



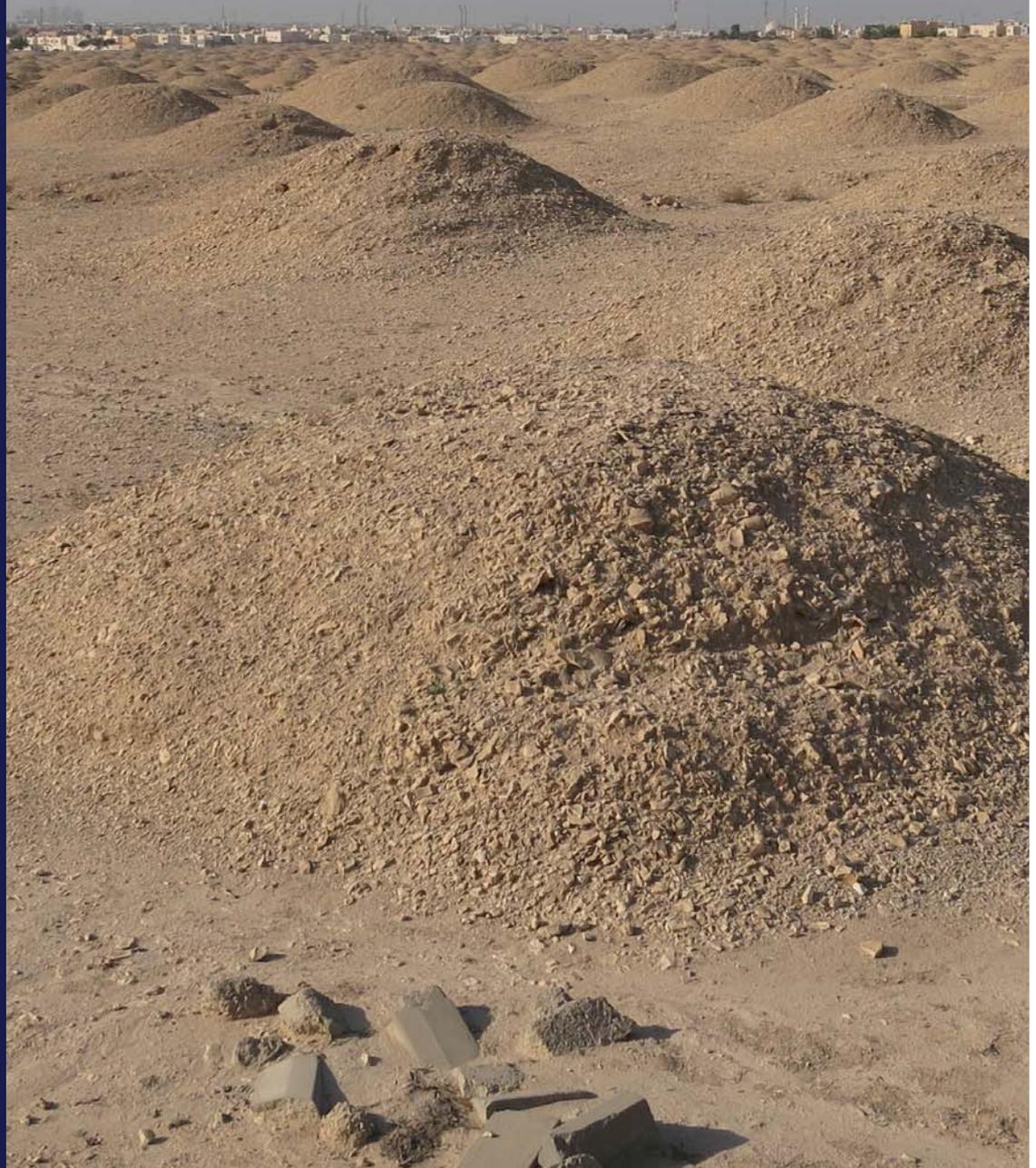
DigIt

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DigIt

Editorial

What an exciting and transformative 6 months for *Dig It!* Our Journal simultaneously became peer-reviewed, international, and larger – including more pages and including more people into the editorial process.

It has been an ever rewarding experience, and I look forward to holding in my hands the printed Journal with 7 research papers from authors in 5 countries; 2 field reports; 2 conference and website reviews; 1 interview with a veteran of archaeology; and a friendly 'hello' from a fellow archaeology student journal from Buffalo, US.

I would like to extend the warmest 'thank you' to my three congenial fellow editors Jordan Ralph, Antoinette Hennessey and Matthew Ebbs for their drive, motivation, ingenious ideas and hard work. To the authors for trusting us with their papers and spending days and nights improving them. To the permanent review panel consisting of Rhiannon Agutter, Amy Batchelor, Robert DeWet-Jones, Anna Foroozani, Simon Munt, Dianne Riley, Zoe Robinson, Fiona Shanahan, Rhiannon Stammers, Isabel Wheeler for their gentle language editing. To the anonymous reviewers for their insightful feedback. To ArchSoc for their financial, organisational and emotional support.

Dig It intends to provide opportunities for professional development to young researchers who wish to familiarise themselves with the different roles in the publishing process, from writing over editing and layouting through to reviewing. As it turns out, the greatest learning experience was probably had by us editors, after all – and we would like to thank everybody else involved in the Journal for allowing us to transform an idea sketched in December 2013, through trial and error and hard work, into something to be proud of. With the mouse still dizzy from the final layouting work, we are looking forward to the next challenge that will be *Dig It* Volume 2, Issue 2.

Jana Rogasch

Editor, *Dig It*: The Journal of the Flinders Archaeological Society
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President's Address

I would firstly like to say welcome to our new and continuing members for 2014. We look forward to delivering an outstanding service of both professional development and social networking to our Society's members. I would like to thank the 2013 committee for their efforts in providing a great network for both students and professionals. ArchSoc continues to be the largest and most active student archaeological society in Australia, a feat that has been recognised by other institutions around the country.

A number of ArchSoc and Departmental events have kept our Society busy throughout the start of the year. These events include the Digger's Shield cricket match against the Paleontology Society, the National Archaeology Student Conference (NASC) hosted at Flinders University, the Ruth and Vincent Megaw Annual Lecture in Archaeology and Art, presented by Professor Emeritus Brian Fagan, and recently, the maritime-themed annual pub crawl. We are hoping to run a field exercise later in the year, details to be advised. ArchSoc activities are displayed on the notice board outside HUMN 112 and details are sent out via our mailing list <archsoc@flinders.edu.au> so keep an eye out for future events.

As some of our returning members may notice, *Dig It* has now become a peer-reviewed journal. As our membership has grown this year, we are also gaining a number of international readers and contributors. The editorial team welcomes your contributions for future issues of *Dig It*. I would encourage our members to publish here where many of your fellow peers can read up on what other members are conducting research on.

Now in our 22nd year of existence, the Flinders Archaeological Society will continue to flourish, bringing out the best in our members for the industry of tomorrow. Get involved when you can! We are always looking for volunteers to lend a hand, generate new ideas, help run social events and professional development opportunities, or simply come along and show some support. I hope to see all of you around some time on campus or at one of our many events. Don't forget to follow us on Twitter (@FlindersArchSoc), like our Facebook page, and follow our blog (<http://flindersarchsoc.org>).

Bradley Guadagnin

President, Flinders Archaeological Society 2014

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Adelaide city at dusk. Photograph: Andrew Wilkinson, 2014

Inert, Inanimate, Invaluable:

How stone artefact analyses have informed of Australia's past

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Abstract

This paper analyses the contribution of stone artefact studies, or 'lithic analyses,' to understandings about the Indigenous occupation of Australia. It explores their significance in informing about both the timing of initial colonisation and the nature of the subsequent spread of settlement. Lithic analyses are discussed as having been central in providing evidence for spatial and temporal occupation of regions around the country. A case study from the mid-Holocene is examined for its value in demonstrating a manner of response by Indigenous people to changing environmental conditions. Stone artefact studies are seen to inform valuably about past Indigenous lifestyles and an example from north Queensland outlines much about the nature of trade and exchange between groups. Specific approaches to the study of stone artefacts are examined, such as use-wear and residue analyses and a more anthropological perspective known as the chaîne opératoire.

Introduction

Stone artefact studies have provided a vast amount of invaluable information about an extensive variety of aspects of the Indigenous occupation of Australia. This paper examines seven key contributions. Firstly, these studies have valuably informed the central and continuing debate about the initial colonisation of Australia. Secondly, they have helped to demonstrate a vast range of temporal and spatial occupation of Indigenous groups, assisting understandings of related issues such as concerning the nature and spread of Indigenous occupation. Thirdly, analyses of stone artefacts (or 'lithics') have contributed to understandings about Indigenous Australians' responses to changes in the environment and been central in correcting earlier notions of Indigenous culture as having been static. Fourthly, they have informed about aspects of Indigenous Australians' lifestyles such as methods of food procurement. Fifthly, analysis of fracture mechanics has helped archaeologists to develop increasingly sophisticated knowledge of and hypotheses regarding attributes of artefacts. Sixthly, lithic studies have provided understandings about the nature of movement, trade and exchange between Indigenous groups, a case study herein involving Queensland and southern areas. Seventhly, this paper discusses some approaches themselves that have been used in the study of lithics because these have been largely determinative of the value and type of information able to be yielded. In particular it focusses on 'use-wear' and residue analyses of stone tools, along with a framework known as the chaîne opératoire.

Initial colonisation of Australia

Malakunanja II

While not yet being able to provide unequivocal answers concerning the precise timing of the human colonisation of

Australia, stone artefact studies like those of the Northern Territory's (NT) Malakunanja II, have contributed valuable indications. Malakunanja II has been put forth as the likely oldest date in Australia, at 50,000 years before present (bp)–60,000 bp (Flood 2010:86, 91; Geneste et al. 2012:3; Roberts et al. 1990:153–156; Zazula 2000/2001:116,119). This was based primarily on dating the stone artefacts from the lowest level of the 260 cm deep trench and asserting the stratigraphic integrity along with support from thermoluminescence dating. Critics such as Roberts (1997:856), however, contend that these artefacts may have been subject to downward movement, thus discrediting their stratigraphic integrity, and a degree of imprecision also always exists (Bowdler 1996:38; Hiscock 2008:42–44) in thermoluminescence and other dating techniques which are subject to calibration resulting in potential deviations of several millennia. Malakunanja II has, however, a minimum antiquity of 45,000 bp, a date accepted by 'all archaeologists' (Hiscock 2008:44; supported by Flood 2010:91), so in any case has provided a solid update to earlier twentieth century notions such as of colonisation occurring at 35,000 bp to 40,000 bp (Zazula 2000/2001:113).

Nauwalabila

Stone artefacts from NT's Nauwalabila rockshelter also provide dates which may indicate the oldest Indigenous settlement in Australia. Support exists (Flood 2010:92) for the integrity of the stratigraphy in which the lowest artefacts were found and as such the Optically Stimulated Luminescence (OSL) dates of 55,000 bp–60,000 bp. While some vertical movement may have occurred with artefacts above (Hiscock 2008:42), the lowest level at Nauwalabila was thick rubble and bedrock (Hiscock 2008:42; O'Connell and Allen 2004:843), which may have been much harder for any downward moving artefacts to have penetrated. Dates from this rubble layer were, however, based on what some (eg. O'Connell and Allen 2004:843–846) regard as inconsistencies in the association between the artefacts, rubble and charcoal samples from it. Reluctance in accepting Nauwalabila's antiquity also exists due to the possibility of post-depositional termite activity leading to downward artefact movement (O'Connell and Allen 2004).

Temporal and spatial occupation

Despite dating difficulties, lithic studies have helped to demonstrate antiquities of occupation in regions across the continent, which has assisted in understandings of related issues. At Cuddie Springs in NSW stone artefacts were dated to around 36,000 bp (Field et al. 2008:101), which complemented studies of bones of megafaunal species to demonstrate at least several millennia of coexistence there. Combined with the lack of evidence for human hunting or butchery at the site over this period (Fillios et al. 2010:127), this helped to cast doubt on notions, in the intense debate, that humans hunted megafauna to extinction. The relatively quick spread of Indigenous occupation around Australia (Bowdler 1996:38) and that it occurred through inland regions in contrast to earlier coastal models (Bowdler 1977) has also been indicated by lithic analyses. At Devil's Lair



Figure 1: Map of Australia showing some locations mentioned in the text (created by author)

in the far south-west of Western Australia (WA), despite a small number of artefacts existing, occupation is indicated at 41,000 bp–46,000 bp (O'Connell and Allen 2004:840–841) and stone artefacts and sediment at Allen's Cave, in SA, provide a luminescence date reliably correspondent with the calibrated 14C date of approximately 40,000 bp (Roberts et al. 1996:7, 14–15). In NSW, Lake Mungo's stone artefacts and other archaeological evidence 'unambiguously demonstrated a human presence at least 43,000–45,000 years ago' (Hiscock 2008:43, supported by Zazula 2000/2001:114), even if pre 45,000 bp is uncertain (O'Connell and Allen 2004:843). Central Australia's Puritjarra rockshelter contained stone artefacts demonstrating first occupation, followed by periodical visitation, at approximately 35,000 bp and perhaps older (Smith et al. 1997:319).

Human-environment interaction: A mid-Holocene case study

After stone artefacts had not until the 1960s and 1970s been considered particularly useful for contributing to an understanding of the nature of Indigenous people's interactions with their environment (Holdaway and Stern 2004:294), studies such as Hiscock's (1994) proved highly valuable. His examination of stone artefacts used in the mid-Holocene period of relatively dramatic environmental change indicated that one of the main strategies of Indigenous people was to minimise risk by modifying their toolkit (Hiscock 1994:267–268, 283). As sea levels rose and the climate ameliorated (Mulvaney and Kamminga 1999:226) Indigenous people also managed risk by becoming more mobile and seeking previously unsettled and unknown regions (Hiscock 1994:267). Hiscock (1994:277) contended that as such they needed their tools to be more portable, reliable, multi-functional and longer lasting and that this took the form of a proliferation of bifacial points and backed blades (Fig. 2) with an emphasis on hafting. This received support from some subsequent finds and analyses, such as of backed blades from Mussel Shelter in NSW (Slack et al. 2004:135). Hiscock argued that the subsequent reduction in Indigenous people's production of these tools in the late Holocene supported his contention in that it was a reflection of Indigenous people's adaptation to the new environmental conditions and resultant lessening of risk (Hiscock 1994:281), aided by the climate stabilising (White 2011:69).

Criticisms of such conclusions as Hiscock's have also contributed



Figure 2: An example of how an invasively backed blade may appear (created by author)

greatly to our understanding of the Indigenous occupation of Australia by testing the veracity of arguments made. White (2011:67) cast doubt on the precision of the timing of the proliferation of backed blades and whether they were in fact more economical than the previous form of multifunctional tool, unretouched flakes (White 2011:68). This is a strong consideration, particularly given that a number of factors affect extents of reliability, such as availability and quality of raw materials in different regions. Blades, for example, were more effectively made from stone of greater quality but that was less abundant in Australia than quartz (Hallam 1985:228), whose flaking value, particularly in the form of effective conchoidal fracturing, is generally poor (Dickson 1977:97). More specific archaeological evidence inclusive of such considerations than that provided by Hiscock is needed to demonstrate that backed artefacts were more reliable than unretouched flakes. White also questions the legitimacy of the assumption that the mid-Holocene climate changes represented increased risk, noting that the opposite has at times been the case (White 2011:68). He produces, however, no supporting archaeological evidence for the Australian situation.

Lifestyles

Lithic analyses have informed about fundamental aspects of Indigenous Australians' lifestyles over time. Before around the 1930s very little (McCarthy 1976:94) was known about the way Indigenous Australians had lived. Dogmatic notions of a largely primitive and static culture prevailed until recent decades, when studies revealed many changes in uses of stone tools over time (Hiscock and Veth 1991). Colley (2002), for one, highlighted how Bondi points and pirri points were used at different times depending on environmental and economic circumstances. Recent studies have informed how stone artefacts were 'intimately linked' to Indigenous people's survival (Hiscock and Mitchell 1993:5). They demonstrate, for example, that raw materials were selectively sourced to make stone tools for different purposes (Dickson 1981:15–17; Fullagar 1994:67), that tools like spears and spear throwers were used for hunting and adzes, tulas and scrapers were generally for woodworking (Holdaway and Stern 2004:230; McCarthy 1976:32). Axes ground to a sharp edge (Dickson 1981:39) were used for chopping and butchering. Grindstone technology was implemented for sharpening axes (Dickson 1981:43) and spears (Hiscock and Mitchell 1993:31) and for processing material such as seeds (Fullagar 1994:65), to extract their carbohydrate value, and ochre, for pigment production (Dickson 1981:39). Experimental studies such as

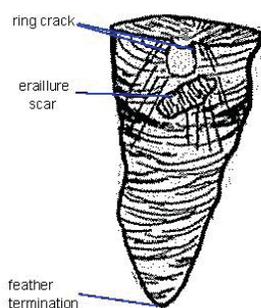


Figure 3: A 'typical' (if there is such a thing) flake showing some characteristics mentioned in the text (created by author)

Dickson's (1981:39) over fifteen years even demonstrated the typical dimensions of grooves in rock that resulted from uses such as axe grinding and ochre processing.

Understanding of production techniques

Resulting from a range of lithic studies, archaeologists' increasing knowledge of techniques used by Indigenous Australians in stone tool production has led to greater accuracy in artefact identification and interpretation. McCarthy (1976) developed one of the first classification schemes, establishing an effective foundation of common terminology and understandings. Seminal studies such as that by Cotterell and Kamminga (1987) contributed greatly to archaeologists' understandings of fracture mechanics and general flake formation. This provided further fundamental knowledge of how Indigenous people flaked raw material and of resultant characteristics such as ring cracks, errillure scars and various termination types (Fig. 3). Earlier misinterpretations have been corrected, such as that errillure scars, a product of conchoidal fracture, were 'thumb grips' (Hiscock 1998:260–261).

Trade: A north Queensland case study

Pioneering ethnographic work by Roth (1897), supported by several subsequent researchers of north Queensland (Qld) Indigenous people, revealed much about the existence and nature of trade and exchange from there with people further south. Knives, spears and axes were among items traded along networks stretching hundreds of kilometres south to New South Wales (NSW) and South Australia's (SA) Lake Eyre basin, with McBryde (1987:252–273) and McCarthy (1977:253) finding evidence of an axe trade from north Qld to Lake Eyre. Hiscock (2005:287) and Tibbett (2006:30) also both concluded that axes in north Qld were produced for the purposes of trade. The existence of a large number of axe grinding groove sites in the region (there are currently 220 known sites in all of Qld; DATSIMA 2013), containing thousands of axe grinding grooves, further attests to the significance of north Qld for the manufacture of edge ground axes. These axes themselves often being found significant distances from their raw material sources (Dickson 1981:15–17) supports notions of trade. At Rocks Crossing in north Qld 423 axe grinding grooves were found but no edge ground axes (Wallis 2004). McCarthy (1977:253–254) found evidence of detailed trade networks of grindstones themselves, throughout vast distances across regions in Qld, NSW, SA and Victoria. Such trade was not always solely for economic reasons but also for ceremonial exchange, indicating a broad 'diffusion of

ideas' (Mulvaney 1975:110).

Approaches to analysis

Use-wear and residue studies

Various methods of stone artefact analysis have provided significant insights into Indigenous people's lives. 'Use-wear' and residue analyses (Fullagar 1994:66–67), where the working edges of stone artefacts are microscopically examined for traces of plant or animal material (eg Lombard and Wadley 2007; Fullagar 1994:66–67), have been effective in informing about functions of artefacts across the continent (Dickson 1981:180; Holdaway and Stern 2004:221). Field and Fullagar (1997:300–302), for example, analysed grindstones from Cuddie Springs to demonstrate antiquity of a seed-grinding economy there of around 30,000 bp. Such results have then been used to support theories such as that seed grinding was, in certain regions, a response to climatic changes (Field and Fullagar 1997:302). Slack et al. (2004:132) found, from north-western Qld, one particular artefact having residue of 'dark smears and small starch granules' that indicated possible hafting. Use-wear and residue examination can also assist in the accurate identification of artefacts, such as in distinguishing between cores and core tools, which is particularly challenging with small stone artefacts (Fullagar 1994:66). Experimental studies of stone heat treatment have also revealed characteristics of the use of heat, such as an 'increased, greasy lustre on flaked surfaces' (Domanski and Webb 1992:612), which archaeologists have subsequently used to determine that Indigenous people at times pre-heated stone in order to improve its flaking abilities, such as at Burrill Lake (Hiscock 2008:121). 'Refitting studies' have also helped to understand the stone tool reduction process by attempting to reconstruct it through rejoining flakes and flaking debris to a biface or core (Laughlin and Kelly 2010).

The chaîne opératoire approach

Cultural practices have also been revealed by lithic analysis using the chaîne opératoire approach. Although caution is needed (Andrefsky 2009:68), perhaps best in the form of corroborating evidence from specialist disciplines, this also has potential for indicating levels of human cognition (Moore 2011:702). The framework seeks to inform about cultural influences and circumstances acting on the decisions made by the maker of an artefact at each step of production (Close 1978:223; Dobres 2010:106; Holdaway and Douglass 2012:127). McBryde (1987:252–273; also in Torrence 2005:357) demonstrated that Indigenous people transported stone artefacts over long distances for symbolic and ceremonial purposes and Mulvaney (1985:211) noted similar evidence. This provided valuable understandings of the importance of symbolism and ceremony in the social systems of Indigenous Australians and that this, not solely function, was often reflected in their artefacts. This evidence of symbolic behaviour in turn supports generally accepted views that such cognitive ability was a continuation of that which had already existed in anatomically modern humans at the time of their exodus from Africa some 65,000 to 85,000 years ago. Although a range of methods is most effective (Gould et al. 1971:167), had McBryde, even though she was not specifically adopting the entirety of the chaîne opératoire approach, solely studied the artefacts' functions or attributes she may have misunderstood the 'more anthropological context' (Tolstevn 2011:363).

Conclusion

Stone artefact studies have not been able to answer every question about the Indigenous occupation of Australia. They have, however, provided a number of highly informed, evidence based conclusions and indications about a range of important issues. Well accepted dates from inland and southern sites have demonstrated both a relatively rapid spread of colonisation of Australia and that this occurred not exclusively in coastal regions. Despite a lack of universal agreement, sites such as Malakunanja II and Nauwalabila provide some evidence for the arrival of Indigenous people in Australia at pre 45,000 bp and perhaps between 50,000 bp and 60,000 bp. This supports arguments for the timing of the original exodus of anatomically modern humans from Africa and their subsequent speed and pattern of dispersal. Such dates have also been critical for debates such as that concerning the role played by Indigenous people in the extinction of the megafauna. Use-wear and residue analyses have helped to demonstrate important aspects of Indigenous people's lives, such as the manner in which they procured food. Experimental studies have demonstrated that at times Indigenous people pre-heated cores in order to improve their flaking quality. Lithic studies have demonstrated trade networks stretching over vast distances, provided insights into the ways that Indigenous people may have responded to environmental changes and helped to dispel early notions of Indigenous culture as having been static. The chaîne opératoire approach has helped to focus on anthropological reasons for an artefact being made in a certain way. Many methods can be employed to learn about the past but the contribution of stone artefact studies has been particularly valuable for helping to understand the nature of the Indigenous occupation of Australia.

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Dig It is a student-run journal and the official newsletter of the Flinders Archaeological Society. The publication began in 1997 and after a hiatus of at least five years, it was relaunched in 2012. The new series began in 2013. The purpose of *Dig It* is to provide students, from undergrad through to postgrad and recent graduates, with the opportunity to practise and familiarise themselves with writing, publishing, editing and the reviewing process involved in professional publications. It aims to offer emerging young academics with an avenue to engage with archaeological dialogues and discourse. In addition, it aims to keep aspiring archaeologists connected and informed about what is happening in the archaeological community.

Dig It is published twice a year and is printed at Flinders Press. *Dig It* considers a range of contributions, including research articles, essays, personal accounts/opinion pieces, book reviews and thesis abstracts for publication. We welcome contributions from local, interstate and international undergrad and postgrad students and recent graduates.

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