From Earth to Enlightenment
Materiality, Technology and Cultural Transmission of Terracruda Sculpture Across Buddhist Asia
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Introduction

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1 Tracking the Practice of Terracruda Sculpture Across Buddhist Asia

Across Buddhist Asia, from the beginning of the Common Era onwards, clay-rich earth has been transformed into images of Buddhas, bodhisattvas, protective deities, and other sacred figures through sophisticated artistic and technological processes encompassing spatial and architectural planning, structural construction, modelling, surface finishing, and polychromy. This sculptural tradition, referred to here as 'terracruda sculpture', was widely employed during periods of Buddhist patronage to create enduring sacred images, extending from the monasteries of Central Asia and northwestern South Asia to the cave temples of China, the religious complexes of the Himalayan region and the Tibetan Plateau, and the temples of Japan and Korea. Despite its distinctive material characteristics, extensive geographical distribution, and historical significance, this image-making practice has received comparatively limited attention as a coherent field of study. Frequently examined within the frameworks of regional art histories, individual archaeological sites, or the conservation challenges of particular monuments, its technological, cultural, and conceptual commonalities and connections across the wider Buddhist world have barely been considered.

From Earth to Enlightenment seeks to address this gap by bringing together archaeological, art-historical, scientific, textual, and ethnographic approaches to the study of terracruda sculpture within Buddhist image-making traditions. The central premise is that the use of clay-rich earth, shaped and left to harden

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through drying, should not be understood merely as an alternative to more durable sculptural media, such as stone, metal, or terracotta, but rather as a deliberate material and technological choice supported by specialised knowledge. By examining the materials, technical processes, and cultural contexts involved in the creation of terracruda sculpture, the contributions gathered here explore its cultural significance, potential historical connections, technological transformations, and local adaptations within a shared sculptural tradition across different periods and geographical regions.

2 Naming and Understanding the Sculptural Tradition

The challenges of identifying and defining this sculptural tradition begin with terminology. Sculptures produced from clay-rich earthen materials, shaped and hardened without firing, have been variously described as 'clay', 'unfired clay', 'unbaked clay', 'raw clay', 'air-dried clay', 'terracruda', and 'painted clay', among other designations. This terminological diversity is reflected in the contributions to the present volume, whose authors employ different expressions according to their disciplinary approaches and the historical and geographical contexts of their studies.

The significance of this distinctive medium in Asian sculptural traditions has been recognised by scholars whose pioneering studies laid the foundations for its historical, artistic, and technological investigation. Among the earliest influential contributions is K.M. Varma's landmark work, *The Indian Technique of Clay Modelling* (1970), which provided an important framework for understanding the specialised technological knowledge underlying clay sculpture by exploring the relationship between archaeological record, Āgamic literature, and traditional image-making practices in Bengal. The connections between textual prescriptions, sculptural techniques, and living traditions were further explored by James D. Robinson in his doctoral thesis, *The Worship of Clay Images in Bengal* (1983), which examined the technological and religious dimensions of clay image-making in the region. Within the context of Buddhist art, other significant early contributions include Loden Sherab Dagyab's *Tibetan Religious Art* (1977), Giovanni Verardi's *Osservazioni sulla coroplastica di epoca kusana nel Nord-Ovest e in Afghanistan in relazione al materiale di Tapa Sardar* (1983), and Zemaryalai Tarzi's *La technique du modelage en argile en Asie Centrale et au Nord-Ouest de l'Inde sous les Kouchans: la continuité malgré les ruptures* (1986). Subsequent research, notably Christian Luczanits' *Buddhist Sculpture in Clay: Early Western Himalayan Art, Late 10th to Early 13th Centuries* (2004) and, more recently, Susan S. Bean's *Clay Works: Earthen Sculpture in South Asia* (2026), has further broadened historical, artistic, technological, and cultural perspectives on this form of sculptural production. Nevertheless, research in this field has remained fragmented across disciplinary and regional boundaries. The present volume builds upon these scholarly foundations by placing materials and technology at the centre of a cross-regional and diachronic discussion of Buddhist terracruda sculpture.

Rather than imposing a uniform terminology, the editors propose a term capable of highlighting the material characteristics, technological principles, and shared features that allow this sculptural tradition to be recognised and distinguished from other forms of image-making. The Italian

term 'terracruda', adopted as an overarching designation for this volume, emphasises both the principal material employed (*terra*, 'earth') and its raw condition (*cruda*, 'raw'), in deliberate contrast to the well-established Italian term 'terracotta' ('baked earth'). The term 'terracruda' encompasses sculptures produced from earthen mixtures, often incorporating plant materials, through additive modelling processes that may involve internal supporting structures, successive layers whose composition varies according to their function, from building up the sculptural volume to refining its final form, surface preparations, and polychromy. The term does not imply a uniform material composition or manufacturing procedure, nor is it intended to replace historically or regionally specific terminology.

Opening the volume, Yamane et al.'s contribution, *Earth in Buddhist Modelled Sculpture: Material Diversity and Multi-Material Practices from Northwestern Pakistan to Central Asia*, addresses these questions of material identification and classification. By examining the diversity of materials employed in Buddhist modelled sculpture across these regions, Yamane and colleagues highlight the distinction between clay-rich earthen mixtures that harden through drying and other materials, such as lime- or gypsum-based compounds, whose setting involves chemical reactions. The chapter also foregrounds modelling as a fundamental sculptural process, providing a broader technological framework for understanding the terracruda tradition and its continuity and transformation across diverse geographical and historical periods.

3 Shaping the Sacred Body: Material, Technique, and Meaning

Among the most significant properties of clay-rich earth as a sculptural medium is its plasticity. Unlike subtractive carving, modelling permits the gradual addition, removal, and reshaping of material. Internal supporting structures made of stone, wood, or brick, often combined with reeds, ropes, or other materials, can support successive applications of earth-based mixtures, allowing artists to construct figures of considerable scale and complexity. These processes often require prolonged drying periods between stages and involve a sequence of modelling layers, beginning with those that establish the overall sculptural volume, followed by layers that define the torso, limbs, and garments, and culminating in finer finishing layers that enable the detailed rendering of facial expressions, anatomical features, drapery, and other surface details. The resulting sculptures are frequently composite constructions whose material organisation reflects a sequence of specialised technical operations requiring considerable time, skill, and planning.

An especially revealing connection emerges between the construction of sculptural images and conceptions of the human body. Buddhist textual traditions, including an account preserved in the *Mūlasarvāstivāda-vinaya*, draw analogies between the formation of the human body and the making of a clay image (Varma 1970, 140). Similar correspondences between sculptural components and human anatomy appear in Āgamic traditions, where internal supports, ropes, bindings, and earthen mixtures are associated with bones, veins and sinews, fat, and flesh (Varma 1970, chapters 1-12). These analogies suggest that the making of a sacred image could be conceived not merely as the representation of a figure, but as a process of constructing a body.

Mills's chapter, *Flesh of Clay: Instructions for Making a Figure from Unbaked Clay*, contributes to this discussion through its examination of South Indian Sanskrit technical and religious treatises, particularly the *Vimānārcanakalpa* and other Śaiva and Vaikhānasa texts prescribing the materials and procedures for constructing sacred images intended for permanent installation in temples. These written traditions reveal specialised knowledge in which technological practices and religious conceptions are closely intertwined, providing insights into the selection, preparation, and combination of materials used in their construction. Particularly significant is the distinction between unbaked (*apakva*) and baked (*pakva*) clay. The *Vimānārcanakalpa* explicitly warns against the use of baked clay for permanent sacred images, indicating that allowing clay-rich earth to harden through drying was not merely a matter of convenience, but a deliberate choice with metaphysical significance. This raises broader questions about the relationship between the material properties of earth and its capacity to embody sacred presence. One possible interpretation is that, by avoiding firing, the material was perceived as retaining its natural capacity to hold water and sustain life, thereby preserving its fertility and making it particularly meaningful for embodying and vivifying sacred presence. Although this interpretation remains hypothetical, the textual evidence challenges the understanding of terracruda as a simple or expedient medium and invites further investigation into the religious significance of its deliberate selection for the construction of sacred images, particularly within the ritual and conceptual frameworks of Āgamic and Tantric traditions.

The construction of a sacred body did not end with its modelling, as colour played a fundamental role in its completion and vivification. In the Sanskrit textual traditions discussed above, colour is closely associated with life, suggesting that polychromy was not merely a matter of aesthetic finishing or surface decoration, but an essential stage in bringing the sacred image to life. In the contribution *Colouring the Body: Pigments, Symbolism, and Beauty Practices in Ancient Afghan Buddhist Art*, Giulia Forgione extends this discussion by examining the role of pigments and colour in bodily representation, symbolic meaning, and practices of adornment. Considered alongside the Sanskrit textual evidence, this study encourages an understanding of modelling and colouring as interconnected processes through which terracruda was progressively transformed into sacred bodies capable of conveying a sense of living presence.

4 Shared Technological Principles

The geographical and chronological distribution of Buddhist terracruda sculpture reveals both the persistence of shared construction principles and considerable regional diversity. The use of internal supporting structures, additive modelling techniques, and successive clay-rich earthen layers of differing composition to create enduring, often monumental images constitutes a recurrent and distinctive technological sequence documented across widely separated regions of Buddhist Asia. The persistence of these construction principles suggests the circulation of specialised technological knowledge within the religious and cultural networks that accompanied the expansion of Buddhism along the Silk Roads. At the same time, variations in raw materials, aggregate selection, organic additives, armatures, surface

treatments, and finishing procedures may reflect adaptations to existing local artistic and technological traditions, as well as to the availability of resources.

The contributions by Chang et al. and Nurmi et al. provide further evidence of the materials and techniques employed in Buddhist terracruda sculpture in different historical and geographical contexts. The former investigates a polychromed clay sculpture of a kneeling attendant bodhisattva from Mogao Cave 61 (Tang dynasty, 618-704), examining its materials and construction techniques within the context of one of the major centres of Chinese Buddhist art. The latter presents a technical study of terracruda fragments from Khara-Khoto, a major centre of the Tangut-ruled Western Xia Empire (1038–1227 CE), located in present-day Inner Mongolia, China, contributing to our understanding of material selection and sculptural production in this region. Considered alongside evidence from present-day Afghanistan, Pakistan, northern India, and Central Asia, these studies broaden the basis for comparing construction techniques, material composition, modelling procedures, and surface finishing in historical Buddhist terracruda sculpture.

The recurrence of complex construction sequences involving the modelling and air-drying of clay-rich earth across geographically distant regions raises important questions about the historical transmission of specialised technological knowledge. Rather than considering each regional manifestation as an isolated development, the persistence of shared technological principles invites us to investigate the movement of specialised artistic traditions through Buddhist religious and cultural networks. These connections involved the mobility of artists, the circulation of technological practices, and the transmission of religious ideas within monastic and artistic communities. Nevertheless, recognising the technological tradition does not necessarily imply uniformity in its practice or establish the precise mechanisms through which knowledge circulated. Identifying these historical relationships requires the integration of material and technological evidence with chronology, archaeological contexts, religious currents, and artistic practices.

The distinctive geographical distribution of this sculptural tradition is particularly relevant in this respect. Its close association with Buddhist artistic and religious contexts across vast territories suggests that the expansion of Buddhism may have played a significant role in its dissemination, continuity, and transformation. Rather than a uniform or unidirectional process of diffusion, however, this transmission may be understood as a dynamic process through which shared technological knowledge was maintained, adapted, and further developed within different regions and environments.

Technological comparison thus offers a means of investigating cultural transmission beyond formal and iconographic similarities. Materials, internal structures, and construction sequences may preserve evidence of shared knowledge and practices that is not immediately apparent in the finished appearance of an image, providing an additional perspective on the historical connections between Buddhist artistic traditions across Asia.

5 Earth, Ritual Efficacy, and Living Traditions

The relationship between material and sacred meaning becomes especially evident in Himalayan Vajrayāna Buddhist contexts, where earth is valued

not merely for its plasticity or availability, but also for its associations with the natural world, sacred places, and its capacity to incorporate ritually significant substances. The inclusion of medicinal ingredients, sacred earths, relics, and other consecrated materials contributes to the ritual efficacy of sculptural images, investing the sacred body with potencies understood to extend beyond the physical properties of its constituent materials.

López-Prat and Bean's contribution, *Technological and Spiritual Knowledge in Bhutanese Terracruda Sculpture*, offers a contemporary perspective on these relationships through the examination of current sculptural practices in Bhutan. By documenting the knowledge and experience of practitioners, the study reveals how material selection, construction techniques, and ritual prescriptions are closely intertwined in the creation of sacred images. These living traditions demonstrate that the choice of clay-rich earth can be deeply intentional, informed not only by technical expertise but also by metaphysical understandings of the materials considered appropriate for embodying sacred presence.

These observations also invite consideration of possible historical relationships between earth-based image-making and the development of Buddhist ritual traditions. The continued significance of terracruda in parts of the Himalayan and Tibetan regions, together with the importance attributed to substances, consecration, and the construction of sacred bodies, raises questions about the interaction between sculptural technologies and ritual practices. However, chronological and geographical overlaps cannot in themselves establish a causal relationship. The possibility that particular ritual frameworks encouraged, sustained, or transformed terracruda practices remains a subject for further investigation.

Living traditions therefore offer neither direct reconstructions of ancient techniques nor universal models for interpreting archaeological sculpture. Their comparative value lies instead in revealing the range of technical, ritual, and conceptual considerations that may inform material choices and sculptural practices. They also remind us that knowledge of sculptural production is not confined to surviving objects or written texts, but is embodied in the experience, decisions, and expertise transmitted across generations of practitioners.

6 Vulnerability and Durability: Implications for Conservation

The inherent vulnerability of terracruda introduces a further dimension to its historical interpretation and conservation. Sculptures made from clay-rich earth hardened through drying are particularly sensitive to moisture, mechanical damage, environmental fluctuations, and the deterioration of their organic constituents. Nevertheless, the complexity of their construction, the identification of organic compounds in modelling pastes from archaeological sculptures in Afghanistan (see López-Prat et al. 2025), and the elaborate prescriptions for preparing such mixtures found in Sanskrit technical treatises suggest a deliberate concern for material properties and long-term performance. Together with evidence of successive repairs and interventions, these observations indicate that considerable attention was devoted to ensuring the durability of sacred images, even when their preservation required continuous care. Such concerns remain evident in maintenance and repair practices observed in temples where terracruda sculptures continue to fulfil their religious functions.

The conservation of these sculptures therefore raises questions that extend beyond their physical vulnerability. Historical repairs and successive modifications may reflect not only responses to deterioration but also the continued religious significance of the images, complicating conventional distinctions between original materials and later interventions. The analogy between the sacred image and the living body also invites consideration of its material life cycle, in which care, repair, renewal, and eventual replacement may acquire religious significance. Such practices suggest that preserving the physical presence and religious function of sacred images could remain an important concern throughout their material existence, even within religious frameworks that recognise the impermanence of material forms.

These considerations have important implications for conservation. Effective approaches require an understanding not only of material composition and deterioration processes, but also of construction sequences, the functions of constituent materials, historical interventions, and the cultural significance of traditional practices. Such knowledge is essential for evaluating the compatibility of conservation treatments and recognising the potential significance of successive repairs and modifications. The contribution by Schwantes et al., *Polychrome Air-Dried Clay Sculptures (Nísù) in Shanxi, China: Community Practice, Conservation, and Cultural Continuity*, illustrates these interconnected dimensions through its examination of the relationships between traditional sculptural knowledge, community involvement, cultural continuity, and the preservation of *nísù* sculpture in Shanxi.

The preservation of terracruda sculpture also depends on the survival and transmission of the knowledge through which these images were created, maintained, and renewed. As traditional practices disappear or undergo transformation, specialised knowledge that can provide valuable insights into historical sculptural technologies and inform the development of compatible conservation strategies is increasingly at risk. Documenting this knowledge, while recognising the expertise and authority of its practitioners, is therefore an essential part of conservation. Preserving Buddhist terracruda sculptures requires attention not only to the material survival of sacred images, but also to the technological knowledge and cultural values that have sustained them across generations.

7 Towards a Material and Technological History of Buddhist Terracruda Sculpture

The contributions assembled in this volume highlight the importance of approaching Buddhist terracruda sculpture through the materials, technical knowledge, and practices involved in its production. By integrating archaeometric analyses, technical examination, archaeological evidence, textual sources, and the study of living traditions, they offer complementary perspectives on how sculptural technologies were developed, transmitted, and transformed across different historical and cultural contexts. This interdisciplinary approach contributes to a fuller understanding of the role of material choices and technical practices in shaping not only the physical appearance of sacred images, but also their religious meanings and functions.

At the same time, the studies presented here reveal important gaps that call for further investigation. The geographical coverage of the volume is necessarily selective, with limited representation of several East Asian

traditions, particularly those of Japan and Korea. Further comparative research across East Asia would contribute to a more comprehensive understanding of the diversity of terracruda practices and their possible historical connections. Equally important is the systematic investigation of Buddhist textual sources, which may provide further evidence concerning the selection and preparation of materials, sculptural procedures, and the ritual prescriptions associated with image-making. Such research would complement the Sanskrit technical traditions examined in this volume and help clarify the relationships between written prescriptions, material evidence, and historical practices.

Future research would also benefit from closer integration of scientific characterisation, comparative studies of construction techniques, textual interpretation, the examination of religious practices, and the knowledge preserved in living sculptural traditions.

Particular attention should be given to the mechanisms through which specialised technological knowledge may have circulated across regions, and to the ways in which it was transformed through encounters with local materials, artistic practices, and religious traditions. Similarities in sculptural techniques alone cannot establish direct historical transmission, but their systematic investigation may help identify patterns of technological exchange and distinguish shared knowledge from independently developed practices.

Understanding terracruda sculpture in Buddhist Asia requires looking beyond the finished object to the processes, expertise, and relationships through which it came into being. The evidence examined throughout this volume suggests that the transformation of clay-rich earth into a sacred body was not simply a technical operation, but a complex process in which material and metaphysical knowledge were closely intertwined. It is through this wider perspective that the study of terracruda sculpture can contribute not only to the history of Buddhist art, but also to broader discussions of materiality, technological transmission, and the role of making in the creation of sacred images.

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