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Explaining the lack of emu eggshell material culture in Australia: Experimental working and archaeological implications

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ABSTRACT

Ostrich eggshell (OES) disc beads are among the earliest types of personal adornment produced by Modern Human populations in African and Asia, and represent the first example of a raw material transformed into an entirely new shape — as opposed to simply perforating a whole marine shell — for decorative purposes. These same beads have continued to be made into present day as an important item in modern gift-exchange systems in sub-Saharan Africa, while OES has a similarly long history for being used as water (etc.) containers. Given the importance of OES to so many communities through time and space, questions regarding why a similar use of emu eggshell (EES) is completely absent from the Australian context is frequently voiced in archaeological forums. This paper will address that question through experimental replication of both OES and EES disc beads for direct comparison of their manufacture and use characteristics. It was found that while it is possible to successfully create disc beads in EES, there are several factors which make this raw material unsuitable for use in either social or utilitarian technologies.

1. Introduction

Ostrich eggshell (OES) disc beads are among the earliest types of personal adornment produced by Modern Human populations (e.g., Ambrose, 1998; d'Errico et al., 2012; McBrearty and Brooks, 2000; Miller and Willoughby, 2014), and represent the first example of a raw material transformed into an entirely new shape — as opposed to simply perforating a whole shell — for decorative purposes (Miller and Willoughby, 2014). Their importance to human communities is reflected in the fact that they were not only produced over an exceptionally large geographical area (Africa to Asia), but over many thousands of years, continuing to be produced into the present day as part of integral social systems (Mitchell, 1996, 2002). Similarly, containers made from OES featuring standardised and repetitive engraved patterns found prior to 60,000-years-ago in South Africa (Texier et al., 2010; Texier et al., 2013) find modern-day analogues in Kalahari hunter-gatherer material culture (e.g., Schapera, 1930; Silberbauer, 1981; Wannenburgh et al., 1980). Given the importance of OES beads and water carriers to so many communities through time and space, questions regarding why a similar use of emu eggshell (EES) is completely absent from the Australian context are frequently voiced in archaeological forums. This paper addresses that question.

The Australian emu (*Dromaius novaehollandiae*) — along with the kangaroo — are currently Australia's largest native terrestrial animal prey and are still hunted (and farmed) for their meat, tendons, oil, feathers, and eggs (e.g., Roth, 1901; Thomson, 1939; Gould, 1966, 1969; O'Connell, 2000). Fragments of EES are frequently reported for Pleistocene and Holocene archaeological sites around the country, commonly being associated with hearth features indicating their collection for consumption, though no artefacts of any kind manufactured on EES have been reported in either the archaeological or ethnographic literature. Importantly, no reason for the exclusion of this hard animal material from use in material culture production is ever provided.

In order to identify why EES was disregarded by tool and ornament makers (until very recently), data pertaining to its physical characteristics is compared to that of ostrich and moa — the eggshells of these large birds both having been utilised for material culture manufacture in their respective regions. Additionally, experimental working of EES alongside OES was undertaken in order to ascertain the plausibility of its use for ornament production. Results of these investigations indicate that ESS's are deficient in several crucial aspects, likely causing their exclusion from the extensive Australian Indigenous organic material culture repertoire.

2. Background: Ostrich, moa, cassowary, and emu eggshells and their use

Emu belongs to the Order Stuthioniformes, otherwise known as the ratites; a diverse group of large, flightless birds with small wings and without a keeled sternum. In addition to the Australian emu, extant

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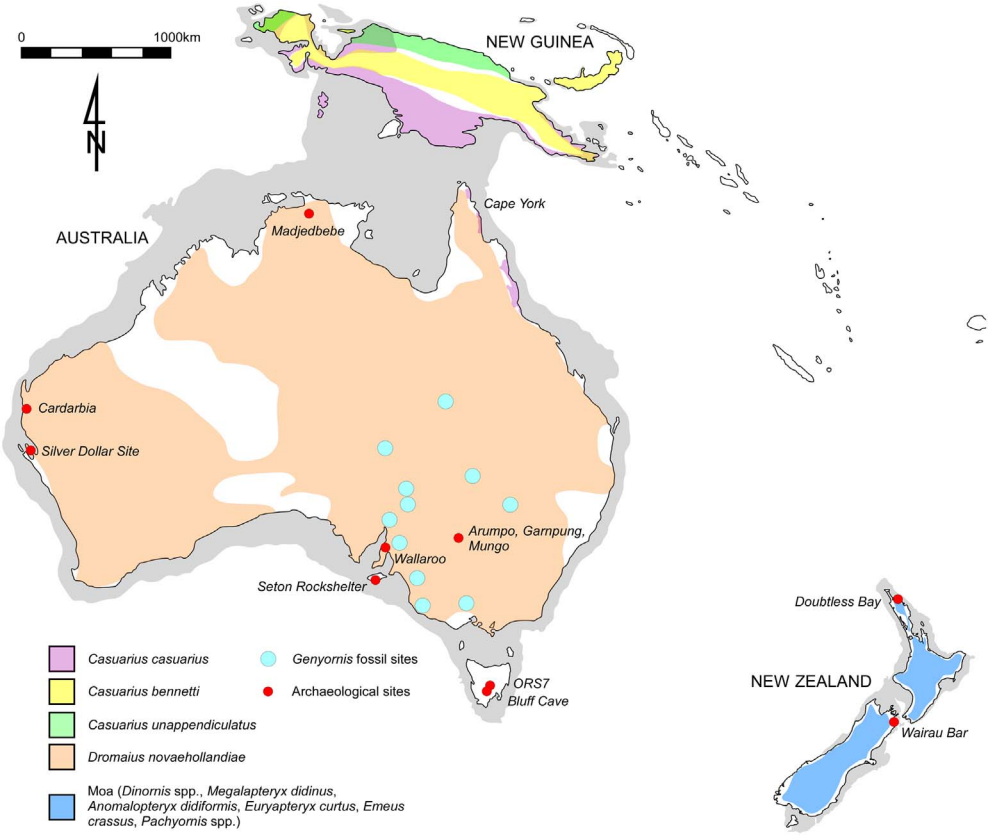

Fig. 1. Distribution of ratites in Oceania and location of sites mentioned in text. *Genyornis* fossil sites after Baird (1991). Moa distribution after Bunce et al. (2009). Emu and Cassowary distributions after Barrett et al. (2003).

species include three species of cassowary found only in the northern tropics of Australia and New Guinea (*Casuarius casuarius*, *C. unappendiculatus*, and *C. bennetti*), the African ostrich (*Struthio camelus*), three South American rhea (*Rhea americana*, *R. pennata*, and *R. tarapacensis*), and five species of New Zealand kiwi (*Apteryx haastii*, *A. owenii*, *A. rowi*, *A. australis*, and *A. mantelli*). The 11 extinct species of New Zealand Moa also fall into this group. The eggs of the largest of these birds, moa and ostrich, will be discussed below as people are known to have utilised the shells of their eggs to create items of material culture. Those of the emu and cassowary — being the subject of this paper — will also be described. The eggs produced by the smaller kiwis, while perhaps eaten by people at least at one time in the past, are not known to be utilised in material culture and will not be described. Similarly, while the consumption of rhea eggs in archaeological contexts is regularly reported (e.g., Borrero et al., 1998; Medina et al., 2011; Salem and Frontini, 2011), no evidence for their use in material culture production has ever been found, and so these eggshells will also not be described further.

2.1. Ostrich eggshell use

Ostriches are the largest of the living ratites (reaching 160–130 kg), and are today found throughout sub-Saharan Africa, though in the past their geographic distribution was significantly wider reaching into Siberia, Mongolia, and China (e.g., Derevianko and Rybin, 2005; Wei et al., 2017; Zwyns et al., 2014). Their eggs were and continue to be an important resource for humans owing to three main factors: (1) their nutritional value; (2) their size; and (3) the robustness of their shell. Ostrich eggs average around 150 mm long by 130 mm wide and are cream/white in colour. Importantly, the shells average 2 mm in thickness, allowing their use as a support for material culture production.

OES is best known in archaeology for its transformation into small disc-shaped beads which were ubiquitous throughout many regions of Africa and Asia during the Terminal Pleistocene and Holocene (Miller and Willoughby, 2014; Mitchell, 2002; Wang et al., 2009; Wei et al., 2017). First appearing in the African archaeological record after around 50,000-years-ago (Ambrose, 1998; Miller and Willoughby, 2014), the manufacture of OES beads has been ethnographically observed and recorded (Mitchell, 2002). Indeed, OES beads are documented as important in gift-exchange networks, such as the *Hxaro* system practiced by modern Ju/'hoansi Bushmen (Wiessner, 1977, 1984, 2002), encouraging researchers to view these items as potential indicators of such complex social systems reaching back into the deep past (e.g., Ambrose, 1998; Miller and Willoughby, 2014; Mitchell, 1996; Wang et al., 2009).

Pendants, along with painted and engraved fragments of OES have also been recovered from both Middle (MSA) and Later Stone Age (LSA) contexts of southern Africa (Dewar, 2008; Humphreys and Thackeray, 1983; Rudner, 1953; Texier et al., 2010; Texier et al., 2013; Vogelsang et al., 2010), with the latter (engraved fragments) suggested to originate from broken OES containers. Common ethnographically (Marshall, 1976; Silberbauer, 1981), these containers were made by perforating (drilling, punching, hammering, or grinding) a small hole in the tapered end of the egg (Kandel, 2004), and are most commonly cited as water storage, though mentions of their use in storing ground pigments, small OES fragments, and ant larvae are also known (Henderson, 2002; Humphreys, 1974; Kandel, 2004; Silberbauer, 1981). As mentioned above, the first appearance of such containers in the archaeological record is prior to 60,000-years-ago (Texier et al., 2010; Texier et al., 2013).

2.2. Moa eggshell use

The New Zealand moa comprised of 11 species, the largest of which were the North Island giant moa (*Dinornis novaezealandiae*) and the South Island giant Moa (*Dinornis robustus*). These flightless birds reached about 3.7 m in height and weighed some 100–200 kg (Anderson, 1989a; Davies, 2002). These characteristics no doubt made