

# Time to Quarry: The Archaeology of Stone Procurement in Northwestern New South Wales, Australia

Trudy Doelman

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In this volume, Doelman examines the “role” of different stone resources in the organization of technology in northwestern New South Wales, Australia. Through the detailed study of two quarries and three lithic scatters, Doelman identifies the factors that contributed to the formation, composition, and distribution of these assemblages in order to explore the larger, complex interactions between people and their environment. The goal of this research was to “identify the factors that influenced the formation and composition of a quarry assemblage by contrasting how the types of reduction strategies implemented, the landscape features, and time processes influenced the discard of artefacts” (p. 3), which Doelman successfully accomplishes. This volume is derived from Doelman’s Ph.D. research (Doelman 2002), and portions of this study have been published elsewhere (Doelman 2005a, 2005b; Doelman et al. 2001).

This volume contains ten chapters. Chapter One provides a brief introduction to the study and overview of the volume. Chapter Two communicates the theoretical framework focusing on the formation of assemblages, the study of stone artifact analysis (technological organization), and non-site approaches to the analysis and interpretation of artifact distributions. Doelman also presents an overview of quarry studies, emphasizing the role of quarried and non-quarried stone sources in the organization of lithic technology. The literature review is comprehensive, and adequately supports the theoretical framework that is constructed. Doelman addresses the limitations and criticism of the study of technological organization but is able to justify its use. She constructs a solid theoretical basis which supports an overall solid research design.

Chapter Three describes the landscape context of the study area—the Stud Creek catchment within Sturt National Park in western New South Wales, Australia. Doelman details the broad environmental features, available lithic resources including quarried outcrops and gibber pavement, archaeological chronology, and previous archaeological research of the area. Importantly, it is here that Doelman provides her working definition of a quarry, “any outcrop with evidence of extraction and core reduction,” which she contrasts with the use of non-quarried stone sources such as cobbles obtained from the gibber pavement or creek beds (p. 27). This concept of a quarry is later reevaluated in chapter Nine to assess its viability

within a non-site distributional approach. Doelman also defines the landscape sampling units which were used, a critical part of her method which is explained more extensively in Chapter Four.

In Chapter Four, Doelman presents the field methodology and analytical framework for this study. Her methodological approach is multifaceted but straightforward, detailed, and specific. Field survey was undertaken at quarry locations and within the landscape sampling units. GPS was used to create a fixed survey grid allowing individual artifacts to function as the smallest scale of recording. These data were then used along with geomorphological mapping within a GIS system in order to determine if spatial patterning in artifact distribution was present and, if so, how taphonomic processes may have influenced artifact visibility and distribution. Doelman endeavors to examine the character and position of each individual artifact within the quarries and the landscape sampling units so she can characterize and compare the quarries and landscape sampling units at the assemblage level. This is successfully done and importantly overcomes a number of issues related to dealing with the large numbers of artifacts at quarries without creating a sampling bias in the results.

In Chapters Five through Nine, the analytical framework constructed in Chapter Four is used to organize and analyze the data. Chapters Five and Six provide the artifact and spatial analyses, respectively, of Quarry 27. Quarry 27 was selected for analysis as it is a highly visible feature on the landscape and contains high quantities of a high quality silcrete. Doelman found that, in terms of organization of technology, a limited amount of core reduction occurred at the quarry, implying minimal labor and time investment and, further, that stone procurement was likely opportunistic. Although core reduction was limited, a number of spatial patterns in the distribution of artifacts were found and were attributed to the stages of core reduction. Doelman hypothesizes that the strength of the discard patterns may be related to the time spent at the quarry and invested in core reduction, as well as the frequency and duration of visits to the quarry, with increased discard seen with the greater time spent. This hypothesis was tested in the examination of Quarry 35, the subject of Chapter Seven. Quarry 35 was selected for comparison as it is considerably larger in both size and density than Quarry 27. Owing to the high density of artifacts, a targeted sampling method was ap-

plied, focused on the distribution of cores. Doelman found that Quarry 35 exhibits a complex pattern of core reduction which indicates the organization of both stone and space. However, overprinting of many different knapping events appears to have reduced the usefulness of Quarry 35 in assessing the validity of Doelman's time-discard hypothesis.

In Chapter Eight, Doelman analyzes the three types of stone resources present in the Stud Creek Catchment, concentrating on the stone obtained from the gibber pavement (a desert pavement characterized by extensive surface scatter of pebbles or "gibbers") and quarried outcrops that was subsequently discarded in the three landscape sampling units. This chapter highlights how raw material and source attributes, such as quality, availability, size, and form, significantly influence not just how stone tools are manufactured, used, transported, and discarded, but also the time invested in their procurement. This in turn determines the assemblage composition at each location. It is in this chapter that Doelman is able to refine her time-discard hypothesis and elaborate on it to include other elements which influence tool production and raw material use.

Doelman reexamines the differences between the two quarries in Chapter Nine in order to reevaluate and redefine quarries and to contrast this definition with how the gibber sources were used in each of the landscape sampling units. She does this to determine the factors which influence the spatial distribution and character of the artifacts and the formation and composition of the quarry assemblages. This is accomplished through looking at the reduction strategies employed, the spatial distribution of artifacts, and the time invested in reducing stone, thus elucidating the role the different raw material sources played in the organization of technology. Chapter Ten summarizes Doelman's study and presents the broader implications of this study. Doelman concludes by recapitulating the pivotal point quarries represent in the landscape.

Doelman's work demonstrates first, the importance of a solid analytical framework where attributes are clearly defined and, second, the importance of detailed spatial analyses that will allow one to highlight variability in the distribution of artifacts in terms of the location of different reduction activities. Overall, this volume represents a valuable contribution to the study of quarries specifically regarding its methodological and theoretical framework. The chapters are well illustrated with ample figures, tables, and graphs, although higher quality photographs would be preferable. The only major issue is the large number of typos, sentence fragments, repeated sentences, and inconsistencies in font size and shape throughout the volume. More diligent editing would have increased the overall readability and clarity, and serve to better represent a well constructed and executed body of research. Despite this minor criticism, it is hoped that this important work by Doelman will continue to stimulate thought and research on quarries.

#### REFERENCES

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