Ritually Orchestrated Seascapes: Hunting Magic and Dugong Bone Mounds in Torres Strait, NE Australia

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People dwell in a world of their own subjective making. For many hunters, engagement with the 'natural' world is a negotiated affair because animals, like people, possess spirits. A critical part of the negotiation process is mediation of the human–prey relationship by hunting magic. Torres Strait Islanders of NE Australia are skilled hunters of dugongs, a marine mammal whose capture entails a broad range of ritual practices. Following ethnographic expectations, excavation of bone mounds reveals ritual treatment of dugong bones, especially skulls, to increase hunting success. Extensive use of dugong bones in ritual sites has important implications for the extent to which 'secular' midden deposits are representative of Islander subsistence practices. Since dugong bone mounds provide archaeological insights into Islander spiritual relationships with dugongs, chronological changes in use of these sites inform us about historical developments in Islander ontology and their ritual orchestration of seascapes and spiritual connections to the sea.

> At their village I saw signs of a custom which will perhaps one day puzzle the naturalist. (Captain John Moresby, Mabuiag Island, Torres Strait, 1872: Moresby 1876, 131)

Traditional archaeological approaches to prehistoric subsistence focus on procurement technology, diet and foraging strategies. Yet subsistence concerns more than ecological relationships between humans and the so-called 'natural' environment. While a subsistence system must have an underlying ecological logic to remain viable, it also embraces a wide range of symbolic practices that mediate interactions in a socially-constructed 'natural' world inhabited by various kinds of forces and beings. These mediations reflect the simple fact that all peoples negotiate cultural landscapes rich in cosmological meaning. It therefore comes as no surprise to find that hunting involves ecological information (e.g. location and behaviour of animals) and technological strategies (e.g. use of weapons and trapping facilities) coupled with beliefs about the spiritual positioning of target taxa within a broader cosmology. In cultures where spirituality encompasses animals, rituals often exist to ensure the production of prey (increase rites) and the capture of prey (hunting magic). While archaeology has developed a broad range of analytical tools to investigate the technological and ecological dimensions of subsistence, the discipline's ability to understand the spiritual and ritual dimensions of subsistence is poorly developed (Reitz & Wing 1999). The incorporation of such dimensions in archaeological theory and method would considerably enhance our capacity to access and assess how people constructed their worlds — how notions of Being were constructed through ontological relationships between themselves and their world — in the past.

The lack of archaeological exploration of the ritual dimensions of faunal remains (in a non-mortuary context) reflects an assumption that spiritual issues have little analytical value for understanding and modelling ecological relationships and long-term subsistence change. This view has three key conceptual and taphonomic problems. First is the assumption of 'constitutive reductionism' (Winterhalder & Smith 1992, 14–15) whereby ecological relationships

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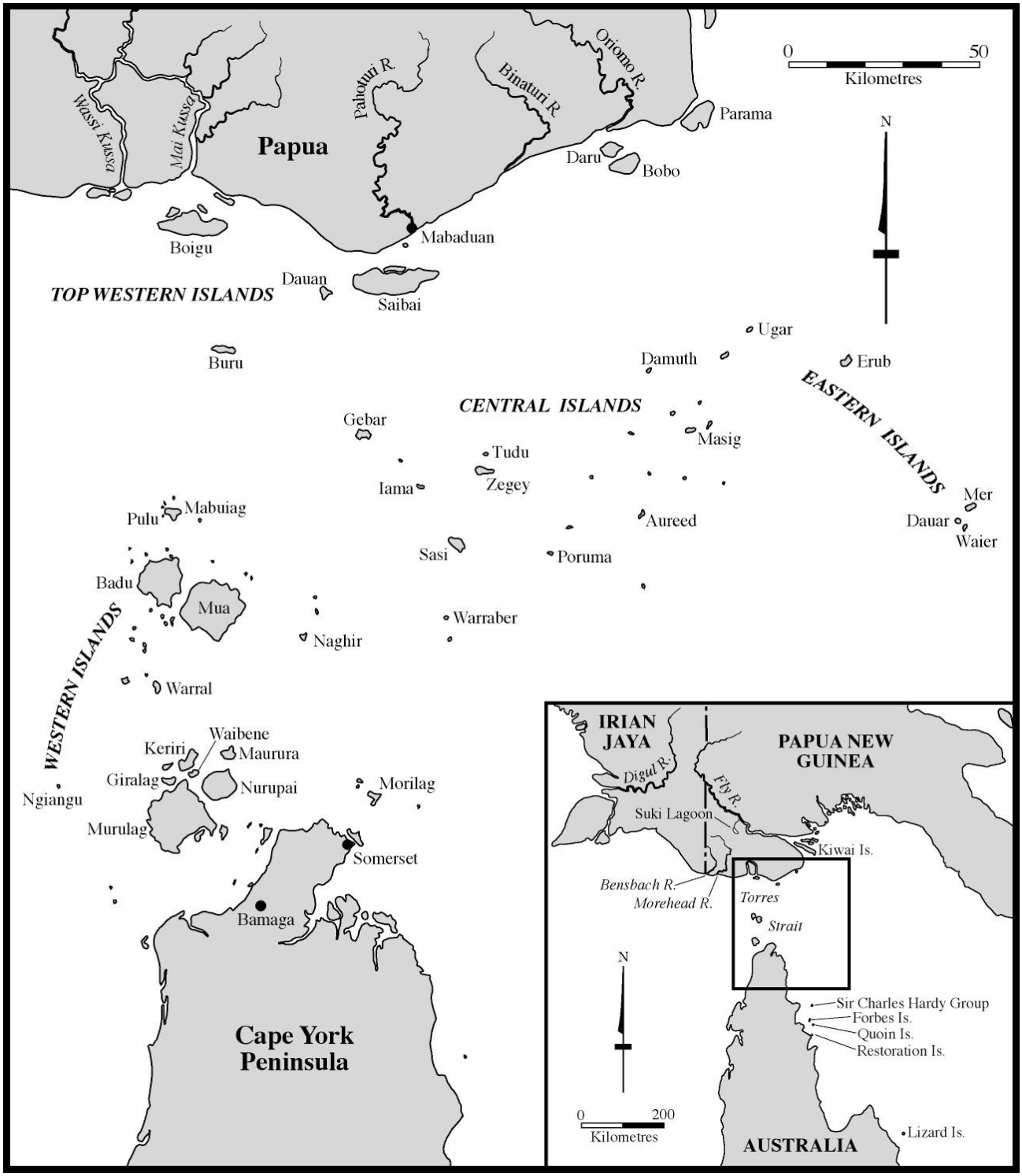

Figure 1. *Study area.*

are represented as the core of subsistence while spiritual dimensions of subsistence, such as increase rites and hunting magic, are seen as epiphenomena with little adaptive significance. This approach is founded on an arbitrary, analytical hierarchy which dis-embeds subsistence from its broader social and religious context. It fails to recognize that social relations, including organizing principles such as totemism,

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critically influence and mediate ecological relations (Ingold 1986, ch. 5; 1991; Minnegal 1996; Rappaport 1967). Increase rites and hunting magic mediate human–environmental interaction because they consume energy (in ceremonial/ritual activity and in the production of associated material culture) and alter perceptions of the quality (particularly abundance and accessibility) of prey. Second, the restricted conceptualization of animal bone deposits as either secular (i.e. village or home base refuse and kill- or processing-site residue) or sacrificial deposits (i.e. typically intentional burial of whole or partial animals) (Reitz & Wing 1999, 113–14; Wait 1985, 122) is problematic. Recent studies have demonstrated that deposits of subsistence remains are much more functionally diverse and complex than previously thought (Lamotta & Schiffer 2001, 45–6). In particular, the concepts of 'ritual rubbish' in England (Bradley 1990; Hill 1995; McOmish 1996; Needham & Spence 1997; Thomas 1999, ch. 4; Tilley 1996, 284–91; Wait 1985) and 'ceremonial trash' in North America (Walker 1995; 1998) have been developed in acknowledgement of the emerging appreciation of the biographical nature of refuse and the embeddedness of subsistence remains in ritual behaviour, place-marking and the symbolic construction of cultural landscapes. The third problem concerns the integrity of food-refuse deposits and the assumption that such deposits are representative of subsistence strategies. While it is widely recognized that taphonomic processes can alter the relative contents of faunal deposits (Reitz & Wing 1999, 202–4), few archaeologists consider that large-scale secondary use of faunal remains for rituals (e.g. hunting magic) can radically alter the form and content of other food-refuse deposits. This article outlines a conceptual framework for archaeological investigation of ritualized subsistence remains through an exploration of dugong hunting magic from Torres Strait, NE Australia.

Ritually orchestrated land- or seascapes

Finding one's place in the 'natural' world is far from a secular exercise. In all societies, people operationalize their lives through ontologies that involve causal relationships between the social world of people and the social world of spiritual beings. These relationships are made possible through recognition that all things are located in, and animated by, unifying cosmologies. Plants, animals and topographic/atmospheric features (e.g. mountains, wind) are thus neither 'secular' nor 'sacred', for in humanity's spirituality the world is itself constructed in both, be it explicitly or implicitly (Ingold 1986, 245). People construct land- or seascapes as anthropomorphized *spiritscapes* to make them comprehensible, and often develop symbolic strategies (rituals and associated magico-religious activities and paraphernalia) to establish the necessary social relations to meaningfully engage with spirits (Bender *et al.* 1997; David & Wilson 1999; Guthrie 1993; Langton 2002; Morris 2000; Thomas 2001; Thomas *et al.* 2001; Tilley 1994). Following Guthrie (1993, 161–70), we argue that the universal human tendency for anthropocentrism underpins a teleological view of 'nature' and an ensuing belief that people need to manage and manipulate spiritscapes through rituals for their own survival. Rituals formally activate efficacious relationships between phenomena by stimulating and channelling spiritual forces. By definition, rituals need to be performed periodically, as their effect tends to be short-term and situational (e.g. healing a particular person, helping with a particular hunting event). In this sense, the notion of the negotiated landscape comes into full action. Human action engages with an animated and anthropomorphized 'nature' and spiritscape through symbolic acts (i.e. rituals) to bring about some form of desired change. And as with all negotiated (social) engagements, unknown variables and fickleness can create a difference between desired and actual outcome.

Since ritual places demarcate land- or seascapes with liminal zones where people experience bodily engagement with the spiritual realm through ritual performance, they also represent geographical metaphors of ontology (see Bradley 2000, 158). Collectively, ritual places can be read as ontological maps and cosmological guides for how cultural groups ritually orchestrate land- or seascapes and conceptually construct and divide their worlds (David 2002; David & Wilson 1999; McNiven in press). It is what Thornton (1980) referred to as 'topology' and the 'ritual creation of space'. In many cases, the phenomenological significance of ritual places can be visually elaborated through a broad range of place-marking strategies such as construction of structures/monuments (e.g. buildings, mounds) and enhancement of existing features (e.g. rock art, tree carving). These fixed, marked places add to cultural land- or seascapes the dimension of biography, differential knowledge and power. Some members of a society will know more about the history and significance of particular ritual places than others. In many instances, a hierarchy of knowledge is established for ritual places with the most sacred and secret information residing with a few senior community members.

Ritual places also have temporality. They provide each generation with an opportunity to historicize their cosmology, and if desired, call on cultural tradition to reaffirm (and perhaps redefine) the significance of such places through spatial (re)inscription (Bradley 1998; David 2002; Edmonds 1999; Thomas *et al.* 2001). Thus marked places and their associated rituals not only anchor people to the past, they also provide beacons for the future. As Gosden (1994, 11–12) cogently notes, '[w]ithout material culture it is impossible to imagine long-term trends in social forms'. It is the materiality and temporality of ritual places that makes them amenable to archaeological investigation.

To understand the internal logic of rituals, care needs to be taken not to see spiritual/magico-religious forces as somehow external to a 'natural' world of objective reality. These forces occur *within* and not 'outside the ordinary operation of cause and effect' (Lewis 1994, 579; see also Hviding 1996; Ingold 1980, 296). As Evans-Pritchard (1965, 109) pointed out in the case of witchcraft magic, 'nothing could be more natural'. Such a view contrasts with a Western capitalist ontology that separates, objectifies and mechanizes 'nature' (cf. Cartesian dualism) and a concomitant Christian cosmology that espouses an omnipotent God that is not amenable to manipulation by rituals involving 'magic' or associated 'charms' (Descola & Pálsson 1996; Guthrie 1993, 174; Serpell 1986, 137; Tambiah 1990). From a phenomenological standpoint, the notion of a detached or externalized, objectified 'nature' also loses value, for in this construction human experience is framed and constrained as an internalized, subjective world of our own creation (Merleau-Ponty 1962). As Schama (1995, 61) notes, 'landscapes are culture before they are nature'.

For many indigenous peoples, a key class of spiritual/magico-religious activity that exemplifies the concept of ritually orchestrated land- or seascapes is 'increase', 'fertility' or 'maintenance' rites. These rites are aimed at ensuring production and continuity of critical elements of the 'natural' world such as food, and invariably take place at special ritual places. The responsibility for these 'increase' activities often falls upon particular community members who possess specialist knowledge or skills (e.g. shamans) and rights (e.g. senior totemic custodians) to mediate the secular and spiritual realms. Indigenous Australians provide some of the best examples of totemic increase rites and what has been referred to as 'ritually stimulated nature' (Maddock 1978, 26) or 'religious curation' of the landscape (Jones 1990, 31: see also Berndt & Berndt 1981, 269–73; Elkin 1981, 222–6). Increase rites of the Arrernte of Central Australia are associated with 'increasing the food supply' and were made famous in anthropology by Spencer & Gillen (1899). Strehlow (1970, 102–3) documented how senior members of totemic clans of the Arrernte possessed the 'power' and responsibility for performing 'increase rites which ensured the magic propagation of [their respective totemic] animals and plants'. Some Arrernte increase sites are associated with rock paintings (Spencer & Gillen 1899), and similar associations between animal or plant increase sites and rock paintings have been documented for other parts of northern Australia (e.g. Layton 1992, 47–9; see David 2002 for a detailed archaeological study of Arrernte ritual places). Senior Aboriginal men from Central Arnhem Land, northern Australia, 'call out to the spirits, asking them to ensure that more kangaroos will be produced and new grass will come to bring the earth back to life' during the ritual disposal (often in caves) of ochred bones of kangaroos eaten by young male initiates (Yibarbuk 1998, 5).

Hunting magic

Ethnographic observations reveal that a related group of 'magico-religious' rituals, often referred to as hunting magic, were performed by many if not most hunters to assist *capture* of animals (see Frazer 1911, ch. 3; Hallowell 1926; Zerries 1968 for major literature surveys). Piddington (1963, I, 258) comments that all hunters attempt to minimize the risk of hunting failure, often through recourse to 'magico-religious rites'. Lee (1979, 247) suggests that in a 'modest way the use of hunting magic helps to restore or maintain the confidence of the hunter and to give him the feeling that unseen forces are favourable to his quest'. Whereas increase rites aim to ensure existence of prey, hunting magic is concerned with securing prey. Hunting magic is a form of 'sympathetic magic', which, according to Sir James Frazer in his monumental *Golden Bough*, assumes 'that things act on each other at a distance through secret sympathy, the impulse being transmitted from one to the other by means of what we may conceive as a kind of invisible ether' (Frazer 1911, 54). After an extensive ethnographic survey of sympathetic magic across the world, Frazer (1911, 53–4) concluded that connections between the operator and subject are enabled by manufacture of an image of the subject ('Homoeopathic or Imitative Magic') or use of objects once in contact with the subject ('Contagious Magic') (see also Haddon 1906). Fraser (1911, 54) noted that in 'practice', sympathetic magic usually involves

elements of each. For the purposes of this article, we identify two broad functional types of hunting magic: 1) immobilization rituals; and 2) allurement rituals.

Immobilization rituals: Immobilization rituals aim to assist hunters to advance upon prey, kill prey and/or increase the functional efficacy of their weapons. Bushman hunters would assist capture of an animal they have wounded by eating the flesh of a slow-moving animal (Forde 1964, 28–9). Amongst the Ewe of West Africa, hunters 'stab the footprints of game with a sharp-pointed stick in order to maim the quarry and allow them to come up with it' (Spieth 1906 cited in Frazer 1911, 212). From eastern Africa, Wandamba hunters apply the juice of a certain fruit onto their guns to make wounded elephants bleed more profusely (Hodgson 1926) while Malawian hunters increase the accuracy of weapons by application of special 'medicines' (Morris 1998, 105). The Wola of Papua New Guinea recite incantations to render game 'blind' as they approach traps (Sillitoe 2002, 69).

Allurement rituals: Allurement rituals aim to cajole animals into coming towards a hunter, either by use of charms or by making sensory contact with the prey. On the Great Plains of North America, the Paiute performed a ceremony to 'charm' wild goats into approaching and entering specially-built brush pounds (Forde 1964, 37). The Torajans of the Central Celebes 'hang up the jawbones of deer and wild pigs in their houses, in order that the spirits which animate these bones may draw the living creatures of the same kind into the path of the hunter' (Kruyt 1899 cited in Frazer 1911, 109). Guenther (1991, 199) records that a /Xam Bushman hunter, by 'projecting himself into the animal and viewing himself as the object, through the antelope's eyes . . . would monitor [the antelopes] every thought, emotion and action, in order to sustain the bond of connectedness with the animal by which he felt he could steer the hunt towards an auspicious conclusion'. Thus the 'hunt became an ongoing process of intersubjectivity' where hunters 'attune themselves spiritually to one animal species or another'.

Bone caches

While ethnographic accounts of hunting magic often refer to charms, few make reference to *sites* marked by material culture. The major exception is sites marked by the bones of prey. The Mundurucú shamans of South America blow tobacco smoke over parallel rows of animal skulls near the 'men's house' to propitiate the 'mother' spirit of these animals to 'grant success in the hunt' (Murphy 1958 cited in Zerries 1968, 265). The Chimane of Bolivia place bones of hunted animals in large baskets suspended from the roof of huts to 'prevent their spirits from leaving the district and taking the rest of the game with them' (Zerries 1968, 73). The Mountain-Ok of Papua New Guinea hang bones of game (e.g. pigs, cassowary, marsupials) on the walls of men's cult houses to help bring 'success in hunting' (Craig 1990, 207; Hyndman 1991; see also Sillitoe 2001, 384).

The best-documented hunting rituals involving animal bones are those practiced by indigenous peoples of northern Eurasia and North America. Ritual activity can involve single bones or the entire skeleton and of the wide range of animals treated in this manner, the best known are bears (Paulson 1968; Tanner 1979). Following his Frazerian survey of Northern Hemisphere bear ceremonies, Hallowell (1926, 136) concluded that bear bones, especially skulls, are cached and protected from dog scavenging to avoid 'the "spirit" or "owner" of the animal' from being 'offended' lest 'misfortune or poor luck in hunting will result'. Most bones are hung in trees or placed around special poles; others are thrown into a river or buried. In some cases, attachments are made to the bones in 'an effort to "dress up" the creature in borrowed finery' (Hallowell 1926, 146). For example, the Northern Saulteaux Native Americans attached bear ears, skin from the muzzle, red ochre, tobacco and ribbons to bear skulls (Hallowell 1926, 138). Khanty peoples of western Siberia deposit elk heads and vodka bottles, along with coins and cloth which have been 'ritually smoked', at special places to propitiate the 'forest spirit . . . who dispatches game to the hunter' (Jordan 2001a, 95, 101).

The extent to which hunting rituals associated with animal bones can be differentiated from increase rites is often difficult to discern. Paulson (1968, 453) concluded that by 'saving and burying the bones of the killed animal in strict accordance with ritual prescriptions, and by observing certain laws and taboos, the natives not only aim at future luck in hunting, but also wish to avert any danger that might threaten the hunter from other animals of the same species'. Alternatively, Hallowell (1926, 145) noted that bear bone rituals were also associated with 'propitiation of the supernatural controller of the bear . . . in order that more bears or other animals may be released by the spiritual controller of the bears'. Khanty hunters place elk bones (especially skulls) in special places in the forest for future hunting success

and to allow the elk's soul to 'revive' (Jordan 2001b, 29). In a related sense, certain Algonkian groups placed beaver bones in lakes without beavers so that the animals will 'appear' (Skinner 1915 cited in Hallowell 1926, 140). The Gilyak of Siberia throw the 'decorated heads of seals' into the ocean to ensure seal 'reincarnation' (Child & Child 1993, 34). Thus, 'the hunter receives the animal's physical substance — its meat, hide and bone — but its spirit is immortal and undergoes an eternal cycle of death and rebirth' (Serpell 1986, 145; see also Ingold 1980, 282).

Hunting magic: archaeological approaches

Despite considerable ethnographic information for hunting magic across the globe, very few archaeological studies have identified material remains associated with this class of ritual. Following the introductory comments above, this dearth of interest reflects a broader neglect of spiritscapes and a lack of acknowledgement of the embeddedness of rituals in everyday subsistence. As a result, little effort has gone into developing methodologies to identify hunting magic sites and the impact of these rituals on secular subsistence remains (e.g. refuse dumps).

The most celebrated archaeological example of hunting magic comes from the European Upper Palaeolithic. The foundational work here is Reinach (1903) who applied Frazer's anthropological ideas of sympathetic magic and Spencer & Gillen's descriptions of Aboriginal increase ceremonies to Palaeolithic rock art (see Ucko & Rosenfeld 1967 for detailed overview). Reinach based his interpretation on two perceived features of Palaeolithic paintings: 1) most are food animals; and 2) most are in inaccessible locations. The hunting magic theory was boosted by the discovery of paintings interpreted as animal traps (tectiforms), ritually-killed animals (with arrow wounds) and sorcerers (theriomorphs) (Bégouen 1929; Breuil 1952; see also Kehoe 1990; Mithen 1990). The limitations of the hunting magic theory of Upper Palaeolithic rock art are variable and complex and have long been recognized (e.g. Ucko & Rosenfeld 1967). For example, the quality of data, particularly examples of ritually-killed animals, is often spurious (Bahn 1991). Furthermore, only a moderate correlation exists between animals depicted in paintings and animals eaten (as revealed by archaeological analysis of associated bone deposits) (Davidson 1999; Rice & Paterson 1985; 1986). Significantly, Aboriginal rock art, which provided an important analogy for the hunting magic theory, actually includes few examples of hunting magic (see Flood 1997; Gould 1969, 152–3; Layton 1992; Taçon 1989, 241).

Arguably the most informed archaeological investigations of hunting magic concern big-game hunting in North America. In Colorado, the *c.* 10,000-year-old Jones-Miller bison kill site reveals a concentration of bison remains within a corral enclosure. The centre of the site has a post mould containing an antler fluke, butchered canid remains, a miniature projectile point and calf skull, interpreted as analogous to historically-recorded 'medicine poles' used to spiritually coerce bison (Stanford 1979). At the Ruby bison kill 'corral' site in Wyoming, Frison (1991, 207–8) suggests that an associated structure featuring an arrangement of bison skulls but lacking evidence of domestic activities was used as a 'supernatural' aid to hunting. Frison *et al.* (1990) document an extraordinary series of mountain sheep hunting structures dating to the late eighteenth and early nineteenth centuries in mountainous areas of Wyoming. Nearly all of the log and rock rubble trapping devices incorporate log structures which are inferred, based on ethnographic analogy, to have been used by shamans spiritually aiding the hunt. Equally intriguing, a series of ram skulls were found embedded by regrowth within old trees that 'may reflect religious activity associated with mountain sheep procurement' (Frison *et al*. 1990, 232).

The above examples not only demonstrate the wide geographical spread from the Arctic to the Tropics of hunting magic rituals that use bones, but also that such practices have a considerable antiquity, possibly back to the Pleistocene. From this broad backdrop we now focus our attention on dugong hunting.

Dugongs

The dugong or sea cow (*Dugong dugon*) is a marine mammal herbivore growing to about 3 m in length and 400 kg in weight (Nishiwaki & Marsh 1985). It has poor eyesight, a keen sense of hearing and a relatively simple skeleton consisting of a skull, vertebrae, ribs, forelimbs and vestigial pelvis (Fig. 2). Dugongs can be found singly or in herds of over 100 (Marsh *et al.* 1978, 166). They are distributed across shallow coastal tropical and subtropical waters of 37 countries from Mozambique in east Africa to Vanuatu in the western Pacific (Marsh *et al.* 2002). Within this range, dugongs are hunted for meat in 34 countries. Despite widespread protective legislation, over-hunting and habitat depletion have resulted in dugongs being listed as vulnerable to extinction by the World Conservation Union (IUCN 2000; Johannes & MacFarlane 1991, 42). Dugong populations are highly

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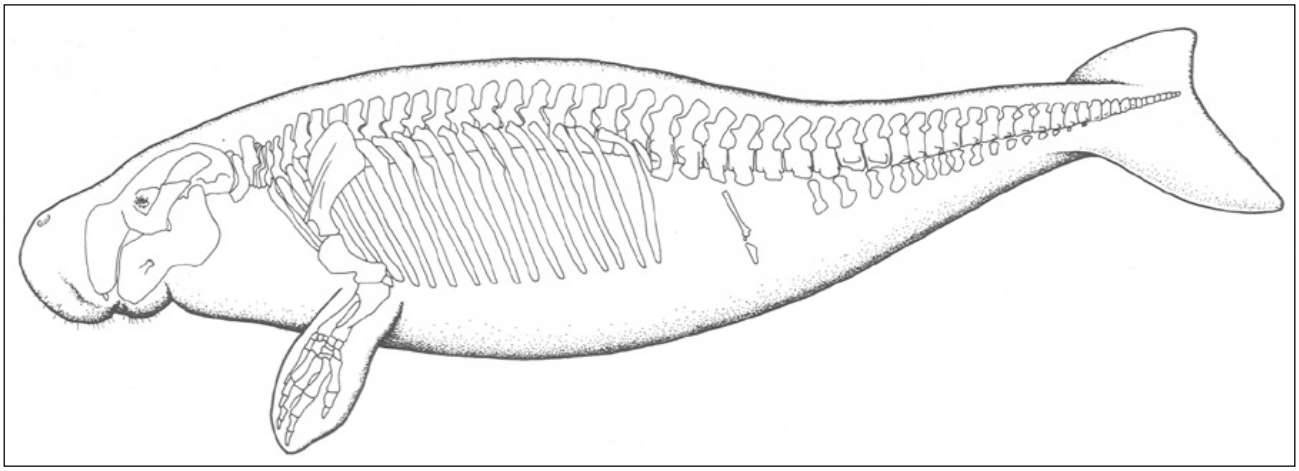

Figure 2. *Dugong skeleton with outline of soft tissue. (After Marsh 1989, 1030; Kingdon 1971, 392.)*

susceptible to over-hunting with a maximum sustainable loss rate for females of <3 per cent per annum (Marsh *et al.* 1997, 1384). The most common hunting technique used across their range is harpooning from small boats (Marsh *et al.* 2002). While details of dugong hunting are generally lacking, anecdotal evidence indicates that hunting rituals were practised in a number of areas. For example, the Ongés of the Little Andaman Islands (India) cached dugong skulls and jaws painted with 'red clay' above cooking areas so that 'smells' released from the bones will 'attract' dugongs 'thus facilitating future hunts' (Das 2000, 6). Further hunting rituals include rubbing wild ginger on harpoons and 'reciting sacred spells to attract dugongs towards the canoe' (Das 2000, 8). By far the most detailed ethnographic and historical information in the world on dugong hunting and associated rituals, however, comes from Torres Strait Islanders whose seas contain the largest population of dugongs in the world.

Torres Strait Islanders, dugongs & hunting magic

For at least 2500 years, Torres Strait Islanders have inhabited the aquatic realm that separates mainland Australia from Papua New Guinea (Barham 2000) (Fig. 1). Despite considerable colonial impact over the last 150 years, Islanders maintain their maritime lifeways and seascapes (Beckett 1987). This maintenance is expressed through totemic associations with marine animals (e.g. dugongs, turtles, sharks), ownership and telling of myths and legends about the sea, star constellations associated with marine animals (e.g. shark, remora), long-distance sea navigation, sea tenure and territoriality, deep knowledge of marine ecosystems, diverse use of marine resources, and most importantly for this paper, dugong hunting rituals (Barham 2000; Beckett 1987; Bird & Bliege-Bird 1997; Fitzpatrick 1991; 2000; Haddon 1912, 220–21; Harris *et al.* 1992; Johannes & MacFarlane 1991; Lawrie 1970; Nietschmann 1984; Nietschmann & Nietschmann 1981; Peterson & Rigsby 1998; Scott & Mulrennan 1999; Sharp 1993; 2002).

In Torres Strait the dugong is referred to as *dhangal* across the western and central Strait (Kala Lagaw Ya language) and *deger* in the eastern Strait (Meriam language). The Kiwai people of the adjacent Papuan coast (Papua New Guinea) know the dugong as *momoro*. Torres Strait Islanders and the Kiwai are the greatest hunters of dugongs in Australia and Papua New Guinea respectively (Hudson 1982, 312; Marsh *et al.* 2002). Two key areas for dugongs in Torres Strait are the expansive sea-grass beds across Orman Reefs (*Gururai, Koi Maza, Beka*, etc.) and associated reefs in the northwest Strait, and Warrior Reef in the north central Strait (Haddon 1912, 166; 1935, 75; Johannes & MacFarlane 1991, 23; Olewale & Sedu 1982). Dugong is a high prestige food and much status is attached to men who successfully hunt these animals. While women have never been recorded hunting dugong in Torres Strait, their 'desire' for meat prompts much hunting. Anthropologist Alfred Haddon (1890, 351; 1912, 166) described Mabuiag Island in the central western Strait as 'the head-quarters of the fishery of this sirenian'. This he felt resulted from 'its contiguity to the great reefs', particularly Orman Reefs to the north (Haddon 1912, 137).

Hunting of dugongs was 'undoubtedly the most dangerous and spectacular occupation' practised by Indigenous Australians (Thomson 1934, 238). Today, as in the past, success in dugong hunting requires

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Figure 3. *Ned Waria of Mabuiag Island holding a harpoon (*wap*) and demonstrating the use of a dugong hunting platform (*nat*) to Alfred Haddon, Mabuiag, 1888. Note dugong hunting charm hanging from platform (from Haddon 1912, pl. XXIII, fig. 1). (Courtesy of Cambridge University Museum of Archaeology & Anthropology – P.1148.ACH1.)*

personal motivation, skilful use of technology, detailed knowledge of reef systems and dugong behaviour, a social network to organize a boat crew and the strategic use of rituals and taboos. Such is the intimate knowledge of dugong behaviour gained by some Torres Strait Islander hunters that they can distinguish the age and sex of dugongs at night simply by listening to their exhalation sounds while surfacing to breathe (Nietschmann 1977a, 9).

At the time of European colonial impact in the nineteenth century, Torres Strait Islanders hunted dugongs using a wooden harpoon (*wap*) armed with a barbed wooden point thrown from either a bamboo platform (*nat*) or canoe (Haddon 1890, 350, 352) (Figs. 3 & 4). According to anthropologist Gunnar Landtman (1927), the Kiwai of the adjacent southern Papuan coast employed similar technologies. Today, dugongs are hunted still with a wooden harpoon but with a metal point and from aluminium dinghies (Johannes & MacFarlane 1991, 24–31; see Hudson 1986; Olewale & Sedu 1982; Parer-Cook & Parer 1990 for similar details on contemporary Kiwai hunters). As in the past, dugongs are killed by drowning. The acute hearing of the dugong makes silence an important part of dugong hunting. Haddon (1890, 352; 1912, 168) recorded that hunting platforms were erected with the long axis pointing into the wind to avoid making 'a noise which alarmed the dugong'. He also observed that when stalking a dugong, the boat crew communicates 'by signals only, not a word is said' (Haddon 1901, 150). Silence is still a key to dugong hunting success amongst boat crews who often travel many kilometres out to sea, ideally on moonlit nights. The silence is finally shattered as the harpooner lunges off the bow of the boat to strike the dugong as it re-emerges for air. With much excitement the crew works long and hard to draw the tethered creature to the side of the boat. The exhausted dugong is drowned, tied to the stern of the boat, and the long, slow ride back home begins.

Dugong increase rites

Haddon (1935, 355) reported that the 'two most important food animals of the Torres Straits Islanders were the dugong and turtle, and it was only natural that there should have been elaborate ceremonial in connection with them'. While Haddon (1912, 151) recorded that '[p]ractices of a magico-religious character were universally employed to ensure the fertility of crops and the productivity of fruit-trees', no such rituals were observed for dugongs. Senior Kiwai people 'believed the bounty of the sea was inexhaustible and the dugong could never disappear' (Parer-Cook & Parer 1990, 33–4). This is a long-held view of the Kiwai, and Landtman (1927, 127–8) believed it explained why 'no rites are performed in order to multiply dugong'.

In marked contrast to Torres Strait, numerous references to dugong increase ceremonies exist for Aboriginal peoples south of the Strait where dugongs are less abundant. In eastern Cape York Peninsula, anthropologist Donald Thomson (1933, 501; 1934, 252) documented a ceremony by the Koko Ya'o (Kuuku Ya'u) 'for the purpose of increasing the number of dugong' which took place at the 'dugong totem centre' which is marked by a special 'dugong stone' (see also Rigsby & Chase 1998, 207). Men of the dugong clan walk around the stone, 'striking' it

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with bunches of leaves and saying the words — *Ampimbo! Ampi'! Ampi'! Ampi'!* (You come plenty! Come plenty! Come plenty! Come plenty!). The ceremony was undertaken at no set time, only when 'people notice a falling off in the number of dugong'. Similarly, Hale & Tindale (1933, 92–3) recorded 'dugong increase charm[s]' in the form of dugong bone 'heaps' on the 'islands and mainland of Princess Charlotte Bay'. Some of the piles comprised 'only one or two animals' but one large example was 'six feet in length, three feet in width, and about three feet in height' and contained '[a]ll the major bones' of the dugong. The Yanyuwa Aboriginal people of the Gulf of Carpentaria (west of Cape York Peninsula) perform 'dugong increase rituals' at a special dugong Dreaming site to send forth dugongs into the sea (Bradley 1991, 102–3). The site consists of a 'herd' of 'metamorphosed dugong' (quartzite boulders) and the increase ritual includes striking 'female dugongs' with hammerstones. 'Deep grooves and depressions' in some of the dugongs reveal that the 'rites of increase are of some antiquity'.

Figure 4. *Nomoa of Mabuiag Island holding a harpoon (*wap*) and standing with two dugongs, Mabuiag, 1888 (from Haddon 1912: Plate XXIII, Fig. 4). (Courtesy of Cambridge University Museum of Archaeology & Anthropology – P.1149.ACH1.)*

Dugong hunting magic

Dugong hunting magic was commonly practised across the western half of Torres Strait and along the adjacent Papuan coast. As dugongs were and continue to be 'rarely caught' in the eastern Straits, there exists a corresponding 'absence of ceremonies connected with the dugong' (Haddon 1908, 217; 1935, 158; Marsh *et al.* 2002, 119). The following synthesis concerns only positive magic, it does not discuss negative magic such as taboos and sorcery that undermine the hunting ability of hunters.

On Mabuiag Island, Haddon (1904, 182) was told that only members of the dugong (*Dhangal*) and turtle (*Surlal* or *Waru*) clans had the 'medicine' to magically control dugongs. This power reflected the special spiritual bond that exists between Islanders and their totems (see Haddon 1904, 184). The 'headquarters' of the dugong clan was at the village site of Dabungai and it was at the associated *kod* (ceremonial place) located 'close to the sea shore, that the magical ceremony took place, which had for its object the constraining [allurement] of the dugong to come towards the island to be caught' (Haddon 1904, 182).

Haddon (1904, 183, 341–2) observed that hunting ceremonies 'occurred only in definite places' and Dabungai is strategically located on the north coast of Mabuiag facing the prime dugong 'feeding grounds' on Orman Reefs. For the all-important ritual associated with the 'first dugong of the season', the animal was landed on the beach at Dabungai and a red ochre line was painted along the top of the carcass from mouth to tail. This line represented the mud trail left by a dugong as it fed on sea grass. The dugong was then placed on a mat of plants with magical properties with its head facing inland, 'to make the dugong [in the sea] come towards the island of Mabuiag' (Haddon 1901, 134, 183).

A range of dugong hunting 'charms' was manufactured from wood, stone or parts of dead dugong. Haddon (1890, 352; 1908, 217) recorded that '[u]sually a wooden or stone image of a dugong' was hung from a hunting platform (*nat*) 'to serve as a charm to ensure the approach of the animal' and to 'make him come straight'. Wooden dugong charms could have a cavity in which was placed 'chewed' vegetal matter 'mixed with dugong grass, dugong fat, and red paint' (Haddon 1890, 352–3) (Fig. 5). One such charm, collected by Haddon from Mua Island in 1888, had attached the fibulae of the sorcery man (*maidelaig*) who originally made the charm to 'greatly' increase

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Figure 5. *Wooden dugong hunting magic 'charm' with cavity for placement of special substances. Collected by Alfred Haddon from Mabuiag Island in 1898. L = 49 cm. (Courtesy of Cambridge University Museum of Archaeology & Anthropology – Z9678.)*

its 'efficacy' (Haddon 1904, 338; Moore 1984, 50). Haddon collected a similar wooden dugong charm with human bones (all painted with red ochre) from Mabuiag in 1898 (CUMAA #Z9679: Anita Herle pers. comm. 2002). In 1888, Haddon collected a carved stone dugong hunting charm with woven handle and red ochre line along its back (cf. Dabungai ritual) from Tudu Island in the central Strait (Moore 1984, 56, fig. 159). Today, 'sacred dugong stones' are rubbed over the bodies of some Kiwai hunters 'to give strength and good luck on the hunt' (Parer-Cook & Parer 1990, 23). In some cases, Kiwai hunters take a small stone charm in the shape of a dugong out on hunting trips where the 'spirit' and 'power' of the stone is 'freed to go out and bring us dugong' (*Dugong Hunters of Daru* 1982). Charms could also be made from the 'nose and anterior part of the face of a dead dugong' and the 'larynx and trachea . . . stuffed' with a range of plant products (including sea grass) so 'dugong he smell him, he come quick' (Haddon 1904, 338; see also Landtman 1927, 137; Nietschmann 1977a, 9). On Boigu Island, anthropologist Michelle Raven (1990, 140) notes that prior to 'Haddon's time, dugong skulls were stuffed with plants and used' as hunting charms.

A number of larger 'dugong stones' occur on the northern and eastern islands of Torres Strait. On Dauan Island, LMS missionary W. Wyatt Gill (1876, 302, 322) observed a spherical stone painted red ('intended to symbolize the dugong') 'encircled' by a 'white streak' (symbolizing 'the ropes which will, it is hoped, make it a prisoner'). Before embarking on a dugong hunt, a man would make an offering of fish and coconut to the shrine. He would then approach the stone as he 'mimics the paddling of a canoe' and when near, rush forward and 'firmly' hold the stone 'while uttering a prayer for success'. Four 'dugong stones' were on Boigu Island but only one remains in use today (Lawrie 1970, 236–37; Raven 1990, 230, 284; Toby 1991, 35). The extant stone resembles a dugong in shape and can be moved, albeit with difficulty. Ritual use of the stone, which is restricted to men 'who have the power', includes anointing with coconut oil and painting a line of red ochre from mouth to tail (cf. Dabungai ritual). Next to it are placed sea grass (dugong food), dugong bones (arranged in their 'correct order') and a post from which hangs a *damab* (dugong's trachea stuffed with flowers). The operator can then 'call up' dugongs out to sea by whispering into the ear of the stone dugong, orienting the stone dugong in certain ways, and taking the *damab* out to sea to 'waft the dugong towards the hunter'. A 'dugong stone' on Ugar in the eastern Strait was 'used in the ceremony connected with dugong hunting'. After a 'young boy had speared his first dugong some of its blood was poured over the dugong stone. This was to ensure that the boy would become a great dugong hunter like his father and his ancestors' (Teske 1987, 48).

Significantly, as is also the case with hunting magic sites that possess animal bones across other parts of the world, Torres Strait Islanders constructed dugong bone sites to assist capture of dugongs. On Tudu Island 'stood, until lately, a stately banyan-tree, completely ornamented with dugong bones, the supposed shrine of a spirit possessing the power of giving or withholding success in dugong hunting' (Gill 1876, 302). This may be the same site observed by French explorer Dumont d'Urville in 1840 that he assumed was associated with graves. He noted

> at the north point of the island is a great quantity of the bones of dugong destined to decorate the graves. Walls 1 m to $1^1/_2$ m in height and nearly 2 m thick are built of the ribs of these animals. The skulls were sometimes raised into a pyramid, sometimes they were hung on to neighbouring trees, with large shells (paraphrased in Haddon 1935, 73) (Fig. 6).

It is unclear how d'Urville knew the bones were 'destined to decorate' graves. During the *HMS Fly* expedition in 1845, Jukes (1847, I, 162) observed a similar site on Damut (Dalrymple Island), also in the central Strait. It was located up 'against an old tree' to the side of a 'place of meeting' (probably a *kod* or men's ceremonial area) and consisted of

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> a semicircular pile or wall of dugongs' skulls about three feet high, many of which were quite fresh, but others rotting with age; in the middle of this was a conical heap of turtles' skulls in a similar state. There must have altogether been some hundreds of skulls of each kind of animal.

Haddon noted that 'dugong and turtle skulls and bones were formerly, and often still are, massed in heaps or placed in rows by the Western Islanders'. This

> was done for ceremonial purposes, or merely to keep count of the number of animals caught in any one season, in the later case they were subsequently distributed and soon crumbled away (Haddon 1912, 131–2).

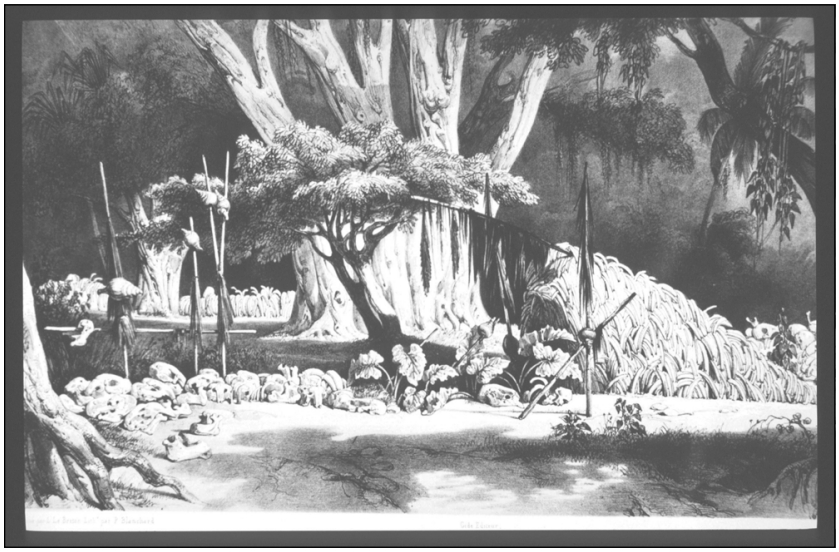

Figure 6. *Lithograph of dugong bone mound on Tudu Island, Dumont d'Urville expedition 1840. (Dumont d'Urville 1846, pl. 189.)*

Another tally tree, referred to as the 'Tree of Skulls' or *Sibui Pui*, was located on Boigu Island in the northern Strait (Haddon 1935, 38; Raven 1990, 104). Gill (1876, 203) described a similar tree ('Devil-tree') on Mabuiag Island, festooned with shells and dugong bones used as 'propitiatory offerings' to a 'mighty spirit'. Haddon (1935, 59) ascertained that this tree grew beside the *kod* (ceremonial place) at Dabungai. He also believed this was the same tree observed by Captain John Moresby in 1872:

> At their village I saw signs of a custom which will perhaps one day puzzle the naturalist. The huts were pitched under the shelter of some enormous banyan trees, in the massive trunks of which the bones of the dugong were so deeply imbedded as to seem one with the wood. Looking farther, I saw one with the shoots, just drooping to root themselves, were twined round the bones of freshly killed dugong. They are placed there as a propitiatory offering, and are never removed (Moresby 1876, 131).

Gill (1876, 232) mentions a 'huge pile of bones of the dugong . . . and rows of pig's jaw-bones' at Mawata village on the adjacent Papuan coast. More specifically, Landtman (1927, 130) recorded that the Mawata bone site was an 'offering' to three 'mythical beings of the sea' — *Nágimarkái*, *Kíbumarkái* and *Usáraba*, 'who are said to be the "bosses" of the dugong and turtle'. Another type of sea spirit called *óboúbi* was known to kill and eat dugongs on Kimusu Reef (northern end of Warrior Reef) located 25 km out to sea. Dugong bones seen on this distant reef at low tide were believed by Kiwai hunters to be the result of such meals and were subsequently 'arranged in circles' (Landtman 1927, 305). *Óboúbi* can provide hunters with special medicines during dreams to assist with harpooning.

Most accounts of dugong hunting magic imply that it was the hunter who controlled the magic. It is clear, however, that efficacious powers also resided with a third party. For example, sorcerers (*maidelaig*) had the power to 'lure' dugong (Haddon 1904, 321). Raven (1990, 146) notes that hereditary sorcerers attended the dugong stones on behalf of the hunter in the northern Strait. On Mabuiag Island, Seligman recorded that a dugong hunter would pay a recognized 'wind-maker' to make appropriate winds to sail canoes for a successful dugong hunt (Haddon 1904, 351; see also Nietschmann 1977b).

Ancestors also had a role to play in many dugong hunting rituals. Gill (1876, 302) noted that Torres Strait Islanders believe that 'the spirits of their deceased friends aid them in chasing dugongs, turtle, etc'. For this reason, portions of dugong are presented to the 'skulls of parents and other relatives' to help in 'securing their goodwill' (Gill 1876, 302). Amongst the Iama-Tudu people of the central Strait, the Rev. MacFarlane recorded:

> When a man intended to go out in his canoe in search of dugong or turtle, he prepared his bamboo tobacco pipe, *zub*, inhaled a big mouthful and puffed it into the mouth of the grinning skull of his father, which was hanging up in the house, and said: 'This my last tobacco now, I give you smoke,

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Figure 7. *Grave of Banasa (b. 1879, d. 1943), Mabuiag Island Cemetery. (Photo: Ian McNiven.)*

> you show me where dugong or turtle stop'. The smoke coming out from the skull whispered 'Whf, whf!' When at sea, the hunter and his friends, with open ears and every sense alert, would presently hear, a little to one side, a dugong faintly blowing 'Whf, whf!' Thus the father by means of the creature's breath was leading it by sound to the place where the hunters waited (cited in Haddon 1935, 78).

Haddon (1935, 230) noted that the 'ghosts of successful harpooners' could accompany hunters out to sea to ensure 'people lucky along dugong'. Before embarking on a dugong hunting trip, Kiwai men may ask an 'old man' to call on the 'spirit of some famous deceased harpooner' and say 'Boy belong you he go outside to-morrow, he take hand belong you, no make him miss' (Landtman 1927, 131). In the 1970s, Nietschmann & Nietschmann (1981, 61) observed that some hunters on Mabuiag would make a 'visit to the graveyard to ask ancestors for luck'. The graves of some renowned dugong hunters are adorned with moulded concrete harpoons (Fig. 7). In this sense, 'skulls have been replaced by headstones' as the symbolic point of contact with the dead (Fitzpatrick-Nietschmann 1980, 331, 344). The association between ancestral powers and dugong hunting is represented in local legend where Sesere introduced the hunting and eating of dugong to Torres Strait after advice from his dead parents (skulls) (Haddon 1904, 40–44; Lawrie 1970, 57–60).

In summary, a wide range of historical and anthropological information from the nineteenth and twentieth centuries makes it clear that a successful dugong hunter in Torres Strait (including the adjacent Papuan coast) is one who has knowledge and skills in the technical (use of harpoon and boat, dugong behaviour, etc.), social (organization of canoe crew, distribution network for meat) *and* spiritual (magic) aspects of hunting. Consistency amongst independent observations made by professional anthropologists on dugong hunting magic over the last 100 years — 1880s/90s (Haddon), 1910s (Landtman), 1970s (Nietschmann & Nietschmann) and 1980s (Raven) — not only reveals the reliability of these observations, but also shows strong continuity in such beliefs. This view is not surprising given Fitzpatrick-Nietschmann's (1980) finding that spiritual aspects of Islander life have been highly resilient to change from colonial impact (see also Beckett 1987). Significantly, none of the early historical observations of dugong bone sites cited above have been found by Haddon (or subsequent researchers) to be inconsistent with anthropological observations. The only issue we see is to what degree Dumont d'Urville assumed the bone mounds he observed on Tudu in 1840 were associated with mortuary practices. Overall, dugong hunting in Torres Strait in the past and in many respects today is far from a 'secular' exercise. Efficacious magical powers came from the hunter, ancestors and/or sea spirits. Material culture associated with dugong hunting magic included charms made from wood, stone and dugong body parts, and special sites where dugong bones (e.g. skulls) were cached. The remainder of this study explores the possibility of identifying archaeological traces of dugong hunting magic sites.

Archaeology of dugong hunting magic: prospects & problems

Mounded caches of dugong bones are the most likely archaeological expression of dugong hunting magic in Torres Strait. A key identification issue, however,

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is that historical and ethnographic sources indicate that dugong bones can also be expected at three other site types in the region: 1) turtle lookouts; 2) graves; and 3) refuse dumps. Haddon (1890, 350) noted that there are

> some favourite look-out stations for turtle where the tide runs strongly off a high rocky point. At many such places, distinguished by large cairns of stones, bones of turtle, dugongs, &c., watch is kept during the season, and when a turtle is perceived drifting past with the tide, the canoe is manned and sent in chase (see also MacGillivray, 1852, II, 22; Moore 1979, 88–9).

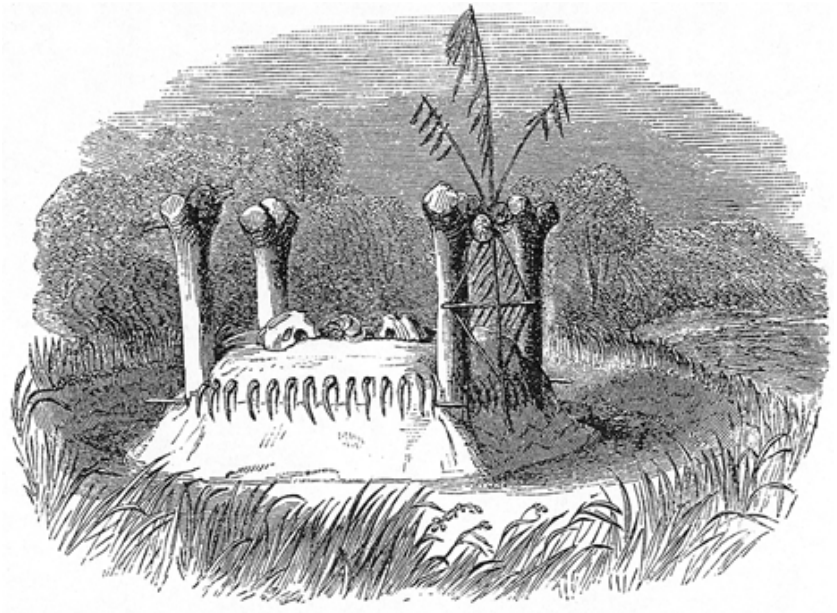

Figure 8. *Grave decorated with marine shells, dugong ribs and skulls and four wooden corner posts, Murulag Island, Torres Strait, 1844. (From Jukes 1847, I, 149.)*

In the southwest and central Strait, burial mounds were observed in the mid-nineteenth-century decorated with dugong ribs and skulls (Haddon 1904, 259–61; 1912, 160; 1935, 65, 73–4; Jukes 1847, 149–50; MacGillivray 1852, II, 32) (Fig. 8). Similar burial mounds occur along the east coast of Cape York Peninsula (Rigsby & Chase 1998, 207; Tennant 1959, 70–1; Thomson 1934, pl. XXXI, fig. 2). Finally, middens with dense deposits of shell and bone (fish, dugong and turtle) and stone artefacts are found along the coast of many islands of Torres Strait (e.g. Barham & Harris 1985; Carter *et al.* in press; Ghaleb 1990; Harris *et al.* 1985; Rowland 1985) and selected parts of northern mainland Australia (e.g. Minnegal 1984a,b; Mitchell 1996). Thus, even if caches of dugong bone are found, will they possess features that will allow an association with hunting magic? This question is put to the test by discussing the results of excavations of dugong bone mounds on the islands of Mabuiag, Pulu and Tudu in Torres Strait.

Dugong bone mound excavations

Archaeological surveys have recorded numerous sites with dugong bone mounds on Torres Strait islands (McNiven *et al.* in press). In the mid-1980s, David Harris and Barbara Ghaleb excavated two dugong bone mounds at the old village site of Gumu on Mabuiag Island. In 2000–2001, one of us (IM) directed excavation of single dugong bone mounds on two widely-separated islands in Torres Strait, Pulu Islet and Tudu Island. These excavations are the first archaeological attempts to identify ritual bone mounds in Australia.

Mabuiag Island mounds

Across the surface of the extensive midden deposit at Gumu, Harris and Ghaleb recorded 95 mounds averaging 1–2 m in diameter and 30 cm high and composed largely of dugong bones, shells and stone fragments (Barham & Harris 1987; Ghaleb 1990). Dugong bones were represented mostly by rib, mandible and cranium fragments. The least frequent dugong bones were ear ossicles and cervical vertebrae (Ghaleb 1990, 187). In 1984, Harris and Ghaleb 'dissected' Mound 57 to 'establish whether or not it was a human grave' (Ghaleb 1990, 161, 173–76, 364). This test reflected a number of nineteenth-century records that associated dugong bone mounds with human graves (see above). The mound had a diameter of 1 m and was surrounded by three 'large stones'. It contained dugong bones (skull and rib fragments), bones of marine turtle and fish, shellfish, stone artefacts, rock fragments and a large coral lump (resembling a human head) surrounded by dugong ribs (Ghaleb 1990, 174). The dugong bones produced a minimum number (MNI) of six individuals. Using Haddon's (1904, 334–35, pl. XXI, fig. 2) written and photographic records from 1898, Ghaleb (1990, 177) concluded that Mound 57 was the historically-known 'Wiwai turtle-shrine' used for tur-

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Figure 9. *General view of* Moegi Sibuy *looking northwest. (Photo: Ian McNiven.)*

tle hunting magic.

In 1985, Harris and Ghaleb excavated half of another mound (Mound 87) at Gumu (Ghaleb 1990, 228–31). The mound was 24 cm high with a diameter of 3 m. It contained fragments of dugong bone, shellfish, coral, glass, a stone artefact, and rock fragments. In contrast to other midden deposits at Gumu, 'virtually no fish remains' were recovered (Ghaleb 1990, 280). 'Fragments of glass' came from the 'lower layers of the mound' and most likely date the structure to the nineteenth century. Dugong bones were represented mostly by rib and skull elements with minor counts of vertebra, ulna, epiphysis and ear ossicle. An MNI of eight dugongs was estimated for the mound (Ghaleb 1990, 365). Ghaleb (1990, 255) suggested that the representation of dugong bone elements may reflect differential preservation, as rib and skull bones are the 'densest bones' of the dugong skeleton. This view is unlikely given that much older midden deposits in the region exhibit more porous bone elements such as vertebrae and scapulae.

Ghaleb (1990, 209, 378) suggested that from a purely 'objective' archaeological perspective, the Gumu mounds appear little more than 'unusual and enigmatic' features containing the 'refuse from Islander meals'. Reading the mounds through Haddon's ethnographic records on the ritual role of bone mounds in Torres Strait, however, it was clear that the Gumu mounds were more than just midden mounds. Ghaleb (1990, 209, 363) surmised they were 'symbolically significant' and represented the 'loci of past ceremonial activity'. More specifically, Ghaleb concluded that 'it seems conceivable' that the mounds 'may represent past "shrines" which symbolized some sort of power or magic (perhaps related to hunting, warfare, or to individual men?)' and that 'some of the features may have been related to burial practices, or to honouring the dead' (1990, 379). It is clear that the mounds are not grave features, however, as they extend across much of the settlement site, and extensive excavations failed to recover human remains. While an association between Mound 57 and a known turtle hunting ritual site seems apparent, no other evidence was forthcoming to demonstrate an association between any of the other mounds and dugong hunting magic. It is in this respect that the dugong bone mounds on Pulu and Tudu are fundamentally different.

Pulu Mound

The Pulu Mound is located within the large ceremonial (*kod*) site complex on Pulu Islet immediately west of Mabuiag Island. Although Mabuiag Islanders (Gumulaig) had a number of *kod* sites, Haddon (1904, 3) noted that Pulu had their 'national' *kod*. This *kod* was the spiritual capital of the Gumulaig and a key totemic centre for clans: *Dhangal* (dugong), *Kaigas* (shovel-nosed shark), *Kodal* (crocodile), *Sam* (cassowary) and *Tabu* (snake) (Haddon 1904, 4; 1935, 57). It features a range of shell, bone and stone structures (Haddon 1901, 137–9; 1904, 3–5) and prior to the twentieth century hosted rituals associated with turtle-hunting magic, mortuary, male initiations and headhunting (Haddon 1904, 252–6, 301–5, 333–4, 369–70). As the turtle-hunting ritual incorporated 'numerous recently caught turtles and dugongs' (Haddon 1904, 334), it is likely it also included dugong-hunting magic.

The *kod* site on Pulu is still revered by the people of Mabuiag and many other Torres Strait Islanders. Recent (November 2001) ochre paintings of clan totems (e.g. dugongs, shovel-nosed sharks) by Mabuiag Islanders on granite boulders at the site demonstrate continued totemic associations (McNiven *et al.* 2002). In 1898, Haddon (1901, 138; 1904, 4) recorded two dugong bone features at the *kod*. The first, known as *Koi Siboi* (*Koi* = big, *Siboi* = dugong head),[1] was described as an 'oblong heap of dugong

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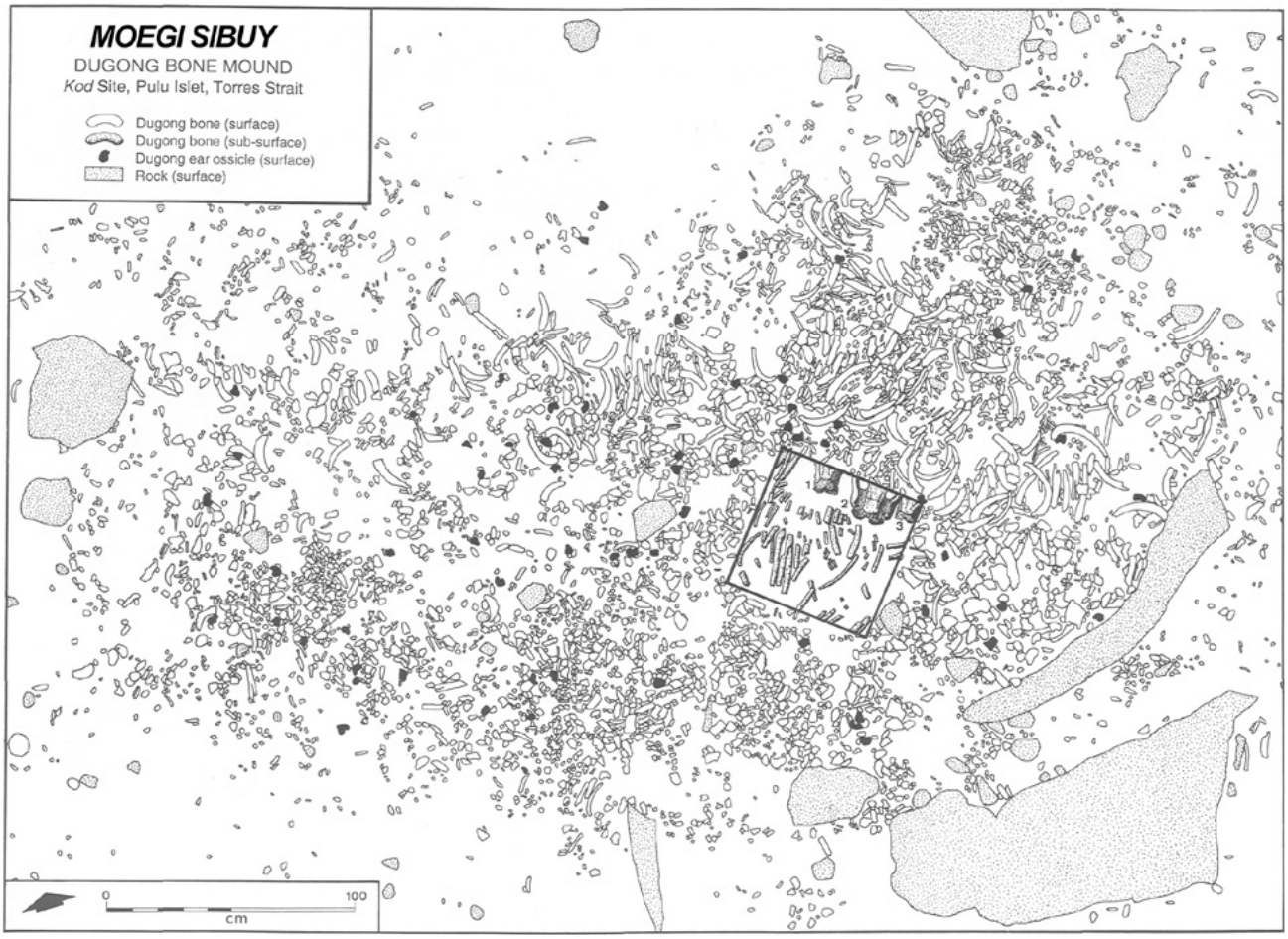

Figure 10. *Plan of* Moegi Sibuy *showing surface features and sub-surface bones within Square A (as exposed at the base of Spit 5 at 18 cm below the surface).*

bones' measuring 'about 10 feet in length . . . and surrounded by several upright stones'. This mound is clearly visible today and measures 4 × 2 m and is *c.* 30 cm high. The second feature, known as *Mugi Siboi* (Small Dugong Head), was described simply as a 'double row of dugong ribs' (Haddon 1901, 139; 1904, 5). Today, *Moegi Sibuy* features a dugong bone mound measuring 4.5 × 3 m with a height of 30 cm. It exhibits a dense surface assemblage of over 5000 dugong bones dominated by rib fragments and smaller quantities of rear skull fragments (Figs. 9 & 10). Haddon provided no details as to the function of the two bone structures.

In November 2001, a 60 × 60 cm test pit positioned at the highest part of the *Moegi Sibuy* mound was excavated. Excavation revealed a dense bone assemblage within a matrix of dark brown colluvial sediments down to a maximum depth of 35 cm below the surface (Fig. 11). The mound rests on loose, shelly beach sands. The mound deposit contains only a few shells and artefacts (e.g. flaked quartz). Less than 0.1 per cent of bone by weight is non-dugong (mostly turtle and fish). The deposit contains a highly selective dugong bone assemblage made up almost exclusively of ribs, tusks and fragments of rear skull bones, especially parietal-supraoccipital skullcaps and ear ossicles. The ossicles and tusks are normally well embedded in a dugong skull and as such can only be extracted by smashing apart the rear and front sections of the skull respectively (Fig. 12). Dugong MNI calculations for diagnostic bone elements within the test pit are ribs ($n = 11$) and ossicles ($n = 24$).[2] Using the MNI data, the extrapolated number of dugongs for the entire mound is *c.* 250.

Excavation revealed three significant structural features within the mound. First, dugong ribs dominate the lower half of the mound while dugong skull fragments dominate the upper sections of the mound.

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Figure 11. *Cygnet Repu excavating basal section of* Moegi Sibuy *dugong bone mound on Pulu Islet in November 2001. (Photo: Ian McNiven.)*

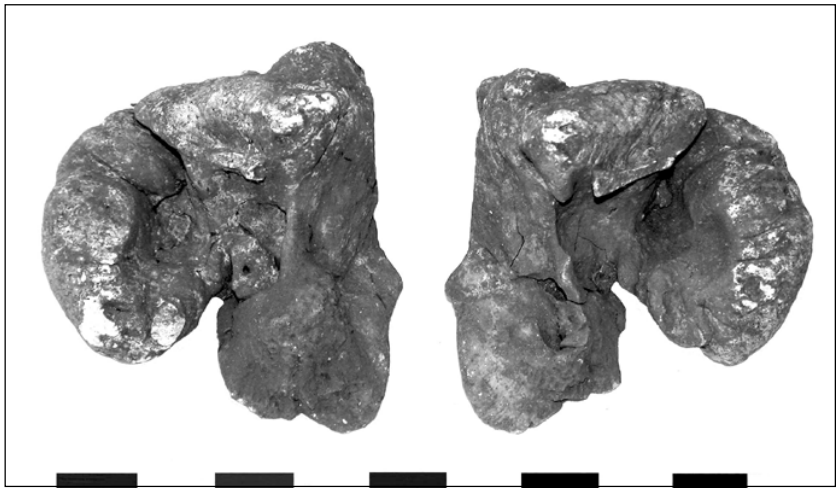

Figure 12. *Left and right dugong ear ossicles recovered from* Moegi Sibuy, *Pulu Islet. Scale in cm units. (Photo: Ian McNiven.)*

Second, the lower dugong ribs are consistently arranged arching upwards and oriented perpendicular to the long axis of the mound (Fig. 13). Third, the rear sections of three dugong skulls were uncovered in the northeast wall of the pit, oriented perpendicularly to the long axis of the mound (Figs. 10 & 13). Significantly, all three skulls are from smaller individuals and may explain why the site is called *Moegi Sibuy* or Small Dugong Head. To minimize disturbance to the site, the skulls (and underlying supporting ribs) were left *in situ*. The ribs, tusks, rear skull bones and whole skulls all indicate that *Moegi Sibuy* was a specially-built structure with internal patterning using a selective bone assemblage.

A radiocarbon date of 670±44 BP (Wk–10703) with a two sigma calibrated age range of AD 1540–1830, centring around AD 1700 (Calib 4.3, marine curve, ΔR 49±45: see Ulm 2002), was obtained for a single dugong rib from the base of the mound. This date indicates that the site was constructed well before Haddon's 1898 visit. Haddon's description of the site simply as two rows of dugong ribs was clearly schematic.

Tudu Mound

Tudu Island is located in the middle of Torres Strait. It is a small sandy cay that during the nineteenth century was the home of the Iama-Tudu people, a sub-group of the Central Islanders or Kulkalaig. Today, Iama Islanders continue to use Tudu as a fishing base. A dense deposit of dugong bone is exposed in a creek bank on the northeast corner of the island (Fig. 14). The bank section reveals a truncated bone mound with a maximum thickness of 20 cm and diameter of 6 m. In August 2000, our 1-m-wide trench excavated through the site revealed the outer edge of the mound at a point 2.5–3 m in from the erosion bank (Figs. 15 & 16). Assuming the mound was originally circular in shape, approximately half of the site has washed away. Dugong bone forms more than 99 per cent by weight of cultural remains at the site. Surviving faunal materials are mostly small bones (fish and bird) and shellfish. The dugong bone assemblage shows remarkable similarity to the Pulu Mound assemblage. Nearly all of the dugong bones are ribs, with smaller quantities of tusks, ear ossicles and miscellaneous fragments of rear skull bones (e.g. zygomatic arches, occipitals, parietal-supraoccipitals). Unlike the Pulu Mound, no patterning was observed in the orientation of ribs and no whole or near-whole dugong skulls were recovered. Using the same methodology as for the Pulu Mound, MNI

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calculations for diagnostic bone elements are ribs ($n = 27$) and ossicles ($n = 11$). Using the MNI data, the extrapolated number of dugongs for the entire mound is *c.* 200.

In marked contrast to the Pulu Mound, the Tudu Mound contained an extensive artefact assemblage in the form of hundreds of small items of 'European' manufacture such as glass trade beads, copper nails, a coin, buttons and shotgun cartridges, along with fragments of bottle glass (some flaked into tools), metal, ceramic and clay pipe. The only 'traditional' items recovered were numerous small pellets of red ochre and finely-worked rectangular 'beads' made from pearl shell. Preliminary analysis of the artefacts indicates the mound dates to the early twentieth century. As only the apex of the mound is visible above the ground surface, it is clear that some 20 cm of sand has covered the original ground surface upon which the mound was constructed last century. The base of the mound features scattered pearl shell fragments. Below the pearl shells is a 5 cm thick cultural deposit of scattered shells and 'European' items underlain by culturally sterile beach sand. As archaeological survey has failed to locate other bone mounds across the northern sections of Tudu, it is apparent that the site recorded by Dumont d'Urville in 1840 has either been washed away by the sea or buried by aeolian sand deposits.

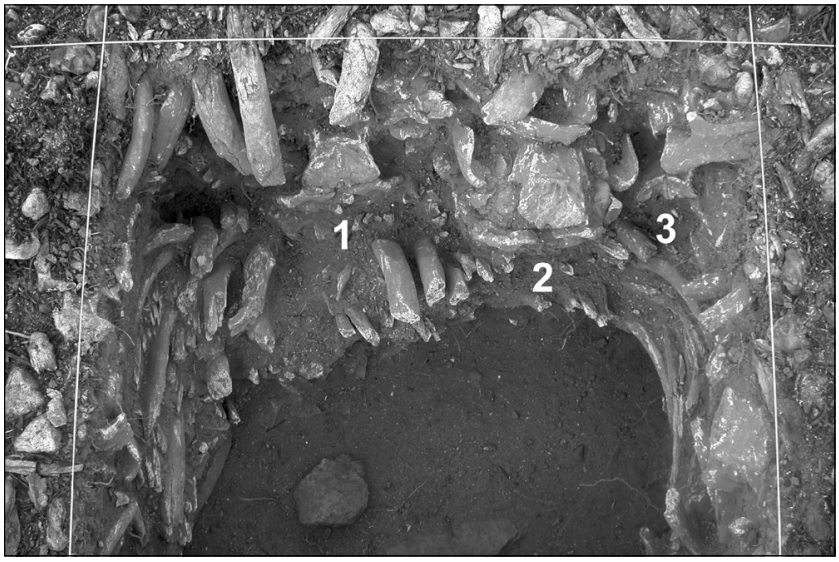

Figure 13. Moegi Sibuy *showing dense dugong rib bones and rear sections of three dugong skulls protruding from north section. (Photo: Ian McNiven.)*

Figure 14. *Ricky Feldman (left) and Andrew Border (right) excavating Tudu Mound in August 2000. (Photo: Ian McNiven.)*

Function of Pulu and Tudu Mounds

The function of the Pulu and Tudu Mounds was assessed in relation to the four historically / archaeologically-documented mounded site types in Torres Strait featuring dugong bones: 1) turtle lookouts; 2) graves; 3) refuse dumps; and 4) hunting-ritual sites. In terms of turtle lookouts, Pulu and Tudu Mounds are low relief features located on low-lying land only a few metres above sea level. They are not located on headlands with good views of the sea; standing on top of these sites confers no benefits in terms of spotting turtles (or any other marine animals such as dugongs). As such, it is doubtful that the excavated mounds are hunting lookouts for marine animals. It is equally doubtful that the sites are simply graves, as no human remains were found either within or below the Pulu and Tudu Mounds. The mounds are also unlikely to be simple refuse dumps or middens. They were deliberately constructed, discrete struc-

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Figure 15. *Ian McNiven drawing south section of Tudu Mound. (Photo: Ricky Feldman.)*

tures with highly-selective bone assemblages that contrast markedly in morphology and content to midden deposits excavated in Torres Strait (e.g. Barham & Harris 1985; Carter *et al.* in press; Ghaleb 1990; Harris *et al.* 1985; Rowland 1985). Although the shell and non-dugong bone (e.g. fish and bird) contents of the Tudu Mound are similar to midden deposits, the dugong bone assemblage (dominated by ribs, tusks and rear skull fragments) is atypical. The Tudu Mound also features a unique foundation layer of pearl shell.

We argue that a broad range of historical, ethnographic and archaeological information associates the Pulu and Tudu Mounds with hunting magic:

1. Both the Tudu and Pulu mounds are similar in size and dugong MNI and contain near-identical dugong bone assemblages. This morphological similarity, combined with the age of both mounds, points to a shared class of ritual activity extending back at least 300 years ago.
2. Dugong bone deposits associated with dugong hunting magic are historically recorded for a number of Torres Strait islands, most notably Mabuiag and Tudu.
3. The Pulu Mound (*Moegi Sibuy*) is part of an historically important *kod* (ceremonial) site and totemic centre where mortuary rituals and turtle- and most likely dugong-hunting rituals took place according to detailed ethnographic research by Haddon.
4. The Tudu Mound is located on the northeast coast of Tudu Island that faces the southern end of Warrior Reef, a key location for dugongs in Torres Strait. At low tide, waves breaking on the edge of the massive reef can be seen on the horizon from the mound site (Fig. 16). Haddon recorded that the dugong bone hunting magic site on Mabuiag was strategically located at Dabungai because it overlooked Orman Reefs — another key location for dugongs in the Strait. This location was important for the functional efficacy of hunting magic as it allowed a direct line of sight between ritual site and dugong habitat.
5. The parallel arrangement of small dugong skulls found embedded in the Pulu Mound is consistent with the recorded significance of dugong skulls at other dugong hunting sites in the region. Indeed, the name of the Pulu Mound — *Moegi Sibuy* (Small Dugong Head), indicates the importance of these buried skulls.
6. The unusually high representation of rear skull bones in the Pulu and Tudu Mounds indicates special treatment of these bones. Working with the historical literature, we tentatively hypothesized that the ear bones may have been deliberately extracted from the skull as a form of sympathetic magic associated with affecting the auditory sense of dugongs.

Corroboration and elaboration of the hunting magic interpretation was obtained following discussions about the excavated mounds between one of us (IM) and senior male Islanders in 2001. It was acknowledged that the dugong bone mounds were associated with dugong hunting. More extraordinary were revelations concerning the significance of rear skull bones. A senior cultural man on Mabuiag with totemic associations to the *kod* site on Pulu noted that certain rear skull bones recovered from *Moegi Sibuy* were 'radar bones' used by hunters in the past to establish communication with dugongs to assist their capture. Independently on Iama Island, a Tudu Island Elder revealed that the rear skull bones of dugongs were important in helping hunters communicate with dugongs. These bones were referred to as 'wireless bones' and hunters would 'talk to bones' before a hunting expedition to assist communication with dugongs and help lure these animals towards a boat for harpooning. Significantly, it seemed apparent that information on the existence and function of 'wireless bones' was revealed because IM was familiar with the dugong bone mounds (via excavation), demonstrated some knowledge of

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dugong hunting magic and expressed an awareness that rear skull bones had special significance. It was explicitly stated to IM that no *further* information on the function of 'wireless bones' and other aspects of dugong hunting magic would be revealed as such matters were 'secret'. Secrecy of dugong hunting magic was also encountered by Nietschmann & Nietschmann (1981, 61) amongst Mabuiag Islanders, by Raven (1990, 230) on Boigu Island, by Landtman (1927, 133) and Parer-Cook & Parer (1990, 25) amongst Kiwai Papuans and by Thomson (1934) for Aboriginal peoples of eastern Cape York Peninsula. Secrecy exists because hunting magic is often a personal and competitive affair, each hunter having his own special repertoire of rituals, in addition to specialist knowledge of the environment and behaviour of dugongs, to ensure hunting success.

Two final issues surround the function of the Pulu and Tudu Mounds. First, how long did they take to make, and second, did they have functional efficacy in their own right as hunting-magic sites? In terms of construction time, it is clear from the quantity of bones and animals represented in each mound (Pulu Mound MNI = *c.* 250 dugongs and Tudu Mound MNI = *c.* 200 dugongs) that construction required multiple hunting episodes over some time. Recent detailed surveys (1998 & 1999) on Mabuiag Island found an average of 0.4 dugongs hunted per day (Kwan 2002; cf. Harris *et al.* 1992). With this hunting rate, it would have taken 1–2 years to accumulate enough dugong bones to create each of the Pulu and Tudu mounds. While it is impossible to know how the current Mabuiag hunting rate compares to nineteenth-century hunting rates, it can be considered very high given that it is on the limit of sustainability for the local dugong population (Marsh 1996; Marsh *et al.* 1997). Rising population (i.e. more hunters) coupled with increasing use of dinghies with outboard motors (i.e. greater hunting efficiency) has increased dugong hunting rates across Torres Strait in the last 40 years (Hudson 1986; Johannes & MacFarlane 1991; Marsh 1999; Marsh *et al.* 1997; see also Mitchell 1994, 403). As such, it is more likely that the Pulu and Tudu dugong mounds each represent the results of well over two years of dugong hunting. It is also probable that both mounds were built incrementally, rather than by collecting old bones and building the structures in a single event. New additions to mounds probably took place soon after dugong captures. In this connection, Brierly (1849 cited in Moore 1979, 151) recorded that the Kaurareg of SW Torres Strait 'have a ceremony' when a dugong is caught. Kiwai people perform the Baura dance after a dugong 'feast' (Parer-Cook & Parer 1990, 27). Furthermore, it was noted above that dugong bones were added to dugong bone caches on Mabuiag and Boigu Islands and at Mawata on the adjacent Papuan coast as 'propitiatory offerings' (Gill 1876, 203; Moresby 1876, 131; Raven 1990, 200–201, 293–5). These views are consistent with Jukes' observation in 1845 that the dugong skull site on Damut Island revealed aged and fresh skulls.

Figure 16. *Tudu Mound after completion of 2.5-m-long excavation trench looking northeast towards Warrior Reef on the horizon. (Photo: Ian McNiven.)*

The formal structure, strategic location and contents of the Pulu and Tudu Mounds indicates that each site had functional efficacy in hunting magic and symbolic meaning beyond the sum of its parts. Both sites are formally-designed, circular or oval structures — the Pulu Mound has patterning in the arrangement of ribs and skulls while the Tudu Mound has a foundation layer of pearl shell fragments. Both mounds are located close to the shore and the Tudu Mound is strategically located adjacent to the key dugong habitat of Warrior Reef. The

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high concentration of rear skull bones in each site, and the whole skulls in the Pulu Mound, indicates that both mounds contain important ritual items. What specific role artefacts such as fragmented pieces of glass, metal and ceramic played at the Tudu Mound is unknown and is a matter of ongoing investigation. It seems clear, however, they had a ritual (possibly propitiatory) role given their hunting ritual context (see Bradley 1990; Hill 1995; Mulk 1994; Thomas 1999, ch. 4; Tilley 1996, 284–91; Wait 1985; Walker 1998). Whether or not construction of a mound was the long-term deliberate intention of site-users is difficult to know. A mound could simply be the concomitant result of long-term tethering of multiple, ritual, discard events. A growing mound, however, signifies successful hunts (to supply building material), confidence in its functional efficacy and a commitment to continued use. As a mound gradually increased in size, so too would its ritual gravity, because of increasing spiritual, social and historical capital. Each contribution to the mound not only signifies a hunting ritual, but a successful hunt, a dugong, a community feast, sets of social relations and gendered power relations, and a man (with adrenalin pumping) leaping off the end of a canoe or from the top of a hunting platform. More significantly, the centralized discard of dugong bones on a mound may have been a metaphor for the transformation of a successful dugong hunt (an exclusive act associated with personal status) into a feast (an inclusive act associated with food sharing, community welfare and solidarity) (see Kent 1993). In this sense, the temporality and historical dimension of bone mounds have similarities with skull trophy arrays in the PNG Highlands (Craig 1990; Hyndman 1991; Sillitoe 2001). Dugong bone mounds thus articulate individual acts of hunting success with collective history and identity, and the archaeology of such sites can inform us about the nature and antiquity of each of these dimensions of the past. Even after construction ceased, the physicality of mounds would continue to remind observers (Islanders and archaeologists alike) that successful dugong hunting depended on successfully-negotiated spiritual and social relationships.

Discussion

Torres Strait provides a rare and informative case study on the role of material culture in hunting magic. Research was made possible by the detailed ethnographic work of Alfred Haddon and colleagues on the 1898 Cambridge Anthropological Expedition to Torres Straits and by the maintenance of a complex maritime lore by today's Torres Strait Islanders. From an archaeological perspective, the materiality of Islander dugong-hunting rituals produced bone mounds of enduring quality that focus the observer's gaze today as they did in the past. Despite this wealth of information, linking dugong bone mounds with dugong-hunting magic is a complex inferential process. Ghaleb (1990) pointed out that from a purely 'objective' or empirical point of view, the problem of association is almost insurmountable. A rich local ethnography from which to draw analogies, while extremely useful, is not the full answer. A key concern of this article has been to establish a theoretical framework where ritual sites associated with hunting magic are not 'unusual and enigmatic' but expected for hunting societies of the past. All societies ritually orchestrate landscapes, and for maritime peoples, this orchestration extends to seascapes. For societies that engage in subsistence hunting, an important part of that ritual orchestration is the spiritual maintenance of key animal species and the manipulation of those species to minimize hunting risk and maximize hunting success. Understanding the place of these rituals in a society provides a more intimate picture of the lives of past peoples by glimpsing their worldview and their role in the production of that world. An archaeology of rituals is an archaeology of people, of social codification and of individual agency.

A more immediate implication of the Torres Strait research is the issue of the integrity and representativeness of 'secular' food refuse deposits. If Torres Strait Islanders used numerous dugong bones to construct and maintain ritual bone mounds, to what extent are their secular middens representative of subsistence practices? That is, to what extent do middens under-represent dugong consumption because significant quantities of dugong bones are discarded in other (ritual) contexts (see also Barham 2000, 294)? This issue has much wider relevance for archaeologists working in many parts of the world. In fact the potential problem of ritual bone sites for subsistence inferences from middens was raised nearly 80 years ago by Hallowell (1926, 136) in relation to bear-hunting in North America. Suspected biases in subsistence remains in middens may, however, be used to help identify hunting magic. Perhaps some of the problem of the mismatch between depictions of animals in rock art and representation of animals in bone assemblages in Upper Palaeolithic sites reflects such a ritual process. For example, Davidson (1999, 125–6) noted that ibex have a higher

representation in paintings as compared to bone assemblages in five of the ten rock-art regions of SW France. Could this discrepancy reflect, in part, use of ibex bones in other locations associated with hunting rituals? While the suggestion is hypothetical and speculative, an ibex skull was found in the 'Skull Chamber' in an apparent ritual context at Chauvet Cave (Chauvet *et al.* 1996). We also note with some interest the suggestion by Zvelebil & Jordan (1999, 123) that the lack of bear skulls compared to other bear bone elements in East Baltic middens dated 4000–2000 years ago may reflect ritual use and discard of such remains elsewhere.

A further implication of this study is the conceptualization and identification of ritual bone deposits by archaeologists. Wait (1985) in his important study on the subject limits 'special animal deposits' to sites containing either whole or partly butchered animals. Wait (1985, 153) saw this discard and 'loss' of 'otherwise useful and valuable material — meat, skin, bones etc.' as a form of 'sacrifice'. While this may be true in certain cultural contexts, Torres Strait Islander treatment of dugong bones reveals that ritual bone deposits can consist entirely of heavily butchered, defleshed and disarticulated bones. This pattern was well illustrated by ear ossicle extraction and the tight packing of ribs in the Pulu Mound. Furthermore, no articulated dugong bones were recovered from the Pulu and Tudu Mounds. Historical and archaeological evidence indicates that dugong bones in Torres Strait could signal both subsistence remains *and* ritual objects. As such, archaeologists need to take care that animal bones are not simply dichotomized as either ritual *or* secular items. A biographical perspective on material culture indicates that the degree to which items, including animal bones, are embedded in the spiritual realm may change through time. In Torres Strait, rear skull bones (particularly the ear ossicles) start their lives in dugongs and help dugongs to sense the presence of hunters. Following butchering, the skull is smashed apart and the rear bones removed to be used for ritual communication with other dugongs. Finally, the bones are incorporated into a bone mound where countless other dugong ear bones recall previous ritual events. Tracing the use-life of these bones thus maps out a broad range of social institutions and ritual behaviours. If archaeologists can reconstruct these use-lives they have a better chance of understanding how societies of the past socially and culturally constructed and negotiated their place in a meaningful, interconnected world of 'nature'.

Conclusion

Dugong bone mounds represent a ritual nexus between Islanders and the sea. They are a material expression of a ritual process that spiritually transforms an alien *sea* into a socialized *seascape* that may be engaged and often controlled. Thus hunting rituals help domesticate the sea by facilitating negotiated encounters between hunters and their prey. By influencing the actions of dugongs, hunting rituals do more than assist capture of an important and prestigious food item; they ritually orchestrate seascapes by positioning hunters as active agents in the creation of their maritime world.

Archaeological explorations of ritually orchestrated land- or seascapes provide much scope for understanding ontologies that frame and constrain the lives of past peoples. It is an explicit attempt at understanding the embeddedness of people in spiritscapes. By addressing the way people construct cosmological relationships between themselves and their world, an archaeology of spiritscapes provides scope for understanding how people constructed and managed their world in ways that touch at the core of Being more than reconstructing ancient menus or tool manufacturing techniques. More importantly, attempting to understand how societies ritually orchestrated land- or seascapes provides continuing scope for exploring *agency* — how people engaged in their meaningfully structured, inter-connected worlds — in archaeological investigations of human-environmental interaction (Shanks & Tilley 1987). Faunal remains are the relics of past relationships. Just as ancient menus inform us about ecological relationships, ritual treatment of bones informs us about spiritual relationships. It is a mistake, however, to assume that the archaeological record neatly separates out these two realms. A key aim of this study has been to show how faunal remains reflect the mutual embeddedness of ecological and spiritual relationships. To assume that a bone deposit has not been affected by ritual activity is to make, somewhat ironically, a major statement about both the ontological status of animals and the spiritual relationships between people and animals in that society.

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Notes

1. Ray (1907, 105) in his Kala Lagaw Ya ('Mabuiag')–English vocabulary notes *koi* = 'large, great, big' and *siboi* = 'row of dugong's ribs'. Contemporary speakers of Kala Lagaw Ya on Mabuiag Island agree that while Ray's translation of *koi* (*koey*) is correct, his translation of *siboi* (*sibuy*) is incorrect as *siboi* (*sibuy*) = dugong head.
2. Each dugong has a left and right ear ossicle. MNI for ear ossicles was calculated by totalling the MNI for each spit. Each dugong has 38 ribs. MNI for ribs was calculated by totalling the MNI for each spit. Only whole ribs or rib fragments with an intact proximal end were used in MNI calculations.

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