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Front Cover: The Willandra Fossil Trackway, southwestern New South Wales. Children from the three traditional tribal groups of the Willandra Lakes walk on the site of what promises to be the world's largest collection of Pleistocene human footprints in the world (photograph courtesy of Michael Amendolia).

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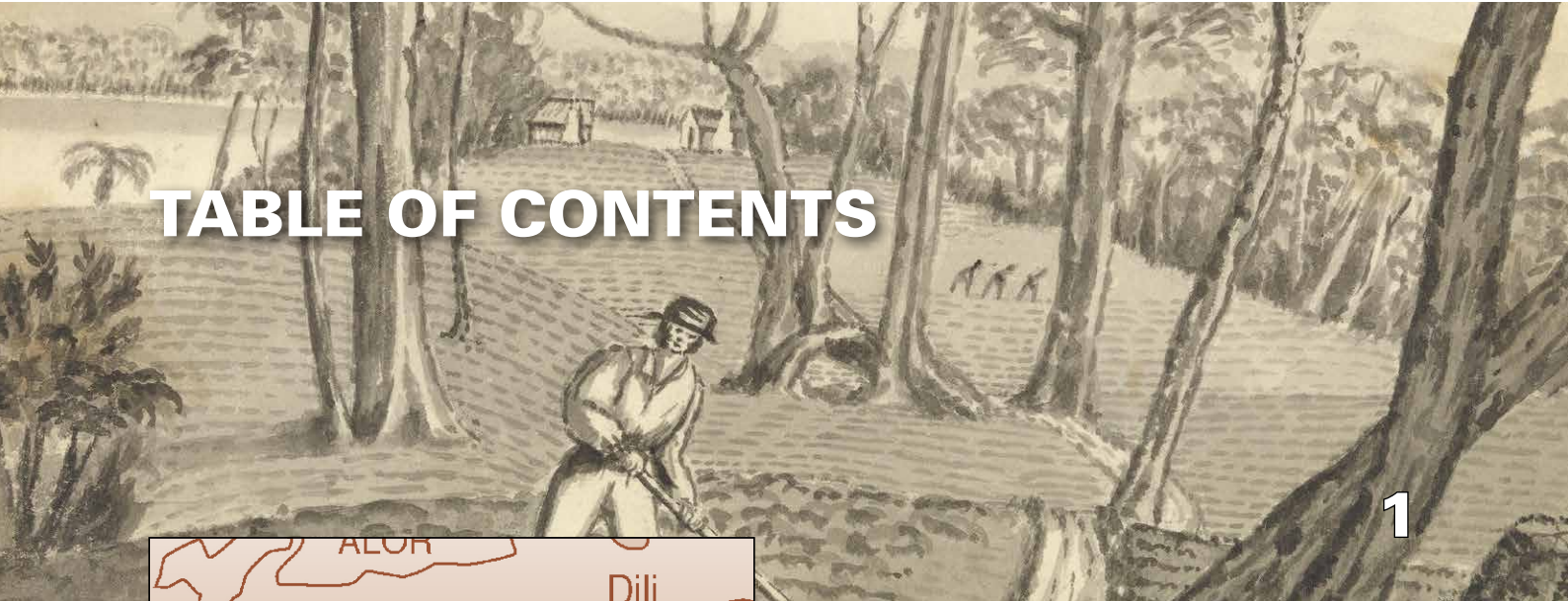
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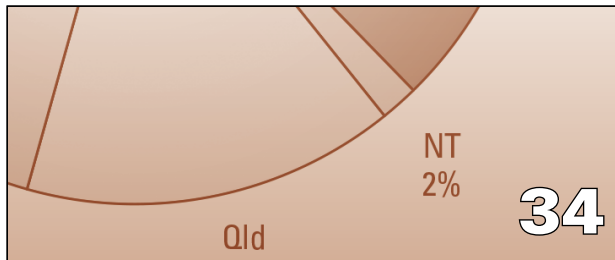
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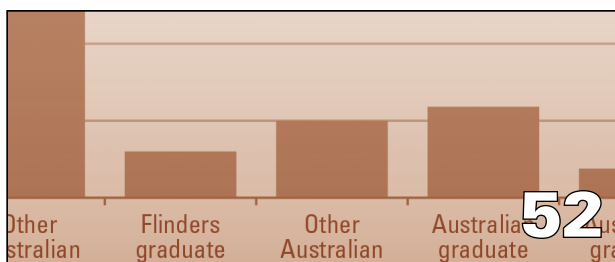
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Credits: 'There's your problem' (photograph by Tammy-Lee Pursell).

Further radiocarbon dates from Dabangay, a mid- to late Holocene settlement site in western Torres Strait

Duncan Wright¹ and Geraldine Jacobsen²

Abstract

Dabangay, on the island of Mabuyag, is one of only two known mid-Holocene sites in Torres Strait. Eleven new radiocarbon dates, combined with nine previous determinations, clarify its site formation processes and settlement history. The sequence shows two sustained settlement periods between 7239–3211 cal. BP and 1815 cal. BP–present, with little evidence for use during the intervening period. This differs from Badu 15, approximately 15 km south of Mabuyag, where human activity became sporadic after 6500 cal. BP. There is no evidence for a settlement expansion at 2500 BP as observed at other sites in the western Torres Strait. These differences suggest varied human responses to post-glacial marine transgression and the subsequent sea-level high stand in western Torres Strait.

Introduction

Despite its close proximity to regions occupied by humans at least 45,000 years ago, very little is understood about the prehistory of Torres Strait prior to 2000 years ago. Golson (1972:384–385) suggested western Torres Strait was occupied by hunter-gatherer communities before marine transgression, followed by the arrival of Papuan horticulturalists after 6000–5000 years ago. Subsequent studies (Barham 2000; Moore 1979:308–313; Rowland 1985:181) broadly agreed with this model, though the issue of human survival after island formation remained hotly debated. For example, Rowland (1985:131) suggested Torres Strait Islander communities were ‘ill equipped to deal with insularity’ and perished or abandoned their island homes. Barham (2000:290–292) argued that sustained settlement required sheltered living space and predictable subsistence economies that were not available until 4000 years ago (see also Barham et al. 2004:57).

David et al. (2004:72) reported the first direct evidence for early to mid-Holocene human activity in Torres Strait from the site of Badu 15, on Badu, suggesting ‘definitive and sustained human presence between 8000 and 6000 years BP’, followed by a ‘sporadic presence’ between 6000–3500 cal. BP. Long distances between Badu and New Guinea, and increased use of offshore islands in north Australia, suggested visitation of Torres Strait was part of ‘systematic territorial and sea-based expansions’ (David et al. 2004:74) in both regions during the mid-Holocene. A period of ‘sustained settlement’ after 3500 cal. BP was interpreted as evidence for Austronesian incursion (David et al. 2004:74), but has elsewhere been explained as a ‘major demographic expansion of local populations’ (McNiven et al. 2006:66) within Torres Strait and mainland Australia (see also Carter 2002; Carter and Lilley 2008). Barham (2000:290) suggested availability of living space increased after 4000 years ago due to

beach progradation and sea-level stabilisation. This may have influenced settlement, with low intensity occupation (3800–2600 cal. BP) by marine specialists identified on Pulu (McNiven et al. 2006) and Berberass, near Badu (Crouch et al. 2007). McNiven et al. (2006:49; see also Carter 2002; McNiven et al. 2011:5) suggested a migration of ‘Papuan maritime, horticultural and pottery-making peoples to the eastern and western islands of Zenadh Kes [Torres Strait]’ after 2600 years ago. This period was also associated with the emergence of a ‘Torres Strait Cultural Complex’, which involved increasing marine specialisation, a shift in cosmology towards the sea, and fluid links between islands through exchange, warfare, intermarriage and maritime voyaging (Barham 2000:228). This paper presents new findings with relevance to these issues: radiocarbon dates from Dabangay, a mid- to late Holocene settlement site on Mabuyag.

The Dabangay Site

Mabuyag (Mabuiag) is a small (8 km²) granitic island which lies at the most northerly point of western Torres Strait. Dabangay (previously Dabangai) is an ethnographically significant ‘village’ situated in a deep embayment on the northeast coast of Mabuyag (Eseli et al. 1998; Haddon 1904). Historical and ethnographic records suggest this area was occupied prior to the arrival of London Missionary Society (LMS) teachers and pearl shelling boats after 1872 (Haddon 1904:162; MacFarlane 1933 as cited in Eseli et al. 1998:28–29). Moresby (1876:60) observed continued occupation of Dabangay during this period by people who lived in huts ‘pitched under the shelter of some enormous banyan trees’.

In 2004, a large dugong bone mound was excavated on the Dabangay foreshore (McNiven and Bedingfield 2008). A single 70 x 70 cm pit revealed layers of dugong skulls and ribs, dating from approximately 350 cal. BP. Glass and metal in the upper 10 cm of the sequence suggested mound construction continued after European arrival (McNiven and Bedingfield 2008:509). An earlier test pit targeted ‘field mounds and ditches’ observed to ‘underlie the edges of some of the stone-bone-shell mounds, suggesting that they pre-date the latter’ (Harris and Ghaleb 1987:28).

In 2006, an area of midden was excavated in the grassy interior of Dabangay (Wright 2011; Wright and Jacobsen in press). Excavation of Square A revealed well-stratified cultural deposits (including stone artefacts, charcoal and faunal remains) dating between 7239–4901 cal. BP (at 2 sigma), followed by a period of increased human activity between 313 cal. BP and the present (Wright and Jacobsen in press:Table 2). Burnt large marine vertebrate bone was radiocarbon dated to 6480–6256 cal. BP (at 2 sigma), providing the earliest direct evidence of dugong/marine turtle hunting in Torres Strait. Significant white ant disturbance observed in the upper 90 cm of the Dabangay midden meant that the age of the SU 2–SU 3 interface (i.e. the mid- to late Holocene transition) could not be resolved. As no clear breaks were observed between the two cultural horizons, it remained uncertain whether or not a settlement hiatus

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existed at Dabangay. Furthermore, the antiquity of the Square A excavation (and, therefore, chronology of human settlement and subsistence at the site) could not be ascertained owing to the absence of suitable organic samples associated with the deepest cultural materials (XU 49).

Additional Excavation Results

To address the dating issues highlighted above we returned to Dabangay in November 2011 to conduct two 1 x 1 m excavations. Square B, located 13.5 m to the west of Square A, was excavated to a depth of 105 cm before being discontinued owing to white ant disturbance, time constraints and poor preservation of cultural materials. Square C, located 5 m northwest of Square A, was excavated to a depth of 197 cm below surface and included 15 cm of culturally sterile deposits at its base. Both squares were excavated using arbitrary excavation units (XUs), guided by natural changes in stratigraphy. All sediment was wet sieved through a 2.1 mm mesh, with sediment samples obtained from excavation units and a column cut into the west wall of Square C to collect samples for particle size/pollen/phytolith analysis (Figure 1).

The stratigraphy in Square C was similar to that observed in Square A, with a change from dark, organic rich soil (Stratigraphic Unit [SU] 1–SU 2; Figure 1) to calcareous sand (SU 3–SU 6). The lower, calcareous sand layer was not observed in Square B, with compacted clay continuing to the base, with variation between dark, humic sediment (SU 1–SU 2; Figure 2), light, fine-grained sediment (SU 3) and clay/gravel (SU 4). In Squares A and C a gradation was observed from mottled silt/sand (SU 3–SU 4) to coarse-grained, cemented white/yellow sand (SU 5–SU 6). A pH test showed that sediments from both Squares B and C varied from mildly acidic to neutral (4.14–5.46), with a slight increase in acidity in the basal XUs of Square C. Clear stratigraphic boundaries and intact lenses of charcoal, bone and stone suggest overall stratigraphic integrity. Localised mixing was observed in SU 2 and the interface between SUs 2 and 3, associated with pit features in both squares. In Square B, a white ant burrow was excavated separately (as SU 2b in Figure 2) and this unit discarded.

Eleven samples of wood charcoal/hardwood were submitted to the ANSTO and Waikato laboratories for radiocarbon (AMS) dating. Tables 1 and 2 provide a list of all dates from this recent excavation, compared with initial results from Square A. Radiocarbon dates were calibrated with OxCal 4.1 (Bronk Ramsey 2009), using the Southern Hemisphere calibration dataset (SHCal04) (McCormac et al. 2004) for charcoal samples, and the marine calibration dataset (Marine09) for the bone sample with the ΔR value of -63 ± 44 years (Sean Ulm pers. comm. 2010). Radiocarbon dates descend in correct chronostratigraphic order, suggesting minimal post-depositional disturbance.

Using the 2 sigma age ranges, AMS C14 dates span the mid- to late Holocene period (6938 cal. BP–present). For Square C, sedimentation rate remained constant in SUs 4 and 5 (i.e. 330–355 g per year, 6938–3349 cal. BP). A substantial decline in sedimentation rate was observed in SU 3 (161 g per year, 3349–1415 cal. BP) before it increased to 256 g per year in SU 1–SU 2 (1615 cal. BP–present). Square B estimates suggest a low sedimentation rate between 5907 and 3211 cal. BP (94 g per

year), with a significant increase above this (239–258 g per year). We note that the small sample of radiocarbon dates may have influenced these results.

Results from Squares B and C suggest that mid-Holocene settlement (marked by marine vertebrate bone, lithics and charcoal) dates to between 6938–3211 cal. BP, overlapping with the slightly earlier radiocarbon dates from Square A (7239–6033 cal. BP). A settlement hiatus, represented in the stratigraphy, sedimentation rates and substantial reductions in cultural materials, dates to between 3211–1815 cal. BP. Results from Squares B and C suggest renewed settlement at Dabangay after 1815 cal. BP (Table 1), with the greatest density of cultural materials in the upper XUs of SU 2. European items were dispersed throughout these XUs, suggesting increased activity coincided with LMS and pearl shelling activities on the island.

Discussion and Conclusions

Previous research at Dabangay revealed a 7300 year settlement chronology for Mabuyag, providing the earliest direct evidence for human subsistence in Torres Strait. Results suggested that increased settlement corresponded with (or immediately preceded) the arrival of Europeans on the island, following a settlement hiatus of 4000–5000 years. Re-excavation of Dabangay supports two principal settlement phases, 7239–3211 cal. BP and 1815 cal. BP–present, separated by a period of infrequent visitation between 3211–1815 cal. BP. Historical and archaeological records suggest a marked increase in human activity during the late nineteenth and early twentieth centuries. The shorter, late Holocene settlement chronology previously reported from Square A (300–present) can now be attributed to termite disturbance.

The Dabangay excavations provide insight into mid-Holocene human activities in western Torres Strait. A period of sustained settlement during the period of marine transgression and sea-level high stand (7239–3317 cal. BP), suggests that 'Islanders' survived the isthmus to island transition, developing new technologies (i.e. dugong/turtle hunting) to support an increased reliance on marine resources (see Wright et al. under review for further details). Whether or not the coastal margins of Badu and Mua were also occupied during this period remains an important subject for future research.

Results suggest a major period of reorganisation on Mabuyag after 3317 cal. BP. The reduction in settlement activity at Dabangay between 3317–1815 cal. BP is unlikely to represent an absence of people on Mabuyag during this period. Construction on the main beach-flat on the eastern side of Mabuyag recently unearthed a cache of dugong bones at a depth of 3.5 m below surface. An AMS radiocarbon determination from one dugong rib suggested that beach development (and possibly also human activity) occurred from at least 2412 ± 31 BP (Wright and Gizu 2012). Cultural materials (including one pottery sherd) were excavated at Mui, also on the east coast, in deposits dating to between 1600–1300 cal. BP (Wright and Dickinson 2009). This fits geomorphic and palaeoecological predictions of beach stabilisation (Barham 2000), increased anthropogenic firing, and reduction in forest cover (Rowe 2006) after 3800 years ago. It supports major demographic expansion within western Torres Strait after 4000 years ago (cf. McNiven et al. 2006). Dabangay adds to a growing literature on dynamic interactions

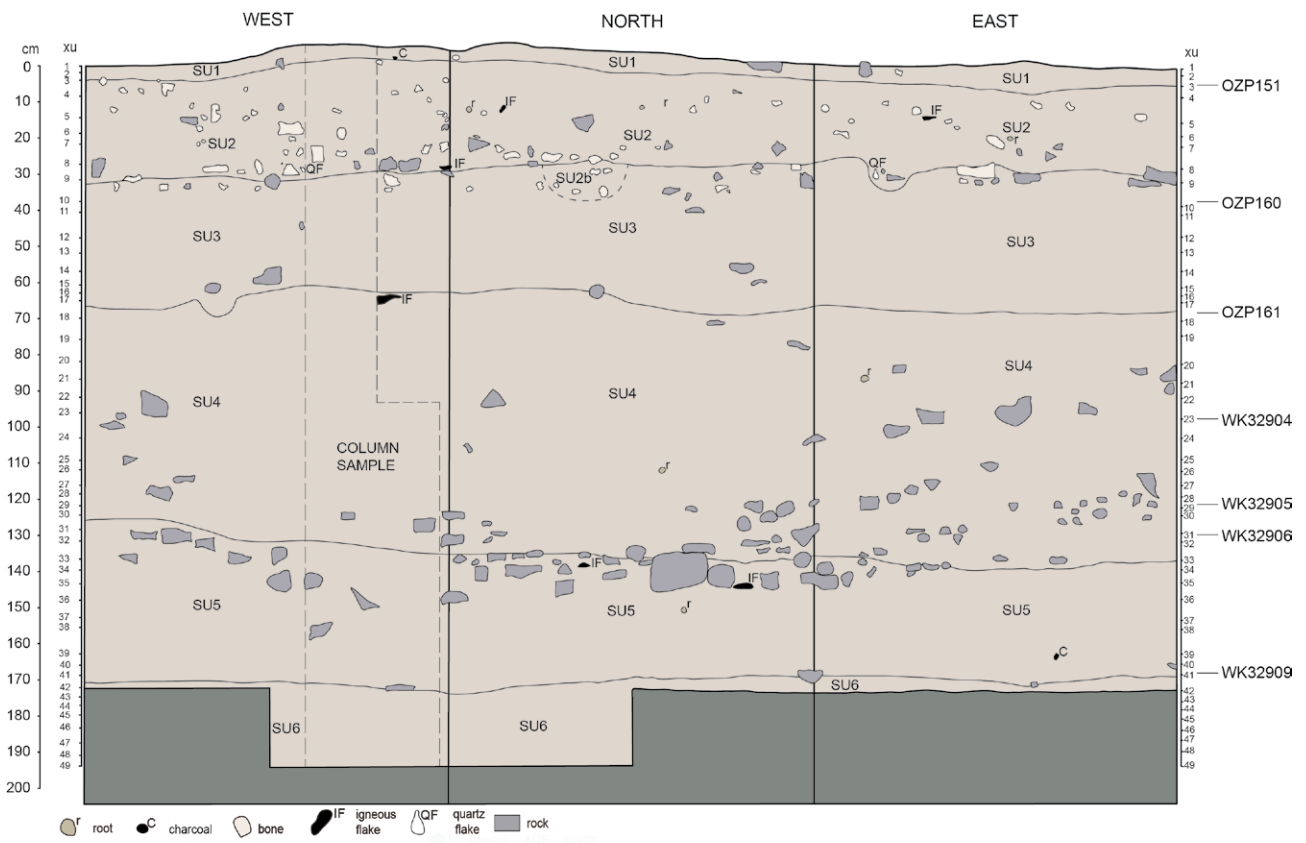


Figure 1 Stratigraphic drawing of Square C.



Figure 2 Stratigraphic drawing of Square B.

Lab Code	Square/ XU	Depth Below Surface (cm)	Sample/ Weight (g)	$\delta^{13} \text{C}(\text{‰})$	C^{14} Age BP	Calibrated Age BP 68.3%	Calibrated Age BP 95.4%
OZP159	C, 3	2–4	Charcoal/ 0.16	-25.8±0.1	240±25	296–279 (23.1%) 205–195 (12.9%) 187–180 (8.1%) 171–154 (24.1%)	306–271 (29.9%) 219–148 (65.5%)
OXP160	C, 10	27–31	Charcoal/ 0.21	-26.9±0.1	1695±30	1600–1583(7.7%) 1570–1515 (49.5%) 1459–1443 (7.6%) 1431–1423 (3.4%)	1684–1678 (0.8%) 1615–1415 (94.6%)
OZP161	C, 18	67–70	Charcoal/ 0.18	-24.5±0.1	3250±30	3446–3383 (68.2%)	3480–3349 (95.4%)
Wk-32904	C, 23	100–104	Hardwood/ 0.22	-24.9±0.2	3924±32	4406–4367 (17.4%) 4357–4323 (16.0%) 4317–4311 (2.7%) 4304–4240 (32.1%)	4415–4223 (83.7%) 4205–4157 (11.7%)
Wk-32905	C, 29	120–125	Hardwood/ 1.64	-23.3±0.2	4454±33	5037–5007 (15.4%) 4980–4875 (52.8%)	5268–5222 (3.1%) 5215–5186 (4.2%) 5120–5112 (0.5%) 5064–4855 (87.6%)
Wk-32906	C, 31	130–132	Hardwood/ 0.2	-25.0±0.2	4359±34	4958–4936 (11.4%) 4883–4832 (56.8%)	5028–5021 (0.7%) 4974–4825 (94.7%)
Wk-32909	C, 41	173–177	<i>Acacia?</i> / 0.55	-24.6±0.2	6052±29	6889–6786 (68.2%)	6938–6742 (95.4%)
OZP157	B, 4	5–7	Charcoal/ 0.1	-26.2±0.2	95±25	238–232 (4.2%) 137–115 (23.9%) 60–27 (40.0%)	252–227 (9.8%) 142–82 (34.6%) 74–5 (50.9%)
Wk-33443	B, 12	49–54	Charcoal/ 0.2	-23.3±0.2	1833±25	1736–1687 (35.0%) 1674–1621 (33.2%)	1815–1611 (95.4%)
OZP158	B, 20	99–103	Charcoal/ 0.6	-28.2±0.3	3150±35	3367–3317 (38.1%) 3308–3264 (30.1%)	3398–3211 (95.4%)
Wk-33442	B, 25	117–119	Charcoal/ 0.1	-24.6±0.2	5115±25	5891–5842 (30.6%) 5832–5804 (17.7%) 5794–5783 (6.2%) 5770–5748 (13.6%)	5907–5728 (95.4%)

Table 1 AMS radiocarbon dates from Squares B and C, Dabangay. Calibrated using OxCal 4.1 (Bronk Ramsay 2009) and SHCal04 dataset (McCormac et al. 2004).

Lab Code	Square/ XU	Depth Below Surface (cm)	Sample/ Weight (g)	$\delta^{13} \text{C}(\text{‰})$	C^{14} Age BP	Calibrated Age BP 68.3%*	Calibrated Age BP 95.4%*
Wk-24928	9	16–18	Burnt seed/ 0.43	-23.4±0.2	197±30	226–165	295–136
Wk-24929	19A	40–43	Charcoal/ 0.23	-25±0.2	247±30	301–279	222–147
Wk-25437	25A	56–59	Charcoal/ 0.2	-25.4±0.2	142±30	125–80	148–0
OZM308	30	70–73	Charcoal/ 0.2	-24.9±0.1	175±40	116–59	155–0
Wk-25438	35	90–93	Charcoal/ 0.46	-25.4±0.2	4510±30	5274–5182	5145–4959
OZM309	36	102	Charcoal/ 0.3	-25.4±0.2	5530±100	6401–6182	6468–5996
OZM310	39	124–131	Charcoal/ 0.3	-23.6± 0.3	5510±45	6299–6208	6351–6178
Wk-28931	46	162–164	Burnt bone/ 1.8	-9.8±0.2	6005±30	6402–6291	6480–6256
OZM311	48	166–169	Charcoal/ 0.2	-25.4±0.2	6160±80	7030–6886	7176–6775

Table 2 AMS radiocarbon dates from Square A, Dabangay. Calibrated using OxCal 4.1 (Bronk Ramsay 2009) and SHCal04 dataset (McCormac et al. 2004). * = highest probability of calibrated ranges. See Wright and Jacobsen (in press) for complete table.

between people and environment, and provides insight into a 7000 year history of survival and innovation on western Torres Strait islands.

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