Links to the Past: Woomera from Central Cape York Peninsula

by

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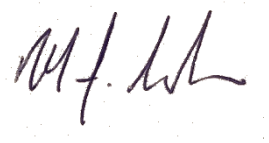
DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: 

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ABSTRACT

This thesis seeks to develop an improved understanding of an Australian projectile technology through the analysis of a collection of woomera selected from the Queensland Museum's Indigenous cultural collection. It investigates the historical and cultural context of the collection and elements of the manufacturing processes involved. The provenance of the woomera is potentially within the homelands of the Kuuku I'yu people of central northern Cape York Peninsula. The analysis was informed by published ethnohistorical, anthropological and ethnographic research, with a focus on the Cape York Peninsula region.

A *chaîne opératoire* approach was used to gain new insights into woomera manufacturing processes and their transformation into museum collection items. This revealed the complex interconnectedness of these woomera with traditional narratives, the ecology of the Cape York Peninsula region, shared manufacturing techniques, and their use in both everyday life and traditional ceremonies. An improved understanding of the woomera was sought by uncovering new details about how, why and from where these woomera were collected. The individual collectors of the woomera: a missionary, a policeman formerly with the Native Mounted Police, the first government meteorologist and a member of parliament and later government official, represent a snapshot of Queensland colonial society at the turn of the twentieth century.

Very little detail of the provenance of the woomera was recorded but they do reflect a significant cultural continuity with traditional central Cape York Peninsula First Nations lifeways and are a representation of the strong shared culture of this region. Although collected as representing a material culture type and transformed into a museum research object, there is now the potential for Kuuku I'yu and other First Nations people to reconnect with this aspect of their cultural patrimony.

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ABBREVIATIONS AND GLOSSARY

CMT	Culturally modified trees
CYP	Cape York Peninsula
FAIMS	Field Acquired Information Management System
NMP	Native Mounted Police
Woomera	Used as both the singular and plural form in this thesis

Chapter 1: Introduction

Woomera are a sophisticated projectile technology found in many parts of the world in various forms and dating as far back as 17.5 ka (Cattelain 1997:214; O'Driscoll and Thompson 2018:37). In its basic form, a woomera is an elongated throwing tool with a peg or receptacle at one end that connects to the proximal end of a spear, providing a mechanical advantage for spear throwing when hunting, fishing or fighting. Given that woomera have rarely been preserved in the archaeological context, research into woomera and related objects has been heavily reliant on the analysis of ethnographic collections and associated sources. A problem with this approach is that museum-collected woomera are significantly dislocated from their cultural contexts, often reduced to museum 'types' through the collection process rather than being understood as culturally embedded objects. Importantly, in Cape York Peninsula (CYP), surviving culturally modified trees (CMTs), formed by the removal of wood for woomera construction, provide a physical link between woomera, people and Country.

This thesis seeks to generate a deeper understanding of the past lifeways of the Kuuku I'yu people, whose homelands are in central northern CYP, by analysing a collection of woomera held in the Queensland Museum's material culture collection. The research approach is embedded in Western archaeological and anthropological theoretical perspectives. While Indigenous perspectives and elements of Traditional Knowledge have been incorporated, the thesis does not claim to speak for or on behalf of First Nations Australians. This research comprises part of a broader study involving Kuuku I'yu people (through their representative body, the Chuulangun Aboriginal Corporation) working in collaboration with researchers from the University of New England, Queensland Museum, Macquarie University and Flinders University. The research project—Indigenous Foodways in Colonial Cape York Peninsula—is a Linkage Project funded by the Australian Research Council (LP170100050).

The *chaîne opératoire* approach, first developed by anthropologist André Leroi-Gourhan in the 1950s and 1960s (Renfrew and Bahn 2005), was used in this research to reconstruct the

woomera manufacturing process and history. This included the analysis of woomera in the museum collection to provide a more complete understanding of the woomera life cycle and its ongoing 'construction'. The *chaîne opératoire* approach enables the inclusion of etic (outsider) and emic (insider) perspectives on artefact production and use (Harris 1976). Given the lack of published information about the material culture and manufacturing processes used by the Kuuku I'yu, it was important that analogies were drawn from other CYP groups that used similar manufacturing techniques and accessed the same types of raw materials (Tutchener 2018:82). The traditional custodians of eastern and western CYP share a material culture, including 'spearthrowers with baler-shell handles' (Best 2003:42). Moreover, Indigenous communities neighbouring the Kuuku I'yu in the eastern coastal and western areas of CYP have been subject to a greater degree of anthropological and ethnographic research and perhaps less to the destructive colonial forces that led to widespread dislocation and cultural loss (Morrison et al. 2019a).

Location of the Kuuku I'yu People (Study Area)

Kuuku I'yu Ngaachi or Country comprises an area of approximately 840,000 hectares in the upland region of central CYP on the upper Wenlock and Pascoe Rivers (Claudie et al. 2012) (see Figure 1). The Wenlock flows westward to the Gulf of Carpentaria, while the Pascoe flows to the east coast. The Kuuku I'yu people are spiritually, culturally and historically connected to Ngaachi. Important Dreaming places, ceremonial grounds and totemic sites associated with the obligations of the traditional custodians to manage or care for Country are found throughout Kuuku I'yu Ngaachi (Chuulangun Aboriginal Corporation 2016). The Kuuku I'yu share boundaries, cultural connections and exchange systems with peoples in every direction, including the Southern Kaanju along the headwaters of the Archer River. Together these people form a large cultural group, whose boundaries run north to south along the eastern plateau of CYP and across the higher watersheds of the Archer and Holroyd Rivers (McConnel 1935:454).

Kuuku I'yu Ngaachi extends eastward to the lower reaches of the Pascoe River and parallel to the coast to the south. Kuuku I'yu Ngaachi is centrally located, both socially and geographically, with proximity to both the east coast, facilitating access to coastal resources, and the western CYP plains. Thus, the Kuuku I'yu were part of a wide social and cultural block (Chase 1980:201–203), with shared cultural traits across a geographically diverse region (Chase 1980:204). Seasonal ceremonial gatherings were collectively held by inland and coastal peoples (McConnel 1930a:104). The marriage and exchange relationships between the Kaanju and Wik Munkan along the upper Archer River are examples of the closeness of these intergroup relations (McConnel 1930a:98). The strength of these connections was evident, even after the forced removal of Kuuku I'yu people to the Lockhart River Mission in the 1930s. From there they maintained their links to their families in Coen and Ngaachi through cattle work on inland stations (Chase 1980:216).

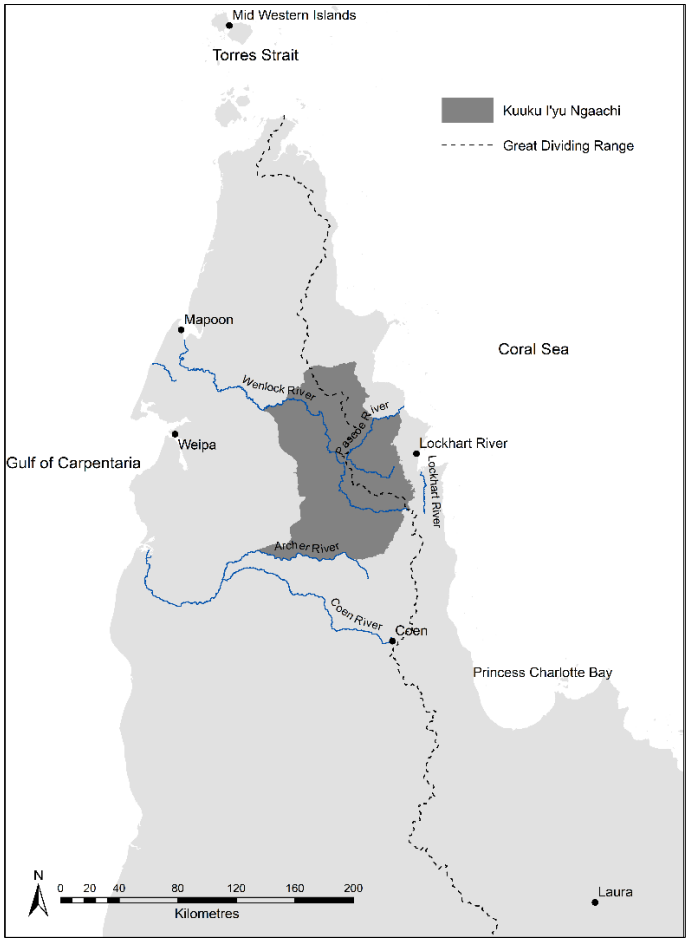

Figure 1: Study area: Kuuku I'yu Ngaachi, Cape York Peninsula.

Research Question and Aims

Woomera represent more than a functional projectile technology or museum object. A study of woomera can enhance knowledge about cultural traditions, manufacturing processes, lifeways, resource use, cultural exchange and diffusion of technology of First Nations Australians, as well as how they responded to external influences such as colonialism. These interests led to the following research question:

> *What new insights can be revealed about Kuuku I'yu traditions, manufacturing processes and cultural adaptation through the analysis of a collection of woomera from central CYP?*

This question is addressed via the following research aims:

- Adapt the *chaîne opératoire* approach as a framework to analyse woomera manufacturing processes, use and incorporation into a museum collection.
- Identify the materials used in the manufacture of woomera in CYP and what this reveals about trade, resource use and social interactions.
- Determine to what extent woomera from central CYP vary or share common traits.
- Consider how an analysis of CMTs can contribute to knowledge about woomera in museum collections.
- Understand the taphonomy of woomera, from manufacturing, use and maintenance to museum collection, storage and research.
- Using the museum collection as a motivation, investigate the links between Traditional Knowledge, colonialism and woomera manufacture.

Significance

Detailed research into the material culture of the Kuuku I'yu is limited (Tutchener 2018:82). Previous studies have focused little on central CYP woomera as culturally imbued objects that feature in ceremonies and traditional creation narratives. This research drew together a range of ethnohistorical, anthropological and archaeological data related to central CYP woomera

and demonstrates the use of the *chaîne opératoire* approach to integrate this literature with a physical analysis of woomera and CMTs to identify gaps in the knowledge of this complex projectile technology.

First Nations Australians are seeking to reconnect with their material culture held in museums to reclaim their history and demonstrate their ongoing connection to Country and are working with researchers to better understand the Traditional Knowledge expressed in their material culture (Akerman et al. 2014; Rigsby et al. 2015). This research aims to facilitate greater access to museum collections for the Kuuku I'yu people by improving the understanding of the provenance of these collection materials. It will expand on existing data sources and knowledge regarding woomera manufacture and collection and how woomera changed both physically and in terms of their value following museum acquisition. Analysis of the Queensland Museum woomera collection can broaden our understanding of the interactions between the traditional custodians and the police, missionaries and 'men of science' who contributed to these collections. An understanding of both the manufacture and the collection of the woomera is critical to obtaining deeper insights (Akerman et al. 2014; Erckenbrecht et al. 2010; Robins 1980).

Thesis Summary

Chapter 1 introduces the research question, aims and significance. Chapter 2 provides an overview of woomera from a global perspective and presents the *chaîne opératoire* methodology. Chapter 3 continues to review the literature, particularly on the material culture of CYP, and provides details of the study area. Chapter 4 outlines the methodological approach used in the research, including the physical analysis of the woomera, recording of the CMTs and application of the *chaîne opératoire* approach, and discusses research limitations and sample bias. Chapter 5 presents the research findings and incorporates them into the *chaîne opératoire* model. Chapter 6 discusses the results and their implications for First Nations Australians seeking to reconnect to their material culture. Chapter 7 outlines the

need for greater inclusion of Traditional Knowledge in an improved methodology to further this research.

Chapter 2: Literature Review

This chapter provides an overview of the archaeological research on woomera, beginning with their emergence in Palaeolithic Europe and how they have stimulated archaeological thinking about the development of projectile technologies. Research into Australian woomera, the development of woomera typologies, museum collecting and the use of the *chaîne opératoire* methodology provides both additional context to the research question and highlights its wider significance.

Woomera in World Archaeology

Archaeological and anthropological research into woomera (generally referred to as spearthrowers outside the Australian context) has sought to address a range of technological and theoretical concerns related to the global development of projectile technologies, including where and when these projectile technologies first emerged (O'Driscoll and Thompson 2018), the sequence of spearthrower development relative to that of other projectile technologies (Hutchings and Brüchert 1997) and the mechanical advantages of thrower-launched spears (Cundy 1989). The development and use of projectile technologies are considered important indicators of evolutionary progress and cultural development among early humans (Ingold 1997:108; Lombard 2016:136; O'Driscoll and Thompson 2018:30). Thrower-launched spears enabled humans to increase the distance between hunter and prey and facilitated the technical development of composite tools (O'Driscoll and Thompson 2018:30).

The earliest archaeological evidence of spearthrowers, carved reindeer antlers dated to the late Upper Palaeolithic (around 17.5 ka), was first found in 1862 by Lartet and Christy at the Laugerie-Basse rock shelter in France (Cattelain 1997:214; Critchley 2018:6; O'Driscoll and Thompson 2018:37). The antlers were initially thought to be harpoon heads, and it was not until the late 1800s that an unknown Irish scholar suggested that they were spearthrowers based on a comparison with similar ethnographic objects, woomera, from Australia (Garrod

1955:21). These artefacts were then interpreted to be the distal ends of spearthrowers, carved to form a short shaft and hook and previously attached to wooden handles. Another example of a spearthrower found in an archaeological setting and dating back to 15.2–15.9 ka was a hook carved from an antler found in Cantabria, Spain (Morales and Straus 2009:270; O'Driscoll and Thompson 2018:37). Similar implements from the Upper Palaeolithic period have been identified in France, Switzerland, Germany and Spain (Cattelain 1997:214; Critchley 2018:6). The considerable variations in the morphology of these spearthrowers correlate with different periods and regions in Europe.

Examples of spearthrowers from different parts of the world include the Arctic *nuqaq*, a short spearthrower used for harpooning from a seated position in a kayak (Cattelain 1997), and the North and South American *atlatl*, which was used to throw darts rather than spears, which coexisted with bow technology and occasionally had stone attachments (Cattelain 1997; Critchley 2018). The stone attachments did not provide a mechanical advantage but were possibly an important feature in hunting rituals or other ceremonies (Palter 1976:503). While Australian woomera are well known, other Oceanic spearthrowers are not well recorded or described in the archaeological and anthropological literature. Although there is no direct evidence of spearthrower use in Africa (Critchley 2018; O'Driscoll and Thompson 2018), some researchers have found indirect evidence via projectile point assemblages (O'Driscoll and Thompson 2018), even claiming a possible association with *Homo sapiens* dispersing from Africa (Shea and Sisk 2010).

The same spearthrower can be effectively used to launch a range of spears with different dimensions (Hutchings and Brüchert 1997). The ability of spearthrowers to enhance the projectile force of spears was often advantageous, explaining their historical persistence in the Americas long after the adoption of the bow (Hutchings and Brüchert 1997:890). In the Australian context, woomera may have been more versatile and appropriate to the environment than bows (see O'Driscoll and Thompson 2018:31), potentially explaining the absence of bow technology in Australia.

Woomera in the Australian Context

Research into the origins and functions of woomera in Australia (e.g., Cosgrove 1978; Davidson 1936; Robins 1980) has generated findings and theories that remain open to further investigation. Notes about woomera appear in early colonial records. For example, Lieutenant William Bradley of the First Fleet's *HMS Sirius* recorded his impressions of the functional and multipurpose nature of woomera:

> The long spears are indented at the end, for to receive a peg which is fixed on a stick 2 or 3 feet long to which they apply to throw the lance [a] considerable distance, the other end of this stick has a sharp, hand [sic] shell fixed onto it which serves for opening shellfish, getting them off the rocks [and] various other purposes. (Bradley 1969:69)

Bradley (1969:128) observed the use of shell attachments as knives or chisels and described the implement's mechanical advantage in spear throwing: 'Directed with the forefinger [and] thumb, this stick being applied increases its velocity very much' (Bradley 1969:73–74).

Despite this early interest, systematic research into woomera did not occur until much later. Daniel Davidson (1936:195) studied the emergence of woomera in Australia, concluding that the technology spread from Papua New Guinea several thousand years ago. The diffusionist model is based on the premise that technological changes were made to existing spear types to accommodate the introduction of woomera and considers the relationship between spears and woomera important (Akerman 1996; Cundy 1989; Davidson 1936). Davidson (1936:195) concluded that woomera were more suited to the use of lighter spears. He mapped regions of Australia by their presence or absence of woomera (see Figure 2) and examined woomera collections in the South Australian Museum and the Australian Museum for differences in typologies and morphologies. However, no clear explanation was given for woomera not being used in all areas of mainland Australia (Best 2003; Davidson 1936). He argued that woomera and related composite spears were never used in Tasmania because it was isolated from mainland Australia prior to the arrival of the technology. This 'indicates that Aboriginal societies

could survive quite well in the absence of either spearthrowers or composite spears, suggesting that projectile technologies had a wide margin of effectiveness' (H. Allen and Akerman 2015:83).

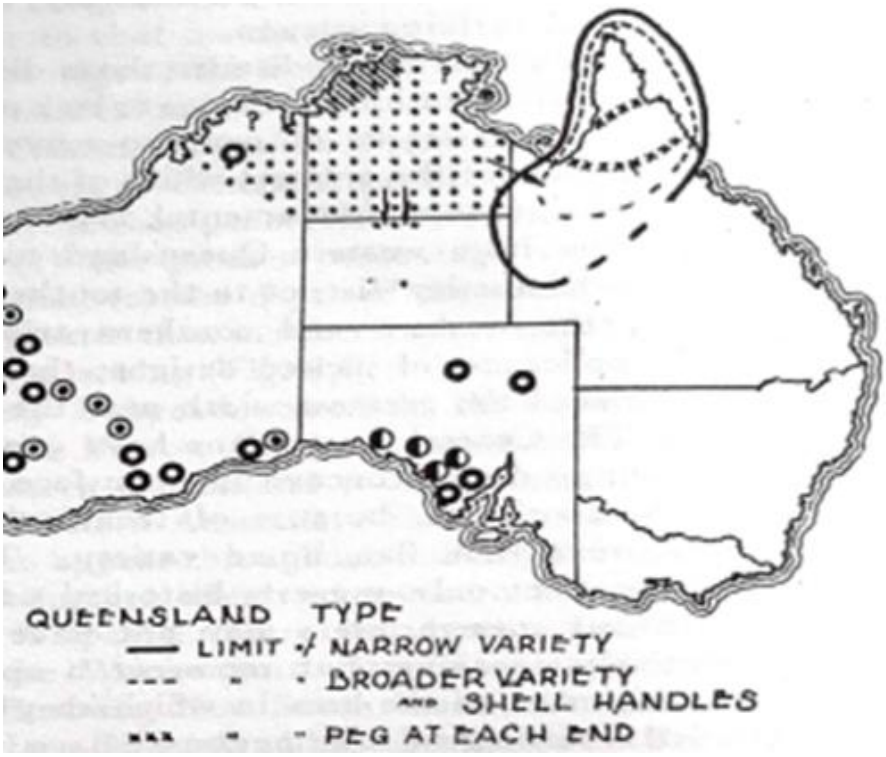

Figure 2. Davidson's map of woomera distribution in Australia. (Davidson 1936:470)

Davidson's conclusions continued to influence later studies. Johnson and Letnic (2014:419) proposed that the Gwion Gwion rock art paintings in the Kimberley contain the last depictions of thylacines and the first depictions of woomera. The disappearance of the thylacine from the Australian mainland has been attributed to the diffusion of woomera as a more accurate and lethal projectile technology compared with handheld spears (Johnson and Letnic 2014:419). Akerman and McConvell (2002) examined the names given to woomera and identified possible linguistic correlations across northern Australia. They revised Davidson's woomera typology and, with the evidence of language shift across northern Australia, hypothesised a diffusion of woomera from an original source in CYP (Akerman and McConvell 2002:3–15).

Ursula McConnel (1935:452) identified exchange routes between Papua New Guinea, Torres Strait and CYP, with evidence of the cultural influences of these regions found as far south as the Archer River. Frederick McCarthy (1939:104) accepted that the geographic distribution of cultural materials and manufacturing techniques in Australia indicated that they had diffused from New Guinea. However, he theorised a cultural conservatism in CYP that ensured that only those traits that fitted existing cultural patterns were absorbed (McCarthy 1939:176).

Assumptions that these cultural influences flowed primarily from the north to the south have been challenged. Ritual specialists from the Australian mainland may have played a role in generating cultural exchanges flowing northward (Greer et al. 2015:69). Alfred Haddon (1904) undertook anthropological work in the Torres Strait from 1898 to 1899, identifying strong cultural links between CYP, Torres Strait and Papua New Guinea, determining that CYP woomera were traded north to the central western islands of the Torres Strait. He also recorded Indigenous accounts of the cultural hero Kowime travelling from CYP to the Torres Strait with a CYP woomera and spears. Haddon documented two types of CYP woomera: a photo of an ovate lath woomera with a long peg being held by an Indigenous man undertaking a ritual at a Kowime site (Haddon 1904:197, Plate IV, Figure 2) and a drawing of a linear lath woomera with a short peg (Haddon 1904:197). McCarthy (1939:182) noted that baler shell woomera were traded from Princess Charlotte Bay to the Murray Islands and Daudai district of Papua New Guinea, confirming the dispersal of woomera from different CYP sources to the north. Indicative of a complex trade and cultural exchange relationship, this confirms the movement of woomera northward at the time of colonial contact rather than a southern diffusion.

Cundy (1989:1) sought to understand the structural variations of woomera and spears through a functional study of their mechanical principles rather than viewing their variations as simply cultural or adaptive. According to Cundy (1989:3), spears and woomera varied because of technological factors, and structural variations could be linked to different performance criteria (Cundy 1989:8). Cundy concluded that ‘societies may invest large efforts in the production of complex technologies which have little outward significance in terms of subsistence’ (Cundy

1989:125), allowing for a greater agency and cultural preference in the use of woomera than a deterministic approach would suggest. Woomera technology may have developed at different times and places in response to cultural and environmental circumstances rather than through diffusion or sequential technological development (Lombard 2016; O'Driscoll and Thompson 2018:34).

Because of the decomposition of wooden artefacts, few traces of woomera remain in archaeological assemblages (Langley et al. 2019), resulting in a greater reliance on ethnographic collections for their study. The earliest purported evidence of woomera use in Australia is found in the Bradshaw petroglyphs in the Kimberley region of Western Australia, indicating the emergence of woomera in the mid-Holocene period (H. Allen and Akerman 2015:83; Walsh and Morwood 1999:55). Appearing 5,000 years ago, small stone projectile points in the Kimberley region and the Northern Territory suggest the use of light spears, indicating woomera use during the Holocene (H. Allen and Akerman 2015).

Changes to the form and materials used to manufacture woomera, such as those seen in the Northern Territory gooseneck woomera, were observed in the postcolonial period, reflecting the social and economic impacts of colonialism (Akerman 1996). These changes were both functional, altering the form but not the purpose or use of woomera, and non-functional, resulting from artefacts being manufactured for tourists rather than for their original purpose (Akerman 1996). These studies have a strong technological and functional focus on woomera. Woomera were an implement 'for hunting, fighting and as symbolic markers of the masculine gender' (H. Allen and Akerman 2015:83). These functional approaches place little focus on woomera as cultural objects that feature in ceremonies and traditional creation narratives.

Traditional Knowledge and Perspectives of Woomera

Given the history of trade across wide-ranging geographic and cultural areas, the origins of individual artefacts can be difficult to determine. Museum records about places of origin or sites of field collection often contain little detail (e.g. 'Mapoon Mission' or 'Wenlock River').

Walter Roth (1897:136) noted that while collectors would typically record the location from which they obtained artefacts, they failed to record the cultural group, the district in which manufacturing occurred or the distribution networks along which artefacts were passed. This lack of cultural information can create barriers for First Australians seeking to reconnect with museum-held cultural objects. However, important outcomes are possible by involving Aboriginal and/or Torres Strait Islander peoples in research. The Lamalama people from Princess Charlotte Bay in CYP found that reconnecting with museum-held cultural items helped affirm their cultural identity (Rigsby et al. 2015). Interpretation of the collection by the Traditional Owners generated new insights into the items and the people who made them (Rigsby et al. 2015:2). This interpretation was informed by oral history and living memory, helping the Traditional Owners gain a better understanding of their recent history and supporting their reconnection to Country and endeavours to secure land titles (Rigsby et al. 2015:18). This highlights the complex relationships that exist between First Australians and cultural items held in museum collections and the urgent need for collaborative research with First Nations peoples to provide their perspectives on the management of this cultural heritage.

Previous artefact collection and categorisation practices have also influenced the value placed on and the ownership of material culture by First Australians in contemporary political and cultural settings (Erckenbrecht et al. 2010). The value of material cultural items is transformed during collection and accession processes, raising ethical questions in relation to the ownership of these objects, particularly given the interest of First Nations Australians in their material culture and their requests for repatriation of these artefacts (Henry et al. 2013). Museum collections should be understood as ‘biased samples’, providing a snapshot of a given period that shows short-term rather than long-term changes (Best 2003:60–61). Studies of Indigenous artefacts provide examples of existing forms being adapted to new uses and new forms applied to old uses (Satterthwait 2008:38). Woomera in museum collections are products of cultural entanglement and may have been made for a market partly created by the collectors themselves or linked to existing trade networks. First Nations Australians understood

the ‘attitudes, habits and behaviours of the invaders’ (Satterthwait 2008:46) and were not passive participants in the collection of their material culture.

The *Chaîne Opératoire* Approach

The incorporation of technical manufacturing details with Indigenous knowledge, oral histories and the transformation of woomera following their incorporation into museum collections required a flexible holistic methodology. *Chaîne opératoire* offers such an approach. It was initially developed by anthropologist Leroi-Gourhan in response to the then-predominant typological approach to stone tool analysis in French archaeology and the influence of Marcell Mauss (Audouze 1999). In contrast to the typological approach, *chaîne opératoire* focuses on the entire manufacturing process rather than only the final product. Tixier, a French prehistorian who studied lithics, proposed that it was ‘possible to retrieve techniques, actions, human choices and intentions from chipped flint artefacts’ (Delage 2017:161), revealing the people behind the stones through an analytical framework that brings together materials, tools, makers and their actions. The *chaîne opératoire* approach suggests that technological domains interact with other technologies and sub-cultures in a systematic manner (Delage 2017:162), providing new analytical insights. Understanding the operational sequence facilitates insights into the decisions being made by the makers (Bar-Yosef et al. 1992:511; Grace 2012:3). Where decisions are repeated across an area or region, it is possible to identify a ‘technical tradition’ that can help define a social group (Bar-Yosef 1992; Grace 2012).

Chaîne opératoire provides not only a method but also a framework within which different techniques, such as typology and technology analysis, may be used depending on the research requirements (Grace 2012). It has a wider application than simply the analysis of stone tool production and enables the application of different theoretical positions and is useful in the study of cultural change (Grace 2012). Blakeslee (2012:205) viewed *chaîne opératoire* as an ‘organising principle’ that identifies steps in manufacturing, use and discard, thus being no impediment to the analysis of objects other than stone tools. Blakeslee (2012:305) analysed

a type of Native American stone tobacco pipe known as the Windom pipe in terms of its distribution in time and space, the tools used in its manufacture and its associated by-products to identify cultural norms in the manufacturing process. His research identified a cultural response by the Wichita people within a defined time frame and demonstrated 'strong cultural constraints on the manufacture, maintenance, and eventual dissection of the pipes ... conforming to a fairly strict cannon [sic] with regard to form and decoration' (Blakeslee 2012:321).

The lack of knowledge about the manufacture and use of projectile technologies represents a barrier to researching these implements (Hutchings and Brüchert 1997:890). A *chaîne opératoire* approach incorporating both etic and emic perspectives, including that of the maker, can provide insights into 'how local people think' (Kottak 2006:47) and a more nuanced and complex understanding of the making of material culture. Although understanding the manufacturer's viewpoint presents many difficulties, both insiders and outsiders can develop etic and emic perspectives of a culture (Harris 1976). Emic classifications can provide insights into both the variations and unchanging elements of material cultural items through time and space. The discarding of an artefact at the end of its life cycle has been regarded as the final stage in the classic *chaîne opératoire* approach. The transformation of woomera following their collection and accession into museums and becoming objects of research should be regarded as further stages in *chaîne opératoire.* The potential for the Kuuku I'yu people to reconnect to these objects is an important future stage to consider.

Chapter Summary

This chapter has provided the research context for the analysis of woomera in the Indigenous material culture collection of the Queensland Museum through the work of Davidson (1936) and others. The experience of the Lamalama of CYP provides an example of the importance of Traditional Knowledge (Rigsby et al. 2015). It demonstrates how the study of woomera in museum collections requires perspectives which allows for woomera to be understood as

culturally embedded and symbolic items rather than just functional material culture items used to explain technological development or cultural diffusion. The background to the development of the *chaîne opératoire* approach is outlined. Its practical application (Blakeslee 2012) and capacity to include a range of perspectives (see Kottak 2006 and Harris 1976) is important to archieving the research aims outlined in Chapter 1.

Chapter 3: Woomera Production in Cape York Peninsula

This chapter provides a historical context to museum collecting in northern Queensland along with material culture research of woomera production such as the tools, techniques and materials used (Best 2003; Cosgrove 1978; Kamminga 1988; Robins 1980; Roth 1909). Research into CMTs is considered for its value in providing links between museum collections and places in the CYP landscape. A detailed consideration is given to woomera typology and a synthesis of work undertaken by Best (2003), Cosgrove (1978), Kamminga (1988, Robins (1980), and Roth (1909) is developed. A First Nations understanding of woomera is sought through ethnographic accounts from a range of researchers including Chase (1980), McConnel (1935; 1936; 1957) and Sharp (1938).

Colonial Collection Practices in Cape York Peninsula

The CYP region has a long history of trade in material culture, which continued following colonisation. The Torres Strait had become a busy European shipping lane by the second half of the 1800s, and, by 1874, a market for artefacts from CYP, the Torres Strait, New Guinea and the Pacific had been established, with ‘collectables’ being sold to interested travellers. This has made it challenging to establish the provenance of these items (Peterson et al. 2008:8). The first contact between the Traditional Owners of central CYP and Europeans involved Dutch colonialists, who were investigating the economic potential of CYP in 1606 and 1623 where, according to the accounts of Wik people, on landfall they were met with strong resistance (Wharton 2005:50). Resistance continued in response to colonial expansion into central CYP from 1860 to 1939, characterised by the expropriation of land and various forms of colonial violence (Morrison et al 2019a). The expanding colony (and later state) of Queensland involved a search for land, resources and control over the lives of First Nations people. The establishment of pastoral stations, mines and an international telegraph line and outposts such as the Moreton Telegraph Station on the Wenlock River were all part of the devastating colonial expansion that reached into Kuuku I’yu Ngaachi. As the colonial frontier

moved north, the Native Mounted Police (NMP) Force was extended from New South Wales into Queensland to enforce the property rights of invading colonists, with NMP camps being established at Coen, Clayhole and elsewhere (Wharton 2005). While some groups did not survive colonial expansion, others, including the Kuuku I'yu, sought accommodation by establishing camps near mines, telegraph and cattle stations or retreated to areas of the range where they could fish undisturbed (McConnel 1930a:98). Few researchers have investigated the impact of this loss of land and how First Australians changed their land use strategies in response (Morrison et al. 2019a). It was not until the 1930s that the upland Kuuku I'yu and Southern Kaanju were finally driven from their Country through forcible removal to the Lockhart River Mission (Chase 1980:216).

Australian museums hold collections of material culture with CYP provenance dating back to the 1840s, which can provide valuable information about changes to manufacturing processes and materials used in response to colonisation. To place these collections in context, it is important to understand the motivations for collecting and the circumstances under which collections were made (Peterson et al. 2008:3). Northern Queensland was considered an important area for research by anthropologists interested in Aboriginal and Torres Strait Islander culture. The developing academic field of anthropology and associated social evolution theories saw 'scientific' collecting intensify between 1880 and 1920. Prior to 1880, the approach to collecting for Australian museums was unsystematic. The period between 1880 and 1920 was framed by social evolutionary theory, and a key motivation in the period 1920 to 1940 was to obtain Indigenous cultural materials 'before it's too late' (Peterson et al. 2008:8). The collection of Indigenous material culture by or for museums has been an integral part of ethnohistorical and anthropological studies, and such research has evolved over time to reflect contemporary trends and concerns (Best 2003).

Walter Roth was an important early collector of ethnographic material in this region (Kahn 1993; Robins 2008b; Wharton 2005). His interests included the manufacturing process and raw materials used, Indigenous language names of objects and materials and the combined

use of traditional and introduced materials to produce material culture (Roth 1904, 1909, 1910). Under the influence of Radcliffe-Brown during the 1920s and 1930s, CYP became a focus for anthropological research on social organisation rather than material culture or technology, reflecting the theoretical concerns of the time (Peterson et al. 2008:11). Key research outcomes included work by McConnel (1930a, 1930b, 1932, 1933, 1935, 1936, 1953) and Thomson (1933, 1934a, 1934b, 1939), who worked directly with Aboriginal groups that had maintained a strong connection to Country. They identified similarities and shared cultural elements between adjoining groups across the peninsula. Despite their focus on social organisation, both undertook important material cultural research.

In his interpretation of artefacts, Donald Thomson (1939) emphasised the link between ecological factors and material culture, rather than style or culture as the single influential factor (H. Allen and Rowe 2014:65). Thomson was interested in 'types' associated with specific locations and collected material cultural items with established regional distribution patterns, demonstrating the sharing of technologies between groups and how objects were distributed through trade networks (L. Allen 2008:397). Thomson's work explored how the utilisation of different ecosystems on a seasonal basis required subsistence strategies, tools and equipment adjusted to the targeted resources (Best 2003:14). In contrast, the CYP woomera are a versatile projectile technology that enable the use of a wide variety of spears suitable for a range of tasks, including hunting larger animals such as wallabies and the range of birds and fish that exist in the diverse ecology of CYP.

McConnel used a participant observation approach, at times having a family make artefacts at her request, enhancing records of methods and materials used (O'Gorman Perusco 2008:426). Her description of woomera used by the Wik people includes language names for both the objects and their different parts and notes the use of orchid fibre and *Abrus precatorius* seeds as decoration (McConnel 1953). There are details on the making of twine and resin used to bind the peg and handle and the use of baler (*Melo* spp.) shells attached to the handle.

Use of Materials and Tools

The consideration of tool use in woomera manufacture offers insights into the effects of colonial contact. Understanding the manufacturing process not only helps to reconstruct Traditional Knowledge and techniques but also enables consideration of how the introduction of European materials and tools may have changed the selection of wood and other materials used (Kamminga 1988:28).

Kamminga (1988:32) endorsed Robins' (1980) view that the use of different wood species in the woomera collected by Reverend Hey from the lower Wenlock River region indicates that they may have an inland origin, made by people who moved from their traditional inland homelands in central CYP to the coastal Mapoon Mission in response to colonial contact. This does not confirm a Kuuku I'yu Ngaachi origin for these woomera. It does demonstrate that complex relationships exist between the place from which artefacts are collected, the people who made them and the materials used and supports a view of First Nations people as being dynamic and adaptive rather than culturally static (Robins 1980:61).

Although many wood species have been used for the manufacture of woomera, most central CYP woomera in museum collections were manufactured using Cooktown ironwood (*Erythrophleum chlorostachys*). Mitchell (1959) examined the use of stone axes to obtain raw materials for wooden implements, including woomera, finding that simple chopping and cleaving tools were often used in preference to stone axes to remove wood from trees. Hafted stone axes had limited utility for chopping across the grain of hardwoods and were better suited to splitting wood along the grain, while chopping tools—large pieces of stone with natural or flaked cutting edges—were more effective for cutting across the grain (Mitchell 1959:192). Ironwood was difficult to remove from living trees. However, doing so enabled the wood to be worked when freshly cut, and burying the wood in damp sand during the following manufacturing process helped retain a suitable moisture level (Kamminga 1988; Mitchell 1959:195).

Bassani et al. (2006:38) recorded the following Lamalama oral tradition on woomera wood removal:

> The inside of that tree makes strong hard wood
> good for making woomera, spear point and shield
> You gotta take out the heartwood
> That sapwood is too soft
> The way the Old People took the heartwood
> From that tree is hard work
> With stone axe and stone wedge
> They didn't kill the tree to get the hardwood
> You can cut the bump off to make a Coolamon
> like the Old People did.

The introduction of metal axes in the colonial period facilitated the extraction of wood and may have resulted in a greater targeting of ironwood for woomera blades (see Tutchener 2018:270), similar to the change in sugarbag (wild honey) harvesting patterns and extraction techniques around Weipa in north-west CYP (Morrison and Shepard 2013). In his study of the replacement of stone axes with short-handled metal axes by the Yir Yont of south-western CYP, Sharp (1952) demonstrated changes in patterns of resource use and social structure through the adoption of new technologies. Cole et al. (2020) has also documented changes in land use patterns with the introduction of long-handled metal axes in the area around the Lower Laura NMP camp in southern CYP. The use of metal tools by First Australians in CYP has been recorded from 1845. More than 100 artefacts collected by Roth in Normanton, North Queensland, in the late 1800s showed no evidence of being made using stone tools (Satterthwait 2008:34). There may have been a greater targeting of ironwood to manufacture woomera using an introduced tool, the metal axe.

The use of traditional tools or techniques following the introduction of metal persisted though. Roth recorded the use of a short-handled kangaroo incisor drill used to drill holes in woomera blades for the attachment of pegs (1904:25) after recording 'holes drilled with iron-wire through the blade-head' (1900:55). Macropod teeth attached to resin smoothers and small wooden

handles were used in western CYP (von Sturmer 1978:232) and the Princess Charlotte Bay area in eastern CYP to manufacture spears and woomera, with the enamel cutting edge refreshed by being broken (Hale and Tindale 1933:104–105). Woomera were a sustainable technology—the ironwood blades continued to be reused, while other less durable parts such as pegs and baler shells were replaced (von Sturmer 1978:232). Men carried a repair and maintenance kit in a dilly bag, including an ironwood smoother to apply resin, a wallaby tooth engraver, string and pegs (von Sturmer 1978:224).

Culturally Modified Trees: Evidence of Woomera in the Landscape

The presence of distinctive CMTs, created by the removal of wood for woomera blades and other uses, has been recorded in western CYP (Morrison and Shepard 2013), the Laura area of southern CYP (Cole et al. 2020) and the upper Wenlock River area of central CYP (Tutchener 2018). Ironwood is fine grained and durable, and the slow-growing tree is resistant to wood rot, termite attacks and fire, enabling the persistence of these CMTs compared with other tree species (Morrison et al. 2012). Scarring can represent a single or multiple removal of hardwood. The outer Cambrian layer, too soft for use, is removed (Bassani et al. 2006), dressing the section in preparation for the removal of the inner hardwood. CMTs with woomera scars, including those with multiple removals, are located at Clayhole Creek NMP camp (Tutchener 2018). The correlation between the length of scars on the CMTs in the upper Wenlock River area and the length of woomera in museum collections examined by Tutchener (2018) is assessed in relation to the data sets collected in this research. CMTs are a cultural resource of significant value to the local traditional custodians and function to connect them to Country and the Old People (Morrison et al. 2012). Research into these CMTs and woomera, in collaboration with traditional owners, offers the potential for further and deeper insights into the lifeways of the First Australians.

Identification of Woomera Styles

The cultural and technical elements of woomera manufacture are transmitted through Indigenous knowledge about the first woomera made (McConnel 1957). Through experiential learning, the manufacturing patterns used by the elders were passed on as a template. Individual preferences within this template resulted in variations in 'length, weight, and right- or left-handedness, as well as taste in decoration' (von Sturmer 1978:242). These variations occur within regional technical traditions, which, on a broader scale, suggest a strong conformity and are evidence of a long history of exchange between freshwater and saltwater people, with *Melo* shells sourced from coastal areas and string and beeswax sourced from inland areas (von Sturmer 1978:243). These exchange systems suggest a culturally rather than an ecologically determined need (von Sturmer 1978). Best (2003:20) describes style as 'observable variables and elements that unite or differentiate objects of material culture through time and space'. A regional cultural style can be identified in central CYP, not just in the completed product but also at the various stages of the procurement, manufacturing, use and maintenance of woomera.

Cape York Peninsula Woomera Typologies

The different approaches to categorising CYP woomera into types or styles (see Best 2003; Cosgrove 1978; Davidson 1936; Robins 1980; Roth 1900, 1904, 1909) are outlined and synthesised below. A 1900 description of central CYP woomera from the Pennefather River (see Figure 3) included the following key characteristics:

- used to both throw and defend against spears during fighting
- variations in blade height and peg length
- use of different timbers for the blade
- varnishing of the blade with resin and fat
- splitting of the distal end of the blade to attach the peg
- drilling and binding with fibre and resin to secure the peg

- use of fibre and resin to provide a handle grip at the proximal end
- fixing of a pair of *Melo* shells to the proximal end with bees wax
- occasional use of *Abrus precatorius* beans and orchid stalks as decoration (Roth 1900:34–35).

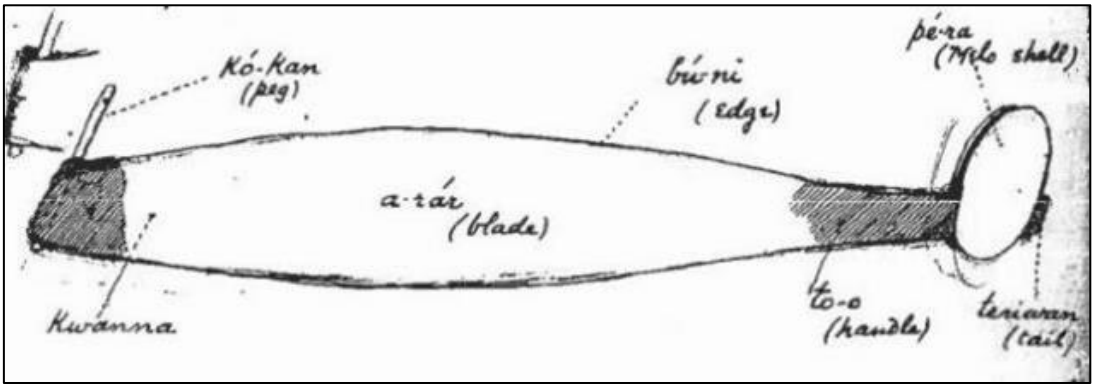

Figure 3: Diagram of Cape York Peninsula woomera. (Roth 1900:35)

Roth (1904, 1909, 1910) documented a range of different materials used in the manufacturing process, with variations in forms and styles, attributing these variations to specific cultural groups and geographic areas (Cosgrove 1978:9). These observations were referenced by later researchers such as Davidson (1936), who mapped the distribution of Australian woomera (see Figure 2), including those used in CYP. However, the boundaries and distribution patterns of this mapping reflected broad generalisations rather than the more geographically specific approaches of Roth. Best (2003) and Cosgrove (1978) later recorded more nuanced patterns of distribution across the coastal and inland areas of CYP but relied on museum collections rather than field work to support their conclusions. The research demonstrated a range of morphology and manufacturing techniques both within as well as across regions.

The characteristic CYP woomera for Davidson (1936) was a long and narrow (linear lath) form with a peg. A second type, similar to Roth's description above, was an ovate lath shape 2 to 5 inches in width, which also serves as a defensive weapon to deflect spears' and occurring within the distribution area of the narrow form (Davidson 1936:471). The long and narrow form with attached shells was found in the middle western islands of the Torres Strait, the east and

west coasts of CYP and south into north-western Queensland. Variations identified within the ovate lath forms include a medium ovate lath with shell adornments and the broad form with no shells. A form with limited geographic distribution is that with a plain curved shaft found from Bloomfield River to Cape Grafton (Davidson 1936:469–473). Cosgrove (1978) used Roth's North Queensland ethnographic material and examined woomera collections at the National Museum of Victoria and National Museum of Australia. His study area covered the region of CYP north of the line drawn from Townsville to the Staaten River. Manufacturing techniques, style variations and raw materials provided insights into the 'mechanisms which influence the basic design and form of the spearthrower' (Cosgrove 1978:6). Like Davidson (1936), various woomera types were identified within an underlying form. The woomera were grouped by geographic area (see Table 1), then further clustered by the predominant form from these areas using statistical analysis.

Table 1: Woomera grouped by geographic location

Group	Geographic location	Description
A	Cloncurry and Boulia	Long, narrow and lath-like with a short peg
B	Bloomfield River	Curved with a moderate depth and short peg
C	Staaten River	Moderate length and broad depth with a long peg
D	Weipa, Wenlock and Ducie Rivers	Moderate length and broad depth with a long peg
E	Eastern Cape York	Long, narrow and lath-like with a short peg
F	North-eastern Cape York	Long, narrow and lath-like with a short peg

Source: Cosgrove (1978).

Additional forms have been classified within some of these groupings. For example, although the woomera in Groups C and D are grouped together, Group C (Staaten River) woomera have a moderate blade height averaging 70 mm and a thicker blade width averaging 9–12 mm, while Group D woomera (Weipa, Wenlock and Ducie Rivers) are broad bladed, with an average height of 87 mm, average peg length of 100 mm, small shells and thin blades with a width of 7–9 mm (Cosgrove 1978:47–50). Although there is a general uniformity in manufacturing techniques across CYP, the local variations that exist in these techniques are not well understood and may be poorly represented in the collections analysed. The key factors

driving these variations are thought to be trade, social factors, ritual functions and access to raw materials (Cosgrove 1978:59).

Best (2003:138–141) analysed stylistic variations in woomera by their morphology and materials and classified them by region as follows (descriptors used in this research are given in brackets):

- Paddle-shaped (ovate lath) woomera were unique to CYP, with the majority coming from the west CYP coast. Limited numbers were provenanced from the east CYP coast.
- Slightly paddle-shaped (narrow ovate lath) woomera were found in both the Cape York and Gulf regions, with only two examples securely provenanced from east CYP.
- Straight lath woomera with shell handles (linear lath) were found in eastern CYP, the north-east CYP coast and the Gulf.
- Straight lath woomera without shell handles (linear lath, no shells) were present in the Gulf area but not in central CYP.
- Boomerang shaped (curvilineal lath) woomera were unique to the Bloomfield River district (see Figure 4).

Best (2003:138–141) notes that woomera with shells attached have been found across eastern and western CYP and the Gulf of Carpentaria. Broad and narrow-paddled (ovate lath) forms were the most common, but the broad (ovate lath) form was not found in the Gulf. Both broad and narrow forms represent a single morphological type (Best 2003:141). These observations confirm regional variabilities, the broad form being the predominant western CYP type, while the narrow paddle-shaped form is more frequent in the south-west CYP region. Best (2003:143) states that while shell use extends beyond the CYP regional boundary the ovate lath form, used in ceremony and ritual fighting, is regionally bound.

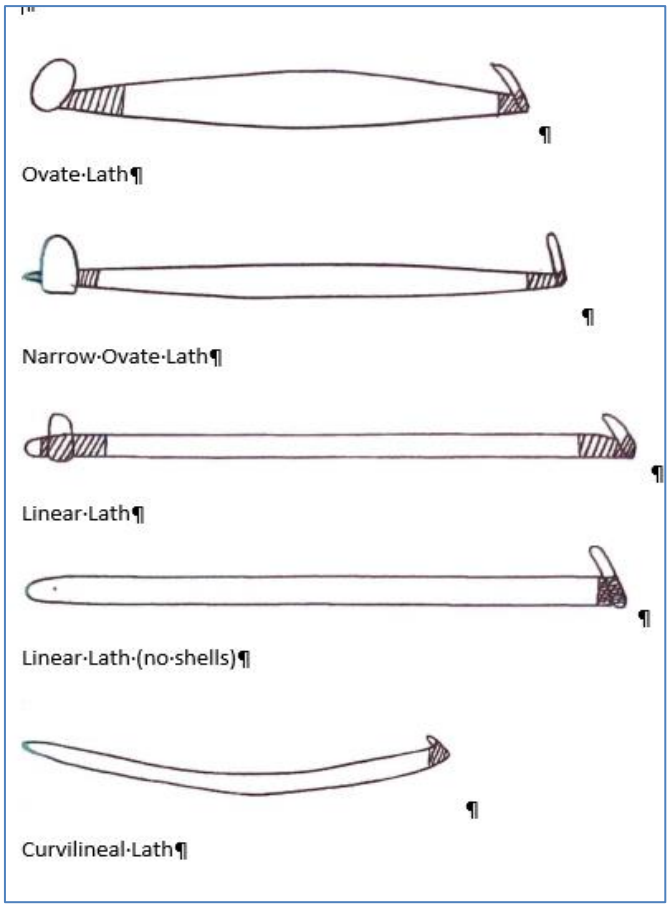

Figure 4: Woomera shapes. (Best 2003:139)

Typology Summary

Based on typology and geographic origins, there are two main types of woomera from central CYP—the ovate lath form and the linear lath form with shells (see Table 2). The ovate lath form has wide variations, including a narrow ovate lath form, which Cosgrove (1978) places in the Staaten River grouping. However, Best (2003:20) questioned the assumption that a language group or clan would seek group identity through a distinctive woomera style. The range of materials available affects the spatial distribution of artefacts, but this spatial distribution also reflects interactions between people who inhabit geographically adjacent areas such as the coastal and inland regions of Cape York (Best 2003:28).

Table 2: Synthesis of woomera typologies

Type	Roth (1909)	Davidson (1936)	Cosgrove (1978)	Robins (1980)	Best (2003)
Ovate lath, ranging from broad to narrow	Varied width (Pennefather River)	Broad shell grip (Batavia River, Staaten River, Normanton, Clonagh, Cape Bedford)	Very broad blade, small shells, long peg	Ovate lath (north Queensland)	Paddle with handle and peg (western, south-western and eastern CYP)
	Koko-olkulo type: short wide long peg (north-west of Princess Charlotte Bay)	Broad no shell grip (Batavia River)	Moderate depth blade		Narrow paddle shape, handle and peg (western, south-western and eastern CYP and Gulf of Carpentaria)
	Koko-minni type: long narrow blade with wide centre, gradually sloping to a proximal long peg (Middle Palmer River, Laura River, Maytown)	Medium-width shell grip (Batavia River)			
Linear lath	Long even width, short peg (Princess Charlotte Bay)	Long narrow shell grip (Muralug-Mabuiag, Pennefather River, Princess Charlotte Bay, north-western Queensland)	Straight lath with shells short peg	Linear lath with shell (north Queensland)	Straight lath with wood handle (eastern CYP, north-east coast) with shell handle (eastern CYP, Gulf of Carpentaria)
	Long thin lath (Lower Tully River)	Long narrow one peg (Bloomfield River to Cape Grafton, Cairns, Herberton, Princess Charlotte Bay, Lower Tully River, north-western Queensland)	Straight lath without shells short peg	Linear lath (north Queensland)	Straight lath without shell handle (Gulf, Eyre, Rainforest)
	Long even width, short peg (Cape Bedford, Endeavour and Bloomfield Rivers, Butchers Hill)				
		Long narrow peg at each end			
Curvilinear	Bent, moon-shaped (Bloomfield River)	Plain curved shaft (Cairns, Bloomfield River to Cape Grafton)	Curved shape	Curvilinear (Bloomfield River area)	Boomerang shaped with peg (Bloomfield River district)

Note: CYP: Cape York Peninsula.

Indigenous Accounts of Woomera

Indigenous accounts offer explanations for the creation of geographical features, plants and animals, including flying foxes, as well as culture and language by Dreaming ancestors (Rose 2011:122). Within these accounts are explanations for the origins of woomera and their form and roles in hunting and conflict. An association between the flying fox and woomera can be found in accounts relating Indigenous knowledge from across northern Australia (Akerman and McConvell 2002:11). McConnel (1957:17–18) provides an explanation of how manufacturing and use of material items is embedded in cultural beliefs:

> Technical skills, the arts of hunting and cooking, all natures gifts, and observations of ritual and ceremonial are made explicit and kept intact in the social mind by the recital and dramatic portrayal of the creative and inventive activities of the *pulwaiya* by whose sanction they continue to exist and function.

Pulwaiya (totems) were derived from objects of social significance and especially economic value (McConnel 1930b:203). Men were named after totems relating to spears they made and used, while women were named after dillybag totems they made and used (McConnel 1930b:184). Indigenous knowledge and symbols associated with totems carried concepts and beliefs about how to live and were passed to successive generations (McConnel 1936:363–364). Woomera are known to be totems among cultural groups to the south-west of Kuuku I'yu and Southern Kaanju Country (Sharp 1938:271).

The association between the woomera and flying fox also appears in a traditional account recorded from the Wik Munkan people neighbouring the Kaanju. A literal translation begins, 'Wuka-the-red-flying-fox (as-men) went once (1) spear-throwers-the-nose-(of) with-gun [sic] they-(used-to)-fasten (2) for spear-throwers bailer-shells they-cut (3) for-the-spear-thrower with-bees-wax they-laid-on the-shell (4)' (McConnel 1936:370). Thus, the account of Wuka the Red Flying Fox (*Pteropus scapulatus*) and Mukamu the Black Flying Fox (*Pteropus Alecto*) continues with details about the creation of woomera and spears, fighting and mortuary rituals

and the use of flying foxes as food, including how they were cooked (McConnel 1936:370–371).

No similar creation accounts from the Kuuku I'yu (Northern Kaanju) or Southern Kaanju people were identified in the ethnographic literature. However, the word *kaanju* is also the name for the hook (peg) of the *yuli* or woomera (Thomson 1933:458). This suggests a deep affiliation or identification between woomera and Kaanju people. Accessibility to Indigenous knowledge can be restricted by age, gender or rights to access, differentiating it from public knowledge. A Kaanju man informed McConnel that participation in and obtaining some ritual knowledge was restricted to men over the age of 60 years (McConnel 1935:461). The Kuuku I'yu people's deep knowledge about their links to woomera and their creation may not be available to researchers or may simply be an account no longer told. There has been very little ethnographic research undertaken with Kuuku I'yu people since the 1930s.

Woomera were a key part of the men's toolkit, used both to hunt fauna and manage social relationships through ritual and aggravated fighting. Its use in ritual fighting to both throw and deflect spears was widely noted (Cosgrove 1978:5; Hale and Tindale 1933:100; McCarthy 1936; Roth 1900:34). In this dual role it replaced shields, which were not ethnographically recorded in central CYP (Best 2003:145). Woomera are material objects with multifaceted meanings (see Binford 1972:199–200; Hayden 1984:85), and the identification of woomera as an exclusively male object is complex. For example, at Lockhart River there were prohibitions on women using or touching woomera (Chase 1980:195–196). However, at certain times in CYP, existing gender boundaries were transcended. For instance, women have been noted to have carried woomera during mourning rituals (McConnel 1936:353). A 1933 photograph by Donald Thomson shows a Wik Munkan woman painted for a mortuary ceremony and holding a woomera and firesticks (Museum of Victoria 1992:30). Another photograph taken on the Archer River shows Wik Munkan women dancing and holding woomera as part of a cremation ceremony for a male relative (McConnel 1936:370). The woomera from the Archer River ceremony are now in the South Australian Museum Aboriginal collection and challenge a

narrow functional interpretation of woomera (O'Gorman Perusco 2008:435). Such ethnohistorical material helps locate woomera in time and place and improves the understanding of past cultural practices. Understanding what an object is communicating requires knowledge of the social situation in which it was used (Best 2003:19). As objects, central CYP woomera move between the sacred and the everyday. They are objects used by males for hunting and fighting but are transformed when used in a symbolic way by women in mourning rituals. Much of this context about cultural items is not available in museum collections. Such intangible elements are not readily visible to the researcher's eye, and their identification relies on the accounts of First Australians, which are occasionally available in ethnographic studies.

Kuuku I'yu and the Woomera Collection

The woomera analysed for this research were collected for the Queensland Museum between 1896 and 1913. The woomera were possibly made by the Kuuku I'yu and Southern Kaanju people at a time when they were living on or near Ngaachi and were involved in trade relationships with neighbouring groups. After the inland Kuuku I'yu people had been moved to Lockhart River Mission, they continued to actively maintain links to their countrymen at Coen and to Ngaachi by participating in cattle work on inland stations (Chase 1980:216). The meeting of physical needs and adjusting to the new social situation of mission life resulted in adaptations to rituals, artefacts, resource use and language (Chase 1980:373). These changes had been ongoing since the first colonial contact in the CYP region, with the introduction of metal tools and glass through trade and the more direct effects of the telegraph line, the maritime, mining and cattle industries and the NMP and missionary activities.

The Clayhole NMP camp is located south of the Wenlock River in Kuuku I'yu Ngaachi (see Figure 5). It was used intermittently from 1887 to 1897 as an NMP base at a time of brutal suppression of the Kuuku I'yu people and later as a base for cattle work as European pastoralists became established in the area (Tutchener 2018:279). The site contains evidence of varied use, with glass scatters, stone foundations, stock yards and woomera CMTs in the

immediate vicinity (Tutchener 2018:279). Stone tool scatters at the site suggest the site may have been used by Kuuku I'yu prior to European occupation.

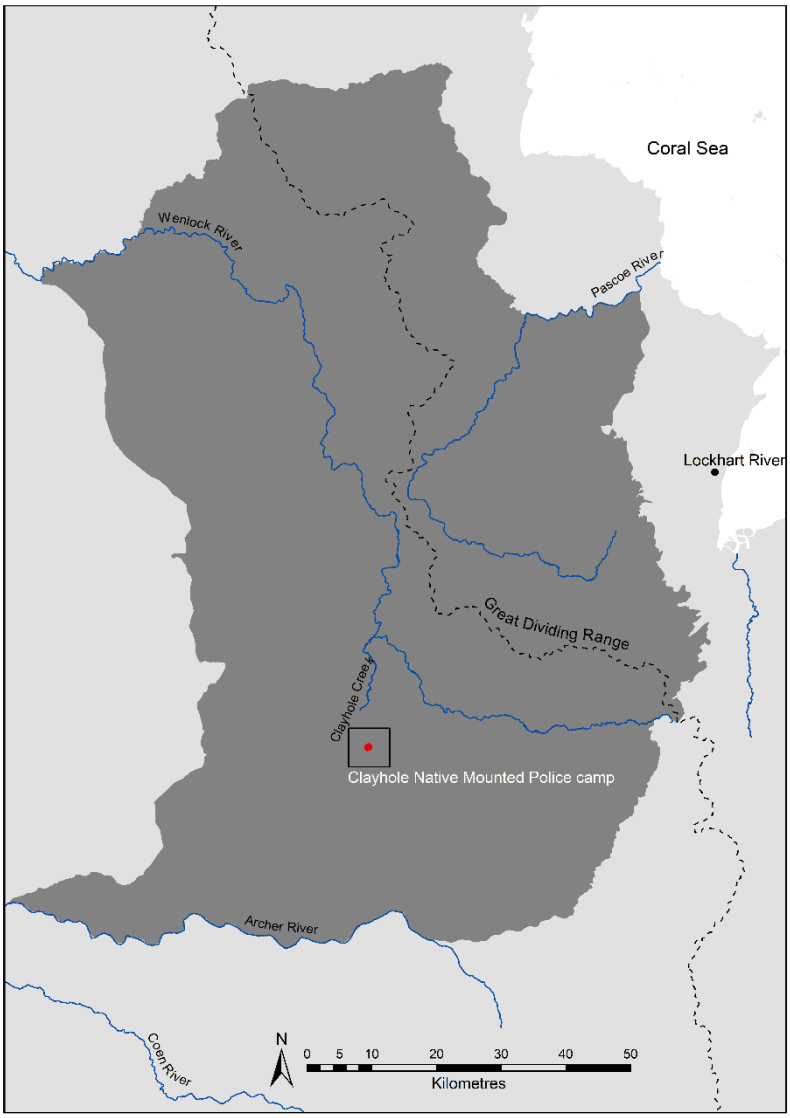

Figure 5: Clayhole Native Mounted Police camp in Kuuku I'yu Ngaachi.

Chapter Summary

This chapter presented a context to museum collecting in northern Queensland and trends in early anthropological and material culture research. The impact of introduced tools and persistence of traditional techniques is considered along with how First Nations people understand woomera. These perceptions are deeply embedded in Indigenous knowledge and challenge understandings of woomera as just material culture items in museum collections.

A synthesis of woomera typology demonstrates the forms previously reported in central CYP are variations of the ovate lath form with the linear lath more often associated with coastal areas.

Chapter 4: Methodology

This chapter provides a description of the wider project of which this research is part, how the selected literature data sources were used, and the methods used to record and analyse the woomera collection and CMTs. The role of the *chaîne opératoire* in drawing this data together and research limitations are also described.

The Project

This research forms part of the 'Indigenous Foodways in Colonial Cape York Peninsula' project. Support and funding was provided through the Australian Research Council Linkage Project (LP170100050, 2019–2022), the Western Cape Communities Trust, the Napranum Aboriginal Shire Council, the Chuulangun Aboriginal Corporation and the Queensland Museums Network. The project commenced in 2019 at Flinders University in South Australia before being transferred to the University of New England in New South Wales in April 2020. The lead researchers are Dr Mick Morrison, Dr Darlene McNaughton and Director of the Chuulangun Aboriginal Corporation, Mr David Claudie.

The wider project and this subproject were granted ethics approval through the Flinders University Social and Behavioural Research Ethics Committee (Approval 8295, May 2019). This approval requires it to be conducted in accordance with the *Guidelines for Ethical Research in Australian Indigenous Studies* published by the Australian Institute of Aboriginal and Torres Strait Islander Studies (2012) and under the direction of Morrison, McNaughton and Claudie. The results of this thesis research will be presented to the Chuulangun Aboriginal Corporation in the form of an oral and poster presentation as well as a hard copy of the thesis and digital copies of the generated data sets. Other data sets and interpretive outputs will also be made available in digital form.

Archival and Literature-Based Research

A range of literature was reviewed for material relevant to the research question and aims. The material included information drawn from:

- ethnographic and ethnohistorical research focused on the CYP region
- material culture research on projectile technologies and woomera manufacturing, form, function and style in CYP
- Queensland Museum archives
- studies related to museum collecting and collectors of Indigenous Australian material culture
- archival material and publications about or by collectors, early explorers, missionaries, anthropologists and archaeologists.

References to woomera manufacturing, use and collection linked directly to Kuuku I'yu were limited. The manufacturing techniques and woomera styles of other central CYP cultural groups, some of whom neighboured the Kuuku I'yu such as the Wik Munkan, have been more comprehensively documented and were used to provide insight into the manufacturing options available to Kuuku I'yu woomera makers. Key areas of focus included records of manufacturing tools and techniques, the variety and sources of raw materials used and the range of woomera styles and morphologies. A range of woomera typologies described by various researchers (see Best 2003; Cosgrove 1978; Davidson 1936; Robins 1980) were collated (see Table 2) and used to characterise the woomera analysed. Records of collection locations and archival material related to collecting practices were used to consider whether these woomera could be directly associated with the study area. Assessment of technologies, styles and morphologies using a qualitative approach sought to identify patterns that may contribute to a greater understanding of past lifeways (see Miller 2016). Evidence of changes in the form and function of woomera through time or resulting from contact with colonialists or external cultures were considered. Published records of First Australian accounts of woomera and the tools and

materials used to produce them helped place woomera manufacturing within an Indigenous cultural and ecological context.

Physical Analysis of the Woomera Collection

The parameters of the project's ethics approval restricted the cultural material examined to items originating from the study area previously outlined. A collection of 13 woomera selected from the Queensland Museum ethnographic collection formed the key cultural material for analysis. Given their relevance as woomera manufacturing tools, a resin smoother with an attached wallaby tooth chisel and wallaby tooth engraver were also included for examination.

Potential items for analysis were initially identified via keyword searches in the Queensland Museum collections database. This was undertaken by Senior Curator Dr Brit Asmussen, who searched for geographic localities and other keywords provided by Dr Mick Morrison. The search was further refined by Dr Morrison to objects that could be confidently associated with the study area. The list of provenanced items was made available in Excel spreadsheets and filtered to create a list of items that were clearly associated with Kuuku I'yu Ngaachi. Given their close association with the selected woomera, the two manufacturing tools mentioned above were also selected for examination during the museum-based research.

The physical analysis was undertaken manually using macroscopic and microscopic examination, and findings were recorded on a customised artefact recording form (see Appendix A). The Assistant Curator at the Queensland Museum delivered the woomera on a trolley to the examination area. Each woomera was moved by hand to the examination table for initial assessment and documentation. An informal risk assessment was made on the physical state of each item before commencing a process of measuring and photographing. The recording process was modified for woomera in a fragile condition and handling was minimised where necessary. Woomera in a robust condition could be handled with ease. The woomera were individually described, and patterns or differences were identified. A subset of quantitative measurements, including length, width and height of woomera blades, shells and

pegs, was compiled to show the range and variations in the data set. Qualitative observations of the shape and style of each woomera were undertaken and recorded in photographs, notes and sketches. The key measurements taken are shown in Figure 6 and Table 3.

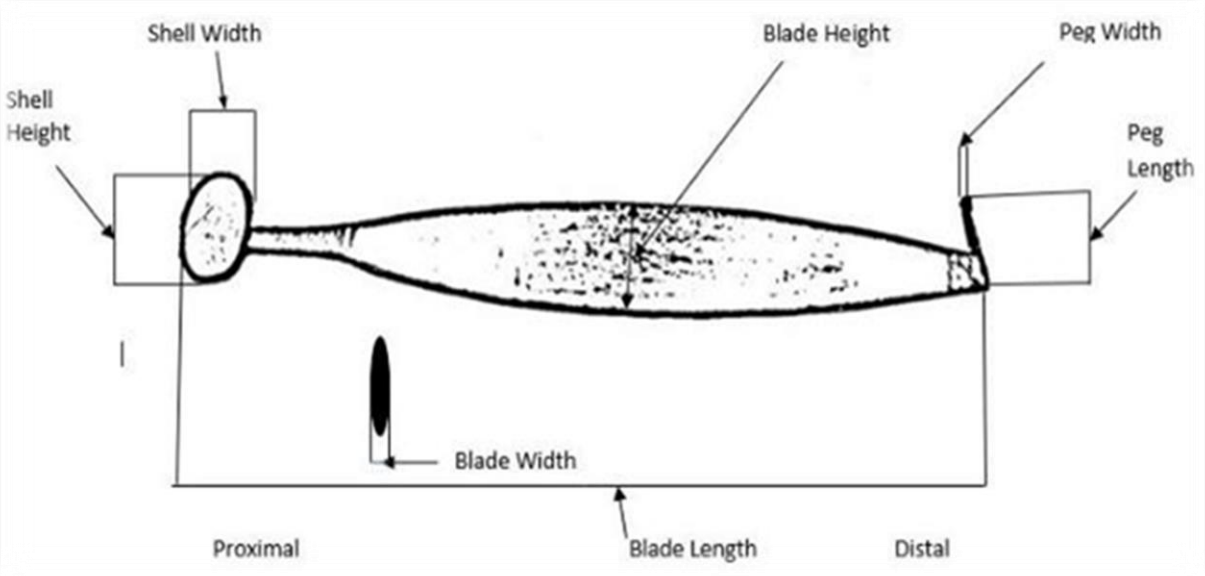

Figure 6: Diagram indicating the measurement points of woomera attributes.

Table 3: Key woomera attributes

Attribute	Description
Length (mm)	Measured from proximal to distal end of blade, including attached peg
Height (mm)	Measured at greatest distance from top to bottom of blade
Middle width (mm)	Cross-sectional width, measured at midpoint of blade length
Peg length (mm)	Full length, including attached portion
Peg width (mm)	Measured at distal end above notch
Shell height, Side 1 (mm)	Measured perpendicular to blade
Shell height, Side 2 (mm)	Measured perpendicular to blade
Shell width, Side 1 (mm)	Measured at widest point
Shell width, Side 2 (mm)	Measured at widest point

Photographs were taken of both sides of the woomera using a Nikon DSLR 3100 camera. Areas of interest related to manufacturing techniques, use wear and materials were examined and photographed at 50x and 200x magnification using a Dino-Lite digital microscope. To assist in subsequent analysis, photographic points were indicated on a line drawing of each artefact on artefact recording forms. Data sourced from the published literature and/or archival

material was used to help confirm the manufacturing process and the shaping, grinding and attachment of shells and to understand use wear resulting from manufacturing. No invasive analytical techniques were undertaken as part of this research.

Method of analysis

The data recorded on artefact recording forms were manually transferred to a Microsoft Excel spreadsheet, where they were listed by the Queensland Museum accession number and grouped by the item's collector. The digital and Dino-Lite photographs were transferred to electronic folders and organised by the Queensland Museum accession number. The relevant metric measurements of the woomera were transferred to a spreadsheet and are presented in Table 4 (see Chapter 5). Descriptive data were standardised and presented as individual records along with a representative photograph.

Statistical analysis was applied to the metric data but was rejected as a useful approach given the low number of items, rendering the results unreliable. Use-wear analysis was based on visual observation and not supported by experimental archaeology or a use-wear database.

Tools and Materials for Manufacture and Maintenance

Evidence of the tools used to manufacture and repair woomera was sought through manufacturing marks on the woomera, removal scars on CMTs and ethnohistorical accounts. Two tools in the Queensland Museum ethnographic collection with known associations to woomera making and repair were briefly examined. The key areas of use examined were:

- shaping and dressing of the blade
- drilling to attach pegs and repair splits
- application of resin.

Recording and Analysis of Culturally Modified Trees

Archaeological field data collection for the Indigenous Foodways Project involved the use of a handheld tablet running the open-source Field Acquired Information Management System

(FAIMS) software program developed by Macquarie University (Ballsun-Stanton et al. 2018). A customised recording schema was designed for the overarching project and loaded into the FAIMS program, which was used to record most of the field data (Morrison et al. 2019b). This extended to the recording of a small number of CMTs analysed as part of the current subproject using a specific CMT schema drawn from prior research on CMTs in the region (e.g. Morrison and Shepard 2013).

Key data included coordinates, photographs showing scale and direction, landscape and vegetation setting and tree condition. Other measurements included tree diameter at 1.3 m (breast height), height of the woomera removal scar above ground and the number, length and width of scars on the tree. These data were then downloaded to field servers each night while in the field. Given the limitations in the FAIMS data recording fields, additional field notes, photographs, measurements and sketches were made to record multiple removals of wood slabs within the one scar area. Together, these sources formed the data set used to meet the research aims. The field data from CMTs were uploaded to Cloudstor, then downloaded into an Excel spreadsheet, with the metric data and descriptions organised by the numbers assigned to each tree. The FAIMS photographs together with the Nikon photographs by tree number were organised into electronic folders. These data are presented in Chapter 5.

Applying the *Chaîne Opératoire* Approach

The woomera manufacturing process was analysed by drawing on a range of ethnohistorical, anthropological and archaeological literature and museum records. Each woomera was examined for evidence of its *chaîne opératoire*, including manufacturing marks, tool use, materials used and production sequences. Functional use wear, from active use, and other factors that materially changed the woomera, including changes induced by post-collection processes, storage and research, were recorded. Correlations between direct observations and ethnohistorical sources or analogies from material cultural research were identified.

Limitations

Until the 1970s, Queensland Museum ethnographic materials were not identified by the maker's name, language name, age or gender, and details of manufacturing methods or raw materials were not recorded, with no photographs, audio or film of the manufacturing process (Robins 2008a:63). Consequently, the lack of provenance data has resulted in an over-reliance on analogies from neighbouring cultural groups, particularly the better-documented areas of the west and east coasts of northern CYP around the Weipa, Lockhart River and Wik areas. Because of the small sample size, the capacity to apply statistical analysis was limited. The sample size was constrained by the need to focus on materials with sufficient provenance information to allow inclusion under the research ethics approval. Therefore, the research approach was focused primarily on qualitative analysis.

A more accurate dating of ironwood CMTs would have provided important additional data to this research. Northern Territory ironwood trees with a diameter at breast height of around 350 mm have been dated as being between 180 and 300 years old because of significant variations in growth rates (Cook et al. 2005; Morrison et al. 2012). These variations made this methodology unsuitable for the accurate dating of removal scars. The method used for recording woomera scars on CMTs was not fully developed at the time of recording, and although adjustments were made to the method in the field, its limitations were evident during the analysis of results.

Sample bias

Museum collections reflect the concerns and interests of museums at the time of their compilation, which may be a barrier to later research (Best 2003:60). In representing a limited period, they are better suited to reflecting change over short rather than long periods (Best 2003:61) and are not a representative sample. Material cultural items are transformed in the acquisition process and take on museum-based significance (Best 2003:61; Erckenbrecht et al. 2010; Henry et al. 2013). Understanding a museum's rationale for the incorporation of

woomera and other Indigenous material cultural items into its collections provides a context to the acquisition of these artefacts and contributes to an understanding of the bias reflected in these collections (Best 2003; Robins 2008a). Robins (1980:59) also identified bias in the Queensland Museum Aboriginal collection through its focus on the 'secular, technologically curious and materialistic aspects of Aboriginal life', arguing that these collections were as much a reflection of European culture as they were of Indigenous culture. He noted that archival material recorded little detail or social context, reflecting a limited understanding of the complexity of Indigenous society or the changes it was undergoing at the time of collection (Robins 1980:59).

Chapter Summary

This chapter explains the use of a range of methodological approaches in seeking to address the research question and aims. It outlines how ethnographic analogy and physical analysis of the selected woomera will be used to inform the *chaîne opératoire* framework. It explains how metric data from CMTs and woomera were recorded and limitations of the research approach.

Chapter 5: Results

Chapter 5 presents the data collected during field work in Kuuku I'yu Ngaachi in July 2019 and museum-based research at the Queensland Museum in October 2019. The woomera analysed in this research were collected and acquired by the Queensland Museum between 1896 and 1913. The museum's approach to collecting in the later stage of this period was influenced by its director, Ronald Hamlyn-Harris, and focused strongly on the collection of Indigenous material culture (Mather 1986:208).

The first section provides metric data, descriptions and photographs of 13 woomera and two tools included in the analysis. This is followed by data from six woomera CMTs. The *chaîne opératoire* approach is then used as an analytical tool to better understand the life cycle of the woomera.

The Woomera Collection

The 13 analysed woomera have a consistent underlying morphology, with only minor variations in form and materials (Table 4). No evidence was found of significant changes to the form or function of the woomera across the collection period as found by Akerman (1986) (see Chapter 2) in Northern Territory woomera. All have shell attachments (or indications of previous shell attachments) and handles of binding covered with resin or remnants of resin at the proximal end. Pegs are attached by fibre or sinew binding and covered with resin. The prominent type are variations of the ovate lath form as identified in the typology summary (see Table 2). Woomera QE1692, QE1693 and QE1677 have longer and narrower blades and were classified as linear lath forms (Table 4).

Woomera length ranges from 750 mm (QE1675) to 978 mm (QE1692) (Table 4). Woomera height, measured at the widest point of the ovate shape (see Figure 6), varies between 44.5 mm (QE1677) and 101.4 mm (QE261.1). Peg length ranges from 54.8 mm (QE1693) to

105.7 mm (QE1676), and peg width ranges from 8 mm (QE1676) to 12.2 mm (QE1692) (see Table 4).

Table 4: Key metric data for Queensland Museum woomera

QM id.	Length (mm)	Height Middle (mm)	Width Middle (mm)	Peg length (mm)	Peg Width (mm)	Shell Height (mm) Side 1	Shell Height (mm) Side 2	Shell Width (mm) Side 1	Shell Width (mm) Side 2
QE1675	750	66.1	7.6	90.7	8.4	75.6	74.5	41.4	43.8
QE1676	785	94	5.7	105.7	8	78.6	75.2	51	51
QE1677	830	44.5	10.4		8.5		65.9		38.8
QE2573	755	82.4	5.9	80.9	8.6		75.5		48.5
QE1679	760	72.5	8.7	95.2	8.4				
QE261.1	775	101.4	7.5	86.3	9.6	95.5	95.1	61.2	61.1
QE3978	735	63.2	7.4	70.1	8.9				
QE3979	815	71.6	8.1	88.5	9.3	77.5		55.7	
QE3983	800	52.3	9.1	89.3	8.9				
QE4009	835	84.8	7.8	83.8	9.2	84.5		66	
QE4024	765	85.6	8.7	87.9	9	74.5	73.1	52.7	54.6
QE1692	978	50	9.9	74.9	12.2	79.1	80.3	34.7	35.1
QE1693	915	54.1	8.6	54.8	12				

Four individual collectors contributed items to the woomera collection, three of whom played significant roles in the lives of First Nations people in Queensland: Reverend Nicholas Hey, Superintendent at Mapoon Mission; Sergeant Daniel Whelan, a Native Mounted Police officer and later police officer based at Coen; and Archibald Meston, variously a member of parliament, government official, journalist and amateur ethnographer (Mather 1986:206: McKay and Memmott 2016:182) and who later became Southern Protector of Aboriginals under the *Aboriginal Protection and Restriction of the Sale of Opium Act 1897* (Robins 2008a:65). The fourth collector, Clement Lindsay Wragge, was a Queensland Government meteorologist and Indigenous material culture collector who travelled widely in Australia for the purpose of collecting to sell to museums (Mather 1986:208).

Despite careful investigations, it appears that museum records provide no details about who made the woomera, from which cultural group they belonged or the specific location of manufacture. Details about how individual woomera were obtained—by sale, trade or appropriation—are also difficult to establish.

The following sections include data drawn from the Queensland Museum artefact database and provide descriptions of each woomera analysed, the collector, year of acquisition by the museum and relevant observations.

QE1675 (Hey, 1896, Wenlock River)

QE1675 (Figure 7) has a varnished narrow ovate lath blade. A cylindrical wooden peg at the distal end is attached at an angle to the blade with fibre and gum. The proximal end is tapered and has a pair of oval shell attachments, squared at the top and bottom and fixed to the blade with beeswax. Flaking on the shell edges and vertical striations from grinding are evidence of the manufacturing process. Fibre binding with a resin covering extends along the blade at both ends.

Figure 7: Woomera QE1675. (Photograph: M. Dearden)

QE1675 has been subject to repairs, including repair of a split in the blade. Crosshatching has been impressed into the proximal resin handle section while hot to provide grip, and there are multiple abrasions, scuff marks and dents on both sides of the blade, consistent with functional use wear.

QE1676 (Hey, 1896, Wenlock River)

QE1675 (Figure 8) has a varnished ovate lath blade with a dark patina. The cylindrical wooden peg at the distal end is attached at an acute angle with fibre and gum. The proximal end tapers, with paired oval shell attachments fixed with beeswax and held by fibre covered in resin. A fibre binding with resin covering extends along the proximal end to form a handle.

Figure 8: Woomera QE1676. (Photograph: M. Dearden)

Observations recorded include a split repaired with resin at the distal end of the blade. The etched marks on the peg and blade are consistent with shaping using a narrow-bladed chisel, while finer striations are consistent with a finish using a course stone or pumice. The shell attachments are bound to the blade to mitigate against detachment. The slight convex/concave profile of the blade reflect the inner and outer sides of wood from tree removal, and the resin used at the distal end has a different appearance from the resin used at the proximal end. In

addition to standard accession numbering, large, white, faded numbering appears along the blade.

QE1677 (Hey, 1896, Wenlock River)

QE1677 (Figure 9) has a varnished linear lath blade. A cylindrical wooden peg is attached at an acute angle with fibre and resin at the distal end, and one oval shell is attached and fixed with beeswax at the proximal end (the other is missing). Remnant resin extends along the proximal end.

Figure 9: Woomera QE1677. (Photograph: M. Dearden)

There is a post-collection repair to a split in the blade using commercial string. The peg has regularly spaced shaping marks, consistent with a narrow blade chisel. Flaking and grinding manufacturing marks are evident on the one remaining shell, and significant functional use wear is evident through multiple marks, scratches and the faded varnish finish. An impact mark or wood defect is visible near the blade edge. Along with regular accession numbering, the blade displays large, faded, white numbering and diagonal pencil lines. A cross-section has been removed at the proximal end of the blade for wood-type analysis.

QE2573 (Hey, 1911, Wenlock River)

QE2573 (Figure 10) has a varnished ovate lath blade with a dark patina. The cylindrical wooden peg at the distal end is attached at a slight angle with fibre and resin. The proximal end is tapered, with one oval shell attachment fixed with beeswax (the other is missing). Remnant resin and fibre extends along the blade at the proximal end.

Figure 10: Woomera QE2573. (Photograph: M. Dearden)

Lighter coloured wood is visible where the resin at the proximal end has flaked off, confirming that varnish was applied after binding and application of the resin coating. A split at the distal end has not been repaired. The flaked edge of the shell was not heavily ground away and remains clearly visible. The direction of peg binding suggests that a hole was drilled for the purpose of threading fibre to attach the peg. A cross-section of wood has been removed at the proximal end for wood-type analysis. An accession number written in large white letters and numbers in addition to smaller conventional accession label makes a visual impact. The width of this broad ovate lath type is noticeably less in comparison with the narrow ovate lath and linear lath forms.

QE1679 (Meston, 1897, Cape York Peninsula)

QE1679 (Figure 11) has a varnished ovate lath blade with a dark patina. The cylindrical wooden peg at the distal end is attached at an acute angle with fibre and resin. The proximal end tapers, with evidence of previous attachment of shells to the handle. Resin and fibre extend along the blade at the proximal end.

Figure 11: Woomera QE1679. (Photograph: M. Dearden)

There is a distinct colour difference between the resins used at the proximal and distal ends, possibly indicating the use of different types at each end. The museum description refers to shells being attached. The absence of shells indicates that they became detached following accession. A cross-section of wood has been removed at the proximal end for wood-type analysis.

QE261.1 (Whelan, 1913, Coen)

QE261.1 (Figure 12) has a varnished ovate lath blade with a dark patina. The cylindrical wooden peg at the distal end is attached at a slight angle with fibre and resin. The proximal end tapers, with paired shell attachments fixed with beeswax. Remnants of resin and fibre extend along the blade. The blade has a split at the distal end.

Figure 12: Woomera QE261.1. (Photograph: M. Dearden)

Observations include indications of drilled holes to attach the peg and the use of a narrow-bladed tool to shape the peg, visible from manufacturing marks. Wear marks show functional use consistent with impact and grazing, and the resin at the distal and proximal ends appear different. The flaked edges of the shells have been ground smooth, and the vertical striations on the shells are consistent with removal of the outer layer. Multiple fine striations on the blade are consistent with sanding or smoothing using an abrasive material. Wider, more deeply etched marks run lengthwise along the blade. Impact marks or wood defects at both the proximal and distal ends have been filled with resin. An accession number in large writing in addition to smaller conventional accession labelling makes a visual impact. A cross-section of wood has been removed from the proximal end for wood-type analysis.

QE3978 (Whelan, 1913, Coen)

QE3978 (Figure 13) has a varnished wooden ovate lath blade. A cylindrical wooden peg at the distal end is attached at a right angle with fibre and resin. The proximal end tapers, with evidence of previous shell attachments. Resin and fibre extend along the blade at the proximal end to form a handle. A split in the blade at the proximal end has been repaired with resin.

Figure 13: Woomera QE3978. (Photograph: M. Dearden)

A drilled hole with an hourglass-shaped profile, indicating biconical drilling, was used to attach the peg with threaded fibre. A split in the blade has been repaired with resin, and a post-collection repair of a split has been made using commercial string. Wood defects or impact marks are visible on the blade. Accession number QE13/261 written directly onto the blade in black has been superseded by accession number QE3978.

QE3979 (Whelan, 1913, Coen)

QE3979 (Figure 14) has an unvarnished ovate lath blade. The cylindrical wooden peg at the distal end is attached at a right angle with fibre and resin. The proximal end tapers to paired oval shells attachments, squared at the top and bottom and fixed with beeswax. Resin and fibre extend along the blade at the proximal end to form a handle.

Observations include a lack of functional use-wear marks and no repairs to splits in the blade at the distal or proximal ends. A deeply etched mark in the centre of the blade is clearly visible, and the blade has a smooth finish with fine striations. There is flaking on the edges of the attached shells and multidirectional striations from grinding. There is evidence of a post-collection attempt to reattach the detached shell with commercial glue. The blade retains a

natural timber appearance, evident when compared with an ironwood sample. A cross-section has been removed from the proximal end for wood type analysis. Accession number QE13/261 written in black directly onto the blade has been superseded by accession number QE3979.

Figure 14: Woomera QE 3979. (Photograph: M. Dearden)

QE3983 (Whelan, 1913, Coen)

QE3983 (Figure 15) has a varnished narrow ovate lath blade. The cylindrical wooden peg at the distal end is attached at a slight angle with fibre and resin. The proximal end tapers, with evidence of previous shell attachments. Resin and fibre extend along the blade at the proximal end.

The museum description of this woomera indicates that shells were originally attached and became detached after accession. A split at the proximal end has not been repaired, and a cross-section of wood has been removed from this end for wood type analysis. Accession number QE13/261 written in black directly onto the blade has been superseded by accession number QE3983.

Figure 15: Woomera QE3983. (Photograph: M. Dearden)

QE4009 (Whelan, 1913, Coen)

QE4009 (Figure 16) has a varnished ovate lath blade with a dark patina. The cylindrical wooden peg at the distal end is attached at a right angle with fibre and resin. The proximal end tapers, with paired oval shell attachments fixed with beeswax. The fragility of the shell attachment area necessitated a modification of the recording of metric data and restricted photography.

Observations include the lack of varnish applied under the shell attachment area and regularly spaced shaping marks on the peg. The direction of fibre binding the peg suggests the use of drilling to attach the peg. Repeated marks oblique to the wood grain in the middle section of the blade are consistent with functional use wear. A repair has been made to a slit in the blade using biconical drilling of a hole, binding and application of resin. The shells have ingrained dark scratches and irregular marks, and an attempt to reattach a shell using commercial glue post accession is evident.

Figure 16: Woomera QE4009. (Photograph: M. Dearden)

QE4024 (Whelan, 1913, Coen)

QE4024 (Figure 17) has a varnished ovate lath blade with a dark patina. The cylindrical wooden peg at distal end is attached at right angle with fibre and resin.

Figure 17: Woomera QE4024. (Photograph: M. Dearden)

The proximal end is tapered with the paired oval shell attachments fixed with bees wax and bound with sinew. Abrus seeds are embedded in the wax between the shells. The proximal end is tapered with the paired oval shell attachments fixed with bees wax and bound with sinew. Abrus seeds are embedded in the wax between the shells. Yellow bark binding is used at terminus of fibre and resin at proximal and distal ends. Roth (1900: 34–35) described the occasional use of Abrus seeds and orchid bark for decoration.

QE1692 (Wragge, 1900, Cape York)

QE1692 (Figure 17) has a varnished linear lath blade with a dark patina. A short cylindrical wooden peg at the distal end is attached at a slight angle with fibre and resin. The proximal end tapers, with shells no longer attached. Resin and red cloth binding extend along the blade at the proximal end.

Figure 18: Woomera QE1692. (Photograph: M. Dearden)

The lack of binding around the back of the peg is consistent with the peg itself being drilled for attachment. A drilled hole is visible on the blade at the edge of the resin-covered area. A red-coloured cloth is used as binding at the proximal end to form a handle. The slight convex/concave profile of the blade reflects the curvature of the wood at the removal stage. An impact hole or wood defect has been filled with resin, and there are multidirectional

scratches on blade. The elongated shells are marked in some areas but smoothly polished overall. Small traces of a large white accession number and parallel pencil lines are visible on the blade. A cross-section of wood has been removed from the proximal end for wood type analysis.

QE1693 (Wragge, 1900, Cape York)

QE1693 (Figure 18) has a varnished linear lath blade with a dark patina. The short cylindrical wooden peg is attached at a right angle with fibre and resin at the distal end. The proximal end tapers, with evidence of previous shell attachments. Remnant resin and fibre extend along the blade at the proximal end.

Figure 19: Woomera QE1693. (Photograph: M. Dearden)

The direction of peg binding suggests the use of drilled holes to attach the peg. Long repeated scratches across the grain, consistent with functional use, are visible at the proximal end. A cross-section of wood has been removed from the proximal end for wood type analysis.

Manufacturing and Maintenance Tools Associated with Woomera

Two tools directly associated with woomera manufacturing and maintenance were identified for examination: a wallaby tooth engraver (QE2038.2) used for drilling and shaping and a resin smoothing board with attached wallaby tooth chisel (QE2035).

QE2034 (1903, Coen River, west Cape York Peninsula)

QE2034 (Figure 19) is a wooden resin smoothing board and engraver, spatulated with a macropod tooth at the distal end, which is attached with gum and fibre. The width of the tooth's working edge is 56.3 mm. The binding and resin fixing the tooth to the board would have enabled adjustment of the tooth for resharpening. When the tooth is blunt, a section of the tooth is broken off, repositioned and reattached to create a new sharp edge.

Figure 20: QE2034 Resin smoothing board with wallaby tooth chisel. (Photography: M. Dearden)

QE2038.2 (Wragge, 1900 (Reg: 1923), Coen River, Cape York Peninsula)

QE2038.2 (Figure 20), known as a *groover*, is the lower jaw of a macropod. No modifications were apparent on this tool.

Figure 21: QE2038.2 Wallaby tooth engraver. (Photography: M. Dearden)

Culturally Modified Trees at Clayhole Native Mounted Police Camp

Six CMTs with bark and woomera removal scars at Clayhole Creek NMP camp were recorded. The following section provides the key metric measurements derived from these CMTs, including the length and width of wood removals and axe marks, where distinct measurable points and well-defined woomera blade removals were discernible.

Table 5. Bark and Woomera Removal Data

Registration Number	Scar height above ground (mm)	Bark removal length (mm)	Bark removal width (mm)	Woomera blade removal length (mm)	Woomera blade removal width (mm)	Axe marks length (mm)	Axe marks width (mm)
TR2000	770	980	128			105	
TR2001	550	750	500			120 109 87	99 86 82
TR2002	420	1000	160	700		124 145	109 45
TR2003	300	1500	310			120	48
TR2004	240	1330	310	680 780	190 200	158 118 123 80	97 38 105 37
TR1001	510 620	1320 1620	490 260	500 520 660 620 580		 154 110 118	 57 72 55

The axe mark lengths recorded range from 80 mm to 158 mm with 12 of the 14 axe marks measure over 100 mm in length (Table 5) The marks are well defined with a steep angle.

TR2000

Ironwood tree TR2000 (Figure 22) is in good condition, with a girth of 1,370 mm. It has one bark removal scar and a woomera blade removal (Table 5). Axe marks at the top of the scar are indistinct and partly covered with bark regrowth.

Figure 22: Culturally modified tree TR2000. (Photograph: M. Dearden)

TR2001

The fire-damaged ironwood tree TR2001 (Figure 23) is dead and fallen, without bark and therefore not possible to identify the bark removal area. It has a girth of 830 mm and has multiple woomera blade removals continuing around three-quarters of the trunk. Three metal axe marks are clearly defined at the top of the removals (Table 5).

Figure 23: Culturally modified tree TR2001. (Photography: M. Dearden)

TR2002

Ironwood tree TR2002 (Figure 24) is dead and fallen with intact bark and a girth of 1,650 mm. It has one bark removal scar and one woomera blade removal. The two axe marks are distinct and sharply angled.

Figure 24: Culturally modified tree TR2002. (Photograph: M. Dearden)

TR2003

Ironwood tree TR2003 (Figure 25) is in good condition and has a girth of 1,101 mm. There is one bark removal scar and multiple woomera blade removals within this scar. There is a distinct axe mark at the top of the removal and one midway.

Figure 25: Culturally modified tree TR2003. (Photograph: M. Dearden)

TR2004

Ironwood tree TR2004 (Figure 26) is in good condition and has a girth of 1,170 mm. There is one bark removal scar and multiple woomera blade removals, two of which were measured, and distinct axe marks recorded (Table 5).

Figure 26: Culturally modified tree TR2004. (Photograph: M. Dearden)

TR1001

Ironwood tree TR1001 (Figure 27) is in fair condition, with a girth of 1,800 mm. There is a large epicormic stem at the trunk base below one scar and a dead epicormic stem and decay at the base of the other scar. There are multiple woomera blade removals within two bark removal scars and distinct angled axe marks (Table 5) The width of the woomera removal were difficult to determine.

Figure 27: Culturally modified tree TR1001. (Photograph: M. Dearden)

CMT removal scars

The Clayhole woomera blade removals measured in this research were those with clearly discernible terminal axe cuts at the top and bottom of the removal, which range in length from 500 mm to 780 mm (Table 6). The analysed Queensland Museum woomera range in length from 735 mm to 978 mm. The tendency in the Clayhole removals was towards shorter woomera blade lengths. Some of the wood removals may have been for uses other than woomera blades (see Cole et al. 2020).

Seven woomera have lengths similar to or shorter than Removal 2 on TR2004, which had a length of 780 mm. These woomera are QE1676 (785 mm) to QE3978 (735 mm) (Table 6). All other woomera blade removals, ranging from 680 mm to 500 mm, are shorter than the other six woomera analysed, which have lengths of 800 mm or more (see Table 4 for all woomera lengths).

Table 6. Removal scar and woomera lengths

QM woomera ID no.	Woomera length (mm)	Culturally modified tree ID no.	Removal scar length (mm)
QE1676	785	TR2004 Removal 2	780
QE261.1	775	TR2004 Removal 1	680
QE4024	765	TR1001, Scar 1 Removal 3	660
QE1679	760	TR1001, Scar 2 Removal 1	620
QE2573	755	TR1001, Scar 2 Removal 2	580
QE1675	750	TR1001, Scar 1 Removal 2	520
QE3978	735	TR1001, Scar 1 Removal 1	500

Note: QM: Queensland Museum.

A comparison of woomera length with removal scar length using a box and whisker plot (Figure 27) shows woomera length range from 735mm to 978mm with a mean of 807mm. Woomera removal scars range from 500mm to 780mm with a mean of 620mm. A weak link is demonstrated between woomera length and scar removal length in the two data sets.

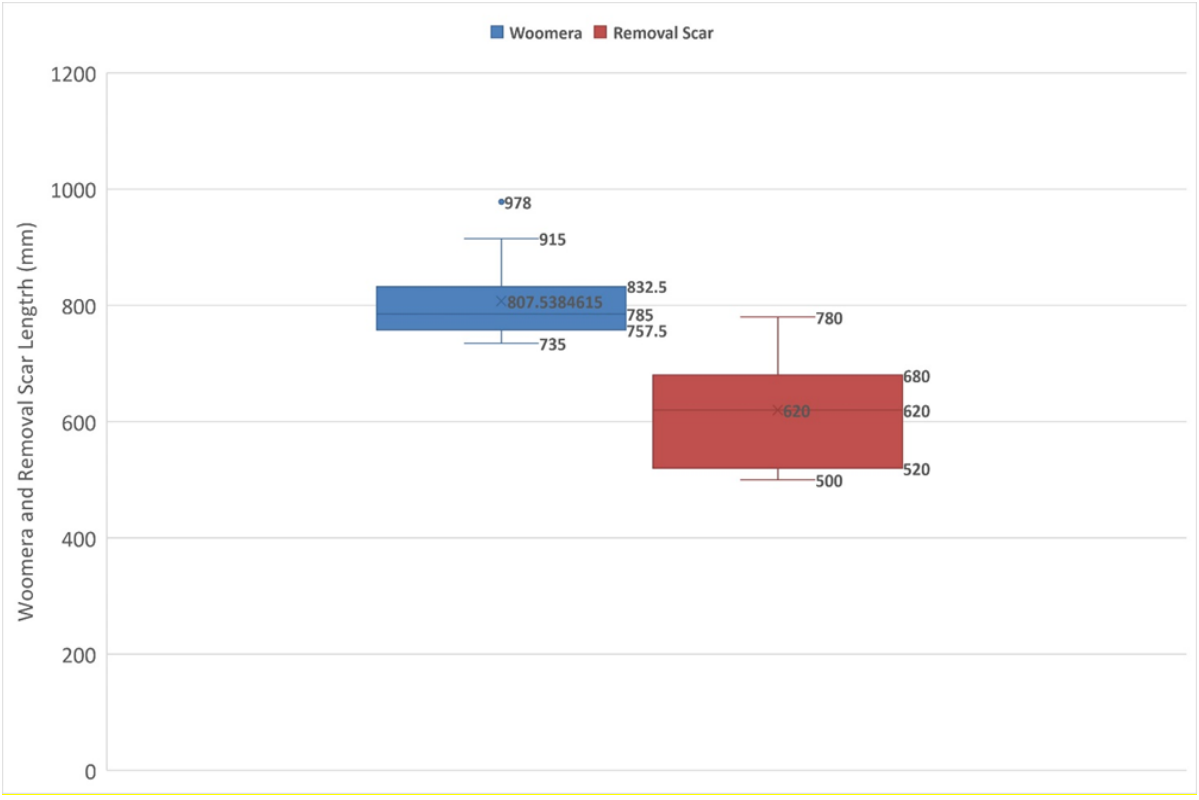

Figure 27: Length of woomera compared with culturally modified tree removal scar.

The *Chaîne Opératoire* of Woomera

Each woomera was examined for evidence of production steps, use and incorporation into the museum collection. Apart from QE3979, all woomera are complete implements with evidence of functional use prior to collection. Initial manufacturing steps are largely obscured by subsequent manufacturing steps and processes, making it difficult to discern the sequence of manufacturing marks, use wear and functional repair. The woomera underwent significant physical changes after collection. The museum records describe each woomera as a completed implement and provide limited information about the materials used and the manufacturing process. To fill these gaps and construct the operational sequence, ethnographic data have been used. The *chaîne opératoire* is presented as four phases, with key steps identified in each phase and presented as a flowchart (see Figure 28):

- Phase 1: Woomera manufacturing
- Phase 2: Use and repair
- Phase 3: Collectors and collecting
- Phase 4: Traditional owners reconnecting with museum-held cultural material.

Figure 28: A *chaîne opératoire* representation of the woomera life cycle.

Phase 1: Woomera manufacture

Step 1: The conceptualisation of woomera—the flying fox story

No published accounts of Indigenous knowledge about the creation of woomera from Kuuku I'yu sources were identified during this research. McConnel (1930b, 1936, 1957) provides examples from the neighbouring Wik Munkan of how knowledge about the origin, form and function of material culture, including woomera, was understood and passed on to successive generations through the totemic system.

Step 2: Removal of the blade from an ironwood tree

A general outline of the process of removing a woomera blade from a living tree is available in material culture studies (Hale and Tindale 1933; Kamminga 1988; Mitchell 1959) and oral history (Bassani et al. 2006). However, no detailed description of the process was identified in the available literature. The removals from all the CMTs recorded show clear evidence of the use of long handled steel axes but evidence of the use of other tools such as wedges was not identified. The importance of the splitting quality of ironwood, making it a desirable material for woomera manufacture, is discussed below in Chapter 6.

Step 3: Shaping and thinning of the blade when the wood is green

Although ironwood is a heavy, dense wood, the finished woomera blades are light and strong. The widths of the blades range from 5.7 mm to 10.4 mm. Those with a greater height (the broad ovate lath) are thinner compared with the linear lath blades (see Table 4). Working the blade down to the desired width appears to have been achieved by splitting off a thin section at removal, then chiselling along the grain with a wallaby tooth chisel or similar tool. Manufacturing use wear suggests that the same tool was used to both dress the blade and shape the woomera peg, given the similarity in manufacturing marks on both. The use of other tools at this stage is possible but not evident on the completed woomera.

The visible manufacturing use-wear marks include parallel striations and some deeper etched marks, suggestive of chiselling or adzing with a narrow-bladed non-metal tool. This was seen

clearly on QE4024, QE4009, QE261.1, QE1677 and QE1676. The fine striations overlaying these marks are consistent with a sanded or a polished finish and obscure the use-wear marks related to the removal of the blade wood from the tree and initial shaping. The convex/concave blade profiles of QE1676 and QE1692 reflect the curvature of the tree trunk from which they were removed. There was no use-wear evidence of metal tools used to dress and finish the woomera blade or shape the woomera pegs.

Step 4: Distal splitting and/or drilling to attach peg

Following the dressing of the blade, the distal end of the woomera was prepared for the attachment of the peg. This required a combination of splitting, binding and/or drilling to thread the binding material. The splitting of the distal end to seat the peg was obscured by fibre binding and resin in the finished woomera and unable to be examined.

Step 5: Attachment of the peg at the distal end

The method used to attach the peg by binding is also obscured by a covering of resin in most examples. For QE39787, QE4009 and QE1693, fibre binding, secured through drilled holes, was used to attach the peg to the woomera blade. A variety of binding techniques were used in peg attachment (Roth 1909:198), and this variation is reflected in this woomera collection. For example, on QE1692, both the blade and peg are drilled, and the fibre was threaded through the peg rather than around the peg.

The bound peg was then covered with resin using a resin smoother tool (Figure 19). While techniques to analyse resin were not available for this research, the use of different resins at each end of some woomera was evidenced by the different colouration and texture of the resin on woomera QE1676, QE1679 and QE261.1 (see also Cosgrove 1978:44).

Step 6: Hafting of shells using beeswax and handle binding

The size of each paired shell (where still attached) varies little, with the difference ranging from 0 mm to 3.4 mm, demonstrating a strong symmetry. The final polishing of the *Melo* shell removes evidence of the course grinding and colour patterns of the shell. Unidirectional

grinding marks and some indications of flaking to shape the shells remain. According to ethnographic evidence, the shells were fixed to the woomera blade with beeswax or a combination of beeswax and resin (Cosgrove 1978:36; Roth 1909:198). Some shells were then also secured with fibre.

The *Melo* shell adornments were shaped using flaking techniques, then the outer surface was ground in a process that removed the patterned layer of the shell, leaving a smooth white surface (Hale and Tindale 1933) and now have vertical striations showing the direction of the grinding. The handle of the woomera was then bound with fibre and covered with resin using a smoothing tool.

Step 7: Exposed area of the blade covered with varnish

Apart from QE3979, each woomera had a coating of varnish or dark patina. A mix of beeswax and tree resin or fats (Cosgrove 1978:36) was used to coat the wood. Both QE4009 and QE2573 show no varnish under the shell attachment area, confirming that this process was undertaken at the end of the manufacturing sequence following the attachment of the handle, shells and peg. This process was also part of ongoing maintenance.

Phase 2: Functional use and repair

Step 8: Use of woomera

Functional use wear was observed on 12 of the 13 woomera inspected. Repeated parallel marks across or oblique to the longitudinal grain of the woomera blade were noted on QE3978 and QE4009. Randomly located incised marks, dents and circular impact marks in the woomera blade, some of which were repaired by filling with resin, were recorded (see Figure 11). Exposed fibres and worn resin areas were identified as potential functional use wear. It was noted that shells were secured with fibre; however, it was unclear from observation whether this was after a period of functional use or during the manufacturing process. Woomera QE1677 had multiple scuff marks and scratches, and the varnish/stain was faded. A split at the proximal end of QE3978 had been filled with resin (see Figure 12). QE4009 and

QE3978 had multiple marks oblique to the wood grain in the middle section of the blade (see Figures 19 and 20). Woomera QE3979 was not varnished/stained and retains a natural timber appearance. No functional use wear was found on this woomera blade.

Analysis identified three examples of repair use wear undertaken during functional use. These were the combined use of biconical drilling with sinew binding and resin filler to repair a split in the blade of QE4009, the application of resin to repair splits in the blades of QE1676 and QE3978 and resin infilling to repair an impact or wood defect mark on QE261.1 and QE1692 (see Figures 29–33).

Figure 29: Woomera QE4009 marks, indicating repeated use for a similar function. (Photograph: M. Dearden)

Figure 30: Woomera QE3978 marks, indicating repeated use for a similar function. (Photograph: M. Dearden)

Figure 31: Woomera QE4009: Repair of a split with binding. (Photograph: M. Dearden)

Figure 32: Woomera QE1676: Repair of split using resin. (Photograph: M. Dearden)

Figure 33. Woomera QE261.1: Possible impact mark or wood defect filled with resin.

(Photograph: M. Dearden)

Step 9: Trade and exchange

The physical analysis of the woomera provided limited information on trade and exchange except to confirm the origin of some material was from the shallow coastal waters (shells) and other materials from freshwater areas along the coast and inland (beeswax, resin and ironwood). The lack of variation between woomera from coastal and inland areas is an indication of the economic interdependence between the coast and inland (von Sturmer 1978:243).

Phase 3: Collecting and collectors

Step 10: Incorporation into the Queensland Museum collection of Indigenous material culture

All woomera and tools examined were clearly marked with museum accession numbers. Some had been renumbered, with previous accession numbers still visible, indicating that the museum's accession numbering system had been superseded several times (Robins

2008a:64). With the exception of Whelan, all the woomera analysed came to the museum from well established collectors.

Reverend Nicholas Hey

Hey was a Moravian missionary at Mapoon, CYP, between 1891 and 1919 (Cruickshank and Grimshaw 2010). He collected a wide range of Indigenous material culture, including woomera, from the central CYP people, who had travelled down the Wenlock River to the mission in response to inland colonial pressures (Kamminga 1988; Robins 1980). Archival material confirms Hey's longstanding relationship with the Queensland Museum as a collector of Indigenous material culture. He recorded ethnographic details and language names in relation to the items he collected and actively participated in the research activities of the museum. A collection of material cultural items provided to the museum in August 1911 included three woomera (Queensland Museum Archive 11/471). Queensland Museum records note that Woomera QE2573 was acquired from Hey in September 1911. Hey expressed concerns about the use of non-traditional materials to make cultural items, arguing that while they may be appropriate to sell to travellers and curio dealers, the trend was causing difficulty in obtaining 'the real thing' suited to a museum (Queensland Museum Archive 11/156).

Archibald Meston

Meston was an active Aboriginal material culture collector, selling and donating a significant number of objects to the Queensland Museum between 1883 and 1907 (Robins 2008b:175). He visited both Mapoon and Albatross Bay in June 1896 and recorded a Coen (now Pennefather) River vocabulary during his stay (Wharton 2005:44). Woomera QE1679 was acquired by the Queensland Museum in 1897, making it possible that Meston collected this woomera during his visit to this area on the west coast of CYP. He provided only general locations from where the items were collected and recorded no details of the maker or their language group (Robins 2008b:175).

Sergeant D. S. Whelan

Correspondence between Whelan and the Director of the Queensland Museum confirm that the woomera attributed to him were collected from 1912 to 1913. Whelan refused to act as a collector of material for the museum until formal permission had been obtained from the police commissioner (Queensland Museum Archive 11/422). In August 1911, Hamlyn-Harris informed Whelan that 20 pounds of tobacco had been sent to him to 'barter for Aboriginal implements' along with a letter of permission from the commissioner of police to undertake this collecting (Queensland Museum Archive 11/470). Whelan was based at the Coen NMP camp but was probably a police officer rather than an NMP officer by this time. Queensland NMP detachments were being replaced by regular police with Aboriginal trackers from the 1870s (McGregor 1995:71) and by 1913 had been disbanded (McGregor 1995:79). Whelan subsequently sent a large collection of artefacts, half of which were intended for the museum, to the chief inspector in Brisbane, but these artefacts were not passed on after their arrival (Queensland Museum Archive 13/883). Whelan assembled a replacement collection between 1912 and 1913. A donor's schedule dated 25 November 1913 catalogued the receipt of 20 hunting spears, 38 fishing spears, 45 'stingaree' spears, seven firesticks, six woomera, two grass dilly bags and eight twine dilly bags (Queensland Museum Archive 13/276).

Clement Lindsay Wragge

Wragge, a Queensland Government meteorologist, collected artefacts in northern and western Queensland during his extensive travels. He was one of the most prolific collectors of Indigenous material culture for the Queensland Museum at the turn of the century, selling 576 items to the museum in 1900 (Robins 2008b:175) and some 900 items in 1901 (Mather 1986:208).

Step 11: Use wear includes modification post accession

Repair and maintenance work undertaken after accession into the museum collection can be seen on various woomera, including the use of glue in the attempt to reattach shells onto two woomera and string to manage splitting on two woomera. Shell adornments occasionally

became detached during museum storage, with three woomera missing both of their shells and four woomera missing one shell. Cross-section removals (Figure 34) at the proximal end for wood analysis research, recorded on nine woomera, related to research by Robins (1980:51–52).

Figure 34: Woomera QE1679: Cross-section removal for wood type research.

(Photograph: M. Dearden)

Chapter Summary

The metric data from key woomera attributes are provided in this chapter followed by a qualitative description of the woomera and two associated tools, based on observation and museum records. Each CMT is described, and removal scar data is used for a comparative analysis with woomera lengths. A diagrammatical representation of the *chaîne opératoire* is organised into four phases and a series of steps. This allows for a holistic presentation of the woomera from conception to manufacturing, use and incorporation into the museum collection. A future phase, reconnection with Kuuku I'yu people is anticipated.

Chapter 6: Discussion

The results of the research using the synthesis of typological studies, ethnohistorical data sources and the application of the *chaîne opératoire* framework is discussed. This reflects the research question and aims outlined in Chapter 1.

Woomera Typology

Two woomera types were identified in the collection, the ovate lath and linear lath forms. There is considerable variation within the ovate lath grouping, with a range of blade morphologies and blade lengths, peg lengths and shell sizes. The ovate lath form was more common in the western plains of central CYP, with only limited examples found along the east coast of CYP, where the narrow ovate lath and linear lath forms are more common (Best 2003). The woomera collected by Whelan while based at the Native Police camp at Coen, on Kaanju Country, are all variations of the ovate lath type. The morphology of the two woomera collected by Wragge (QE1692 and QE1693) are linear lath, and suggest a coastal, not inland, source for these woomera.

Roth (1909:200) made the claim that the people north-west of Princess Charlotte Bay made a particular shorter, wider (higher) form of the ovate lath. Based on the location of Kuuku I'yu and Southern Kaanju people, this may refer to a variation made by them. This shorter form of the ovate lath could explain the shorter removal scars found on some inland woomera scar CMTs relative to the length of woomera in museum collections (see Figure 27 and Cole et al. 2020). While the data collected from this research could not support this claim, an absence of a shorter inland variation in museum collections may reflect a collecting bias towards coastal and western plains variations.

Evidence provided by Best's (2003:138–140) analysis supports the position that the use of the linear lath form in the upland area of central CYP was uncommon. However, the Kuuku I'yu were in contact with users of linear lath forms, particularly where the Kuuku I'yu Ngaachi

neighboured the narrow eastern coastal plain, where this form was more frequent, and which could explain its occasional presence. This still allows for a regionally shared type of woomera, the ovate lath form, within cultural boundaries that are not well defined.

Variations within the ovate lath type and occurrences of other types such as the linear lath are explained by factors such as cultural and personal preferences and extensive exchange networks. No evidence was found that boundaries between central CYP cultural groups were defined by this typological variation (see Best 2003:20). Trade and cultural exchange networks connected the central CYP First Nations people to more distant regions and groups throughout the cape and beyond, from the central western islands of the Torres Strait to north-western Queensland. Analysis of rock art motifs at a site in Kuuku I'yu Ngaachi revealed that some of the motifs represented both freshwater tortoise and saltwater turtles (Marshall 2018). The recurring theme of saltwater/freshwater interaction on CYP is also evident on all the woomera analysed, expressed through the freshwater beeswax and saltwater *Melo* shell discs attached to the handle. While variations in shape, shell and peg size are evident, CYP woomera reflect a consistency in their underlying form, materials and manufacturing techniques used. This supports a conclusion that these woomera are emblematic of a shared cultural region across central CYP.

The *chaîne opératoire*

This research proposes expanding the *chaîne opératoire* to include both the traditional conception of woomera and a phase for the collection and transformation within the museum collection, to achieve a greater understanding of the woomera life cycle. The diagrammatic representation of the *chaîne opératoire* framework reveals the complexity of this composite technology and its entanglement with multiple elements of traditional technologies and resource usage (see Figure 28). The *chaîne opératoire* method provided an integration of both etic and emic understandings of woomera. Some of the phases and steps of woomera production were evident from the physical analysis undertaken, while other steps, such as the

manufacturing of resin, wax and fibre, relied largely on ethnohistorical literature. A further phase is proposed to the traditional model—the reconnection of Kuuku I'yu and other custodians with these woomera, which allows for the future incorporation of Indigenous knowledge that may emerge from this engagement. This will also require communicating the history of the woomera collection, the transformation of the woomera since being incorporated into the museum collection, as expressed physically and visually by the accession numbering. The impact of taphonomy, museum repairs and evidence of past research, and the ongoing management of the collection would require explanation and discussion. For example, past wood identification research has left distinctive cross-section removal scars on the proximal end of nine woomera (see Robins 1980:52).

Phase 1: Woomera manufacturing

The woomera blade forms the key structure of a maintainable form of composite projectile technology. Its repairable nature extends the life of this difficult to obtain resource. Removing the woomera blade as a thin section, split from a living ironwood tree, would have reduced the amount of dressing and shaping required of this extremely hard wood. The splitting quality of ironwood is a key factor in achieving the required form, but also presented difficulties. Evident in multiple steps of the *chaîne opératoire*, the wood's splitting qualities required ongoing management during both manufacturing and functional use stages. The requirement for ongoing maintenance is also apparent in the post-collection repairs to splitting. Robins (1980) sought to confirm that a variety of wood types were used for CYP woomera but did not clearly link the varieties used with specific geographic areas or cultural groups. Further research is needed to confirm that although a variety of wood types were used in CYP, the use of ironwood for woomera blades evident in this research may have resulted from increased access to metal axes, facilitating access to the superior ironwood.

Tool use in manufacturing

The tools and techniques used in the manufacturing process were difficult to determine from analysis of the woomera alone. Those known from ethnographic accounts include the use of

axes, hatchets and wedges to remove wood from trees, shells or stones to shape blades, and pumice, sandpaper leaves, waxes and resins to finish (Cosgrove 1978; Roth 1904). Interest in the finished object rather than the process meant that many of the tools or materials used in manufacturing were collected only in limited numbers. Of interest is the method of applying resin by holding a resin smoother with the right hand while rotating the woomera with the left hand, illustrating a shared technique used in many areas of CYP (Cosgrove 1978:32; Roth 1904:14). The use of biconical drilling to make the holes used to thread fibre for peg attachment and repairing splits, was widely used, but appears to be unique to the CYP region. A review of ethnographic sources found no evidence of this woomera manufacturing technique being documented elsewhere in Australia. Its use is a regional innovation worth further consideration and research.

Wallaby tooth tools (Figure 20) were being incorporated into museum collections after the introduction and widespread use of iron tools. Unlike stone axes, which were replaced by metal axes for the procurement of woomera blanks, the use of tooth drills seems to have continued, even though metal wire was used as an expedient tool when available (Roth 1900:35). The selective adoption of new tools as well as the maintenance of traditional methods and tools may be explained by cultural preferences, expediency or effectiveness. The only evidence of use of new material in manufacturing is on QE1692 where red cloth has been used as binding for the proximal handle. Further consideration and enquiry is required to better understand these variations in response to new tools and materials.

The binding of the proximal end with fibre provided a hand grip. Binding at both ends may also have functioned to prevent the unwanted splitting of the blade. The method of attaching pegs varied. In some woomera, resin was used to hold the fibre binding in place, while in others, the fibre used to bind the pegs was threaded through holes drilled into the wooden shaft to hold it in place and then covered with resin. The differences in the appearance of resins at the proximal and distal ends are consistent with Cosgrove's (1978) findings that different resins were used in the one woomera because of the different requirements for the handle compared

with securing the peg in terms of elasticity and strength. Cosgrove (1978) confirmed the existence of regional preferences for the types of resin used. Other variations, such as the angles at which shells were attached, were based on individual choice (Roth 1909:198).

Phase 2: Use and repair

The analysis suggests these woomera were not made for collectors as part of the artefact trade, but with functional use in mind. Functional use wear on woomera QE4009 and QE3978 indicates repeated use of these woomera prior to collection (see Figure 29 and Figure 30). Ongoing maintenance is evident in the repairs of splits by applying resin or through drilling and binding with sinew. The repair made to a split in the blade of QE4009 (see Figure 31), with biconical drilling, binding and application of resin, demonstrates the level of effort undertaken to maintain the blade once in use. The edges of the drilled hole appears crushed and irregular, suggesting the use of a wallaby tooth (see Figure 20) or a stone-tipped drill rather than metal or heated wire. Attaching pegs and shells with binding and resin also makes them replaceable. The use of fat and resin coatings as varnish on the blade preserved the wood, helped to prevent splitting, and was part of the ongoing maintenance.

Use of resin and beeswax

Cosgrove (1978:15–25) summarises Roth (1904) and unpublished ethnographic material from Donald Thompson to identify that resins had multiple sources, with preferences among different cultural groups for the type used. Different resins or mixtures of resins, oils and fats were used to cover the peg binding, varnish the blade and provide handle grip. Beeswax and resin was used to attach *Melo* shells. Indigenous knowledge about wax, resins compounded with waxes or fats and plant-based oils comprises an important resource. This includes an understanding of the properties of these compounds, the action of heat or pounding on them, storage for later use and the use of alternative types/substitutes when preferred types were not available. Such manufacturing processes, including making fibre, form sub-systems within the *chaîne opératoire* framework and are priorities for further research.

The relationship between culturally modified trees, Native Mounted Police camps and woomera

The removal of wood from living trees for woomera blades provides one of the few sources of locational data on raw material extraction. The gathering of other raw materials for woomera manufacture, such as resin from the roots of young ironwood trees, leaves no visible record in the landscape. The CMT data collected at Clayhole NMP camp were analysed for their potential links to the woomera collection. There is a limited documented association between NMP camps and woomera collecting, such as Roth collecting a woomera at the Palmer River NMP camp in 1899 (Kahn 2004:39).

Tutchener (2018) and Cole et al. (2020) identified a metric correlation between removal scars on CMTs in the Wenlock River area and Lower Laura NMP camp, respectively, and the woomera held in museum collections. Tutchener (2018:213) found that the average woomera scar length of 856 mm in the Wenlock River area was consistent with the length of woomera in the Sharp Collection at Cornell University, the McConnel Collection at the South Australian Museum and the Oceanic Collection at Harvard University. The Sharp and McConnel ethnographic material was collected primarily from the west coast of central CYP, which makes this comparison problematic given that the woomera collected were less likely to have been made in the Wenlock area.

Cole et al. (2020:28–29) compared woomera removal scar lengths on CMTs at Lower Laura NMP camp with woomera in the Roth Collection at the Australian Museum. They reported woomera blade removal scar lengths of 700–780 mm and woomera lengths of 850–960 mm, arguing that scar measurements reflected the relative proportions of woomera but not the precise dimensions. The shorter length of blade removal scars compared with the woomera lengths were explained by complex natural processes following the removal of bark or wood (Cole et al. 2020:28). Regrowth can explain changes in bark scar lengths, but heart wood removal lengths do not change over time. This highlights the need for improved methodologies to investigate the relationship between woomera and CMTs. A direct relationship between

CMTs at Clayhole and the Queensland Museum woomera collection, which also showed a similar disparity in lengths, remains unconfirmed.

Chronology of woomera CMTs

There is no method by which to precisely date CMTs or their woomera blade removal scars. CMTs at Clayhole recorded in this research have distinctive metal axe marks, indicating that wood removals occurred following the adoption of metal axes. Cole et al. (2020:9) identified that axes marks, made on CMTs associated with the Lower Laura NMP camp, with a maximum length of 120 – 160 mm resulted from the use of long handled steel axes. The removals at Clayhole may have occurred over many decades after its use as an NMP camp, with research showing that the Clayhole site later became a cattle mustering camp (Tutchener 2018). Moreover, its location near the old road to Lockhart River made it suitable as a stopover, which may have facilitated the ongoing use of this location to obtain woomera blades (Morrison pers. comm. 2020). A more developed methodology to improve archaeological research into woomera scar CMTs is needed. Such developments are important for local custodians seeking to better understand and protect their cultural heritage (Morrison et al. 2012:45).

Phase 3: The collection and collectors

Analysing the collection of material culture for the Queensland Museum necessitates a consideration of the collectors and the period of collection. The museum policy to 'collect before it's too late' (Peterson et al. 2008:8) was already evident at the Queensland Museum by 1911. Hamlyn-Harris wrote to potential collectors, including police officers, teachers and missionaries, urging them to obtain Indigenous material culture for the museum:

> Since the Aboriginal Tribes are fast dying out, every effort should be made to acquire those symbols of the life of the original Australian inhabitants, whose rites, ceremonies, customs, and traditions are becoming obsolete and being entirely lost to us. (Mather 1986:209)

This demonstrated the awareness at the museum of the scale of the destruction of cultural traditions and lifeways being experienced by First Nations people. Despite this concern, there

was limited direct contact between the makers of material cultural objects and the institutions that sought those items (Peterson et al. 2008:7).

Woomera were viewed as material objects lacking a deeper cultural context. Among some CYP people, woomera were carried by women in funeral rituals, as documented by McConnel and Thomson during their separate field work in western CYP. Some of these woomera are now part of a museum collection (O'Gorman Perusco 2008:435) and speak to the need for sensitivity about the handling of these cultural objects. The woomera selected in this analysis were from four collectors. The background and life histories of each provide insights into the wider social, political and 'scientific' interests at the time of collecting and represent a range of ways in which colonial engagement was experienced by the First Australians, even in remote central CYP.

Reverend Nicholas Hey

Archival data relating to the woomera collected by Hey are not geographically specific enough to determine if the origins of the woomera he collected were in Kuuku I'yu or Southern Kaanju Ngaachi. The makers of these woomera were not named, nor their place of origin recorded. The reference to some woomera being collected from people who had moved to the Mapoon Mission from along the Wenlock River provides limited provenance (see Robins 1980).

Sergeant D. S. Whelan

Whelan was a reluctant collector of ethnographic material for the Queensland Museum. As a police officer based at the Coen Native Police camp, he was well placed to undertake such collecting. Insights into the timing and circumstances of Whelan's collecting are gained through the exchange of letters with the director of the Queensland Museum, Hamlyn-Harris. Although Hamlyn-Harris stated his preference for the collection of ceremonial tokens, Whelan sent spears, woomera, firesticks and dilly bags. Whelan's patrol duties would have required him to cover a considerable area of central CYP. It cannot be assumed that the woomera he collected were limited to the immediate Coen area. As a regional town, Coen attracted Indigenous

people from a wide area, providing a range of potential makers from different cultural groups. Apart from QE3979, none of the woomera collected by Whelan were newly made, confirming they were manufactured for traditional use rather than for sale to a collector. These cultural items carry a story of cultural resilience in the face of colonialism. The Queensland Museum's strategy of engaging police in the collection of material culture has been characterised as making it 'a passive beneficiary of violence and dispossession' (Burden 2017:103).

Clement Lindsay Wragge

The woomera collected by Wragge circa 1900 (QE1692 and QE1693) may have been collected from one location given their strong morphological similarities. With the trade and exchange of such materials across the CYP area and Wragge's widespread travels, prolific collecting and lack of locational detail, it is difficult to determine what location this might be. The wallaby tooth engraver (QE2038.2) was also collected by Wragge at Coen (Pennefather) River in 1900, which suggests a west CYP origin.

Archibald Meston

Like other collectors of the time, Meston identified the origins of the material he collected in general terms such as river names (Robins 2008b:176). Although a prominent figure in the development of the *Aboriginal Protection and Restriction of the Sale of Opium Act 1897* and the Southern Protector of Aboriginals from 1898 to 1904, Meston had a reputation for the misappropriation of Aboriginal material culture and exploitation of Aboriginal people (McKay and Memmott 2016).

Phase 4: Traditional owners reconnecting with museum-held material culture

The provenance of individual woomera were not clearly identified through this research. For example, some of the woomera collected by Hey at Mapoon may have come from inland along the Wenlock River (Kamminga 1988; Robins 1980), but there is not enough evidence to link them directly to Kuuku I'yu Ngaachi, given the size of the region and the fact that it encompasses a number of linguistic and social groups. A detailed investigation of the archival

material associated with the woomera did provide a greater context to their collection and the motivations of the museum and collectors. The traditions of trade and exchange of woomera and raw materials across wide geographic and cultural areas add to the difficulty of establishing provenance. Each woomera consists of both saltwater and freshwater materials from a range of ecological niches. The significant social disruptions and relocation of First Nations Australians resulting from colonialism is another complicating factor. Collaborative research with First Nations people is essential in addressing the cultural heritage management issues generated from this lack of provenance.

Chapter Summary

The analysis of woomera typologies established that the ovate lath form was common to inland central CYP and the linear lath more common to coastal regions suggesting the two woomera collected by Wragge may have a coastal origin. A shorter ovate lath form, more common in inland central CYP, may not be well represented in museum collections. It is suggested that a consistency in form and manufacturing techniques and materials in the ovate lath form is emblematic of a shared regional culture.

The *chaîne opératoire* approach was able to represent the complexity of the woomera lifecycle and incorporate emic as well as etic understandings of woomera. Insights such as the importance of the splitting quality of ironwood for its extraction from living trees, use in manufacturing and the need to manage this quality through repair to ensure longevity in this maintainable technology were gained. Evidence from use wear confirmed these woomera were made for traditional uses rather than the artefact trade. Based on metric data the research demonstrated there was not a strong relationship between the woomera analysed and the CMTs recorded at the Clayhole NMP camp. An examination of the circumstance of the collectors of the woomera analysed provided additional information to better provenance this material.

Chapter 7: Conclusion

The CYP woomera represent both a sophisticated technology and important cultural items that played a critical role in Indigenous lifeways in north central CYP. It was an important element of the portable hunting toolkit and played a broader role in mediating social relationships between individuals and groups within society though ritual fighting (Sutton 1994:47). It was a symbolic representation of manhood and connected people to the Dreaming and to exchange networks necessary to procure essential materials for the manufacturing and maintenance of the woomera. Woomera provide insights into both the adoption of colonial tools such as metal axes and cultural resistance through the continuing use of Indigenous techniques and materials in the face of colonial intrusion. Although little evidence was found of significant changes to their traditional form or function, the woomera selected for this research were transformed by becoming museum collection items, and they will continue to be transformed in meaning through their reconnection with the Kuuku I'yu people and other relevant custodians.

A lack of detail about the maker, place of manufacture or collection does not detract from the value of woomera as cultural objects. The analysis of this collection of northern central CYP woomera was unable to identify an association between particular clans or language groups and individual woomera but rather confirmed the validity of regionally shared types of woomera within wider cultural boundaries. The analysis demonstrated variations in woomera shapes and shell and peg sizes across the central CYP area but a consistency in underlying patterns and manufacturing techniques used. Woomera production between 1896 to 1913 reflected a limited use of introduced tools and materials, a conformity to traditional techniques and the production of these woomera for functional uses.

Research approaches including the collection of oral histories and working with Kuuku I'yu people who hold Indigenous knowledge about the sources of raw materials and woomera manufacturing processes can address the over-reliance on ethnographic analogy in this

research. The potential for integrated studies of woomera and CMTs has been explored in this thesis and may be developed through future research. An improved methodology is required to explore questions such as why the removal scar lengths in some locations are shorter than woomera lengths in museum collections.

Analysis of the data set demonstrated both evidence of change in some elements of the woomera manufacturing process and strong continuity in other elements, including techniques and morphology. The creation of a woomera involves the use of tangible raw materials and intangible elements such as the shape of the blade or techniques used to manipulate the raw materials. An emic understanding of these intangible elements was difficult to obtain with the limited data available in ethnographic and oral histories, a critical element of a more complete understanding of woomera in museum collections.

Collaboration with holders of Indigenous knowledge to facilitate the reconnection of the Kuuku I'yu people with cultural items in museum collections and undertake oral history projects and visits to Country has the potential to further recover techniques, technologies and knowledge. The analysis of museum-held woomera and CMTs in combination with oral histories can assist traditional owners seeking to maintain or re-establish links to Country, gain insights into the history of dispossession and generate new understandings about past Indigenous lifeways for a wider audience. Working closely with the Kuuku I'yu to identify Indigenous knowledge about manufacturing and materials and the use of resins and wax has great potential as an area of future research.

The application of the *chaîne opératoire* approach reveals the complexity of the social, technological and ecological systems required to produce woomera. It provides a visual representation of the life cycle of woomera from Indigenous knowledge about their origins, manufacturing to museum acquisition. The details of these acquisitions provides insight into how the Queensland Museum engaged with First Australians through a variety of collectors who in relation to these woomera represented a microcosm of the colonial world. The model

can project a future reengagement with this cultural patrimony by First Nations Australians. It provides a holistic and more nuanced understanding of museum-held woomera as not simply collected items representing past lifeways but as culturally important objects, examples of Indigenous knowledge and technical skills, representations of colonial intersections and objects with the potential for changing attitudes and understandings of the lifeways of First Australians.

REFERENCES

Akerman, K. 1996 Contemporary changes in the construction of a northern Australian form of spearthrower. *The Beagle, Records of the Museums and Art Galleries of the Northern Territory* 13:1–8.

Akerman, K., B. Birch and N. Evans 2014 Notes on the contemporary knowledge of traditional material culture among the Iwaidja—Cobourg Peninsula, Arnhem Land, Northern Territory 2005–2006. *Transactions of the Royal Society of South Australia* 138(2):181–213.

Akerman, K. and P. McConvell 2002 Woomera: The technology and terminology of the multi-purpose spearthrower in Australia. Paper presented at *ARCLING II: The Second Conference on the Archaeology and Linguistics of Australia*, 1–4 October, Canberra.

Allen, H. and K. Akerman 2015 Innovation and change in northern Australian Aboriginal spear technologies: The case for reed spears. *Archaeology in Oceania* 50:82–92.

Allen, H. and P. Rowe 2014 Assessing Thomson's model of seasonal change. *Ethnoarchaeology* 6(1):61–77.

Allen, L. 2008 Tons and tons of valuable material. In N. Peterson, L. Allen and L. Hamby (eds), *The Making and Makers of Indigenous Australian Museum Collections*, pp. 387–418. Melbourne: Melbourne University Press.

Audouze, F. 1999. New advances in French prehistory. *Antiquity* 73(279):167–175.

Australian Institute of Aboriginal and Torres Strait Islander Studies 2012 *Guidelines for Ethical Research in Australian Indigenous Studies*. Canberra: Australian Institute of Aboriginal and Torres Strait Islander Studies.

Ballsun-Stanton, B., S. A. Ross, A. Sobotkova and P. Crook 2018 FAIMS Mobile: Flexible, open-source software for field research. *SoftwareX* 7:47–52.

Bar-Yosef, O., Vandermeersch, B., Arensburg, B., Belfer-Cohen, A., Goldberg, P., Laville, H., Meignen, L., Rak, Y., Speth, J. D., Tchernov, E., Tillier, A.-M. and Weiner, S. 1992 'The excavations in Kebara Cave, Mt. Carmel', *Current Anthropology* 33(5):497–550.

Bassani, P., A. Lakefield and T. Popp 2006 *Lamalama Country: Our Country, Our Culture-Way*. Graceville: Akito.

Best, A. 2003 *Regional Variation in the Material Culture of Hunter Gathers: Social and Ecological Approaches to Ethnographic Objects from Queensland, Australia.* BAR International Series 1149, Oxford: Archaeopress.

Binford, L. 1972 *An Archaeological Perspective*. New York: Seminar Press.

Blakeslee, D.J. 2012 The Windom pipe: A *chaîne opératoire* analysis. *Plains Anthropologist* 57(224):299–323.

Bradley, W. 1969 *A Voyage to New South Wales: The Journal of Lieutenant William Bradley RN of HMS Sirius, 1786–1792*. Sydney: Trustees of the Public Library of New South Wales in association with Ure Smith.

Burden, G. 2017 From Dispossession to Display: Authenticity, Aboriginality and the Queensland Museum, c1862–1917. Unpublished PhD thesis, School of Historical and Philosophical Inquiry, University of Queensland, St Lucia.

Cattelain, P. 1997 Hunting during the Upper Palaeolithic: Bow, spearthrower, or both? In H. Knecht (ed), *Projectile Technology*, pp. 213–240. Boston: Springer.

Chase, A.K. 1980 Which Way Now? Tradition, Continuity and Change in a North Queensland Aboriginal Community. Unpublished PhD thesis, Department of Anthropology and Sociology, University of Queensland, St Lucia.

Chuulangun Aboriginal Corporation 2016 Kuuku I'yu Northern Kaanju—About Us. Retrieved 5 April 2020 from <https://www.kaanjungaachi.com.au/KuukuIuNthnKaanjuNgaachi.htm>

Claudie, D.J., S.J. Semple, N. Smith and B.S. Simpson 2012 Ancient but new: Developing locally driven enterprises based on traditional medicines in Kuuku I'yu Northern Kaanju homelands, Cape York, Queensland, Australia. In P. Drahos and S. Frankel (eds), pp. 29–55. *Indigenous Peoples' Innovation: Intellectual Property Pathways to Development*. Canberra: Australian National University Press.

Cole, N., L.A. Wallis, H. Burk, B. Barker and Rinyirru Aboriginal Corporation 2020 'On the brink of a fever stricken swamp': Culturally modified trees and land–people relationships at Lower Laura (Boralga) Native Mounted Police camp, Cape York Peninsula, *Australian Archaeology* 86(1):21–36.

Cook, G.D, R.J. Taylor, R.J. Williams and J.C.G. Banks 2005 Sustainable harvest rates of ironwood, *Erythrophleum chlorostachys*, in the Northern Territory, Australia. *Australian Journal of Botany* 53(8):821–826.

Cosgrove, R.F. 1978 String and Sealing Wax: A Study of the North Queensland Spearthrower. Unpublished thesis, Graduate Diploma of Material Culture, James Cook University, Townsville.

Critchley, Z.R. 2018 The Art of the Spearthrower: Understanding the Andean Estolica Through Iconography. Unpublished PhD thesis, The Graduate School, Binghamton University, State University of New York, Binghamton.

Cruickshank, J. and P. Grimshaw 2010 'A matter of no small importance to the Colony': Moravian missionaries on Cape York Peninsula, Queensland, 1891–1919. In P. Grimshaw and A. May (eds). *Missionaries, Indigenous Peoples and Cultural Exchange*. Brighton: Sussex Academic Press.

Cundy, B.J., 1989 Formal variation in Australian Spear and Spear Thrower Technology. *British Archaeological Reports International Series* 546.

Davidson, D. 1936 *Aboriginal Ethnographica: Aboriginal Axes, Spears, Clubs, Canoes, Baskets and Boomerangs*. Reprint, Carlisle: Hesperian Press, 2011.

Delage, C. 2017 Once upon a time ... the (hi)story of the concept of the *chaîne opératoire* in French prehistory. *World Archaeology* 49(2):158–173.

Erckenbrecht, C., M. Fuary, S. Greer, R. Henry, R. McGregor and M. Wood 2010 Artefacts and collectors in the tropics of North Queensland. *The Australian Journal of Anthropology* 21(3):350–366.

Garrod, D.A.E. 1955 Palaeolithic spear-throwers. *Proceedings of the Prehistoric Society* 21:21–35.

Grace, R. 2012 *Chaine Operatoire: The 'Operation Chain' Approach to Lithic Analysis*. Ikarus Books.

Greer, S., R. Henry and S. McIntyre-Tamwoy 2015 Mainland magic: Interpreting cultural influences across Cape York–Torres Strait. *Quaternary International*, 385:69–78.

Haddon, A.C. 1904 *Reports of the Cambridge Anthropological Expedition to Torres Straits: Volume V, Sociology, Magic and Religion of the Western Islanders*. Reprint, New York: Johnson Reprint, 1971.

Hale, H. M., and N. B. Tindale 1933 Aborigines of Princess Charlotte Bay, North Queensland. *Records of the South Australian Museum 5(1):63*–116.

Harris, M. 1976 History and significance of the emic/etic distinction. *Annual Review of Anthropology* 5(1):329–350.

Hayden, B. 1984 Are emic types relevant to archaeology? *Ethnohistory* 31(2):79–92.

Henry, R., T. Otto and M. Wood 2013 Ethnographic artifacts and value transformations. *HAU: Journal of Ethnographic Theory* 3(2):33–51.

Hutchings, W.K. and L.W. Brüchert 1997 Spearthrower performance: Ethnographic and experimental research. *Antiquity* 71(274):890–897.

Ingold, T. 1997 Eight themes in the anthropology of technology. *Social Analysis: The International Journal of Social and Cultural Practice* 41(1):106–138.

Johnson, C.N. and M. Letnic 2014 Introducing a new top predator, the dingo. In H.H.T. Prins and I.J. Gordon (eds), *Invasion Biology and Ecological Theory: Insights from a Continent in* Transformation, pp. 414–428. Cambridge: Cambridge University Press.

Kahn, K. 1993 *Catalogue of the Roth Collection of Aboriginal Artefacts from North Queensland. Vol. 1: Items Collected from Archer River, Atherton, Bathurst Head, Bloomfield River and Butcher's Hill, 1897–1901*. Sydney South: Australian Museum.

Kahn, K. 2004 *Catalogue of the Roth Collection of Aboriginal Artefacts from North Queensland. Vol. 4: Items collected from Nassau River, Night Island, Palmer River, Peak Point Electric Telegraph Office, Princess Charlotte Bay, Staaten River, Starcke River, Tinaroo, Tully River, Vanrook and Weipa (Embley River), in 1896–1903*. Sydney South: Australian Museum.

Kamminga, J. 1988 Wood artefacts: A checklist of plant species utilised by Australian Aborigines. *Australian Aboriginal Studies* 2:26–59.

Kottak, C. 2006 *Mirror for Humanity*. New York: McGraw Hill.

Langley, M.C., R. Whitau, I.E. Dilkes-Hall, M. Smith and S. O'Connor 2019 A spearthrower butt from Widgingarri, Western Kimberley, Western Australia. *Australian Archaeology* 85(1):102–107.

Lombard, M. 2016 Mountaineering or ratcheting? Stone Age hunting weapons as proxy for the evolution of human technological, behavioural and cognitive flexibility. In M.N. Haidle, N.J. Conrad and M.K. Bolus (eds), *The Nature of Culture: Based on an Interdisciplinary Symposium 'The Nature of Culture', Tübingen, Germany*, pp. 135–146. Dordrecht: Springer Netherlands.

Marshall, N. 2018 A Formal Analysis of Rock Art in Kuuku I'yu Ngaachi, Cape York Peninsula, Australia. Unpublished master's thesis, Archaeology and Heritage Management, Flinders University, Adelaide.

Mather, P. (ed) 1986. *A Time for a Museum: The History of the Queensland Museum, 1862–1986*. South Brisbane: Queensland Museum.

McCall, G.S. 2009 Reconstructing landscape use and mobility in the Namibian early stone age using *chaîne opératoire*. In B. Adams and B. Blades (eds), *Lithic Materials and Palaeolithic Societies,* pp. 163–173. Chichester: Blackwell Publishing.

McCarthy, F.D. 1939 'Trade' in Aboriginal Australia, and 'trade' relationships with Torres Strait, New Guinea and Malaya. *Oceania* 9(4):405–438.

McConnel, U.H. 1930a The Wik-Munkan tribe of Cape York Peninsula, part 1. *Oceania* 1(1):97–104.

McConnel, U.H. 1930b The Wik-Munkan tribe of Cape York Peninsula, part 2: Totemism. *Oceania* 1(1):181–205.

McConnel, U.H. 1932 Totem stones of the Kantju tribe, Cape York Peninsula. *Oceania* 1(2):181–205.

McConnel, U.H. 1933 The Wik-Munkan and allied tribes of Cape York Peninsula, N.Q. *Oceania* 4(3):310–372.

McConnel, U.H. 1935 Totemic hero-cults in Cape York Peninsula, North Queensland. *Oceania* 6(4):452–477.

McConnel, U.H. 1936 Mourning ritual among the tribes of Cape York Peninsula. *Oceania* 7(3): 346–371.

McConnel, U.H. 1953 Native arts and industries on the Archer, Kendall and Holroyd rivers, Cape York Peninsula, North Queensland. *Records of the South Australian Museum* 11(1):1–59.

McConnel, U.H. 1957 *Myths of the Mungkan*. Melbourne: Melbourne University Press.

McGregor, L. 1995 The police department 1859–1914. In K. Cohen and K. Wiltshire (eds), *People, Places and Policies: Aspects of Queensland Government Administration 1859–1920,* pp. 58–82. St Lucia: University of Queensland Press.

McKay, J. and P. Memmott 2016. Staged savagery: Archibald Meston and his Indigenous exhibits. *Aboriginal History*, 40:181–203.

Miller, H.M.-L. 2016 *Archaeological Approaches to Technology*. New York: Routledge.

Mitchell, R.S. 1959 The woodworking tools of the Australian Aborigines, *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 89(2):191–199.

Morales, M.R.G. and L.G. Straus 2009 Extraordinary early Magdalenian finds from El Miron Cave, Cantabria (Spain), *Antiquity* 83(320):267–281.

Morrison, M., A. Della-Sale and D. McNaughton 2019a War capitalism and the expropriation of country: Spatial analysis of Indigenous and settler–colonial entanglements in north eastern Australia, 1864–1939. *International Journal of Historical Archaeology* 23(1):204–234.

Morrison, M., H. Bourke, S. Ross, B. Ballsun-Stanton, A. Stevanovic, C. Nassif-Haynes and P. Hermankova 2019b. FAIMS/Indigenous Foodways Landscape Survey (Version 1.0). Retrieved June 2019 from <https://github.com/FAIMS/Indigenous-foodways-landscape-survey>

Morrison, M. and E. Shepard 2013 The archaeology of culturally modified trees: Indigenous economic diversification within colonial intercultural settings in Cape York Peninsula, northeastern Australia. *Journal of Field Archaeology* 38(2):143–160,

Morrison, M., E. Shepard, D.A. McNaughton and K. Allen 2012 New approaches to the archaeological investigation of culturally modified trees: A case study from western Cape York Peninsula. *Journal of the Anthropological Society of South Australia* 35:17–51.

Museum of Victoria 1992. *Women's Work: Aboriginal Women's Artefacts in the Museum of Victoria*. Melbourne: Museum of Victoria.

O'Driscoll, C.A. and J.C. Thompson 2018 The origins and early elaborations of projectile technology. *Evolutionary Anthropology* 27(1):30–45.

O'Gorman Perusco, A. 2008 Only sticks and bark: Ursula McConnel—her collecting and collection. In N. Peterson, L. Allen and L. Hamby (eds), *The Makers and Making of Indigenous Australian Museum Collections*, pp. 419–445. Carlton: Melbourne University Press.

Palter, J.L. 1976 A new approach to the significance of the 'weighted' spear thrower. *American Antiquity* 41(4):500–510.

Peterson, N., L. Allen and L. Hamby (eds) 2008 *The Makers and Making of Indigenous Australian Museum Collections*. Carlton: Melbourne University Press.

Queensland Museum Archive, Correspondence, 13/276, Queensland Museum Donor Schedule (signed by Hamlyn-Harris), 25 November 1913.

Queensland Museum Archive, Correspondence, 13/883, D.S. Whelan to R. Hamlyn-Harris, 30 October 1913.

Queensland Museum Archive, Correspondence, 11/156, Rev. J.N. Hey to R. Hamlyn-Harris, 17 March 1911.

Queensland Museum Archive, Correspondence, 11/422, D.S. Whelan to R. Hamlyn-Harris, 11 July 1911.

Queensland Museum Archive, Correspondence, 11/470, R. Hamlyn-Harris to D.S. Whelan, 7 August 1911.

Queensland Museum Archive, Correspondence,11/471, Rev. J.N. Hey to R. Hamlyn-Harris, 28 July 1911.

Renfrew, C. and P. Bahn (eds) 2005 *Archaeology: The Key Concepts.* London: Routledge.

Rigsby, B., L. Allen and D. Hafner 2015 The legacy of Norman B. Tindale at Princess Charlotte Bay in 1927: Lamalama engagement with museum collections. *Journal Anthropological Society of South Australia* 39:1–25.

Robins, R. 1980 Wood identification of spearthrowers in the Queensland Museum Ethnographic Collection: An evaluation. *Occasional Papers in Anthropology* 10:50–62.

Robins, R. 2008a Reflections in a cracked mirror: What collections representing 'them' can say about 'us' and the role of museum collections? In N. Peterson, L. Allen and L. Hamby (eds), *The Makers and Making of Indigenous Australian Museum Collections*, pp. 61–74. Carlton: Melbourne University Press.

Robins, R. 2008b The legacy of a 'lazy character': Walter Roth's contribution to the ethnography collections of the Queensland Museum. In R. McDougall and I. Davidson (eds), *The Roth Family, Anthropology, and Colonial Administration*, pp. 171–180. Walnut Creek: Left Coast Press.

Rose, D.B. 2011 Flying fox: Kin, keystone, kontaminant. *Australian Humanities Review* 50:119–136.

Roth, W.E.,1897. *The Queensland Aborgines* (Vol. 1). Reprint, Carlisle: Hesperian Press, 1984.

Roth, W.E. 1900 On the Aboriginals of the Pennefather (Coen) River District and Other Coastal Tribes Occupying the Country Between the Batavia and Embley Rivers. Unpublished report prepared for the Under-Secretary, Home Department, Brisbane.

Roth, W.E. 1904 *Domestic Implements, Arts, and Manufactures*. North Queensland Ethnography, Bulletin No. 7. Brisbane: G.A. Vaughn.

Roth, W.E. 1909 North Queensland ethnography. Bulletin no. 13. Fighting weapons. *Records of the Australian Museum* 7(4): 189–211.

Roth, W.E. 1910 North Queensland ethnography. Bulletin no. 14. Transport and trade. *Records of the Australian Museum* 8(1):1–19.

Satterthwait, L. 2008 Collections as artefacts: The making and thinking of anthropological museum collections. In N. Peterson, L. Allen and L. Hamby (eds), *The Makers and Making of Indigenous Australian Museum Collections*, pp. 29–54. Carlton: Melbourne University Press.

Sharp, L. 1938 Tribes and totemism in north-east Australia. *Oceania* 9(3):254–275.

Sharp, L. 1952 Steel axes for Stone Age Australians. In E.H. Spicer (ed.), *Human Problems in Technological Change: A Case Book*, pp. 69–90. New York: Russel Sage Foundation.

Shea, J.J. and M.L. Sisk 2010 Complex projectile technology and Homo sapiens dispersal into western Eurasia. *PaleoAnthropology* 2010:100–122.

Sutton, P. 1994 Material culture traditions of the Wik people, Cape York Peninsula. *Records of the South Australian Museum* 27:31–52.

Thomson, D.F. 1933 The hero cult, initiation and totemism on Cape York. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 63:453–537.

Thomson, D.F. 1934a Notes on a hero cult from the Gulf of Carpentaria, North Queensland. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 64:217–236.

Thomson, D.F. 1934b The dugong hunters of Cape York. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 64:237–264.

Thomson, D.F. 1939 The seasonal factor in human culture. *Proceedings of the Prehistoric Society* 5:209–221.

Tutchener, D. 2018 Persistence and Space: An Investigation into the Archaeology of the Wenlock Region in Cape York Peninsula, Queensland. Unpublished PhD thesis, Department of Archaeology, College of Humanities, Arts and Social Sciences, Flinders University, Adelaide.

von Sturmer, J.R. 1978 The Wik Region: Economy, Territoriality and Totemism in Western Cape York Peninsula. Unpublished PhD thesis, University of Queensland, Brisbane.

Walsh, G.L. and M.J. Morwood 1999 Spear and spearthrower evolution in the Kimberley region, N.W. Australia: evidence from rock art. *Archaeology in Oceania* 34(2):45–58.

Wharton, G. 2005 The Pennefather River: A place of Australian national heritage. In Royal Geographical Society of Queensland (ed), *Gulf of Carpentaria Scientific Study Report*, pp. 35–91. Brisbane: Royal Geographical Society of Queensland.

APPENDIX A: Artefact Recording Form

QM Accession No.	QM Name/Title:	QM Acquisition Date:	QM Field Coll. Date:	QM Locality Name:	QM Field Coll. Place
QM Brief Description:					
Ref. Sketch/Photo points etc.					Typology:
Woomera Length (mm):	Height (mm) Proximal: Middle: Distal:	Width (mm) Proximal: Middle: Distal:	Other measuring points/notes: COB:		
Peg Length (mm):	Width: Proximal: Distal:	Length above shaft:	Notched Y / N	Attachment String: Y / N Resin: Y / N Drilled: Y / N	
Shell Length (MM):	Width:	Length above shaft:	Length below shaft:	Attachment Beeswax Y / N Resin Y / N String Y / N	
Material Used. Wood	Working/carving	Drilling Y / N Where: Hole size:	Splitting	Wedging	
Use wear Y / N	Metal	Stone	Shell	Notes:	
Smoothing	File	Pumice stone	Sandpaper	Notes:	
Shell Y / N Type: Shape:	Angle on shaft: Colour:	Position on shaft: MM from proximal:	Use wear: Groove and snap: Flake scar:	Abrasion: Striations: Polish:	
String Y / N Type:	Colour:	Where used:	Non-traditional:	Notes:	

Animal tendon Y / N	Colour:	Where used:		Notes:
Resin Y / N Type:	Colour:	Length of Proximal: Length of Distal:	Inclusions Soil: Sand: Hair:	Seeds: Charcoal: Other:
Beeswax Y / N	Colour:	Where:	Inclusions Soil: Sand: Hair:	Seeds: Charcoal: Other:
Pigment Y / N	Colour:	Where:	Pattern Y / N	Description:
Orchid Bark Y / N	Colour:	Where:	Pattern Y / N	Description:
Lawyer Cane Y / N	Colour:	Where:	Pattern Y / N	Description:
Abrus Seeds Y / N	Colour:	Where:	Pattern Y / N	Description:
Other material Type:	Detail:			
Non-traditional materials Type:	Detail:			
Photograph Number Nikon:	Dino-Lite File Name:	Archive Follow-up:		

APPENDIX B: WOOMERA DATA

Registration Number	Collector	Length (mm)	Height Prox. (mm)	Height Middle (mm)	Height Dist. (mm)	Width Prox. (mm)	Width Middle (mm)	Width Dist. (mm)	Weight (g)	COB from prox. End (mm)	Peg Length (mm)	Peg angle (°)	Peg width Prox. (mm)	Peg width Dist. (mm)	Peg length above shaft (mm)	Peg height above shaft (mm)
QE1675	Hey	750	32.6	66.1	33.0	5.7	7.6	8.4	332.9	365.0	90.7	87.4	9.2	8.4	53.6	
QE1676	Hey	785	24.4	94.0	35.2	8.4	5.7	5.7	347.5	355.0	105.7	51.6	9.4	8.0	23.4	
QE1677	Hey	830.0	30.6	44.5	28.1	8.3	10.4	8.6	264.1	410.0			8.1	8.5	41.3	32.4
QE2573	Hey	755.0	29.7	82.4	38.0	9.7	5.9	5.9	300.2	370.0	80.9		7.6	8.6	46.2	42.2
QE1679	Meston	760.0	28.4	72.5	29.7	3.9	8.7	8.8	323.4	420.0	95.2	58.7	7.8	8.4	63.5	
QE261.1	Whelan	775.0	21.3	101.4	36.1	7.2	7.5	7.0	490.8	345.0	86.3	82.5	9.2	9.6	52.8	
QE3978	Whelan	735.0	17.3	63.2	27.6	9.4	7.4	5.9	244.8	405.0	70.1	90.5	9.1	8.9	40.9	40.9
QE3979	Whelan	815.0	17.3	71.6	32.9	12.1	8.1	4.9	398.7	385.0	88.5	84.5	9.6	9.3	59.2	59.2
QE3983	Whelan	800.0	18.1	52.3	30.3	10.6	9.1	6.6	275.8	450.0	89.3		9.2	8.9	58.0	
QE4009	Whelan	835.0	20.5	84.8	36.1	12.5	7.8	6.5	464.1	355.0	83.8		9.7	9.2	74.7	74.7
QE4024	Whelan	765.0	16.5	85.6	35.1	8.3	8.7	5.9	445.0	350.0	87.9	84.6	10.4	9.0	55.4	55.4
QE1692	Wragge	978.0	20.7	50.0	38.0	8.8	9.9	7.7	382.1	475.0	74.9	61.6	8.4	12.2	45.2	42.0
QE1693	Wragge	915.0	23.9	54.1	33.1	8.4	8.6	6.9		465.0	54.8		12.0	12.0	28.5	28.5

Registration Number	Peg notched Y/N	String Y/N	Resin Y/N	Drilled Y/N/I (indeterminate)	Drilled Y/N/I (indeterminate)	Shell Length Side 1. (mm)	Shell Length Side 2. (mm)	Width Side 1. (mm)	Width Side 2. (mm)	Length above shaft (mm)	Length below shaft (mm)	Beeswax Y/N	Resin Y/N	String Y/N	Material used
QE1675	Y-slight	Y	Y	I	I	75.6	74.5	41.4	43.8	31.0	18.0	?	?	N	
QE1676	Y-very slight	Y	Y	I	I	78.6	75.2	51.0	51.0	23.4	27.6	?	?	Y	
QE1677	N-worn at tip	Y fibre or string?	Y	I	I		65.9		38.8	21.1	16.7	?	?		
QE2573	Y	Y	Y	I	I		75.5		48.5	24.7	22.7	?			
QE1679	N	Y - possible cane?	Y	I	I							Y - Dark brown material different from resin at prox. and dist.	N	N	
QE261.1	Y	Y	Y	I	I	95.5	95.1	61.2	61.1	49.0	27.8	?	?	N	
QE3978	Y-deep notch	Y	Y	Y - possible drill hole 30 mm from distal end.	Y										Ironwood
QE3979	Y - deep notch	y - reddish fibre	Y	NATD	I	77.5		55.7		46.8	25.1	?	?	N	Ironwood
QE3983	Y - deep notch	Y	Y	I	I										Ironwood
QE4009	Y	Y -fibre	Y	Y - repair of split	Y	84.8		66.0		41.4	24.6	?	?	N - sinew	Ironwood
QE4024	Y	Y		I	I	74.5	73.1	52.7	54.6	45.4	16.2	?	Y	N - sinew	Ironwood
QE1692	Y	Y	Y	Y - drilled and threaded just visible.	Y	79.1	80.3	34.7	35.1	30.5	23.7	?	?	N	
QE1693	Y	Y	Y	I	I								Y	Y	

Registration Number	Manufacturing marks	Drilled Y/N	Where	Hole size (mm)	Splitting	Usewear Y/N	Manufacturing Marks	Type (Metal/Stone/Shell)	Smoothing (File/Pumice/Sandpaper)	Notes
QE1675	Multiple fine striations.	Unable to determine.				Y			Striations similar to QE 1679.	
QE1676	Multiple fine striations.	Unable to determine.			Split in blade - repaired with resin.	Y	Irregular parallel marks on blade.	Not metal, poss. tooth, stone or shell.	Evidence of smoothing.	
QE1677	Not as deeply etched as QE 1676.	Unable to determine.				Y Scratches and marks across the grain.	Fine finish slight striations.		Fine finish.	
QE2573	Finish has a wavey quality, fine striations.	Unable to determine.					Waves in wood surface reflect waves in fine striation.			Some more deeply etched marks.
QE1679		Not able to determine.					Multiple striations - origins not clear.			
QE261.1										
QE3978		Y	Distal end.	3.93	At proximal end.		Y Referred to Dino photos and described.		Smooth finish.	fine finish striations.
QE3979		Unable to determine.								fine finish striations.
QE3983		N					Fine striations, irregular longitudinal pattern.			Fine narrow bladed tool?
QE4009		Y	On blade edge 145mm from distal end.	3.50mm diameter.	Blade split repaired with drilled hole and sinew.	Y Diagonal scratches 370 - 400 mm from proximal.	Fine striations.			
QE4024	Fine striations.	Unable to determine.			At proximal end to attach sinew securing shells.		Fine striations.			
QE1692		Y	28.34 from distal end.	2.67mm diameter.		Y	v. fine striations. Dark stained patina.		Polished appearance.	
QE1693		Unable to determine.					Refer to photos.			

Registration Number	Shell Handle Y/N	Type	Shape	Angle on shaft	Colour	Position from prox. End mm	Abrasion Striations Polish	String Y/N	Colour	Where used	Non-trad. Y/N
QE1675	Y	Melo	Oval, squared at ends.	87.4°		15	Striations. at 24° to shaft on side 1, at 90° on side 2.	Y multi strand fibre.	Covered with resin.	Bind peg. Possible same on handle.	
QE1676	Y	Melo	Oval squared at ends.	87.2°	Hye 2.5Y 8/1	8	Striations running length - possibly natural. More polished side 2.	Y fibre.	Covered with resin.	Peg and securing shell.	
QE1677	Y	Melo	Oval with straight long edges.	89° angled back	Hue 2.5 Y 8/1	12.38	Scratches across the grain of the natural striations.	Y fibre and modern thread.	Fibre covered in resin. Thread grey.	Bind peg. Tread used to repair split post collection.	Y
QE2573	Y	Melo	Oval	90°	Hue 10YR 8/1 white	15.8	Natural striations not fully ground away.	?			
QE1679	Missing							Y	Not visible under resin.		
QE261.1	Y	Melo	Oval	88.2°	Off white	4.35	Abrasions, natural and manufacturing striations.	Y	Covered in resin.	Proximal handle and peg binding.	
QE3978	N							Y	Tan	Proximal and distal ends. Fine dimensions.	
QE3979	Y	Melo	See photo.	83.6° back	Off white	6.9	Ground and shaped, natural striations very smooth.	Y	Reddish	Bind peg.	
QE3983	Y but now missing							Y	Tan	Bind peg and handle.	
QE4009	Y	Large Melo.	Oval, squared top and bottom.		Off white with dark stains.	No prox. wood showing.		?		Note use for repair.	
QE4024	Y	Melo		86.7°	Off white.	13.89	Edges well ground, very smooth to touch	Y	Hue 2.5 YR 5/8 red	Peg binding.	Y?
QE1692	Y	Melo	Elongated oval.		white to opaque white.		areas of the outer layer ground and polished to the point of leaving opaque appearance.	Y		Handle	Y
QE1693								?			

Registration Number	Animal sinew Y/N	Colour	Where used	Notes	Resin Y/N	Colour	Length prox. covered in resin (mm)	Length dist. covered in resin (mm)	Inclusions	Beeswax Y/N
QE1675					Y	Cley/Black 2.5 prox. And dist.	175	75	**Note:** pattern of cross hatching on prox. hand grip.	Need to ref. to Dino photos for id.
QE1676	N				Y	Different colour each end. Proximal Grey N2.5 black. Distal 5YR 3/1 grey dark grey.				?
QE1677	N				Y	7.5 YR 2.5/1 black Peg end.	170	47.52		?
QE2573	Y	tan	To bind peg.	Possible tendon - ref Dino photos.	Y	Black	175	65	Proximal end resin worn away - string/tendon visible.	?
QE1679	?				Y	Prox. Grey/black N2.5 Dist. Hue 5 YR 3/1 very dark grey.	190	90		Y
QE261.1	N				Y	Shiny black at proximal end Matt black at distal end.	17	42		Possible?
QE3978	N				Y	Dark grey Hue 7.5 YR 4/2.	170	30		N
QE3979	N				Y peg, shell and handle	Ref photos.	200	50		?
QE3983					Y		175	45		Y
QE4009	Y	Light tan.	Repair split and attach peg.	Repair rather than discard.	Y	Dark/black.	210	40		?
QE4024	Y	Dark faun over reddish material.	To secure shells to shaft.	Split made in handle to hold tendon binding.	Y	Proximal dark reddish.	175	50		?
QE1692	Refer to photos.				Y	Resin/bees wax mix under shells glossy, other areas resin dull matt.	145	30		?
QE1693	Y				Y	Dark brown/black.	115	30		N

Registration Number	Colour	Where	Pigment	Colour	Where	Orchid Bark Y/N	Colour	Where	Descript.	Lawyer Cane Y/N	Colour
QE1675	Cley/Black 2.5	Under shell.s	Blade has dark patina or varnish.		Over blade.	N				N	
QE1676	10 R 3/2 reddish black	Between shells and over string securing them.	Blade has dark patina or varnish.	Hue 2.YR N 2.5/1	Over blade.	N				N	
QE1677	Hue 2.5 YR N 2.5/1	Under shell.	Blade has dark patina or varnish.	Hue 2.5YR 3/2	Over blade.	N				N	
QE2573	Dark/black with reddish patches.	Under shell placement area.	Dark stain/ varnish over shaft.	Dark tan	whole area of shaft.	N				N	
QE1679	Hue 10R 3/2 dusky red.	Prox. end where shells previously attached.	Blade has dark patina or varnish.	Hue 2.5YR 3/3	Over blade.	N				N	
QE261.1	Dark	Under shells.	Dark stain/ varnish over shaft.		whole area of shaft.	N				N	
QE3978			Y - varnish over shaft.			N				N	
QE3979	Dark with reddish patches.	Attach shell.	N - check photo.			N				N	
QE3983	Dark with reddish patches.	Remnant where shell previously attached.	Staining.		Over shaft.	N				N	
QE4009	Dark/reddish.	Under shell.	Blade has dark patina or varnish.			N				N	
QE4024			Stain/varnish.			Y	Hue 2.5 Y 8/8 yellow	End of proximal and distal resin cove, proximal 14.51 distal 20.47.	Plain band wrapped around multiple times.	Y	Reddish where resin not attached.
QE1692	Dark black shiny.					N				N	
QE1693			Dark stain on wood.			N				N	

Registration Number	Where	Descript.	Abrus Seeds Y/N	Colour	Where	Descript.	Other material	Non-trad Material	Din-Lite File Name	Nikon Photo No.
QE1675			N						QM1675	DSC 0025 - 0076
QE1676			N				N	N	QM 1676 22.10.19	DSC 0068 - 0094
QE1677			N				N	Cotton - museum repair?	QM 1677 22.10.2019	DSC 0094 - 0115
QE2573			N				String possibly from previous museum label.	Label string now part of the object.	QM 2573	DSC 0147 - 0167
QE1679			N				N	N	QM 1679	DSC 0001 - 0024
QE261.1			N						QM 261.1 28.10.2019	DSC 0351 - 0374
QE3978			N					Split in shaft bound with strong cotton post collection..	QM 3978	DSC 0187
QE3979			N						QM 3979 23.10/2019 (side 1 and half edge of shell photographed).	DSC 0168 - 0186 Last two shots together with Ironwood sample.
QE3983			N						QM 3983	DSC 0233 - 0249
QE4009			N					Modern glue attempt to reattach shell.	QM 4009	DSC 0212 - 0232
QE4024	Proximal handle.	Strip 5mm or less wrapped around handle.	Y	Red and black.	embedded in resin/beeswax between the two shells.			String may be used need to review Dino photos.	QM 4024 22.10.2019 QM 4024 30.10.2019	DSC 0116 - 0146
QE1692			N					Cloth used at proximal end on handle.	QM 1692 25.10.2019 (some photos marked x30 are x50)	DSC 0307 - 0325
QE1693			N						QM 1693 25.10.2019	DSC 0326 - 0342

Registration Number	Archive Ref No.	Additional notes	Additional notes on recording form	Additional notes	Use wear reassessment.
QE1675			Y		Shell flaking, vertical striations. Cross hatching proximal resin handle would provide improved grip.
QE1676			Y		Fine striations, deeper etched striations. Blade reflects concave/convex shape of removal from truck.
QE1677			Y		Peg has long regular striations consistent with a wallaby tooth chisel. Flacking and grinding marks on shell.
QE2573		Cape Waymouth Grid Ref 7572.		Follow up Rev. N. J. Hey.	Flaked edge of shell visible, less ground than other examples. Missing resin exposes lighter wood under. Peg has long regular striations consistent with a wallaby tooth chisel. Fine striations, deeper etched striation on blade.
QE1679					Deeper striations under polished finish.
QE261.1	Ack. No. A13/230.	Different resins used at proximal and distal ends.	Y	Removal at proximal end may be from Robins wood type testing.	Shell flaking. Vertical striations consistent with grinding to remove outer layers. Fine striations from sanding or smoothing, Wider mark uniform across and lengthways. Peg shaped by long striations consistent with a wallaby tooth chisel. Notched with sharp edged implement. Drilled and threaded hole for peg attachment.
QE3978	Acting Sergeant Whelan Annual Report of the Northern Protector 1901 and 1903.				Biconical drilled hole, sinew or string binding to attach peg.
QE3979		Shell side 1 not attached, no shell side 2.	No varnish or staining. Has same look as raw timber of the Ironwood sample. See photos.	Notch clearly carved in peg after shaping.	Deep etched mark, blade middle. Smooth fine striation finish. Evidence of shell flaking and striations running in different directions. Peg binding with sinew.
QE3983		No shells attached.	A light thin blade with long peg - variation within the type		Narrow bladed tool use?
QE4009			Damage to the artefact, shell on side 2 made moving difficult. Required modified recording.		Fine striations. Wood under shell attach. area not varnished. Evidence varnishing undertaken after shells attached and resin applied. Peg has long regular striations consistent with a wallaby tooth chisel. Direction of binding to attach peg suggests drilling.
QE4024					Deeply etched marks at prox. Overlay of fine striations. Long even spaced striations on blade consistent with wallaby tooth chisel.
QE1692	Correspondence - 6005 08/01/1900.	Removal at proximal from Robins wood-type analysis.	Y		No binding around peg suggesting drilled for attachment. Direction of binding suggests two holes in peg. Hole drilled into blade at edge of distal end resin covered area. Regular material pattern at proximal handle from use of reddish cloth.
QE1693	Correspondence 6005 - 08/01/1900.	Removal at proximal from Robins wood-type analysis.	Y	Need to clarify area Wragge collected from/ style appears to be Gulf style.	Direction of binding around peg suggests a drilled hole for attachment.

Registration Number	Functional use wear	Repair	Use wear: Collection, Storage, Research
QE1675	Splitting of blade prox. Running under binding End. Scuff marks, dents. Resin worn exposing fibre.		Museum id White background Black letters and numb.
QE1676	Shells secured with sinew, diagonal, resin covered.	Distal split repaired with resin, one side.	Large white faded numbers, smaller written directly on object, Museum id.
QE1677	Multiple scruff marks and scratches. Varnish faded, not polished in appearance. Wood defect or impact mark on blade edge.		Shell missing from one side, Split in blade repaired with commercial string. Prob. Museum repair. Museum id. Large white faded numbers. Diagonal pencil marks rule d across blade. Cross section at proximal, for wood type analysis.
QE2573	Split at distal end not repaired. Multiple scratches across the grain on blade.		Shell missing from one side. Museum id. Large white faded numbers, very visible. Cross section at proximal for wood type analysis. String from museum label attached.
QE1679			Previous placement of missing shell clear. Detached shell kept in separate box. Cross section at proximal for wood type analysis. Museum id.
QE261.1	Crack in shell from use? Impact mark/ wood defect at both prox. and dist. filled with resin. Marks running across grain of blade.		Cross section at proximal for wood type analysis. Museum id. Handwritten "Whelan 13/261".
QE3978	Dents or impact marks on blade. Previous attachment of shells. Proximal end split filled with resin. Regular diagonal marks across the blade indicating repeated use for similar function.		Museum id. and also handwritten directly onto blade "Whelan 13/261" Split at proximal end bound with manufactured cord, similar to that used on QE1677.
QE3979	Woomera not varnished; natural timber similar to Ironwood sample. No wear marks. Suggest manufacture (not complete) just prior to collection.	Split centre distal and edge of prox. Not filled with resin suggest lack of maintenance repair.	Museum id. and also handwritten directly onto blade "Whelan 13/261" Cross section at proximal for wood type analysis. Unsuccessful attempt to reattach shell with modern glue , white colour.
QE3983	No repair to split at proximal.		Shell were attached at accessioning - now absent. Museum id. and also handwritten in black directly onto blade (Old accession number "Whelan 13/261" Cross section at proximal, for wood type analysis.
QE4009	Fine marks, scratches, possible 2 impact marks on blade. Multiple marks oblique to grain mid-section of blade. Shell with dark ingrained scratches and irregular marks.	Biconical drilling, sinew and resin used to repair split running parallel to blade edge.	Museum id. Unsuccessful attempt to reattach shell with modern glue , white colour.
QE4024	Scuff marks and scratches running across grain.	proximal split used to secure sinew binding around shells. May be a feature of the original manufacturing.	Museum id. Handwritten "QE13/261" Cross section at proximal, for wood type analysis.
QE1692	Impact hole or wood defect filled with resin. Multiple scratches in different directions. Shell marked in some areas but very smooth polish overall. Side two shell more visible striations - both sides elongated.		Museum id. Large white numbers, now mostly removed, leaving small traces - previous accession number. Parallel pencil lines across blade. Cross section at proximal, for wood type analysis.
QE1693	Long scratches across the grain at proximal.	Remnant resin at proximal confirms previous shell attachment.	Museum id. Cross section at proximal, for wood type analysis. Faded white writing on wood.

APPENDIX C: CULTURALLY MODIFIED TREE DATA

Tree Identifier	Landform Element	Vegetation Type	Vegetation Cover	Notes	Species	Girth (mm)	Tree Height (m)	Condition	Bark removal scars (N)	Identifier	Scar Type	Scar Height Above Ground (mm)	Scar Length (mm)	Scar Width (mm)	Woomera blade removal length (mm)	Woomera blade removal width (mm)	Axe marks length (mm)	Axe marks width (mm)
TR2000	Rise slope	Woody plants and trees	Mid-dense	Close to creek bank	Cooktown ironwood	1370	>10m	Alive, good condition	1	TR2000-SC2000	Woomera	770	980	128			105	
TR2001	Hill slope	Trees	Mid-dense	Open woodlands	Cooktown ironwood	830	>10m	Dead, fallen	2	TR2001-SC2001	Woomera	550	750	500			120	99
																	109	86
																	87	82
										TR2001-SC2002	Bark removal	1360	560	150				
TR2002	Hill and rise elements	Woody plants and trees	Mid-dense	Open woodlands	Cooktown ironwood	1650	>10m	Dead, fallen	1	TR2002-SC2004	Woomera	420	1000	160	700		124	109
																	145	45
TR2003	Hill and rise elements	Woody plants and trees	Mid-dense	Open woodlands	Cooktown ironwood	1101	>10m	Alive, good condition	1	TR2003-SC2005	Woomera	300	1500	310			120	48
TR2004	Hill and rise elements	Trees	Mid-dense	Open woodlands	Cooktown ironwood	1170	>10m	Alive, good condition	1	TR2004-SC2006	Woomera	240	1330	310	680	190	158	97
																	118	38
															780	200	123	105
																	80	37
TR1001	Hill and rise elements	Woody plants and trees	Mid-dense	Sloping creek bank.	Cooktown ironwood	1800	>10m	Alive, poor condition	2	TR1001-SC1000	Woomera	510	1320	490	500			
															520			
															660			
										TR1001-SC1001	Woomera	620	1620	260	620		154	57
															580		110	72
																	118	55