

Executive Summary of the Thesis

**Palaeolithic Archaeology of the Berach Basin and Its
Adjoining Aravalli Regions, Southeastern
Rajasthan**

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Researcher
Swati Verma

Guiding Teacher
Dr. Vrushab Mahesh



DEPARTMENT OF ARCHAEOLOGY & ANCIENT HISTORY

FACULTY OF ARTS

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Executive Summary

The thesis entitled “Palaeolithic Archaeology of the Berach Basin and its adjoining Aravalli Regions, Southeastern Rajasthan” focused on reconstructing the Palaeolithic cultural sequence of Berach basin using multidisciplinary methods. By reconstructing a regional cultural sequence, this study contributes to wider debates on how South Asian Palaeolithic evidence can be integrated into models of hominin dispersal and technological change. South Asia served as a connective corridor for population movements and technological transmission between Africa and Eastern Asia and remains central to discussions on hominin dispersal. However, despite its strategic location, situating the South Asian Palaeolithic record remains methodologically challenging to integrate into broader dispersal narratives. This is largely due to the lack of chronometric dates generated, and hominin fossils recovered. Further, the Palaeolithic assemblages in South Asia mostly occur as surface scatters or are found in colluvial deposits that are exposed due to post-depositional disturbances. Consequently, contextual integrity and chronological control are often limited. Under these conditions, lithic assemblages constitute the primary empirical basis for constructing cultural frameworks and evaluating technological organisation, mobility, and landscape use, provided they are analysed through context-sensitive, high-resolution approaches that explicitly address formation processes.

This thesis develops such a framework for the Berach Basin and adjoining Aravalli regions of Southeastern Rajasthan, a landscape where Palaeolithic occurrences have been reported since the mid-twentieth century, but have not previously been subjected to sustained, methodologically standardised analysis capable of linking artefact variability to geomorphic context and behavioural processes. Drawing on extensive field surveys conducted between 2021 and 2024, the study documents 62 newly identified Palaeolithic occurrences and integrates them with previously reported localities to produce an expanded regional dataset for technological and spatial assessment. Analytical procedures combine systematic site documentation, geomorphic and sedimentary characterisation, and detailed typo-technological and attribute-based lithic analysis informed by reduction-sequence (*chaîne opératoire*) reasoning. These approaches are organised through three interlinked objectives: (1) reconstructing technological organisation (blank production, core reduction, tool manufacture, and patterns of maintenance and discard); (2) evaluating spatial organisation by documenting

artefact distributions within and between localities and assessing behavioural structuring versus post-depositional reworking; and (3) situating assemblages within their geological and geomorphological settings to clarify the processes of site formation and colluvial records.

The study demonstrates that the variability within the Palaeolithic record across the Berach Basin is spatially structured rather than randomly distributed. Sites form three geospatial clusters - Eastern, Western, and Southern; and align with distinct geological contexts and associated raw-material, providing a basis for evaluating technology against differences in resource availability and landform setting. In broad terms, the Eastern Cluster is strongly associated with quartzite-rich raw-material and is dominated by large-flake systems and cleaver-rich bifacial assemblages consistent with Acheulean technological emphasis. In contrast, the Western Cluster is characterised by greater reliance on fine-grained raw material and reveals prepared core technology, indicating an increased emphasis on planned blank production and flake-based toolkits typical of Middle Palaeolithic organisation. The Southern Cluster exhibits a mixed configuration in which bifacial components occur alongside prepared-core reduction, and is interpreted as reflecting transitional technological structuring at the landscape scale.

Overall, the thesis argues that technological reorganisation in the Berach Basin is best understood as gradual and spatially differentiated, and is consistent with a likely time-transgressive transition from Acheulean large-flake traditions toward prepared-core Middle Palaeolithic strategies. This inference is grounded in cluster-wise technological patterning, reduction strategies, and geomorphic context, while recognising that independent chronometric control remains a priority for refinement. By integrating lithic technological analysis with landscape and formation-process evidence, the study provides the first comprehensive intra-regional framework for interpreting cleaver-rich Acheulean variability and the emergence of prepared-core strategies in this part of Northwestern South Asia, strengthening the empirical basis for situating regional lithic variability within wider debates on dispersal and adaptation, and establishing a baseline for future targeted stratified sampling and chronometric dating to refine regional chronological resolution.

The thesis is structured into six chapters, each addressing a specific dimension of the research while collectively contributing to a coherent understanding of the Palaeolithic archaeology of the Berach Basin and its adjoining Aravalli regions.

Chapter1: Introduction

This chapter presents the research aims, significance, and theoretical framework of the study. It provides a brief review of previous scholarship on situating Palaeolithic archaeology of South Asia within the global context, highlighting key findings and identifying significant gaps. It frames the rationale for the current investigation within the broader scholarly debates on technological evolution, behavioural variability, and early hominin adaptations in South Asia.

Chapter 2: Physiographic and Geological Setting

This chapter provides an overview of the Berach Basin and discusses its physiographic and geological setting. It outlines the basin's location and spatial extent, summarises major landforms and relief, and presents a broad account of the regional geological succession using maps and relevant geological data. The chapter also introduces the drainage system and briefly reviews earlier archaeological research in the area, highlighting key findings and gaps addressed by this study.

Chapter 3: Survey Methods and Analytical Procedures

This chapter elaborates on the survey methods employed for relocating previously reported sites and identifying new Palaeolithic occurrences. It explains the artefact collection techniques, with particular emphasis on random surface collection and stratigraphic observations. Detailed protocols for artefact classification, including typo-technological and morphometric analyses, are discussed.

Chapter 4: Spatial Distribution and Lithic Technology

In this chapter, a thorough analysis of lithic assemblages is presented. The chapter describes artefact distribution patterns, raw material utilisation, blank types, and surface conditions. It provides an in-depth typo-technological and morphometric characterisation of major tool categories, including cleavers, cores, flakes, and handaxes. Quantitative data are supported by statistical summaries, charts, and tables, allowing detailed assessment of spatial and technological variability as well as insights into site formation and artefact preservation.

Chapter 5: Technological and Behavioural Interpretations

Building on the results, this chapter interprets the findings in relation to broader regional and inter-regional lithic technological trends and behavioural frameworks. It critically examines tool types and reduction strategies, patterns of raw material economy, and technological

approaches. The chapter explores behavioural implications, situating the Berach Basin assemblages within the broader Palaeolithic sequences of South Asia, contributing to the ongoing debates on technological transitions and cultural evolution.

Chapter 6: Conclusion

The concluding chapter synthesises the key findings of the research and discusses their implications for understanding Palaeolithic adaptation, technological development, and settlement patterns in the Berach Basin. It reflects on the contributions and limitations of the study and proposes avenues for future research to further explain the Palaeolithic archaeological record of the region.

Key Findings

This research expands the empirical foundation for understanding the Palaeolithic archaeology of the Berach Basin and adjoining Aravalli regions through extensive field survey and high-resolution lithic analysis. Surveys conducted during 2021 to 2024 documented 62 newly identified Palaeolithic occurrences and reinvestigated previously reported localities. This study established a larger regional dataset suitable for evaluating technological and spatial variability at the basin scale. A key outcome of this dataset is the demonstration that archaeological variability in the basin is spatially structured rather than randomly distributed, with sites forming three clusters that align with distinct geological contexts and raw material availability, providing a coherent framework for interpreting lithic technology in relation to landscape setting. The spatial organisation further indicates differentiated landscape use, with the Eastern Cluster reflecting intensive and repeated reduction and tool production activity, while the Western and Southern clusters represent more dispersed expressions of exposure and technological emphasis. Technologically, the thesis establishes the Berach Basin as a distinctive expression of Acheulean organisation in which large flake production, cleaver manufacture, and hierarchical core management operate as an integrated system, while also showing that technological strategies vary systematically between clusters in relation to raw material packages and geomorphic context. The most diagnostic finding concerns cleaver dominance, with cleavers forming 12.8 percent of the assemblage and substantially outnumbering handaxes, including localities where cleavers occur without associated handaxes, a pattern that is unusual within the broader South Asian Acheulean record. At the same time, quantitative analysis demonstrates that cleavers remain highly standardised across the basin, with no statistically significant inter cluster differences in key shape indices,

indicating a shared volumetric concept and conservative end product norms despite variability in reduction intensity and site structure. Finally, the Berach sequence supports an interpretation of the Acheulean to Middle Palaeolithic shift as gradual and spatially differentiated, consistent with models in which prepared core strategies emerge through internal reorganisation of long-established large flake systems rather than abrupt replacement, and it provides a robust comparative anchor that situates South Asian cleaver rich variability within a wider Old World large flake tradition.

Recommendations/Suggestions

The present thesis reconstructs the Palaeolithic cultural sequence of the Berach Basin and adjoining Aravalli regions by shifting attention from earlier, largely riverbank and riverbed centred observations toward a wider landscape-based documentation of lithic variability across geomorphic settings and raw material zones. Field investigations conducted between 2021 and 2024 resulted in the identification of 62 site occurrences, with artefacts collected from 58 localities. However, the study also acknowledges that recovery and comparability across localities were uneven because dense vegetation, limited ground visibility, and restricted exposures often prevented the application of uniform sampling protocols such as systematic transects or grid-based collection throughout the basin. Under these field conditions, artefact recovery relied primarily on pragmatic surface collection, particularly in areas where mining, quarrying, and road cutting are simultaneously destroying deposits and creating fresh sections that provide brief opportunities to document semi stratified contexts. As a consequence, the interpretive framework remains constrained by the broader characteristics of the South Asian record in which many assemblages occur as surface scatters or in disturbed colluvial contexts, and where post depositional processes such as sheet erosion and slope wash can modify artefact distributions. The absence of independent chronometric dates further limits chronological resolution and increases reliance on relative cultural attribution grounded in technological criteria, assemblage structure, and inter regional comparison.

In light of these constraints, future research should prioritise controlled excavations with microstratigraphic recording at carefully selected semi primary localities within each cluster to improve contextual integrity and to test assemblage coherence beyond surface patterning. Such excavations need to be paired with a strengthened chronological dataset, including OSL where suitable and additional chronometric approaches, supported by detailed sedimentological and geoarchaeological analyses to clarify site formation processes. At the same time, high

resolution spatial recording, refitting oriented sampling, and systematic raw material characterisation through petrography and geochemistry would reduce uncertainty arising from time averaging and help distinguish behavioural variability from depositional and post depositional effects. Finally, palaeoenvironmental reconstruction based on artefact associated sediments and securely contextualised deposits is essential for evaluating how landscape change and raw material structure shaped technological organisation and mobility, while a parallel programme of documentation, monitoring, and mitigation is urgently required because ongoing quarrying and associated land use change continue to threaten the preservation of key localities.

Overall, this thesis provides the first integrated basin scale framework for interpreting the Palaeolithic record of the Berach Basin by linking lithic technology, spatial patterning, and geomorphic context within a single analytical structure. It demonstrates that cleaver rich Acheulean variability and the emergence of prepared core strategies in southeastern Rajasthan are best understood through gradual, spatially differentiated reorganisation rather than abrupt cultural replacement. While the current synthesis necessarily relies on relative chronological inference because independent dating is limited, it establishes a robust empirical baseline and a clearly defined set of priorities for future work. In doing so, the study strengthens the comparative value of the Berach Basin for regional and inter regional discussions of technological change, landscape use, and the position of South Asia within broader narratives of hominin dispersal and adaptation.

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