectangular slate knife with one sharp edge and two squared-off ground edges (for nephrite working?);
- Anaro 2A, 10-15, slate fragment with one ground and one sharp edge.

Bottom row, left to right:

- Anaro 2B, 20-25, tip of a projectile point, slate;
- Anaro 2B, 20-25, light green to white nephrite fragment;
- Anaro 2A, 30-25, fragment (not nephrite) with one sharp but damaged edge;
- Anaro 3, 85-90, pointed piece of green Fengtian nephrite with ground edges, identified by Yoshi Iizuka;
- Kaxanggan (below Anaro 3), piece of Fengtian white to light brown/green nephrite ring, identified by Yoshi Iizuka;
- Anaro 3, 60-65, drilled-out core, possibly of metamorphic rock;
- Anaro 3, 65-70, bullet-shaped core of Fengtian green nephrite, probably drilled from a *lingling-o* type of ornament, identified by Yoshi Iizuka;
- Anaro 3, 70-75, core of Fengtien green nephrite, drilled from two opposing directions, possibly from a *lingling-o*, identified by Yoshi Iizuka;
- Anaro 3, 65-70, shell ring fragment.

Fig. 18. **Slate and nephrite artifacts from Anaro, 2005 research. Scale is in cm.**

Top row

- all surface finds, except for B (Anaro 5, 10-15 cm, and paralleled by a similar pieces from Lanyu—Hung Hsiao-chun pers. comm.) and the half ring C (Anaro 3A, 90-95 cm).

Bottom row

- I and J are pieces of nephrite adzes of Taiwan forms; K to N are various pieces of shaped nephrite. All in the bottom row are surface finds.

This window on perhaps 2000 years of continuing contact between Taiwan and the Philippines makes one wonder about the voyaging skills and linguistic connections between the populations concerned.

WERE THE BATANES ISLANDS (WITH LANYU) THE EXTRA-FORMOSAN HOMELAND?

The evidence from Torongan and Sunget, dated to between 4500/4000 and 2500 BP, that supports a Taiwan to Batanes (and Luzon) north-to-south colonizing directionality includes the pottery vessel forms in both sites (especially rim shapes, surface red slip, and

Fig. 19. The stone barkcloth beater recovered from Anaro 2.

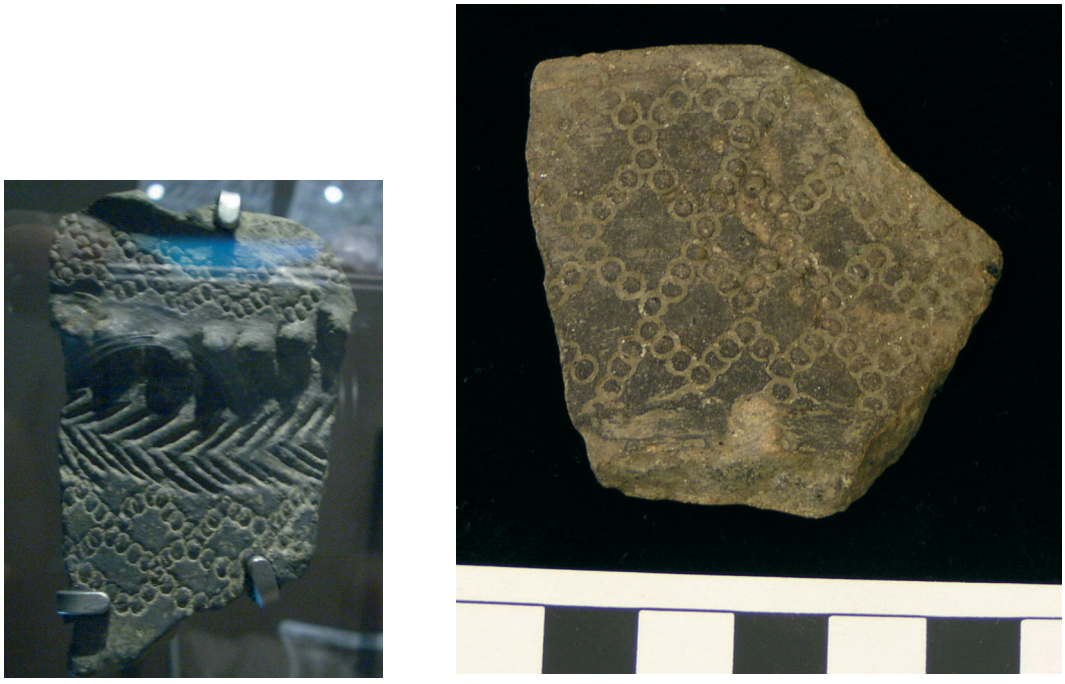

Fig. 20. Sherds with an identical lozenge pattern of linked circles. Left: Yingpu, western Taiwan, c. 2500 BP? (National Museum of Prehistory, Taidong; photo by Hung Hsiao-chun). Right: Anaro 3, 75-80 cm.

Sunget handles and ring feet with occasional cut-outs), the Torongan waisted hoe, the Sunget items of Taiwan slate and nephrite, the Sunget biconical spindle whorls, and the notched stone sinkers. The notched sinkers are the only form found in both Batanes and in sites of the Dabenkeng phase in Taiwan, making it likely that the initial settlement of Batanes occurred before the different forms that occur in Taiwan sites younger than 4000 BP were innovated (Shawna Yang, pers. comm.). Concepts that might reflect contacts between Batanes and Luzon include the Anaro stone adzes of pale grey metamorphic rock, all with trapezoidal cross-sections (paralleled closely in some Cagayan Neolithic sites, such as Irigayen), and the habit of decorating pottery with zones of stamped circles. The tanging of stone adzes occurs both in Taiwan and in the Cagayan Valley sites.

Taken overall, the inventory of material culture that points to an origin for the Batanes Neolithic in eastern Taiwan between 4500 and 4000 BP (especially given the pottery similarities between Torongan and Chaolaiqiao) is so strong that one is tempted to link this movement with the linguistic establishment of Proto-Malayo-Polynesian and the origins of the Extra-Formosan subgroups of Austronesian languages. This paper is not the place to discuss this topic further (see Bellwood 2004a, 2004b, 2004c; Bellwood and Hiscock 2005), but we believe that current evidence, as related above, favours the Batanes as being reached before Luzon. Currently, the Batanes have significantly older

C14 dates for Neolithic assemblages than the Cagayan Valley, although future research in Cagayan could change this, just as future research can change any current inference. It should be noted, however, that the Cagayan Valley sites, despite many years of intensive research, lack Taiwan slate and jade adzes and have very few spindle whorls and bi-notched net sinkers. This suggests that these items of Taiwan origin or inspiration were occasional trade items there, rather than widespread and fundamental elements of material culture as in Batanes. To our knowledge, slate artifacts have never been found in the Philippines south of Batanes.

Solheim (1984-5) has raised an issue over Taiwan-Luzon movement that is also commented upon by Anderson in his forthcoming paper. This concerns the Kuroshio current, that flows northwards up the eastern coastlines of Luzon and Taiwan towards Japan. Solheim felt that this current would have discouraged any direct sailing from Taiwan to the Philippines. Anderson merely suggests that it could have discouraged movement from Taiwan to Batanes, and that people traveled initially further west to the Ilocos coastline of northwestern Luzon, and then back to Batanes later. However, were either of these views correct, then Taiwan nephrite and slate should not occur in such quantities in Batanes sites dating from at least 3000 BP, indeed it should not occur there at all given the rarity or absence of these materials in Luzon. These materials arrived directly from Taiwan. In fact, periods of calm wind and sea surface (April to June mainly) offer situations in which the paddling of a raft or canoe from Lanyu to Itbayat (100 km) could surely have occurred. Isorena (2004) presents oceanographic information that indicates a countercurrent flowing from north to south immediately to the east of the Kuroshio Current, and one is forced to ask if such countercurrents ever develop from time to time in the vicinity of the Batanes. Batanes ocean conditions can sometimes be bad, but this need not mean that they are uniformly so, every day of every year.

Perhaps we can go on to ask if the Sunget and Cagayan pottery stamping traditions (circles in Batanes, but both circles and dentate forms in Cagayan) formed the background to the development of both circle and dentate stamping in the Neolithic of the Marianas Islands, and also Lapita in Island Melanesia? At present, the chronology for these types of stamping is not tight enough to resolve this issue, and it is, of course, quite possible that innovations flowed backwards as frontiers extended, as in the case of the Talasea obsidian from New Britain found at Bukit Tengkorak in Sabah (Bellwood 1989).

However, derivation of the whole Neolithic complex present in Batanes and Cagayan from the *south* (southern Philippines, Indonesia or Melanesia) is no longer a viable hypothesis in terms of current information. We now have enough C14 dates from Batanes and Cagayan, detailed in Table 1 and in the adjoining paper by Hung Hsiao-chun, to give this region an edge of several centuries, even perhaps a millennium, over the beginning of the Lapita sequence in western Melanesia, as well as over the oldest Neolithic sites reported so far in eastern Indonesia. This time span fits well with our linguistic understanding of the fairly rapid movements of the Malayo-Polynesians, between the successive breakups of the Proto-Malayo-Polynesian and Proto-Oceanic linguistic stages of Austronesian history (Pawley 1999; Bellwood and Hiscock 2005).

REFERENCES CITED

Bellwood, Peter

1989 Archaeological Investigations at Bukit Tengkorak and Segarong, Southeastern Sabah. Bulletin of the Indo-Pacific Prehistory Association 9:122-62.

1997 Prehistory of the Indo-Malaysian Archipelago. 2nd edition. Honolulu: University of Hawaii Press.

2004a Colin Renfrew's Emerging Synthesis: Farming, Languages and Genes as Viewed from the Antipodes. In Traces of Ancestry: Studies in Honour of Colin Renfrew. Martin Jones, ed. Pp. 31-41. Cambridge: McDonald Institute for Archaeological Research.

2004b Taiwan, the Batanes Islands, and the Malayo-Polynesian Express to Western Polynesia. Paper presented at Conference on Human Migrations in Continental East Asia and Taiwan: Genetic, Linguistic and Archaeological Evidence, University of Geneva, 9-12 June.

2004c The Origins and Dispersals of Agricultural Communities in Southeast Asia. In Southeast Asia: From Prehistory to History. I. Glover and P. Bellwood, eds. Pp. 21-40. London: Routledge Curzon.

Bellwood, Peter and Peter Hiscock

2005 Australia and the Austronesians. In The Human Past. C. Scarre, ed. Pp. 264-305. London: Thames and Hudson.

Bellwood, Peter, Janelle Stevenson, Eusebio Dizon, and Atholl Anderson

2003 Archaeological and Palaeoenvironmental Research in Batanes and Ilocos Norte Provinces, Northern Philippines. Bulletin of the Indo-Pacific Prehistory Association 23:141-61.

Blair, P. and E. Robertson

1903-1909 The Philippine Islands 1493-1898. 55 vols. Cleveland: A.H. Clark.

Cameron, Judith

2002 Textile Technology and Austronesian Dispersals. In The Archaeology of Lapita Dispersal in Oceania. G. Clark, A. Anderson and T. Vunidilo, eds. Pp. 177-181. Canberra: Pandanus Books.

Dizon, Eusebio Z.

1998-2003 Batanes Archaeological Project: 1996-1997 Status Report. Ivatan Studies Journal V-X:9-18.

Fischer, A. and J. Heinemeier

2003 Freshwater Reservoir Effect in 14c Dates of Food Residue on Pottery. Radiocarbon 45:449-466.

Fox, R.

1970 The Tabon Caves. Manila: National Museum Monograph.

Groves, Colin
1997 Taxonomy of Wild Pigs (Sus) of the Philippines. Zoological Journal of the Linnaean Society of London 120:163-91.

Heaney, Lawrence
1985 Zoogeographic Evidence for Middle and Late Pleistocene Land Bridges to the Philippine Islands. Modern Quaternary Research in SE Asia 9:127-44.

Hung, Hsiao-chun
2004 A Sourcing Study of Taiwan Adzes. Bulletin of the Indo-Pacific Prehistory Association 24:57-70

Isorena, E.
2004 The Visayan Raiders of the China Coast, 1174-1190 AD. Philippine Quarterly of Culture and Society 32:73-95.

Kano, T. and K. Segawa
1956 An Illustrated Ethnography of Formosan Aborigines. Vol. 1: The Yami. Tokyo: Maruzen.

Koomoto, M.
1983 General Survey in Batan Island. In Batan Island and Northern Luzon. Pp. 17-68. University of Kumamoto, Faculty of Letters, Japan.

Larson, G., Keith Dobney, Umberto Albarella, Meiying Fang, Elizabeth Matisoo-Smith and 8 other authors
2005 Worldwide Phylogeography of Wild Boar Reveals Multiple Centers of Pig Domestication. Science 307:1618-21

Lien, Chao-mei
2002 The Jade Industry of Neolithic Taiwan. Bulletin of the Indo-Pacific Prehistory Association 22:55-62.

National Museum of Prehistory
2004 Collecting the Past. Taitung: National Museum of Prehistory (Catalogue, in Chinese).

Ogawa, Hidefumi
2002 Chronological Study on the Red-Slipped Pottery of Lal-Lo Shell Middens. In Archaeological Research on the Lower Cagayan River—Study on the Historical Process of Hunter-Gatherer/Farmer Interdependent Relationship. Hidefumi Ogawa, ed. Pp. 79-101. Tokyo: Report for the Grant-in-Aid for International Scientific Research, Ministry of Education, Science, Sports and Culture.

Pawley, A.
1999 Chasing Rainbows: Implications of the Rapid Dispersal of Austronesian Languages

for Subgrouping and Reconstruction. In Selected Papers from the Eighth International Conference on Austronesian Linguistics. E. Zeitoun and P. J-K. Li, eds. Pp. 95-138. Taipei: Institute of Linguistics, Academia Sinica.

Solheim, W.G. II

1984-5 The Nusantao Hypothesis. Asian Perspectives 26:77-88.

Sung, Wen-hsun

1991 Multi-Mouthed Bottles of the Yuan-shan Culture. In Archaeology, History and Culture. Wen-hsun Sung, ed. Pp. 1-24. Taipei: Chih Chung Bookstore (in Chinese).

Sung, Wen-hsun and Chao-mei Lien

1987 Multi-Mouthed Bottles of the Yuan-shan Culture. In Archaeology, History and Culture. Wen-hsun Sung, ed. Pp. 1-24. Taipei: Chih Chung Bookstore (in Chinese).

Szabo, Katherine, Hazel Ramirez, Atholl Anderson, and Peter Bellwood

2003 Prehistoric Subsistence Strategies on the Batanes Islands, Northern Philippines. Bulletin of the Indo-Pacific Prehistory Association 23:163-72.

UNESCO

2003 Archaeological Research in Batanes Province, Northern Philippines, 2002-3. Unpublished ms submitted to Unesco in Bangkok, 2003.

NOTE ADDED IN PROOF

After final proof-reading of this paper, Dr. Ed Rhodes of the Research School of Earth Sciences at the Australian National University reported an optically-stimulated luminescence (OSL) date on a sherd from Torongan Cave, square AB, 50-55 cm. The date is 4960±480 years before AD 1950. It overlaps at two sigma with AMS C14 date OZH 771 (4450-4080 cal. BP).

巴丹群島考古計劃以及南島語族擴散"源自台灣"假說

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本文摘要了自2002年至2005年間由澳大利亞國立大學和菲律賓國家博物館、菲律賓大學共同在菲律賓巴丹群島進行的考古工作結果，研究結果顯示巴丹群島最早的新石器時代聚落是在距今4000年以前由台灣遷移而來，其後與台灣密切的持續往來至少持續到距今1300年前，這些頻繁的互動包括了台灣板岩和玉料的搬運、輸送（很可能是經由綠島及蘭嶼）到巴丹島及Itbayat島。因此，由目前發掘出土器物的組合來看，本文完全無法支持「巴丹群島最早的史前居民是經呂宋島由南而來」的說法。

關鍵字：巴丹群島，菲律賓和台灣考古，馬來玻里尼西亞語，碳十四定年，閃玉。