Journal of Archaeological Research
https://doi.org/10.1007/s10814-021-09162-4

Archaeology and Epigraphy in the Digital Era

Mallory E. Matsumoto[1]

Accepted: 24 September 2020

Abstract
Archaeologists and epigraphers have long worked in concert across methodological and theoretical differences to study past writing. Ongoing integration of digital technologies into both fields is extending this collaboration's scope by facilitating rapid information exchange, integration of multiple datasets in digital formats, and accumulation and analysis of large datasets. Recent research by the Maya Hieroglyphic Database Project, for example, has deployed social network analysis to correlate ritual practice, discourse, and material culture with political interactions. Similarly, epigraphers and archaeologists of pre-Angkorian and Angkorian Southeast Asia have conducted spatial analysis to illuminate the relationship between economy, human mobility, and land use. Collectively, these examples illustrate how scholars are already using digital technologies for research at larger scales and with more diverse datasets than was previously possible. Moreover, they point to further directions for articulating text, material, and context in future studies of the human past.

Keywords Archaeology · Epigraphy · Digital documentation · Social network analysis · Spatial analysis

Introduction

Research on past writing has traditionally been distributed between epigraphy, archaeology, and other disciplines whose practitioners differentiate themselves by the methods they deploy, the theories they cite, and the questions they pursue about written records from the past. Even regionally based epigraphic traditions demonstrate subtle, yet significant distinctions in both theory and practice, for which reason I refer to these sub-manifestations as individual "epigraphies." But actual and perceived differences between archaeology and epigraphy can obscure their fundamental, shared concerns

✉ Mallory E. Matsumoto
mematsumoto@austin.utexas.edu

[1] Department of Religious Studies, University of Texas at Austin, 2505 University Ave., Stop A3700, Austin, TX 78712-1090, USA

Published online: 28 April 2021

with material and visual qualities of historical text-bearing objects, including sociocultural context, viewer reception, scale, text-image relations, or materiality.

The dynamic between archaeology and epigraphy promises to continue evolving as both disciplines advance into the digital age. As specialists integrate new technologies into their research on textual and material culture, they are opening interfaces between archaeology and epigraphy in documentation and analysis methods, broadening potential sites of collaboration. In this article, I profile key digital techniques that epigraphers and archaeologists are successfully employing and highlight burgeoning areas of digitally based collaboration that have not yet been clearly articulated. I begin with brief background on epigraphy—long the formal nexus of scholarship on ancient writing—and its historical relationship with archaeology, both generally and in regional epigraphies. I then address current trends in digital methods for studying texts in archaeology and epigraphy, focusing especially on documentation, editing, and analysis.

I propose on the basis of recent, digitally based studies that evolving technologies and changing dynamics of expertise are opening a still largely unexplored space to pursue new research questions that integrate data from both archaeology and epigraphy. In making my case, I highlight two sets of recent studies that illustrate how collaboration between digital epigraphy and archaeology is already forging new paths for inquiry into the human past. Social network analyses conducted by members of the Maya Hieroglyphic Database Project, for instance, shed light on local diversity in ritual practice and monumental rhetoric in the Classic Maya lowlands and the degree to which it was shaped by political affiliation. In pre-Angkorian and Angkorian studies, joint spatial analyses by archaeologists and epigraphers indicate that development of local economies and land use were entangled in the circulation of goods and people across the Khmer empire. Although many digital initiatives that bridge archaeology and epigraphy today still emphasize data from one field over the other, they already gesture toward the novel insights that future, more balanced digital collaborations can yield.

My goal is less to suggest new digital approaches for archaeologists and epigraphers to engage with texts than to highlight ones they are already using and their consequences for present and future collaboration. By shifting focus to commonalities in digital methods and analysis, I encourage scholars working within and between these disciplines to consider the opportunities that digital developments offer to articulate new research questions, address old questions from new perspectives, and open additional avenues for interdisciplinary work. More broadly, too, archaeologists and epigraphers would benefit greatly from cooperatively addressing the challenges that the digital era presents to all humanities researchers by establishing appropriate practices for sustainable and responsible scholarship.

Studying Past Writing: A Brief Disciplinary Overview

History of Epigraphy

Epigraphy has existed as a formalized discipline for studying ancient inscriptions for a millennium, reflecting longstanding and widespread fascination with past writing

(see Lurie 2018). From a global perspective, the discipline's history is most extensive in Europe and Asia (Buonocore 2014; Harrist 1995; McNair 1994). Asia's tradition of epigraphy is the longest, where it was first systematized as a field of study in 11th-century China (Wang 1927, cited in Moser 2014, p. 2; see Brown 2011). In South and Southeast Asia, early studies focused on Sanskrit inscriptions and have since expanded to texts in local scripts and the still-undeciphered Indus writing system (Perret 2018; Possehl 1996; Wells 2015). Epigraphy in East Asia in particular has been marked by reflexive engagement with cultural practices of individual calligraphers and sculptors, allowing scholars to trace histories of scribal metadiscourse, influence, imitation, and innovation with a level of nuance not possible in many other areas (Addiss 2006; Bai 2003; Harrist 2008; McNair 1995, 1998).

Within Europe, Roman and Greek epigraphies have been the most thoroughly investigated since the Renaissance (see Bodel 2001; Rhodes 2009; Stenhouse 2005). However, epigraphers have also conducted significant research on other European traditions, including Byzantine (Rhoby 2015a), Runic (Looijenga 2003; Morris 1988), Etruscan (Bonfante and Bonfante 1989), and Linear A and B (Chadwick 1990). Egypt and Mesopotamia, in turn, offer the most robust traditions of epigraphic scholarship in Africa or the Middle East (Carruthers 2015; Keenan 2011; Radner and Robson 2001). Nonetheless, epigraphers have studied Semitic languages with comparatively smaller corpora for several centuries as well (Jongeling and Kerr 2005; Lemaire 2015), including a recent surge in Arabian epigraphy (Al-Jallad 2018; DASI 2013; Rāġib 2011). In the Americas, most epigraphic scholarship concentrates on Mexico and Central America (Houston and Martin 2016; Urcid 2001; Zender 2008), although there has been relatively robust research on the still-undeciphered Rongorongo script in South America (Davletshin 2017; Fischer 1997).

In much of the world but especially in the Americas, the Middle East, and South and Southeast Asia, the discipline of epigraphy has developed in the context of a general fascination with the exotic that both drove and arose from European and United States colonialism (see Díaz-Andreu García 2007; MacDonell 1906; Miksic 1995). Reflective of this intellectual and cultural heritage is the fact that epigraphy in these regions remains largely populated by foreign (and, as in epigraphy globally, male) scholars (Benjamin 2013; Coe 2012). Short of individual or localized interventions (Griffiths 2017; Grube and Fahsen 2002; Salomon 1998, p. 224), this imbalance remains largely unaddressed in the field as a collective.

Epigraphy's Scope and Interface with Archaeology

Epigraphy, broadly defined, is concerned with "writing or lettering engraved, carved, etched, incised, traced, stamped, or otherwise imprinted onto a durable surface" (Bodel 2001, p. 2). This material orientation reflects epigraphy's traditional co-existence with other fields focused on sub-corpora of historical texts, such as codicology (books or manuscripts), numismatics (currency), or papyrology (papyrus documents). However, these disciplinary boundaries reflect more scholarly custom than clear divisions in datasets or emic conceptions of writing, and some individual scholars or epigraphic traditions regularly integrate multiple media into their

research (Bodel 2001, pp. 2–3; e.g., Bülow-Jacobsen 2011; Rhoby 2015b). Mesoamerican epigraphers, for instance, study all forms of hieroglyphic writing, in part because corpora are relatively small (Houston and Lacadena 2004, p. 103; see Houston et al. 2001; Zender 2008). Likewise, scholars of Chinese and Japanese scripts engage their myriad textual forms and have long acknowledged the role of cross-media interaction in writing's local development and use (Harrist 2008; Lurie 2011; Wu Hung 2003).

A central development in contemporary epigraphy has been scholars' increasingly robust engagement with "nontraditional," often non-alphabetic writing cultures, including Arabian, Aztec, Khmer, Luwian, Classic Maya, and Rongorongo. In addition to facilitating broader, more critical cross-cultural comparison, this shift has called into question existing assumptions, paradigms, and tools for analyzing text-bearing objects. Studies of Mesoamerican hieroglyphs and Andean *khipus*, for instance, have challenged traditional definitions of glottic versus non-glottic "writing," the terms' applicability to non-European cultural contexts, and their sociopolitical implications (Boone and Mignolo 1994; Boone and Urton 2011). Early Japanese writing, in turn, offers evidence for characters shifting back and forth between logographic or phonetic functions, defying cross-cultural assumptions of graphemes' exclusive and stable membership in one category (Lurie 2011, pp. 339–341). As scholars continue working within and between more diverse regional epigraphies, they will further refine approaches that have long been based on writing traditions with deeper histories of scholarship.

In general, epigraphers' research concerns the content, form, and context of text-bearing objects, including sociocultural conditions of creation and use, historical significance, and links to other modes of representation. The most fundamental skill is facility in the target script and associated language(s), but how epigraphers develop this knowledge varies regionally. Despite shared interests in language structure, use, and history, they do not consistently receive formal training in linguistics, particularly outside of European academia (Bíró n.d., p. 4; Houston and Lacadena 2004, pp. 103–105). Similarly, philology, with its textual-critical approaches that tend to be more explicitly oriented toward linguistic analysis, remains an infrequent component of epigraphy among North American academics, particularly those studying non-alphabetic traditions (Bíró n.d.; Houston 2000, p. 125; see also, Greenwood 2014).

Archaeology, in contrast, has been a longstanding companion to epigraphy, in China since the Song dynasty (AD 960–1279) (Rudolph 1963) and globally since the 19th century. In Europe, epigraphers and archaeologists tend to be housed in different academic departments; disciplinary overlap is more institutionally visible in North America, where study of indigenous languages and cultures remains closely tied to anthropology (Bíró n.d., pp. 3–4; Houston 2000, pp. 125–127). Today, their mutual interests find expression in distribution studies of epigraphic and archaeological data to elucidate landscape use and mobility (Hall 2010; Jackson 2013; Leube 2016), for instance, or interaction between diverse media in transmitting cultural meaning (Helmke et al. 2018; Kurth 1999). Other topics of mutual concern that would benefit from more concerted dialog between archaeologists and epigraphers include materials and practices of production (Carò et al. 2012; Lambourn 2004),

identity formation (Sitz 2019; Vázquez López 2017), ritual practices (Soutif 2009), and construction and circulation of value (Callaghan 2014). As I argue here, technological changes affecting the two fields provide opportunities for new modes of collaboration on these and other topics.

Writing in the New Millennium: Digital Technologies and Epigraphic Research

Among many significant transformations that epigraphy has undergone in recent generations, adoption of digital technologies remains the most momentous and pervasive at present. I provide an overview of recent digital developments in epigraphy and archaeology, broadly following the workflow stages of documentation, description, and analysis. I conclude by addressing some implications of these changes for both disciplines into the near future. Nonetheless, their ongoing impacts on all levels of scholarship on writing are too complex to be presented in full here; for more detail, I refer the reader to the abundant, recent publications addressing significant consequences and challenges of digital archaeology, many of which equally apply to epigraphic research (see Altschul et al. 2017; Gattiglia 2015; Huggett 2015; Huvila 2018; VanValkenburgh and Dufton 2020).

Although I reference literature from various scholarly traditions to the extent possible, I especially attend to trends in research on Maya hieroglyphic writing. Besides drawing on my own background, this orientation affords the valuable opportunity to observe a regional epigraphy that is relatively young (see Coe 2012; Houston et al. 2001) and that has only recently begun to incorporate digital methods and equipment on a wide scale, following initial forays by epigraphers of other, mostly alphabetic systems. In addition, the Maya script has not yet been fully deciphered, injecting an element of uncertainty into this epigraphy's digital transition. Highlighting the ongoing development of a digital Maya epigraphy allows us to consider the promises and difficulties of incorporating continually evolving approaches into a field that is still establishing itself. Moreover, collective engagement with non-alphabetic writing systems is itself catalyzing technological innovation as epigraphers adapt existing digital approaches to scripts distinct from those for which they were originally developed.

Textual Representation: Documentation from Analog to Digital

The early, widespread adoption of digital techniques for documenting artifacts in epigraphy and archaeology reflects both fields' fundamental concern with context. The potential repercussions of digitizing documentation procedures are more than methodological: this development can also facilitate studies of material production and representation beyond the scope of more traditional, two-dimensional methods. Critically, too, documentation of text-bearing objects in field and laboratory or museum settings offers the first and most comprehensive point of methodological convergence for archaeologists and epigraphers. As such, attention to common

concerns from the outset can yield precise, accurate documentation that is accessible to and insightful for scholars in both disciplines.

Although workflow and standards differ across regional traditions, archaeologists and epigraphers share a common approach when they engage with inscriptions. Following initial localization of a text-bearing object, the first analytical step is its visual documentation, ideally both by photograph and by hand (Bruun and Edmondson 2014a, pp. 3–7). The ultimate goal is an accurate, clear image of the object and its in-situ context; choice of documentation procedures and equipment should reflect this aim to the extent possible. Early in-field documentation of text-bearing objects and other archaeological artifacts was usually limited to sketches or drawings, often completed by field assistants whose work remains underacknowledged (Davies 2020; López Luján 2012; Strudwick 2012). Since the late 19th century, however, photographs have become ubiquitous as more efficient, detailed representations, particularly when coupled with raking light (Just 2012; Sellen 2012). The recent advent of digital photography has further reduced the logistical challenges of recording and development, as camera cards represent a smaller, more lightweight, and more environmentally resistant alternative to traditional film. The digital medium allows much faster viewing and broader dissemination, and digital manipulation to enhance features or stich together images can be decisive for interpreting or reconstructing badly eroded texts (Revez 2020; Sundberg 2006; cf. Tarte et al. 2011).

Yet despite popular perception, photographs are far from an impartial gaze that remains morally unblemished by human interpretation (Daston and Galison 2010). Within recent Euro-American preferences for images over words in presenting "facts," particularly in science, photographs present a deceptive aura or "image of objectivity" that belies the subjectivity underlying their composition and presentation (Daston and Galison 1992; see also Guha 2013). Moreover, they record an excess of unnecessary, potentially distracting detail, and they usually distort or omit features that are at odd angles to the camera lens (Porter 1981, p. 67). Consequently, when viewing photos of a text-bearing object, scholars must filter out extraneous features to distinguish insignificant marks from graphemic signs (compare Der Manuelian 1998, p. 97; Houston 2011, pp. 22–23).

The line drawing has traditionally represented the most significant interpretive product of both archaeological and epigraphic documentation. Ideally, it is based on direct observation of the text-bearing object with raking light and later refined by consulting photographs taken from multiple angles under diverse lighting conditions, to check for features not noticed in the field (Porter 1981, p. 72; Steiner 2005, p. 88). More recently, researchers have begun drawing from digital images, which integrates traditional interpretations entailed in drawing with cutting-edge documentation procedures (Beliaev and de León 2013; Gronemeyer et al. 2016). Nonetheless, any artifact drawing inherently records the illustrator's interpretation. In archaeology as well as epigraphy, interpretive accessibility and comparability of drawings are further complicated when illustrators deploy different standards. A comprehensive drawing manual has yet to be written for Maya epigraphy, for instance (compare Kurth 2020). Although the practices outlined by Graham (1975, pp. 12–13) have been widely adopted as informal standards, many scholars have implemented their own conventions over the years, generating

noticeable diversity over generations of epigraphers (Gronemeyer et al. 2016; Jones and Satterthwaite 1982, pp. 3–4; Sharer and Coe 1979, pp. 18, 20).

In lieu of or in addition to line drawings, some epigraphers create rubbings of inscribed surfaces with pencil, ink, wax, or charcoal (Salomon 1998, p. 161; Steiner 2005, p. 87), following a practice that Chinese scholars and calligraphers were using by the sixth century AD (Starr 2008). Yet these images document only a monument's "frontal or forward planes" and highlight the sides of a line rather than the line itself, whereby one line may appear in a rubbing as two (Porter 1981, p. 67). Another common documentation mode in some epigraphies, including classical and Indian, is the *estampage* or squeeze, a retrograde impression created by beating a sheet of damp paper or applying latex to the inscribed surface before letting it dry in place (Beck 1963; Cooley 2012, pp. 371–373; Salomon 1998, pp. 161–162). Plaster casts were another popular, reliable method of recording a text-bearing object in its three-dimensionality during the pre-digital age; nonetheless, this laborious process, like squeeze or rubbing production, can inflict irreparable damage on the text surface and has thus been discontinued in many areas (Fash and Tokovinine 2008, p. 17). Despite long-term investments in curation and storage required to maintain their contents, archives of rubbings, squeezes, and casts acquire increasing importance as the original inscriptions degrade or are lost (Papadaki et al. 2015; Starr 2008; Zehrt n.d.).

Increasingly, archaeologists and epigraphers use digital technologies to record text-bearing objects in three dimensions (Katz and Tokovinine 2017; Rick 2012), which render the actual volume and texture of epigraphic artifacts much more faithfully than two-dimensional approaches. Previously, flatbed scanners offered a portable, economical tool for 3D documentation in the field or laboratory (Schubert 1998, 2000). Since then, cultural heritage specialists have expanded to a wide range of relevant digital techniques (e.g., Barmpoutis et al. 2010; Gallen et al. 2015). Of these, the most common in archaeology and epigraphy to date are structure from motion (SfM), reflectance transformation imaging (RTI), and 3D scanning.

SfM or photogrammetry entails taking dozens of photos of a stationary object from different angles and stitching them into an orthophoto that is uniformly scaled by geometrical correction (Douglass et al. 2015; Mittica et al. 2015; see Cultural Heritage Imaging n.d.a). Because they are scaled, photogrammetric models can be used to take measurements or, with the addition of GPS coordinates, generate maps, making photogrammetry especially useful for documenting text-bearing objects in the field or for material analysis (Desmond 1994; Olson 2016). RTI and related techniques also entail taking a series of photos of a stationary object, but in contrast to SfM, in RTI the light source moves while the camera remains fixed (see Cultural Heritage Imaging n.d.b; Tweten et al. 2016). Through computer processing, the photos are combined into a synthesized image that is opened in a viewer (Earl et al. 2011; see Cultural Heritage Imaging n.d.b). A key benefit of RTI is that the resulting image can be manipulated in the viewer under a variety of artificial raking light conditions, including ones difficult or impossible to recreate in the field or a museum (Dana and Parker 2015; Tarte et al. 2011). 3D structured-light or laser scanning can generate high-resolution renderings, too, but requires greater investment in

equipment, time, and resources for data processing and curation than either SfM or RTI (Fash and Tokovinine 2008; Wachowiak and Karas 2009).

The advantages of these digital methods generally lie in their products' scalability, (relative) three-dimensionality, and ease of reproduction, as well as their non-invasive application. Through these granular, digital records, scholars can perceive texture and other superficial qualities of text-bearing objects outside the field at a level of detail not possible with traditional analog methods, in some cases with significant implications for the objects' interpretation (Jo and Lee 2012; Prager et al. 2019). Reproductions can become integral components of research, such as miniature 3D printouts that members of the Corpus of Maya Hieroglyphic Inscriptions project are using to rearticulate the monumental Hieroglyphic Stairway at Copan, Honduras (Fash 2017), or cuneiform fragments that Mesopotamian epigraphers have reunited virtually (Lewis et al. 2015). Importantly, too, digital models can document and monitor the status of endangered inscriptions (Jo and Lee 2012; Schmidt et al. 2010). They can generate 3D models for public display, distribution, or repatriation as well—an application that will only become more relevant as collection, curation, and access to text-bearing objects become more contested (see Anderson and Christen 2013; Crouch 2010; Doyle 2015).

Yet digital documentation procedures also necessitate great human and financial investments in equipment and technical expertise, and rapid obsolescence of digital methods and formats mandates attentive curation (Rick 2012, p. 419). Additionally, Fash (2012, pp. 456–461) cautions against replacing traditional line drawings with digital images, because the latter do not elicit the same interpretive engagement from the illustrator (see also Der Manuelian 2020). At present, standard presentation of epigraphic documentation remains two-dimensional, a digital image accompanied by a line drawing to allow the discerning viewer to evaluate interpretations inherent in both (Cooley 2012, p. 373; Pitard 1992, pp. 261–264; Steiner 2005, p. 87). Optimal use of even the newest technologies, in epigraphy as in archaeology, still requires input from human experts (Fash 2012, p. 465). The incompleteness of any single mode of documentation highlights a general mandate: document early and thoroughly with a variety of methods and from multiple perspectives (Porter 1981, p. 69). Such diligence is particularly crucial for objects under active threat from natural or human effects.

Digitizing Form, Function, and Meaning of Text-Bearing Objects

Description and Classification

As in archaeology, the next step in epigraphic analysis is usually to describe the object, its text, the text's relationship to other significant features, and the context of recovery (Cooley 2012, pp. 376–383). Here, I focus on classification as a facet of description that is both specific to the study of text-bearing objects and directly comparable to similar concerns in archaeology. Terminology differs by regional specialty, but key interpretive parameters generally consider material, form, context, function, and content (Zell 1874, pp. 139–141). Analytical terms for text-bearing

objects have been subject to continual evolution in all regional epigraphies, however, as cultural influences and disciplinary orientations have changed (e.g., Moser 2014). Epigraphers have also become more cognizant of inscriptions' materiality, incorporating more insights from archaeology to treat texts as artifacts (Bodel 2001, p. 5; Houston 2004; Whitley 2017). New discoveries periodically challenge assumptions inherent in existing terminology; for example, classifications based on content may encounter difficulties with inscriptions that address multiple topics simultaneously (Lidzbarski 1898, pp. 137–172; Zell 1874, pp. 139–344). Similarly, artifact-oriented terminology must account for instances in which one text-bearing object does not correlate with one text; an object may feature multiple texts on different surfaces, for example, or a single text may span multiple artifacts (Morlock and Santin 2015).

In Mayanist scholarship, traditional classifications of text-bearing objects privilege the object as a whole and its form and presumed function, with little to no input from textual or iconographic content (though cf. Stuart 1996; Tokovinine 2006). The terms *stela* and *altar*, for example, are technically reserved for a "free-standing, upright stone monument" and "circular or rectangular stone that is wider or longer than it is tall," respectively (compare Graham 1975, p. 25; Sharer and Sedat 1987, p. 359). But in practice, they encompass diverse objects that may vary in surface treatment, stone quality, size, or position, among other parameters, and they do not account for local differences in production (Stuart 1996, p. 149; Stuart et al. 2015, p. 1). Moreover, they are frequently applied based on physical form alone, even to text-bearing objects found in other positions or of unknown provenance. In some cases, later scholarship has revealed that artifacts were misclassified, and attempts to correct the errors result in multiple designations circulating in the literature (e.g., monuments from La Corona, Stuart et al. 2015; from Quirigua, Sharer and Coe 1979, pp. 19–20, table 12).

Lack of standardized epigraphic terminology also facilitates inconsistency between scholars. One particularly prominent Maya example is the various designations—"step," "panel," "miscellaneous stone," "monument fragment"—applied to components of a single hieroglyphic staircase from Caracol, Belize, which had been looted in antiquity and was recovered by archaeologists at four separate sites (see Martin 2017 for the most comprehensive analysis). To avoid assumptions inherent in traditional classifications, some projects have adopted more neutral epigraphic terms, such as "element" at La Corona, El Petén, Guatemala (Stuart et al. 2015), or "monument" at Tonina, Chiapas, Mexico (Mathews 1983). Even so, we remain largely ignorant of the degree to which modern designations for inscribed Maya objects correspond to emic conceptions among ancient users. Existing records yield only a handful of Classic Mayan terms for text-bearing objects (e.g., upright-standing *lakam tuun* vs. stairway *ehb* vs. bench or throne *teem*) or hieroglyphs themselves (e.g., painted *tz'ihbaal* vs. quoted *cheheen*/*che'een* vs. carved, sculpted, incised, or modeled [undeciphered] vs. regionally restricted *wojool* or *wojil*) (Grube 1998; Houston 2016, pp. 392–393; Lacadena and Wichmann 2004, pp. 105, 116–118; Stuart 1996, pp. 151–154; Stuart 2016).

Terminology for text-bearing objects has been thrown into higher relief in epigraphers' more recent efforts to make their research more accessible and to facilitate comparison across cultures and time periods (Bodard and Romanello 2016).

If carefully executed, digital initiatives can minimize confusion in and between regional epigraphies by centralizing data, comparing terminology, and establishing concordances. Furthermore, by aggregating multiple types of information, they can facilitate multilayered classifications of text-bearing objects that accommodate archaeological and epigraphic interests at multiple scales of space and time. The Text Database and Dictionary of Classic Mayan (TWKM) at the University of Bonn is the largest-scale Mayanist project pursuing this strategy; its members are correlating designations in the literature with controlled vocabularies to clarify designations and make discussion of Maya text-bearing objects more accessible to nonspecialists (Grube et al. 2017). To this end, TWKM draws heavily on the Art and Architecture Thesaurus of the Getty Research Institute (2017), a controlled vocabulary whose definitions of objects with inscribed surfaces are based largely on European traditions but are intended to be regionally unspecific. Nonetheless, classification remains a dynamic and debated step in epigraphic analysis, as in archaeology (see Jones 2002). Indeed, the hierarchical, multilayered classificatory systems that archaeologists have long used (dividing artifacts into tiered categories according to material, form, function, color, etc.) may offer a productive model for categorizing text-bearing objects in future epigraphic description.

Classifying Signs

After documenting and describing a text-bearing object, the epigrapher analyzes its graphic and linguistic content. The first step is to identify individual signs, correlating each graph with the meaning-bearing grapheme that it represents (see Daniels 1996, pp. 3–4; Meletis 2019) and determining its significance in context. Only after every graph has been classified can the epigrapher begin to understand their interrelationship and thereby the meaning of the broader text. Although digital tools and approaches have been introduced for all these analytical stages (e.g., Meyer et al. 2006), initiatives for sign classifications and lists remain the most numerous, in part because they are fundamental to subsequent steps.

The basic prerequisite for sign classification is a catalog based on as much of the extant corpus as possible. Ideally, sign catalogs should represent the complete variety of graphs in a writing system and their relationship to each other, including contextualized examples of each (Gardiner 1957, pp. 438–548; Mahadevan 1977). They provide a crucial basis for analysis by compiling the full range of meaningfully distinct graphemes in a writing system, including graphic variants that differ in form but not in linguistic value. If composed with attention to chronology, they also provide a basis for paleographic analysis of change over time in sign form and usage (e.g., for Classic Mayan, Grube 1990; for Sumerian, Labat 1995). Accounting for the provenance of source texts can also offer key insights into spatial distribution of writing system usage, for instance (Mahadevan 1977, pp. 746–752, 776–779; Rilly and de Voogt 2012, tables 2.2–2.5).

Because sign catalogs differentiate between meaning-bearing graphemes and substitutable graphic variants (Zimmermann 1956, p. 9), they are generally a prerequisite for successfully deciphering an unfamiliar writing system (Gates 1931; Macri 1993; Wells 2015). However, the compilations can mislead researchers by creating

artificial distinctions between graphs or conflating signs that in fact represent different graphemes (Polis 2020; Springer Bunk 2019; Zender 2014). Moreover, advancements in decipherment inevitably revise our knowledge of a writing system's structure and function. Consequently, sign catalogs—particularly those compiled in the wake of significant advancements in research—can provide valuable overviews of the history of decipherment and scholarly interpretation (e.g., Boud'hors 2020; Macri and Looper 2003; Moje 2020). Given the multiple layers of information that they contain, epigraphic catalogs could also benefit from a tiered structure along the lines of artifact catalogs in archaeology, a format that could be executed digitally with relative ease.

Text Markup and Encoding

Text edition or markup has traditionally been the core component of epigraphic analysis and the cumulative step in which artifact and content are articulated to the greatest extent possible. Each regional epigraphy has its own procedures for text analysis and edition, but they commonly include transliteration, transcription, morphological analysis, and translation, reflecting deep-seated methodological ties with philology and linguistics (compare Bruun and Edmondson 2014b; Fox and Justeson 1984; Sironen 2015). One important markup standard is the Leiden Conventions (Dow 1969), although they are not widely used outside Europeanist scholarship. Generally, standards for edition of text-bearing objects should aim for maximally unambiguous representation of each step in the epigrapher's interpretation of all potentially meaning-bearing marks and their relationship with each other while filtering out nonmeaningful information.

As in documentation and description, the most significant recent developments in the markup and encoding of text-bearing objects have been propelled by digital technologies. Application of computerized approaches first took hold among epigraphers in European traditions, who continue to dominate the ever-expanding field even as more colleagues worldwide engage with the possibilities and difficulties that the new technologies present (Bodel 2012). Digital technologies have been overwhelmingly used in epigraphic analysis for two central, related purposes: data aggregation, usually in large and increasingly openly accessible databases, and text markup and encoding (Bodel 2012, pp. 285–292).

The dominant computer system to date for editing epigraphic sources has been EpiDoc, which classicists developed to encode Greek and Roman texts in Extensible Markup Language (XML), thus rendering them machine-readable (Bodel 2012, pp. 291–292; Elliott et al. 2006–2017). This collaborative product, based on the Text Encoding Initiative (TEI) encoding language, uses the Leiden Conventions as its underlying markup framework (Elliott et al. 2006–2017). Since its initial development, researchers have adopted and adapted EpiDoc for other script traditions as well (see e.g., Avanzini et al. 2015 for pre-Islamic Arabian; Griffiths and Tournier 2017 for Āndhradeśa; Lepoutre et al. 2012 for Campā). Epigraphers often use it in tandem with the formal language CIDOC CRM, which was created to document and model cultural heritage information (DSWG 2006–2019; Felicetti et al. 2015; compare Pàlsson 2020).

Some projects like TWKM have developed their own digital strategies and interfaces for marking up and encoding texts that are partially inspired by EpiDoc but tailored to their own needs (Grube et al. 2017; Maier 2015). Other scholars have created automated, digital tools to recognize Maya hieroglyphs or perform visual pattern analysis, although they have yet to see widespread use (Gatica-Perez et al. 2014; Hu et al. 2015). Some regional epigraphies have even established their own fonts for transcription to streamline publication and digital dissemination by eliminating graphic variation in favor of accessibility (Der Manuelian 1988; Kalvesmaki 2015; Pallán Gayol 2018).

Data Analysis

Advancement of digital technologies and their increasing popularity in archaeology and epigraphy are shaping interpretations applied to ancient textual data. Many recent applications of digital methods to text-bearing objects facilitate work with larger epigraphic corpora according to more regularized, often mathematical criteria. For instance, using techniques ranging from optical filters to morphological operations like thinning, scholars have manipulated images of texts and enabled automated recognition and parsing of individual signs, with varying levels of success (Alaql and Lu 2014; Sober and Levin 2017; Tracy et al. 2007). Others have statistically evaluated patterns in written form with optical character recognition (OCR) to reconstruct eroded text passages (Kavitha et al. 2016), quantify graphic changes over space or time (Karunarathne et al. 2017; Rajan 2016), or establish chronological schemas for dating inscriptions (Soumya and Kumar 2011). Such "corpus epigraphy" approaches to large-scale phenomena in the history of specific writing traditions are gaining traction as data become more abundant, more available, and easier to process with modern computing power (Kettunen 2014; see also Mullen 2007; Murugaiyan 2013).

Of the myriad digital techniques deployed to analyze text-bearing objects, one of the more contested has been phylogenetic analysis, a method that linguists adopted from the biological sciences to reconstruct historical relationships among languages and their correspondences with human populations (Pagel 2017; Platnick and Cameron 1977; Wichmann and Good 2014). The approach generates phylogenetic trees based on occurrences of characters or other variables that the researcher identifies (see Skelton 2008, pp. 164–174). Branches of the tree represent relationships between variables according to their length and distance (difference) from one another (Skelton 2008, pp. 172–174, fig. 4); in the case of paleographic data, for instance, they can situate scribes according to chronological and graphic affinity (Firth and Skelton 2016a, b; Skelton and Firth 2016). Although epigraphers have experimented with phylogenetic analysis over recent decades (see Heggarty 2006; Howe et al. 2001; Spencer et al. 2006), it remains relatively uncommon in writing systems research and has not gained widespread traction in archaeology (Mendoza Straffon 2016, 2019; O'Brien and Lyman 2005).

Digital Developments in Archaeological and Epigraphic Collaboration

A notable advantage of digital approaches for archaeologists, epigraphers, and digital humanists generally is the capacity to accommodate multiple scales: they can evaluate large quantities of data for macrolevel processes or filter them to focus on microlevel phenomena. This development significantly enhances opportunities to articulate epigraphic sources with multiscalar archaeological research, as attested by recent, collaborative publications. Two thematic areas where digital technology-based collaboration between archaeology and epigraphy seems particularly promising are social network analysis and spatial analysis. Without any pretense to completeness, I highlight several compelling examples of how archaeologists and epigraphers across regional traditions have already seized on these approaches to advance understanding of text-bearing objects in social and material context. These scholars have already made substantive contributions by shifting their perspective; instead of treating digital approaches merely "as descriptive or exploratory tools," they embed them in theoretical context by "more frequently and more directly addressing substantial questions about the past that cannot readily be approached using other methods and models" (Peeples 2019, p. 452). Their successful outcomes illustrate the potential of the digitally situated collaborations that I advocate here while simultaneously gesturing to directions of future development.

Ancient Writing in Social Networks

Social network analysis is a graph theory-based approach that examines structured social relations by identifying nodes (actors) and the edges (relationships) linking them, as well as how they interact among each other (see recent overviews by Mills 2017; Pálsson 2020; Peeples 2019). Depending on research goals, nodes may represent individuals, communities, nonhuman actors, ideas, or objects; and edges may denote cultural, economic, political, ideological, or other relevant internode relationships. Key benefits of social network analysis for archaeology include insights into the interface between network structure and actor engagement, allowing scholars to contextualize interactions between individual agents within the larger social environment (Mills 2017; see also Emirbayer and Goodwin 1994). Archaeologists have deployed social network analysis to address longstanding themes in community interaction such as stylistic variation, settlement patterns, or trade (Claßen 2004; Golitko and Feinman 2015; Wernke 2012), as well as less well-represented interests like monumentality or religious practices (Glomb et al. 2020; Houten 2016). Modern capacity for large-scale digital analysis strengthens archaeology's potential to address multiple scales of network structure, as well as a given network's dynamism across time and space (Mills 2017; Terrell 2013; compare Golitko and Feinman 2015; Ruffini 2008).

Epigraphic data can further expand the sociocultural interactions accessible to scholars of the past, particularly phenomena like interpersonal exchange and cultural

transmission that leave scant material traces. As recent studies demonstrate, articulating epigraphic and archaeological data in social network analysis allows scholars to locate historical events in space and time while articulating them with artifact and other contextual information (Graham 2006, 2014; Terrell 2013). Scholars have already integrated such sources to examine issues including production and trade (Larson 2013; Mukai 2016), kinship (Chollier 2019), political status (Alexander and Danowski 1990; Tackett 2014), and cultural transmission (Amati et al. 2019; Yahwei 2018). Future collaborations could expand network analysis to other questions of archaeological and epigraphic interest, such as audience and reception or interactions between diverse forms of material or immaterial culture (compare Brughmans 2013, pp. 635–640; Mills 2017, pp. 387–389).

To date, members of the Maya Hieroglypic Database Project have produced the most systematic research from the pre-colonial Americas that incorporates epigraphic sources into social network analysis. In an initial study, Munson and Macri (2009) applied the method to interactions among Maya polities, especially during the Late and Terminal Classic eras (AD 633–830), by contextualizing toponyms in hieroglyphic inscriptions with respect to where and when they were mentioned, as well as associated political titles or events. The authors observe declining centralization of political networks over time with the biggest dropoff coming in the late eighth century, when archaeological evidence indicates an uptick in warfare and gradual site abandonment. Significantly, too, local restorations of political centralization in the late eighth to early ninth centuries correlate with renewal of hierarchical alliances, not lineage ties. Consequently, the authors argue that relations of subordination and domination were essential for stabilizing Classic Maya political networks, in contrast to politically weaker ties of kinship (Munson and Macri 2009). Scholnick et al. (2013) subsequently examined rhetorical practices through which elites managed their position in political networks. Based on examination of toponyms in over 30 hieroglyphic contexts and a dataset slightly expanded from Munson and Macri (2009), they identify variations in monumental rhetoric between Classic Maya rulers and particularly between settlements according to selective emphasis on interactions with foreign representatives, victorious military campaigns, or alliances with superordinate polities.

The other main focus of social network analyses by members of the Maya Hieroglypic Database Project has been Classic Maya ritual practices, particularly in the context of dynastic history. Munson et al. (2014) initially addressed autosacrificial bloodletting, a practice attested in hieroglyphic records and reflected in archaeological contexts most obviously by obsidian, blades, stingray spines, and other bloodletting tools. Although archaeological, epigraphic, and iconographic evidence attests to bloodletting across the Maya lowlands, the authors note significant regional (southeastern and western) and chronological (AD 593–613 and 692–712) concentrations in its monumental documentation. They also identify a meaningful correlation between hieroglyphic statements and expressions of political hostility, proposing that bloodletting rituals played a meaningful role in local responses to conflict (Munson et al. 2014).

Subsequently, Munson et al. (2016) conducted detailed social network analysis of over 80 distinct elite rituals recorded on Classic Maya stone monuments. They

propose that significant continuity in ritual practice over time and across space indicates a well-defined elite culture across the Maya area, a perspective supported by archaeological evidence for extensive stylistic and material exchange. Nonetheless, rhetorical discrepancies in how elites recorded rituals, as well as increased variation in ritual practice when settlements with medium-sized hieroglyphic corpora are included, attest to meaningful sociopolitical diversity within and between local communities (Munson et al. 2016). In a follow-up study, they argue that political relations were the primary motivation for Classic Maya political elites to record shared accession rituals, but that geographic proximity was more meaningful in determining the distribution of monumental records of ritual incense scattering (Amati et al. 2019).

Considered together, these studies represent the first large-scale attempt to apply social network analysis to Classic Maya inscriptions and compellingly illustrate the new perspectives that resultant temporal, regional, and semantic patterns can contribute to interpreting political and ceremonial practices. The authors' spatial correlation of toponymic references with political events over time complements archaeological and epigraphic evidence for increasing political fragmentation in the late eighth and ninth centuries (see recent synthesis in Martin 2020), and their analysis of elite Maya political rhetoric suggests nuances in local traditions of monumental discourse that would benefit from concerted linguistic study in the future. Additionally, their examination of references to bloodletting and accession rites in political context highlights the need to carefully tease out differences in ritual practice between communities and over time, including potential changes in practices themselves or their sociocultural meaning.

Yet the significance of the social network analyses by the Maya Hieroglypic Database Project extends beyond specific conclusions. More importantly, it points to the ongoing need to articulate hieroglyphic records with archaeological and iconographic evidence. Their detailed methodological and epigraphic explanations leave little room for complementary discussion of archaeological materials. And as the authors readily note, Classic Maya hieroglyphic texts, particularly on stone monuments, are sharply skewed toward elite and especially royal perspectives (Munson and Macri 2009, p. 427; Munson et al. 2014, p. 2; Munson et al. 2016, p. 77). Future research could begin to counterbalance this bias by explicitly articulating rituals recorded in inscriptions with distributions of relevant archaeological artifacts used in their practice, for instance, or by examining (dis)similarities in material culture between settlements whose political relations differed in scale or nature.

Writing in Space and Place

Another notable digital development in archaeology and epigraphy has been application of spatial analysis methods to sociocultural phenomena. Interpreting objects in context is nothing new for scholars in either discipline, particularly archaeologists who have been actively studying spatial distribution and variation for over a century (Childe 1929; Kidder 1924; see Hodder and Orton 1976; Trigger 2006). In the modern era, too, they have been among the earliest adopters of digital technologies

for spatial analysis in cultural studies (Allen et al. 1990). In fact, spatial analysis represents the one approach documented in this review for which archaeologists have spearheaded application to written sources, although scholars working within epigraphy proper are increasingly joining them. Epigraphers, although collectively slower to engage with the relevant digital tools, nonetheless demonstrate their own, long history of examining sociocultural phenomena through the positioning or movement of written sources or recorded objects (Lang 1955; Marcus 1976; Parmentier 1916), or of people producing or engaging with them (Harrist 2008; Premo 2004; Stone 1995). However, modern computer programs for digital recording, visualization, and analysis have significantly increased the amount of data and the range of interpretive parameters that scholars can consider in spatial analyses (McCoy 2017).

The wide variety of spatial analyses conducted on text-bearing objects can be broadly divided into two overlapping streams: applications of spatial analysis to the contents of written sources versus to text-bearing objects themselves. Both approaches have already facilitated significant collaboration between archaeological and epigraphic contexts. Joint studies between archaeology and epigraphy have integrated topographic and field survey data with written sources in examining built features of the ancient landscape such as roads (Lertlum and Mamoru 2009; Sheseña Hernández 2017), settlements (Anaya Hernández 2006; Gillespie et al. 2016), or entire polities (de Weerdt et al. 2016; Sidomulyo 2018), as well as movement between them (Anaya Hernández 2001; Carter et al. 2019). In other cases, scholars have mapped textual references to space and place to visualize past worldviews of the physical and social landscape (Petrulevich et al. 2019; Pottier 2003). Accounting for the chronology of text-bearing objects has allowed others to trace progression of large-scale sociocultural phenomena across time and space, such as political consolidation and collapse (Ebert et al. 2014; Neiman 1997), socioeconomic conditions (Mueller 2005; Streiter 2018), or religion (Estève 2018; Lorrillard 2006). By mapping spatial references from inscriptions in physical and cultural context, archaeologists and epigraphers can reconstruct places that were important enough to merit written mention and possible trajectories of movement between them. The rising frequency with which epigraphers incorporate geospatial information into their online databases both reflects a growing interest and facilitates future efforts in spatial analysis.

Analysis based on locations of text-bearing objects has proven equally promising in articulating spatial and referential information to better understand the ancient past. Archaeologists have been particularly eager to extend it to past inscriptions, a trend likely motivated by their early adoption of spatial analysis and the approach's inherently material orientation to textual sources. Although rock carvings, graffiti, architectural inscriptions, and other texts fixed in place are particularly conducive to this method, it can also be applied to map similarities and differences between editions of a single text (Stones 2017) or to reconstruct the original context of texts whose provenance has been lost (Anaya Hernández et al. 2003; Wilburn 2010). For instance, the spatiotemporal distribution of written sources can elucidate social relations between text producers (Cline and Cline 2015; Corbett 2012), landscape modification (Slawisch and Wilkinson 2018), or public representations of political

authority (Benefiel 2010; Smith et al. 2016). In addition, spatial analysis of inscriptions in situ can be insightful for considering issues such as physical scale and its implications for reception, intervisibility, and targeted placement of writing in the landscape (Gillespie et al. 2016; Rothe et al. 2008, pp. 396–406).

Movement of human and nonhuman actors, information, and objects constitutes a fundamental concern in many applications of spatial analysis in archaeology. A series of particularly insightful publications on pre-Angkorian (sixth–eighth century AD) and Angkorian (ninth–14th century AD) inscriptions from Southeast Asia showcases the meaningful results that can arise from integrating digitally based analyses of archaeological and epigraphic data at multiple scales. In an early landmark study, Lustig et al. (2007) addressed the development of temple and exchange economies in the Khmer empire by articulating epigraphic data on the circulation of goods and human labor, including the location of each inscription, with archaeological evidence for intensifying hydraulic management and urban construction. They argue that certain commodities like cloth circulated primarily through exchange, whereas other items, such as jewelry or musical instruments, were associated with temple economies, and that variable references to transactions involving land or imported goods reflect transitions in Khmer sociopolitical organization. Their results contextualize changes in objects and laborers mentioned in the inscriptions within developments in local economic practices and land utilization, as well as larger-scale infrastructure projects overseen by Khmer rulers (Lustig et al. 2007; compare also Lustig 2011; Lustig and Lustig 2019).

In a later study, Hendrickson (2010) undertook a more detailed examination of the Khmer road system, using toponyms and transport-related lexical items from inscriptions, settlement patterns, and archaeological evidence to investigate infrastructure associated with these roads. His argument for a longer and more layered history of road development than previously assumed adds further nuance to archaeological interpretations of Khmer empire building, population mobility, and construction of political landscapes. Significantly, it underscores the cumulative nature of the empire's territorial growth and political consolidation during the early second millennium, a process in which the role of king Jayavarman VII (reigned AD 1182–1218) was important but not as dominant as prior scholarship had asserted (Hendrickson 2010). Building on this research, Hendrickson (2012) contextualizes roads as conduits of communication between Khmer temples, and Lustig and Hendrickson (2012) argue based on road terminology from inscriptions that increasing lexical diversity and frequency reflects the formalization of road infrastructure over the course of Khmer territorial expansion.

Collectively, these contributions to pre-Angkorian and Angkorian studies highlight the entangled social, political, and cultural concerns implicated in Khmer engagement with the landscape—and the power of interdisciplinary datasets for interpreting them. The authors' scholarship is also noteworthy for its explicit and concerted consideration of architectural context, infrastructure, landscape management, and other archaeological data together with epigraphic sources. In particular, it illustrates the diverse roles that landscape, infrastructure, and economic exchange occupied in Khmer imperial management, including their impact on human mobility and material culture within the empire. More broadly, their work points to the

importance of addressing multiple lines of evidence for the movement of people, animals, goods, and ideas, as well as how digital technologies offer new support for such collaborative research.

Concluding Thoughts

Digital methods and tools have significant advantages for studying text-bearing objects: they facilitate high-resolution documentation, permit access to and analysis of large datasets, and encourage centralized data aggregation, for example. Although practices vary by region and field, epigraphers and archaeologists already share many procedures and technologies, especially with respect to documentation. Acknowledgment of these similarities, coupled with accommodation of divergences, can further narrow the gap by promoting field and laboratory documentation that meets the needs of both disciplines. 3D digital documentation of written sources in situ, for instance, also facilitates comprehensive consideration of the archaeological context from which they originated (Revez 2020; Vavulin et al. 2019).

Despite differences in academic training, specialists in both fields share common interests in sociocultural phenomena ranging from craft production to mortuary practices to religion and beyond. If archaeological and epigraphic data are linked in a single database, aggregating them by region or period can reveal macrolevel patterns in identity formation, settlement patterns, or commodity exchange, for instance; conversely, filtering database results according to local parameters allows microlevel analyses (Hamidovič et al. 2019; Liuzzo et al. 2017; see also Brunson et al. 2016). Existing digital research methods, many of which are already widespread in the social sciences and humanities, can thus broaden and deepen collaboration in the study of text-bearing objects by drawing on complementary, diverse datasets (compare Altschul et al. 2017). Additionally, as epigraphers and archaeologists continue to diversify their digital repertoires, other foci of joint, digitally based research will open in the future.

The digital movement further supports archaeological scholarship on text-bearing objects by making more data available in a centralized location and to a wider audience (compare Cooley 2012, pp. 327–346; Elliott 2014). Digital technologies provide an outlet for dissemination independent of the financial or logistical constraints associated with traditional publishing houses. Moreover, the communities developing many of these technologies are generally attuned to the Open Access and Open Science movements, with many epigraphic projects making their digital datasets freely accessible online (Bozia et al. 2014; see also Depauw and Gheldorf 2014; Haertel 2007; Prag et al. n.d.; Reynolds et al. 2007; USEP 2003–2019). For ethical, methodological, and technological reasons, many epigraphers see the digital transition as the future of their discipline. Comparable efforts are underway in archaeology, too, with the growing popularity of online data repositories, of which The Digital Archaeological Record (tDAR) represents the most prominent initiative to date (Marwick et al. 2017; see also Altschul et al. 2017). Indeed, expansion of digital storage and presentation of research seems inevitable in both fields, given

the impetus throughout the social sciences and humanities to assert contemporary relevance through digital presence.

Epigraphers and archaeologists have already begun significant collaboration in digitally based research areas, as evident from the many innovative studies cited and in the supplementary bibliography. Yet even among these initiatives, many demonstrate the widespread tendency to strongly privilege one dataset over the other, particularly in projects that are not grounded in interdisciplinary data collection and analysis from the onset. Social network and spatial analyses by members of the Maya Hieroglyphic Database Project and scholars of the Khmer empire offer thought-provoking conclusions in their own right but also suggest directions for balancing and expanding interdisciplinary, digitally based research. In considering where monumental inscriptions are positioned in the geopolitical landscape, for instance, researchers could ask, how do texts' locations correlate with archaeological evidence for what they document? How accessible were inscriptions or actual places of ritual practice to people moving through those areas? For ritual contexts like those addressed within the Maya Hieroglyphic Database Project, one could compare the contents of caches associated with monumental texts themselves, for example, to interrogate how memorializing particular rituals may or may not have corresponded with the artifacts intentionally deposited near their hieroglyphic records.

Broadly viewed, the cited Classic Maya and the Khmer studies concern the relationship between an inscription's position and content and human mobility. Subsequent studies could also consider the spatial arrangement of text-bearing objects in terms of consequences for human interaction with their contents. What events or forms of discourse are recorded where, and to whom are they potentially visible? Where are they located relative to archaeological evidence for those activities? And what are the consequences of these answers for understanding human interaction with the material, textual, and physical environment? Digital technologies present a wealth of tools to collaboratively pursue these and other interdisciplinary questions, especially when such research is founded on mutual awareness of how both archaeological and epigraphic evidence can contribute to answering them.

But the digital trajectory of research brings a series of challenges for archaeologists and epigraphers, too (Altschul et al. 2017). First, projects undertaking digital documentation and editing of text-bearing objects, or any archaeological materials for that matter, require substantial financial and human investment in equipment, technical training, and labor for data input that is often done manually from paper records. Rapid and ongoing technological evolution necessitates constant curation of data, metadata, and digital infrastructure to ensure that project outcomes remain functional (Elliott 2014; Kansa et al. 2020). This phenomenon threatens to further widen the gap between institutional and individual haves and have nots, privileging those with the resources to keep pace with technological developments while others fall farther behind (Lor and Britz 2012; Senier 2014). It is particularly problematic when the data being presented freely online originate from communities that are already marginalized and not able to negotiate access, representation, or other rights on equal footing with the data's creators (Earhart 2012; Gupta et al. 2020; Senier 2014; Young 2019).

Moreover, given the scale of many digital projects, scholars (or their students) are occupied for years at a time with data collection and input. Their reduced capacity to conduct analysis slows the pace of disciplinary advancement. The situation becomes especially problematic for researchers employed in academia, where data aggregation, curation, and presentation have relatively low value on the academic hierarchy. Effectively, then, large-scale digital epigraphy initiatives are viable only for tenured scholars who no longer face pressure to regularly produce traditional publications. Long-term impacts of this imbalance remain unclear. Large digital epigraphy projects create opportunities to engage a more diverse population of young academics and to jumpstart their scholarly growth (Reid 2012). But they also run the risk of hampering professional development, keeping important epigraphic and archaeological data and resources in the hands of a few senior scholars, and ultimately increasing barriers of entry into fields that already suffer from silo-ization (Brier 2012; Flanders 2012).

Yet from the challenges also arises a chance to expand interdisciplinary collaboration into the realm of problem solving. As archaeology and epigraphy navigate today's digital research landscape, practitioners of both fields would benefit from direct engagement to find solutions together. Database development, data aggregation, digital publication, curation—these difficulties are common to scholars across the digital humanities and social sciences. To standardize documentation procedures for text-bearing objects and simplify the transfer of information into long-term database storage, for example, epigraphers and archaeologists could collaboratively develop an open source software that is widely compatible, records essential data required by both fields, and can be flexibly adapted to conditions specific to individual research projects (e.g., capacity for born-digital field recording vs. post-field scanning and OCR processing of handwritten field notes). In a more decentralized scenario, archaeologists and epigraphers could enhance data interchange by more regularly using shared digital standards like TEI and XML for data encoding and publication.

In addition to common research endeavors, shared challenges in digital initiatives present another avenue for archaeologists and epigraphers to collaboratively enhance current scholarship on text-bearing objects and to increase interoperability of their data and results. In short, the future of research on text-bearing objects in archaeology and epigraphy certainly has a digital character. However, the degree to which it will resonate throughout the diverse, global community of epigraphers and archaeologists depends largely on the resources, motivations, and political dynamics within each scholarly tradition.

Acknowledgments This research would not have been possible without the TWKM project and especially Katja Diederichs, Sven Gronemeyer, and Christian Prager, who first introduced me to the world of digital epigraphy. I benefitted greatly from many lively exchanges during the Visible Words study trip to Cambodia (May 2016) and workshop (October 2017), especially with John Bodel, Michèle Brunet, Sam Butler, Scott DiGiulio, Arlo Griffiths, Stephen Houston, Darrel Janzen, Christian Prager, and Nicolas Souchon. The thoughts expressed here were also influenced by conversations with Dmitri Beliaev, Albert Davletshin, Philipp Galeev, Alexander Safronov, Alexandre Tokovinine, and Sergei Vepretskii at the 2017 European Maya Conference in Malmö, Sweden; Parker VanValkenburgh and fellow students in his graduate seminar "Archaeology in the Digital Age" in fall 2016; and Carlos Pallán Gayol. Andrew Scherer and Stephen Houston offered perceptive feedback on initial drafts, and Gary Feinman, Alexandre Tokovinine,

and three anonymous reviewers provided insightful comments that significantly contributed to the manuscript's improvement. Any mistakes or omissions remain my own. This article took shape over the course of research conducted with support from a NSF Graduate Research Fellowship (no. DGE 1058262), a NSF Doctoral Dissertation Research Improvement Grant (no. 1821867), and a CLIR-Mellon Fellowship for Dissertation Research in Original Sources.

References Cited

Addiss, S. (2006). *77 Dances: Japanese Calligraphy by Poets, Monks, and Scholars 1568–1868*, Shambhala Publications, Boston.

Al-Jallad, A. (2018). What is ancient North Arabian? In Birnstiel, D., and Pat-El, N. (eds.), *Re-engaging Comparative Semitic and Arabic Studies*, Harrassowitz Verlag, Wiesbaden, pp. 1–44.

Alaql, O., and Lu, C. C. (2014). Text line extraction for historical document images using steerable directional filters. In *Proceedings of the 2014 International Conference on Audio, Language and Image Processing*, IEEE, Shanghai, pp. 312–317.

Alexander, M. C., and Danowski, J. A. (1990). Analysis of an ancient network: Personal communication and the study of social structure in a past society. *Social Networks* **12**: 313–335.

Allen, K. M. S., Green, S. W., and Zubrow, E. B. W. (eds.) (1990). *Interpreting Space: GIS and Archaeology*, Taylor and Francis, New York.

Altschul, J. H., Kintigh, K. W., Klein, T. H., Doelle, W. H., Hays-Gilpin, K. A., Herr, S. A., et al. (2017). Fostering synthesis in archaeology to advance science and benefit society. *Proceedings of the National Academy of Sciences* **114**: 10999–11002.

Amati, V., Munson, J., Scholnick, J., and Habiba, H. (2019). Applying event history analysis to explain the diffusion of innovations in archaeological networks. *Journal of Archaeological Science* **104**: 1–9.

Anaya Hernández, A. (2001). *Site Interaction and Political Geography in the Upper Usumacinta Region during the Late Classic: A GIS Approach*, Archaeopress, Oxford.

Anaya Hernández, A. (2006). Strategic location and territorial integrity: The role of subsidiary sites in the Classic Maya kingdoms of the Upper Usumacinta region. *Internet Archaeology* **19**: https://doi.org/10.11141/ia.19.3.

Anaya Hernández, A., Guenter, S. P., and Zender, M. U. (2003). Sak Tz'i', a Classic Maya center: A locational model based on GIS and epigraphy. *Latin American Antiquity* **14**: 179–191.

Anderson, J., and Christen, K. (2013). 'Chuck a copyright on it': Dilemmas of digital return and the possibilities for traditional knowledge licenses and labels. *Museum Anthropology Review* **7**: 105–126.

Avanzini, A., De Santis, A., Marotta, D., and Rossi, I. (2015). Between harmonization and peculiarities of scientific domains: Digitizing the epigraphic heritage of pre-Islamic Arabia in the project DASI. In Orlandi, S., Santucci, R., Casarosa, V., and Liuzzo, P. M. (eds.), *Information Technologies for Epigraphy and Cultural Heritage*, Sapienza Università Editrice, Rome, pp. 69–93.

Bai, Q. (2003). *Fu Shan's World: The Transformation of Chinese Calligraphy in the Seventeenth Century*, Harvard University Asia Center, Cambridge, MA.

Barmpoutis, A., Bozia,E., and Wagman, R. S. (2010). A novel framework for 3D reconstruction and analysis of ancient inscriptions. *Machine Vision and Applications* **21**: 989–998.

Beck, C. W. (1963). Synthetic elastomers in epigraphy. *American Journal of Archaeology* **67**: 413–416.

Beliaev, D., and de León, M. (eds.) (2013). *Proyecto Atlas Epigráfico de Petén, fase I: Informe final no. 1, temporada abril–mayo 2013*, Dirección General de Patrimonio Cultural y Natural y el Departamento de Monumentos Prehispánicos y Coloniales, Guatemala.

Benefiel, R. (2010). Rome in Pompeii: Wall inscriptions and GIS. In Feraudi-Gruénais, F. (ed.), *Latin on Stone: Epigraphic Research and Electronic Archives*, Lexington Books, Lanham, pp. 45–76.

Benjamin, R. F. (2013). *Journal of Cuneiform Studies*, the early years. *Journal of Cuneiform Studies* **65**: 3–12.

Bíró, P. (n.d.) "Non-Western pre-modern philology: Maya epigraphy and the disciplinary divide." Unpublished manuscript on academia.edu, https://www.academia.edu/1114386/Non-Western_Pre-Modern_Philology_Maya_Epigraphy_and_the_Disciplinary_Divide

Bodard, G., and Romanello, M. (eds.) (2016). *Digital Classics Outside the Echo-Chamber: Teaching, Knowledge Exchange and Public Engagement*, Ubiquity Press, London.

Bodel, J. (2001). *Epigraphic Evidence: Ancient History from Inscriptions*, Routledge, London.
Bodel, J. (2012). Latin epigraphy and the IT revolution. In Davies, J., and Wilkes, J. (eds.), *Epigraphy and the Historical Sciences*, Oxford University Press, Oxford, pp. 275–296.
Bonfante, G., and Bonfante, L. (1989). 'Deciphering' Etruscan. In Duhoux, Y., Palaima, T. G., and Bennet, J. (eds.), *Problems in Decipherment*, Peeters, Leuven, pp. 189–216.
Boone, E. H., and Mignolo, W. D. (eds.) (1994). *Writing Without Words: Alternative Literacies in Mesoamerica and the Andes*, Duke University Press, Durham, NC.
Boone, E. H., and Urton, G. (eds.) (2011). *Their Way of Writing: Scripts, Signs, and Pictographies in Pre-Columbian America*, Dumbarton Oaks, Washington, DC.
Boud'hors, A. (2020). Issues and methodologies in Coptic palaeography. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 19–633.
Bozia, E., Barmpoutis, A., and Wagman, R. S. (2014). Open-Access epigraphy: Electronic dissemination of 3D digitized archaeological material. In *Proceedings of the International Conference on Information Technologies for Epigraphy and Digital Cultural Heritage in the Ancient World (EAGLE 2014)*, Paris, pp. 421–435.
Brier, S. (2012). Where's the pedagogy? The role of teaching and learning in the digital humanities. In Gold, M. K. (ed.), *Debates in the Digital Humanities*, University of Minnesota Press, Minneapolis, pp. 390–401.
Brown, S. J. (2011). *Pastimes: From Art and Antiquarianism to Modern Chinese Historiography*. University of Hawai'i Press, Honolulu.
Brughmans, T. (2013). Thinking through networks: A review of formal network methods in archaeology. *Journal of Archaeological Method and Theory* **20**: 623–662.
Brunson, K., Li, Z., and Flad, R. (eds.) (2016). Oracle bones in East Asia: Tracing the spread and development of oracle bone divination in ancient East Asia. Online project, released 2016-04-04, Open Context, http://opencontext.org/projects/27e90af3-6bf7-4da1-a1c3-7b2f744e8cf7, https://doi.org/10.6078/m74b2z7j.
Bruun, C., and Edmondson, J. (2014a). The epigrapher at work. In Bruun, C., and Edmondson, J. (eds.), *The Oxford Handbook of Roman Epigraphy*, Oxford University Press, Oxford, pp. 3–20
Bruun, C., and Edmondson, J. (2014b). Appendix I: Epigraphic conventions. In Bruun, C., and Edmondson, J. (eds.), *The Oxford Handbook of Roman Epigraphy*, Oxford University Press, Oxford, pp. 785–786.
Bülow-Jacobsen, A. (2011). Writing materials in the ancient world. In Bagnall, R. S. (ed.), *The Oxford Handbook of Papyrology*, Oxford University Press, Oxford, pp. 3–29.
Buonocore, M. (2014). Epigraphic research from its inception: The contribution of manuscripts. In Bruun, C., and Edmondson, J. (eds.), *The Oxford Handbook of Roman Epigraphy*, Oxford University Press, Oxford, pp. 21–41.
Callaghan, M. G. (2014). Maya polychrome vessels as inalienable possessions. In Kovacevich, B., and Callaghan, M. (eds.), *The Inalienable in the Archaeology of Mesoamerica*, American Anthropological Association, Washington, DC, pp. 112–127.
Carò, F., Guy, J., and Sokrithy, I. (2012). The stone quarries of Koh Ker (Preah Vihear Province, Cambodia): Comparison with Koh Ker style sculptures and lintels. In Tjoa-Bonatz, M. L., Reinecke, A., and Bonatz, D. (eds.), *Connecting Empires and States: Selected Papers from the 13th International Conference of the European Association of Southeast Asian Archaeologists*, NUS Press, Singapore, pp. 290–305.
Carruthers, W. (ed.) (2015). *Histories of Egyptology: Interdisciplinary Measures*, Routledge, New York.
Carter, N., Santini, L., Barnes, A., Opitz, R., White, D., Safi, K., Davenport, B., Brown, C., and Witschey, W. (2019). Country roads: Travel, visibility, and Late Classic settlement in the southern Maya Mountains. *Journal of Field Archaeology* **44**: 84–108.
Chadwick, J. (1990). *The Decipherment of Linear B*, 2nd ed., Cambridge University Press, Cambridge.
Childe, V. G. (1929). *The Danube in Prehistory*, Clarendon Press, Oxford.
Chollier, V. (2019). Social network analysis in Egyptology: Benefits, methods and limits. *The Journal of Egyptian Archaeology* **105**: 83–96.
Claßen, E. (2004). Verfahren der "Sozialen Netzwerkanalyse" und ihre Anwendung in der Archäologie. *Archäologische Informationen* **27**: 219–226.
Cline, D. H., and Cline, E. H. (2015). Text messages, tablets, and social networks: The "small world" of the Amarna Letters. In Mynářová, J., Onderka, P., and Pavuk, P. (eds.), *There and Back Again—The Crossroads II*, Charles University, Czech Institute of Egyptology, Prague, pp. 17–44.

Coe, M. D. (2012). *Breaking the Maya Code*, 3rd ed., Thames and Hudson, New York.
Cooley, A. (2012). *The Cambridge Manual of Latin Epigraphy*, Cambridge University Press, Cambridge.
Corbett, G. J. (2012). The signs that bind: Identifying individuals, families and friends in Hismaic inscriptions. *Arabian Archaeology and Epigraphy* **23**: 174–190.
Crouch, M. (2010). Digitization as repatriation? The National Museum of the American Indian's fourth museum project. *Journal of Information Ethics* **19**: 45–56.
Cultural Heritage Imaging. (n.d.a.). Photogrammetry. Electronic document, http://culturalheritageimaging.org/Technologies/Photogrammetry/, accessed 22 Dec. 2017.
Cultural Heritage Imaging. (n.d.b.). Reflectance transformation imaging (RTI). Electronic document, http://culturalheritageimaging.org/Technologies/RTI/, accessed 22 Dec. 2017.
Dana, H., and Parker, D. (2015). Field of view: Northwest Semitic palaeography and reflectance transformation imaging (RTI). In Hutton, J. M., and Rubin, A. D. (eds.), *Epigraphy, Philology, and the Hebrew Bible: Methodological Perspectives on Philological and Comparative Study of the Hebrew Bible in Honor of Jo Ann Hackett*, SBL Press, Atlanta, pp. 209–236.
Daniels, P. T. (1996). The study of writing systems. In Daniels, P. T., and Bright, W. (eds.), *The World's Writing Systems*, Oxford University Press, Oxford, pp. 2–18.
(DASI) Digital archive for the study of pre-Islamic Arabian inscriptions (2013–2017). Electronic database, http://dasi.cnr.it/, accessed 3 Nov. 2019.
Daston, L., and Galison, P. (1992). The image of objectivity. *Representations* **40**: 81–128.
Daston, L., and Galison, P. (2010). *Objectivity*, Zone Books, New York.
Davies, V. (2020). Late nineteenth- and early twentieth-century scientific developments in epigraphy. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 272–284.
Davletshin, A. (2017). Allographs, graphic variants and iconic formulae in the Kohau Rongorongo script of Rapa Nui (Easter Island). *Journal of the Polynesian Society* **126**: 61–92.
de Weerdt, H, Chu, M.-K., and Ho, H-I. (2016). Chinese empires in comparative perspective: A digital approach. *Verge: Studies in Global Asias* **2**: 58–69.
Depauw, M., and Gheldof, T. (2014). Trismegistos: An interdisciplinary platform for ancient world texts and related information. In Bolikowski, Ł., Casarosa, V., Goodale, P., Houssos, N., Manghi, P., and Schirrwagen, J. (eds.), *Theory and Practice of Digital Libraries—TPDL 2013 Selected Workshops*, Springer, Cham, pp. 40–52.
Der Manuelian, P. (1988). ProGlyph: Hieroglyphic font for the Apple Macintosh. *Journal of the American Research Center in Egypt* **25**: 237–241.
Der Manuelian, P. (1998). Digital epigraphy: An approach to streamlining Egyptological epigraphic method. *Journal of the American Research Center in Egypt* **35**: 97–113.
Der Manuelian, P. (2020). An assessment of digital epigraphy and related technologies. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 405–419.
Desmond, L. G. (1994). The application of close-range photogrammetry to archaeology: Chichén Itzá and Uxmal, Yucatán, Mexico, 1989. In Fields, V. M. (ed.), *Seventh Palenque Round Table, 1989*, Pre-Columbian Art Research Institute, San Francisco, pp. 43–48.
Díaz-Andreu García, M. (2007). *A World History of Nineteenth-Century Archaeology: Nationalism, Colonialism, and the Past*, Oxford University Press, Oxford.
Douglass, M., Lin, S., and Chodoronek, M. (2015). The application of 3D photogrammetry for in-field documentation of archaeological features. *Advances in Archaeological Practice* **3**: 136–152.
Dow, S. (1969). *Conventions in Editing: A Suggested Reformulation of the Leiden System*, Duke University Press, Durham, NC.
Doyle, J. (2015). "The blood was pooled, the skulls were piled": Maya star wars and a misconstrued doomsday. Blog post on *Now at The Met*, https://www.metmuseum.org/blogs/now-at-the-met/2015/tortuguero, accessed 11 Apr. 2020.
(DSWG) CIDOC Documentation Standards Working Group. (2006–2019). CIDOC conceptual reference model (CRM). http://www.cidoc-crm.org/, accessed 3 Nov. 2019.
Earhart, A. E. (2012). Can information be unfettered? Race and the new digital humanities canon. In Gold, M. K. (ed.), *Debates in the Digital Humanities*, University of Minnesota Press, Minneapolis, pp. 309–318.
Earl, G., Basford, P., Bischoff, A., Bowman, A., Crowther, C., Dahl, J., et al. (2011). Reflectance transformation imaging systems for ancient documentary artefacts. In Bowen, J. P., Dunn, S., and Ng,

K. (eds.), *Proceedings of the Electronic Visualisation and the Arts (EVA 2011)*, BCS, London, pp. 147–154.

Ebert, C. E., Prufer, K. M., Macri, M. J., Winterhalder, B., and Kennett, D. J. (2014). Terminal Long Count dates and the disintegration of Classic period Maya polities. *Ancient Mesoamerica* **25**: 337–356.

Elliott, T. (2014). Epigraphy and digital resources. In Bruun, C., and Edmondson, J. (eds.), *The Oxford Handbook of Roman Epigraphy*, Oxford University Press, Oxford, pp. 78–86.

Elliott, T., Bodard, G., and Cayless, H. (2006–2017). EpiDoc: Epigraphic documents in TEI XML. Online material, available at https://sourceforge.net/p/epidoc/wiki/Home/, accessed 12 Apr. 2020.

Emirbayer, M., and Goodwin, J. (1994). Network analysis, culture, and the problem of agency. *American Journal of Sociology* **99**: 1411–1454.

Estève, J. (2018). Mapping the sacred: Towards a religious geography of ancient Cambodia through a toponymic atlas of Cambodian inscriptions. In Perret, D. (ed.), *Writing for Eternity: A Survey of Epigraphy in Southeast Asia*, École Française d'Extrême-Orient, Paris, pp. 163–174.

Fash, B. W. (2012). Beyond the naked eye: Multidimensionality of sculpture in archaeological illustration. In Pillsbury, J. (ed.), *Past Presented: Archaeological Illustration and the Ancient Americas*, Dumbarton Oaks, Washington, DC, pp. 449–470.

Fash, B. W. (2017). Decoding Maya hieroglyphs with 3D technology. Lecture at the Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, MA.

Fash, B., and Tokovinine, A. (2008). Scanning history: The corpus of Maya hieroglyphic inscriptions tests a 3-D scanner in the field. *Symbols* **2008**: 17–19.

Felicetti, A., Murano, F., Ronzino, P., and Niccolucci, F. (2015). CIDOC CRM and epigraphy: A hermeneutic challenge. In Ronzino, P., and Niccolucci, F. (eds.), *Extending, Mapping and Focusing the CIDOC CRM*, CRMEX, Poznán, Poland, pp. 55–68.

Firth, R. J., and Skelton, C. (2016a) A study of the scribal hands of Knossos based on phylogenetic methods and find-place analysis. *Minos* **39**: 159–188.

Firth, R. J., and Skelton, C. (2016b) A study of the scribal hands of Knossos based on phylogenetic methods and find-place analysis, Part II: Early, middle and late Knossian writing styles and the dating of the Knossos tablets. *Minos* **39**: 189–213.

Fischer, S. R. (1997). *Rongorongo, The Easter Island Script: History, Traditions, Texts*, Oxford University Press, Oxford.

Flanders, J. (2012). Time, labor, and "alternate careers" in digital humanities knowledge work. In Gold, M. K. (ed.), *Debates in the Digital Humanities*, University of Minnesota Press, Minneapolis, pp. 292–308.

Fox, J. A., and Justeson, J. S. (1984). Appendix C: Conventions for the transliteration of Mayan hieroglyphs. In Justeson, J. S., and Campbell, L. (eds.), *Phoneticism in Mayan Hieroglyphic Writing*, Institute for Mesoamerican Studies, State University of New York, Albany, pp. 363–366.

Gallen, R., Eastop, D., Bozia, E., and Barmpoutis, A. (2015). Digital imaging: The application of shape-from-shading to lace, seals and metal objects. *Journal of the Institute of Conservation* **38**: 41–53.

Gardiner, A. (1957). *Egyptian Grammar: Being an Introduction to the Study of Hieroglyphs*, 3rd ed., Griffith Institute, Ashmolean Museum, Oxford.

Gates, W. E. (ed.) (1931). *An Outline Dictionary of Maya Glyphs: With a Concordance and Analysis of Their Relationships*, John Hopkins Press, Baltimore.

Gatica-Perez, D., Pallán Gayol, C., Marchand-Maillet, S., Odobez, J.-M., Roman-Rangel, E., Krempel, G., and Grube, N. (2014). The MAAYA project: Multimedia analysis and access for documentation and decipherment of Maya epigraphy. In *Proceedings of the Digital Humanities Conference 2014*, Lausanne, http://publications.idiap.ch/index.php/publications/show/2951.

Gattiglia, G. (2015). Think big about data: Archaeology and the big data challenge. *Archäologische Informationen* **38**: 113–124.

Getty Research Institute (2017). Art and architecture thesaurus. Electronic database, http://www.getty.edu/research/tools/vocabularies/aat/, accessed 7 Ma. 2019.

Gillespie, T. W., Smith, M. L., Barron, S., Kalra, K., and Rovzar, C. (2016). Predictive modelling for archaeological sites: Ashokan edicts from the Indian subcontinent. *Current Science* **110**: 1916–1921.

Golitko, M., and Feinman, G. M. (2015). Procurement and distribution of pre-Hispanic Mesoamerican obsidian 900 BC–AD 1520: A social network analysis. *Journal of Archaeological Method and Theory* **22**: 206–247.

Glomb, T., Mertel, M., Pospíšil, Z., and Chalupa, A. (2020). Ptolemaic political activities on the west coast of Hellenistic Asia Minor had a significant impact on the local spread of the Isiac cults: A spatial network analysis. *PLoS ONE* **15**: 1–20.

Graham, I. (1975). *Corpus of Maya Hieroglyphic Inscriptions, Volume 1: Introduction to the Corpus*, Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, MA.

Graham, S. (2006). Networks, agent-based models and the Antonine itineraries: Implications for Roman archaeology. *Journal of Mediterranean Archaeology* **19**: 45–64.

Graham, S. (2014). On connecting stamps—Network analysis and epigraphy. *Les Nouvelles de l'Archéologie* **135**: 39–44.

Greenwood, T. (2014). Armenian epigraphy. In Calzolari, V. (ed.) *Armenian Philology in the Modern Era: From Manuscript to Digital Text*, Brill, Leiden, pp. 101–121.

Griffiths, A. (2017). From the field to the screen: My adventures in digital epigraphy of South and Southeast Asia, so far. Paper presented at the conference Visible Words: Digital Epigraphy in a Global Perspective, Brown University, Providence, RI.

Griffiths, A., and Tournier, V. (2017). Early inscriptions of Āndhradeśa. Electronic database, http://hisoma.huma-num.fr/exist/apps/EIAD/index2.html, accessed 15 Oct 2019.

Gronemeyer, S., Prager, C. M., and Wagner, E. (2016). Evaluating the digital documentation process from 3D scan to drawing. In Prager, C. M. (ed.), *Jahrbuch, Yearbook, Anuario 2014–2015: Textdatenbank und Wörterbuch des Klassischen Maya*, Books on Demand, Norderstedt, pp. 149–157.

Grube, N. (1990). *Die Entwicklung der Mayaschrift: Grundlagen zur Erforschung des Wandels der Mayaschrift von der Protoklassik bis zur spanischen Eroberung*, Karl-Friedrich von Flemming, Berlin.

Grube, N. (1998). Speaking through stones: A quotative particle in Maya hieroglyphic inscriptions. In Dedenbach-Salazar Sáenz, S., Hoffmann, C. A., König, E., and Prümers, H. (eds.), *50 años de estudios americanistas en la Universidad de Bonn: Nuevas contribuciones a la arqueología, etnohistoria, etnolingüística y etnografía de las Américas*, Anton Saurwein, Markt Schwaben, pp. 543–558.

Grube, N., and Fahsen, F. (2002). The workshops on Maya history and writing in Guatemala and Mexico. In Stone, A. (ed.), *Heart of Creation: The Mesoamerican World and the Legacy of Linda Schele*, University of Alabama Press, Tuscaloosa, pp. 216–237.

Grube, N., Prager, C., Diederichs, K., Gronemeyer, S., Wagner, E., Brodhun, M., and Diehr, F. (2017). *Meilensteinbericht 2014–2016*, Textdatenbank und Wörterbuch des Klassischen Maya, Bonn, https://doi.org/10.20376/idiom-23665556.17.pr004.de

Guha, S. (2013). Photographs and archaeological knowledge. *Ancient Asia* **4**: https://doi.org/10.5334/aa.12314

Gupta, N., Blair, S., and Nicholas, R. (2020). What we see, what we don't see: Data governance, archaeological spatial databases and the rights of indigenous peoples in an age of big data. *Journal of Field Archaeology* **45**: S39–S50.

Haertel, R. A. (2007). MayanWiki: An online, consensus-based linguistic corpus of the Mayan hieroglyphs, Unpublished Master's (MA) thesis, Department of Linguistics and English Language, Brigham Young University, Provo, UT.

Hall, K. R. (2010). Indonesia's evolving international relationships in the ninth to early eleventh centuries: Evidence from contemporary shipwrecks and epigraphy. *Indonesia* **90**: 15–45.

Hamidovič, D., Clivaz, C., and Savant, S. B. (eds.) (2019). *Ancient Manuscripts in Digital Culture: Visualisation, Data Mining, Communication*, Brill, Leiden.

Harrist, R. E. (1995). The artist as antiquarian: Li Gonglin and his study of early Chinese art. *Artibus Asiae* **55**: 237–280.

Harrist, R. E. (2008). *The Landscape of Words: Stone Inscriptions from Early and Medieval China*, University of Washington Press, Seattle.

Heggarty, P. (2006). Interdisciplinary indiscipline? Can phylogenetic methods meaningfully be applied to language data—and to dating language? In Forster, P., and Renfrew, C. (eds.), *Phylogenetic Methods and the Prehistory of Languages*, McDonald Institute for Archaeological Research, Cambridge, pp. 183–194.

Helmke, C. G. B., Hoggarth, J. A., and Awe, J. J. (2018). *A Reading of the Komkom Vase Discovered at Baking Pot, Belize*, Precolumbia Mesoweb Press, San Francisco.

Hendrickson, M. (2010). Historic routes to Angkor: Development of the Khmer road system (ninth to thirteenth centuries AD) in mainland Southeast Asia. *Antiquity* **84**: 480–496.

Hendrickson, M. (2012). Connecting the dots: Investigating transportation between the temple complexes of the medieval Khmer (9th–14th centuries CE). In Haendel, A. (ed.), *Old Myths and New*

Approaches: Interpreting Ancient Religious Sites in Southeast Asia, Monash University Publishing, Clayton, Victoria, pp. 70–88.

Hodder, I., and Orton, C. (1976). *Spatial Analysis in Archaeology*, Cambridge University Press, Cambridge.

Houston, S. D. (2000). Into the minds of ancients: Advances in Maya glyph studies. *Journal of World Prehistory* **14**: 121–201.

Houston, S. D. (2004). The archaeology of communication technologies. *Annual Review of Anthropology* **33**: 223–250.

Houston, S. D. (2011). All things must change: Maya writing over time and space. In Boone, E. H., and Urton, G. (eds.), *Their Way of Writing: Scripts, Signs, and Pictographies in Pre-Columbian America*, Dumbarton Oaks, Washington, DC, pp. 21–42.

Houston, S. D. (2016). Crafting credit: Authorship among Classic Maya painters and sculptors. In Costin, C. L. (ed.), *Making Value, Making Meaning: Techné in the Pre-Columbian World*, Dumbarton Oaks, Washington, DC, pp. 391–431.

Houston, S. D., Chinchilla Mazariegos, O., and Stuart, D. (eds.) (2001). *The Decipherment of Ancient Maya Writing*, University of Oklahoma Press, Norman.

Houston, S. D., and Lacadena, A. (2004). Maya epigraphy at the millennium: Personal notes. In Golden, C. W., and Borgstede, G. (eds.), *Continuities and Changes in Maya Archaeology: Perspectives at the Millennium*, Routledge, New York, pp. 103–126.

Houston, S. D., and Martin, S. (2016). Through seeing stones: Maya epigraphy as a mature discipline. *Antiquity* **90**: 443–455.

Houten, P. H. A. (2016). Monumentality in Hispanoroman cities: A social network approach. *Cuadernos de Arqueología de la Universidad de Navarra* **24**: 162–191.

Howe, C. J., Barbrook, A. C., Spencer, M., Robinson, P., Bordalejo, B., and Mooney, L. R. (2001). Manuscript evolution. *Trends in Genetics* **17**: 147–152.

Hu, R., Can, G., Pallán Gayol, C., Krempel, G., Spotak, J., Vail, G., Marchand-Maillet, S., Odobez, J.-M., and Gatica-Perez, D. (2015). Multimedia analysis and access of ancient Maya epigraphy: Tools to support scholars on Maya hieroglyphics. *IEEE Signal Processing Magazine* **32**: 75–84.

Huggett, J. (2015). A manifesto for an introspective digital archaeology. *Open Archaeology* **1**: 86–95.

Huvila, I. (2018). *Archaeology and Archaeological Information in the Digital Society*, Routledge, Milton.

Jackson, S. E. (2013). Writing as material technology: Orientation within landscapes of the Classic Maya world. In Piquette, K. E., and Whitehouse, R. D. (eds.), *Writing as Material Practice: Substance, Surface and Medium*, Ubiquity Press, London, pp. 45–64.

Jo, Y.-H., and Lee, C.-H. (2012). Three-dimensional digital restoration and surface depth modeling for shape analysis of stone cultural heritage: Haeundae stone inscription. *Journal of the Korean Conservation Science for Cultural Properties* **28**: 87–94.

Jones, A. (2002). *Archaeological Theory and Scientific Practice*, Cambridge University Press, Cambridge.

Jones, C., and Satterthwaite, L. (1982). *The Monuments and Inscriptions of Tikal: The Carved Monuments*, University Museum, University of Pennsylvania, Philadelphia.

Jongeling, K., and Kerr, R. M. (eds.) (2005). *Late Punic Epigraphy: An Introduction to the Study of Neo-Punic and Latino-Punic Inscriptions*, Mohr Siebeck, Tübingen.

Just, B. R. (2012). Printed pictures of Maya sculpture. In Pillsbury, J. (ed.), *Past Presented: Archaeological Illustration and the Ancient Americas*, Dumbarton Oaks, Washington, DC, pp. 355–384.

Kalvesmaki, J. (2015). Introducing Athena Ruby, Dumbarton Oaks' new font for Byzantine inscriptions. In Rhoby, A. (ed.), *Inscriptions in Byzantium and Beyond: Methods—Projects—Case Studies*, Austrian Academy of Sciences Press, Vienna, pp. 121–126.

Kansa, S. W., Atici, L., Kansa, E. C., and Meadow, R. H. (2020). Archaeological analysis in the information age: Guidelines for maximizing the reach, comprehensiveness, and longevity of data. *Advances in Archaeological Practice* **8**: 40–52.

Karunarathne, K. G. N. D., Liyanage, K. V., Ruwanmini, D. A. S., Dias, G. K. A., and Nandasara, S. T. (2017). Recognizing ancient Sinhala inscription characters using neural network technologies. *International Journal of Scientific Engineering and Applied Science* **3**: 37–49.

Katz, J., and Tokovinine, A. (2017). The past, now showing in 3D: An introduction. *Digital Applications in Archaeology and Cultural Heritage* **6**: 1–3.

Kavitha, A. S., Shivakumara, P., Kumar, G. H., and Lu, T. (2016). Text segmentation in degraded historical document images. *Egyptian Informatics Journal* **17**: 189–197.

Keenan, J. G. (2011). The history of the discipline. In Bagnall, R. S. (ed.), *The Oxford Handbook of Papyrology*, Oxford University Press, Oxford, pp. 59–78.

Kettunen, H. (2014). Corpus epigraphy: Linguistic implications and didactic applications. In Helmke, C., and Źrałka, J. (eds.), *Contributions in New World Archaeology, Vol. 7*, Polish Academy of Arts and Sciences, Jagiellonian University Institute of Archaeology, Krakow, pp. 37–46.

Kidder, A. V. (1924). *An Introduction to the Study of Southwestern Archaeology with a Preliminary Account of the Excavations at Pecos*, Phillips Academy, Andover.

Kurth, D. (1999). Der Einfluß der Kursive auf die Inschriften des Tempels von Edfu. In Kurth, D. (ed.), *Edfu: Bericht über drei Surveys; Materialien und Studien*, Harrassowitz, Wiesbaden, pp. 69–96.

Kurth, D. (2020). Epigraphic techniques used by the Edfu Project. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 304–315.

Labat, R. (1995). *Manuel d'épigraphie akkadienne: Signes, syllabaire, idéogrammes*, 6th ed., Librairie Orientalisle P. Geuthner, Paris.

Lacadena, A., and Wichmann, S. (2004). On the representation of the glottal stop in Maya writing. In Wichmann, S. (ed.), *The Linguistics of Maya Writing*, University of Utah Press, Salt Lake City, pp. 103–162.

Lambourn, E. (2004). Carving and communities: Marble carving for Muslim patrons at Khambhāt and around the Indian Ocean rim, late thirteenth-mid-fifteenth centuries. *Ars Orientalis* **34**: 99–133.

Lang, D. M. (1955). *Studies in the Numismatic History of Georgia in Transcaucasia*, American Numismatic Society, New York.

Larson, K. A. (2013). A network approach to Hellenistic sculptural production. *Journal of Mediterranean Archaeology* **26**: 235–259.

Lemaire, A. (2015). *Levantine Epigraphy and History in the Achaemenid Period (539–332 BCE)*, Oxford University Press, Oxford.

Lepoutre, A., Southworth, W., Khom, S., Ham, S., Griffiths, A., Elliott, T., and Cayless, H. (2012). Corpus of the inscriptions of Campā, École Française d'Extrême-Orient (EFEO), Institute for the Study of the Ancient World (ISAW), New York University. Electronic database, https://isaw.nyu.edu/publications/inscriptions/campa/index.html, accessed 17 Apr. 2020.

Lertlum, S., and Mamoru, S. (2009). Application of geo-informatics to the study of the royal road from Angkor to Phimai. *Southeast Asian Studies* **46**: 547–563.

Leube, G. (2016). Sacred topography: A spatial approach to the *stelae* of Gao-Saney. *Islamic Africa* **7**: 44–59.

Lewis, A., Woolley, S., Ch'ng, E., and Gehlken, E. (2015). Observed methods of cuneiform tablet reconstruction in virtual and real world environments. *Journal of Archaeological Science* **53**: 156–165.

Lidzbarski, M. (1898). *Handbuch der nordsemitischen Epigraphik, nebst ausgewählten Inschriften, I, Teil: Text*, Emil Felber, Weimar.

Looijenga, T. (2003). *Texts and Contexts of the Oldest Runic Inscriptions*, Brill, Leiden.

López Luján, L. (2012). The first steps on a long journey: Archaeological illustration in eighteenth-century New Spain. In Pillsbury, J. (ed.), *Past Presented: Archaeological Illustration and the Ancient Americas*, Dumbarton Oaks, Washington, DC, pp. 69–105.

Lor, P. J., and Britz, J. J. (2012). An ethical perspective on political-economic issues in the long-term preservation of digital heritage. *Journal of the American Society for Information Science & Technology* **63**: 2153–2164.

Lorrillard, M. (2006). Insights on the diffusion of Lao Buddhism. In Lagirarde, F. (ed.), *Buddhist Legacies in Mainland Southeast Asia*, École Française d'Extrême-Orient, Paris, pp. 139–148.

Liuzzo, P., Mambrini, F., and Franck, P. (2017). Storytelling and digital epigraphy-based narratives in linked open data. In Ioannides, M., Magnenat-Thalmann, N., and Papagiannakis, G. (eds.), *Mixed Reality and Gamification for Cultural Heritage*, Springer, Cham, pp. 507–523.

Lurie, D. B. (2011). *Realms of Literacy: Early Japan and the History of Writing*, Harvard University Asia Center, Cambridge, MA.

Lurie, D. B. (2018). Parables of inscription: Some notes on narratives of the origin of writing. *History and Theory* **56**: 32–49.

Lustig, E. (2011). Using inscription data to investigate power in Angkor's empire. *Aséanie* **27**: 35–66.

Lustig, E., Evans, D., and Richards, N. (2007). Words across space and time: An analysis of lexical items in Khmer inscriptions, sixth-fourteenth centuries CE. *Journal of Southeast Asian Studies* **38**: 1–26.

Lustig, E., and Hendrickson, M. (2012). Angkor's roads: An archaeo-lexical approach. In Tjoa-Bonatz, M. L., Reinecke, A., and Bonatz, D. (eds.), *Connecting Empires and States: Selected Papers from*

the 13th International Conference of the European Association of Southeast Asian Archaeologists, NUS Press, Singapore, pp. 191–208.
Lustig, E., and Lustig, T. (2019). Losing ground: Decline of Angkor's middle-level officials. *Journal of Southeast Asian Studies* **50**: 409–430.
MacDonell, A. A. (1906). The study of Sanskrit as an imperial question. *Journal of the Royal Asiatic Society of Great Britain and Ireland* **1906**(Jul): 673–689.
Macri, M. (1993). *A Sign Catalog of the La Mojarra Script*, Pre-Columbian Art Research Institute, San Francisco, CA.
Macri, M. J., and Looper, M. G. (2003). *The New Catalog of Maya Hieroglyphs, Vol. 1: The Classic Period Inscriptions*, University of Oklahoma Press, Norman.
Mahadevan, I. (1977). *The Indus Script: Texts, Concordance and Tables*, Director General, Archaeological Survey of India, New Delhi.
Maier, P. (2015). Ein TEI-Metadatenschema für die Auszeichnung des Klassischen Maya. *Working Paper 3*. Textdatenbank und Wörterbuch des Klassischen Maya, Bonn. https://doi.org/10.20376/idiom-23665556.15.wp003.de.
Marcus, J. (1976). *Emblem and State in the Classic Maya Lowlands: An Epigraphic Approach to Territorial Organization*, Dumbarton Oaks, Washington, DC.
Martin, S. (2017). The Caracol hieroglyphic stairway. Blog post in *Maya Decipherment*, Stuart, D. (ed.), https://decipherment.wordpress.com/2017/01/20/the-caracol-hieroglyphic-stairway/, accessed 28 Apr. 2018.
Martin, S. (2020). *Ancient Maya Politics: A Political Anthropology of the Classic Period 150–900 CE*, Cambridge University Press, Cambridge.
Marwick, B., d'Alpoim Guedes, J., Barton, C. M., Bates, L. A., Baxter, M., Bevan, A., et al. (2017). Open Science in archaeology. *SAA Archaeological Record* **17**: 8–14.
Mathews, P. (1983). *Corpus of Maya Hieroglyphic Inscriptions: Volume 6, Part 1: Tonina*, Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, MA.
McCoy, M. D. (2017). Geospatial big data and archaeology: Prospects and problems too great to ignore. *Journal of Archaeological Science* **84**: 74–94.
McNair, A. (1994). The engraved model-letters compendia of the Song dynasty. *Journal of the American Oriental Society* **114**: 209–225.
McNair, A. (1995). Public values in calligraphy and orthography in the Tang dynasty. *Monumenta Serica* **43**: 263–278.
McNair, A. (1998). *The Upright Brush: Yan Zhenqing's Calligraphy and Song Literati Politics*, University of Hawai'i Press, Honolulu.
Meletis, D. (2019). The grapheme as a universal basic unit of writing. *Writing Systems Research* **11**: 26–49.
Mendoza Straffon, L. (2019). The uses of cultural phylogenetics in archaeology. In Prentiss, A. M. (ed.), *Handbook of Evolutionary Research in Archaeology*, Springer, Cham, pp. 149–160.
Mendoza Straffon, L. (ed.) (2016). *Cultural Phylogenetics: Concepts and Applications in Archaeology*, Springer, Straffon.
Meyer, É., Parisel, C., Grussenmeyer, P., Revez, J., and Tidafi, T. (2006). A computerized solution for epigraphic surveys of Egyptian temples. *Journal of Archaeological Science* **33**: 1605–1616.
Miksic, J. N. (1995). Evolving archaeological perspectives on Southeast Asia, 1970–95. *Journal of Southeast Asian Studies* **26**: 46–62.
Mills, B. J. (2017). Social network analysis in archaeology. *Annual Review of Anthropology* **46**: 379–397.
Mittica, D., Pellegrino, M., and Rocco, A. (2015). Low-cost structure from motion technology. In Orlandi, S., Santucci, R., Casarosa, V., and Liuzzo, P. M. (eds.), *Information Technologies for Epigraphy and Cultural Heritage*, Sapienza Università Editrice, Rome, pp. 401–420.
Moje, J. (2020). History of recording Demotic epigraphy. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 493–507.
Morlock, E., and Santin, E. (2015). The inscription between text and object: The deconstruction of a multifaceted notion with a view of a flexible digital representation. In Orlandi, S., Santucci, R., Casarosa, V., and Liuzzo, P. M. (eds.), *Information Technologies for Epigraphy and Cultural Heritage*, Sapienza Università Editrice, Rome, pp. 325–350.
Morris, R. L. (1988). *Runic and Mediterranean Epigraphy*, Odense University Press, Odense.
Moser, J. C. (2014). Why cauldrons come first: Taxonomic transparency in the earliest Chinese antiquarian catalogs. *Journal of Art Historiography* **11**: 1–23.

Mueller, K. (2005). Geographical information systems (GIS) in papyrology: Mapping fragmentation and migration flow to Hellenistic Egypt. *The Bulletin of the American Society of Papyrologists* **42**: 63–92.

Mukai, M. (2016). New approaches to pre-modern maritime networks. *Asian Review of World Histories* **4**: 179–189.

Mullen, A. (2007). Linguistic evidence for 'romanization': Continuity and change in Romano-British onomastics: A study of the epigraphic record with particular reference to Bath. *Britannia* **38**: 35–61.

Munson, J., and Macri, M. J. (2009). Sociopolitical network interactions: A case study of the Classic Maya. *Journal of Anthropological Archaeology* **28**: 424–438.

Munson, J., Amati, V., Collard, M., and Macri, M. J. (2014). Classic Maya bloodletting and the cultural evolution of religious rituals: Quantifying patterns of variation in hieroglyphic texts. *PLoS ONE* **9**: e107982.

Munson, J., Scholnick, J., Looper, M. G., Polyukhovich, Y., and Macri, M. J. (2016). Ritual diversity and divergence of Classic Maya dynastic traditions: A lexical perspective on within-group cultural variation. *Latin American Antiquity* **27**: 74–95.

Murugaiyan, A. (2013). Methods in historical linguistics: Evidences from Tamil epigraphic texts. Online document, *HAL*:hal-01194361, https://hal.archives-ouvertes.fr/hal-01194361/document, accessed on 17 Apr. 2020.

Neiman, F. D. (1997). Conspicuous consumption as wasteful advertising: A Darwinian perspective on spatial patterns in Classic Maya terminal monument dates. In Barton, C. M., and Clark, G. A. (eds.), *Rediscovering Darwin: Evolutionary Theory in Archaeological Explanation*, Archeological Papers 7(1), American Anthropological Association, Washington, DC, pp. 267–290.

O'Brien, M. J., and Lyman, R. L. (2005). Cultural phylogenetic hypotheses in archaeology: Some fundamental issues. In Mace, R., Holden, C. J., and Shennan, S. (eds.), *The Evolution of Cultural Diversity*, Routledge, New York, pp. 85–108.

Olson, B. R. (2016). The things we can do with pictures: Image-based modeling and archaeology. In Averett, E. W., Gordon, J. M., and Counts, D. B. (eds.), *Mobilizing the Past for a Digital Future: The Potential of Digital Archaeology*, The Digital Press, University of North Dakota, Grand Forks, pp. 237–249.

Pagel, M. (2017). Darwinian perspectives on the evolution of human languages. *Psychonomic Bulletin and Review* **24**: 151–157.

Pallán Gayol, C. (2018). A preliminary proposal for encoding Mayan hieroglyphs. Unicode Technical Committee Document Registry, Online report, http://www.unicode.org/L2/L2018/18038-mayan.pdf, accessed 16 Aug. 2020.

Pálsson, G. (2020). Cutting the network, knotting the line: A linaeological approach to network analysis. *Journal of Archaeological Method and Theory* https://doi.org/10.1007/s10816-020-09450-1.

Papadaki, A., Agrafiotis, P., Georgopoulos, A., and Prignitz, S. (2015). Accurate 3D scanning of damaged ancient Greek inscriptions for revealing weathered letters. In Gonzalez-Aguilera, D., Remondino, F., Boehm, J., Kersten, T., and Fuse, T. (eds.), *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, International Society of Photogrammetry and Remote Sensing (ISPRS), Avila, Spain, pp. 237–243.

Parmentier, H. (1916). Cartes de l'empire Khmèr: D'après la situation des inscriptions datées. *Bulletin de l'École Française d'Extrême-Orient* **16**: 69–73.

Peeples, M. A. (2019). Finding a place for networks in archaeology. *Journal of Archaeological Research* **27**: 451–499.

Perret, D. (ed.) (2018). *Writing for Eternity: A Survey of Epigraphy in Southeast Asia*, École Française d'Extrême-Orient, Paris.

Petrulevich, A., Backman, A., and Adams, J. (2019). Medieval macrospace through GIS: The Norse World Project approach. *The Cartographic Journal* **57**: 18–27.

Pitard, W. T. (1992). The shape of the 'ayin in the Ugaritic script. *Journal of Near Eastern Studies* **51**: 261–279.

Platnick, N. I., and Cameron, H. D. (1977). Cladistic methods in textual, linguistic, and phylogenetic analysis. *Systematic Zoology* **26**: 380–385.

Polis, S. (2020). Methods, tools, and perspectives of hieratic palaeography. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 550–565.

Porter, J. B. (1981). Relief monuments. In Dillon, B. D. (ed.), *The Student's Guide to Archaeological Illustrating*, Institute of Archaeology, University of California, Los Angeles, pp. 65–77.
Possehl, G. L. (1996). *Indus Age: The Writing System*, University of Pennsylvania Press, Philadelphia.
Pottier, C. (2003). Yasovarman's Buddhist āśrama in Angkor. In Pichard, P. (ed.), *The Buddhist Monastery: A Cross-cultural Survey*, Ecole Française d'Extrême-Orient, Paris, pp. 199–208.
Prag, J., Chartrand, J., Cummings, J., Vitale, V., and Metcalfe, M. (n.d.). I: Sicily. Electronic database, http://sicily.classics.ox.ac.uk, accessed 15 Feb. 2018.
Prager, C. M., Gronemeyer, S., and Wagner, E. (2019). Die Stuttgarter Maya-Stele aus Hix Witz in neuem Licht. In *Tribus: Jahrbuch des Linden-Museums Stuttgart,* Vol. 68, Linden-Museum, Stuttgart, pp. 146–171.
Premo, L. S. (2004). Local spatial autocorrelation statistics quantify multi-scale patterns in distributional data: An example from the Maya Lowlands. *Journal of Archaeological Science* **31**: 855–866.
Radner, K., and Robson, E. (eds.) (2001). *The Oxford Handbook of Cuneiform Culture*, Oxford University Press, Oxford.
Rāġib, Y. (2011). L'épigraphie d'Arabie à la lumière de publications récentes. *Arabica* **58**: 430–435.
Rajan, V. (2016). Quantifying scripts: Defining metrics of characters for quantitative and descriptive analysis. *Digital Scholarship in the Humanities* **32**: 602–631.
Reid, S. (2012). Graduate education and the ethics of the digital humanities. In Gold, M. K. (ed.), *Debates in the Digital Humanities*, University of Minnesota Press, Minneapolis, pp. 350–367.
Reynolds, J., Roueché, C., and Bodard, G. (2007). Inscriptions of aphrodisias. Electronic database, http://insaph.kcl.ac.uk/, accessed 12 Apr. 2020.
Revez, J. (2020). 3D Scanning, photogrammetry, and photo rectification of columns in the Karnak Hypostyle Hall. In Davies, V., and Laboury, D. (eds.), *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford, pp. 388–404.
Rhoby, A. (ed.) (2015a). *Inscriptions in Byzantium and Beyond: Methods—Projects—Case Studies*, Austrian Academy of Sciences Press, Vienna.
Rhoby, A. (2015b) Inscriptions and manuscripts in Byzantium: A fruitful symbiosis? In Maniaci, M., and Orsini, P. (eds.), *Scrittura epigrafica e scrittura libraria: Fra Oriente e Occidente*, Università degli Studi di Cassino e del Lazio Meridionale, Cassino, pp. 15–44.
Rhodes, P. J. (2009). Epigraphy. In Graziosi, B., Vasunia, P., and Boys-Stones, G., *The Oxford Handbook of Hellenic Studies*, Oxford University Press, Oxford, pp. 709–719.
Rick, J. W. (2012). Realizing the illustration potential of digital models and images: Beyond visualization. In Pillsbury, J. (ed.), *Past Presented: Archaeological Illustration and the Ancient Americas*, Dumbarton Oaks, Washington, DC, pp. 413–446.
Rilly, C., and de Voogt, A. (2012). *The Meroitic Language and Writing System*, Cambridge University Press, Cambridge.
Rothe, R. D., Miller, W. K., and Rapp, G. (2008). *Pharaonic Inscriptions from the Southern Eastern Desert of Egypt*, Eisenbrauns, Winona Lake, IN.
Rudolph, R. C. (1963). Preliminary notes on Sung archaeology. *The Journal of Asian Studies* **22**:169–177.
Ruffini, G. (2008). *Social Networks in Byzantine Egypt*, Cambridge University Press, Cambridge.
Salomon, R. (1998). *Indian Epigraphy: A Guide to the Study of Inscriptions in Sanskrit, Prakrit, and the Other Indo-Aryan Languages*, Oxford University Press, Oxford.
Schmidt, N., Boochs, F., and Schütze, R. (2010). Capture and processing of high resolution 3D-data of Sutra inscriptions in China. In Ioannides, M., Fellner, D., Georgopoulos, A., and Hadjimitsis, D. G. (eds.), *Digital Heritage: Third International Conference, EuroMed 2010, Lemessos, Cyprus, November 8–13, 2010: Proceedings*, Springer, Berlin, pp. 125–139.
Scholnick, J., Munson, J., and Macri, M. (2013). Positioning power in a multi-relational framework: A social network analysis of Classic Maya political rhetoric. In Knappett, C. (ed.), *Network Analysis in Archaeology: New Approaches to Regional Interaction*, Oxford University Press, Oxford, pp. 95–124.
Schubert, R. (1998). Höhen und Tiefen: Stereoskopische Aufnahmen mit Flachbettscannern. *Magazine für Computer Technik* **18**: 179–181.
Schubert, R. (2000). Using a flatbed scanner as a stereoscopic near-field camera. *IEEE Computer Graphics and Applications* **20**: 38–45.
Sellen, A. T. (2012). Nineteenth-century photographs of archaeological collections from Mexico. In Pillsbury, J. (ed.), *Past Presented: Archaeological Illustration and the Ancient Americas*, Dumbarton Oaks, Washington, DC, pp. 207–229.

Senier, S. (2014). Digitizing indigenous history: Trends and challenges. *Journal of Victorian Culture* **19**: 396–402.

Sharer, R. J., and Coe, W. R. (1979). The Quirigua Project: 1975 season. In Ashmore, W. (ed.), *Quiriguá Reports*, University Museum, University of Pennsylvania, Philadelphia, pp. 13–32.

Sharer, R. J., and Sedat, D. W. (1987). *Archaeological Investigations in the Northern Maya Highlands, Guatemala: Interaction and the Development of Maya Civilization*, University Museum, University of Pennsylvania, Philadelphia.

Sheseña Hernández, A. (2017). Monumentos arqueológicos del área de Guaquitepec-Sitalá, Chiapas, México: Datos disponibles y nuevas interpretaciones. *Arqueología Iberoamericana* **34**: 68–76.

Sidomulyo, H. (2018). Notes on the topography of ancient Java: Identifying four Sīma territories from the Majapahit period. In Perret, D. (ed.), *Writing for Eternity: A Survey of Epigraphy in Southeast Asia*, École Française d'Extrême-Orient, Paris, pp. 223–242.

Sironen, E. (2015). Zu den Richtlinien für die Edition byzantinischer Inschriften. In Rhoby, A. (ed.), *Inscriptions in Byzantium and Beyond: Methods—Projects—Case Studies*, Austrian Academy of Sciences Press, Vienna, pp. 107–114.

Sitz, A. M. (2019). Beyond spolia: A new approach to old inscriptions in Late Antique Anatolia. *American Journal of Archaeology* **123**: 643–674.

Skelton, C. (2008). Methods of using phylogenetic systematics to reconstruct the history of the Linear B script. *Archaeometry* **50**: 158–176.

Skelton, C., and Firth, R. J. (2016). A study of the scribal hands of Knossos based on phylogenetic methods and find-place analysis, Part III: Dating the Knossos tablets using phylogenetic methods. *Minos* **39**: 215–228.

Slawisch, A., and Wilkinson, T.C. (2018). Processions, propaganda, and pixels: Reconstructing the sacred way between Miletos and Didyma. *American Journal of Archaeology* **122**: 101–143.

Smith, M. L., Gillespie, T. W., Barron, S., and Kalra, K. (2016). Finding history: The locational geography of Ashokan inscriptions in the Indian subcontinent. *Antiquity* **90**: 376–392.

Sober, B., and Levin, D. (2017). Computer aided restoration of handwritten character strokes. *Computer-Aided Design* **89**: 12–24.

Soumya, A., and Kumar, G. H. (2011). SVM classifier for the prediction of era of an epigraphical script. *International Journal of Peer to Peer Networks (IJP2P)* **2**: 12–22.

Soutif, D. (2009). *Organisation religieuse et profane du temple khmer du VIIème au XIIIème siècle,* Ph.D. dissertation, Mondes Iranien et Indien (Ivry-sur-Seine, Val-de-Marne), University Paris III—Sorbonne Nouvelle, École Doctorale Langage et Langues, Paris.

Spencer, M., Windram, H. F., Barbrook, A. C., Davidson, E. A., and Howe, C. J. (2006). Phylogenetic analysis of written traditions. In Forster, P., and Renfrew, C. (eds.), *Phylogenetic Methods and the Prehistory of Languages*, McDonald Institute for Archaeological Research, Cambridge, pp. 67–74.

Springer Bunk, R. A. (2019). El alfabeto líbico-bereber canario: La distribución geográfica de los signos en el norte de África y Sáhara. *Vegueta: Anuario de la Facultad de Geografía e Historia* **19**: 759–772.

Starr, K. (2008). *Black Tigers: A Grammar of Chinese Rubbings*, University of Washington Press, Seattle.

Steiner, M. (2005). *Approaches to Archaeological Illustration*, Council for British Archaeology and Association of Archaeological Illustrators and Surveyors, Bootham, York.

Stenhouse, W. (2005). *Reading Inscriptions and Writing Ancient History: Historical Scholarship in the Late Renaissance*, Institute of Classical Studies, University of London School of Advanced Study, London.

Stone, A. (1995). *Images from the Underworld: Naj Tunich and the Tradition of Maya Cave Painting*, University of Texas Press, Austin.

Stones, M. A. (2017). Mapping illuminated manuscripts: Applying GIS concepts to Lancelot-Grail manuscripts. *Speculum* **92**: S170–S189.

Streiter, O. (2018). Telling stories through R: Geo-temporal mappings of epigraphic practices on Penghu. In Chen, S.-H. (ed.), *Big Data in Computational Social Science and Humanities*, Springer, Cham, pp. 45–94.

Strudwick, N. (2012). Fascimiles of ancient Egyptian paintings: The work of Nina de Garis Davies, Amice Calverley, and Myrtle Broome. In Green, J., Teeter, E., and Larson, J. A. (eds.), *Picturing the Past: Imaging and Imagining the Ancient Middle East*, Oriental Institute, University of Chicago, Chicago, pp. 61–70.

Stuart, D. (1996). Kings of stone: A consideration of stelae in ancient Maya ritual and representation. *RES: Anthropology and Aesthetics* **29/30**: 148–171.

Stuart, D. (2016). Old Notes on /jo/ and /wo/. Blog post in *Maya Decipherment*, Stuart, D. (ed.), https://mayadecipherment.com/2016/10/21/old-notes-on-jo-and-wo/, accessed 11 Apr. 2020.

Stuart, D., Canuto, M. A., and Barrientos, T. (2015). The nomenclature of La Corona sculpture. *La Corona Notes* 2, Mesoweb, San Francisco.

Sundberg, J. R. (2006). A note on the importance of developing digital facsimiles and a digital register of Javanese inscriptions. *Bijdragen tot de Taal-, Land- en Volkenkunde* **162**: 133–136.

Tackett, N. (2014). *The Destruction of the Medieval Chinese Aristocracy*, Harvard University Asia Center, Cambridge, MA.

Tarte, S., Brady, M., Bowman, A., and Terras, M. (2011). Image capture and processing for enhancing the legibility of incised texts. In Holappa, M. (ed.), *Eikonopoiia: Symposium on Digital Imaging of Ancient Textual Heritage*, Faculty of Arts, University of Helsinki, Helsinki, pp. 138–149.

Terrell, J. E. (2013). Social network analysis and the practice of history. In Knappett, C. (ed.), *Network Analysis in Archaeology: New Approaches to Regional Interaction*, Oxford University Press, Oxford, pp. 17–42.

Tokovinine, A. (2006). Art of the Maya epitaph: The genre of posthumous biographies in the Late Classic Maya inscriptions. In Valencia Rivera, R., and Le Fort, G. (eds.), *Sacred Books, Sacred Languages: Two Thousand Years of Ritual and Religious Maya Literature*, Anton Saurwein, Markt Schwaben, pp. 1–19.

Tracy, S. V., Papaodysseus, C., Roussopoulos, P., Panagopoulos, M., Fragoulis, D., Dafi, D., and Panagopoulos, T. H. (2007). Identifying hands on ancient Athenian inscriptions: First steps towards a digital approach. *Archaeometry* **49**: 749–764.

Trigger, B. G. (2006). *A History of Archaeological Thought*, 2nd ed., Cambridge University Press, Cambridge.

Tweten, L., McIntyre, G., and Gardner, C. (2016). From stone to screen: Digital revitalization of ancient epigraphy. *Digital Humanities Quarterly* **10**, http://www.digitalhumanities.org/dhq/vol/10/1/000236/000236.html

Urcid, J. (2001). *Zapotec Hieroglyphic Writing*, Dumbarton Oaks, Washington, DC.

(USEP) U.S. Epigraphy Project. (2003–2019). Electronic database, http://usepigraphy.brown.edu/projects/usep/collections/, accessed 12 Apr. 2020.

VanValkenburgh, P., and Dufton, J. A. (2020). Big archaeology: Horizons and blindspots. *Journal of Field Archaeology* **45**: S1–S7.

Vavulin, M., Nevskaya, I., and Tybykova, L. (2019). Digital macro-photogrammetry in documentation of Old Turkic Runiform inscriptions in the Altai Mountains. *Mediterranean Archaeology and Archaeometry* **19**: 81–104.

Vázquez López, V. A. (2017). Monumental discourse and social distinction: A contextual approach to Classic Maya sculpture. In Banach, M., Helmke, C., and Źrałka, J. (eds.), *Weaving Histories: Women in Mesoamerican Culture, Society and Politics*, Polish Academy of Arts and Sciences and Jagiellonian University Institute of Archaeology, Krakow, pp. 9–48.

Wachowiak, M. J., and Karas, B. V. (2009). 3D scanning and replication for museum and cultural heritage applications. *Journal of the American Institute for Conservation* **48**: 141–158.

Wang, G. (1927). Archaeology in the Sung dynasty, Liu Chonghong (trans.). *China Journal* **6**: 222–231.

Wells, B. K. (2015). *The Archaeology and Epigraphy of Indus Writing*, Archaeopress, Oxford.

Wernke, S. A. (2012). Spatial network analysis of a terminal prehispanic and early colonial settlement in highland Peru. *Journal of Archaeological Science* **39**: 1111–1122.

Whitley, J. (2017). The material entanglements of writing things down. In Nevett, L. C. (ed.), *Theoretical Approaches to the Archaeology of Ancient Greece: Manipulating Material Culture*, University of Michigan Press, Ann Arbor, pp. 71–103.

Wichmann, S., and Good, J. (eds.) (2014). *Quantifying Language Dynamics: On the Cutting Edge of Areal and Phylogenetic Linguistics*, Brill, Leiden.

Wilburn, A. T. (2010). Re-mapping Karanis: Geographic information systems (GIS) and site analysis. In Gagos, T. (ed.), *Proceedings of the XXV International Congress of Papyrology, July 29–August 3, 2007*, American Studies in Papyrology, Ann Arbor, MI, pp. 777–778.

Wu Hung. (2003). On rubbings: Their materiality and historicity. In Zeitlin, J., and Liu, L. (eds.), *Writing and Materiality in China: Essays in Honor of Patrick Hanan*, Harvard University Asia Center, Cambridge, MA, pp. 29–72.

Ya-hwei, H. (2018). The social networks of antiquities collectors in the late northern Song. *Xin Shixue (New History)* **29**: 71–124.

Young, J. C. (2019). The new knowledge politics of digital colonialism. *Environment and Planning A: Economy and Space* **51**: 1424–1441.
Zehrt, C. (n.d.) "Digitising the legacy of a Victorian explorer: The British Museum Google Maya Project." Trustees of the British Museum, https://artsandculture.google.com/exhibit/QgKCKkgImooxIA, accessed Apr. 11, 2020.
Zell, K. (1874). *Handbuch der römischen Epigraphik, Zweiter Theil: Anleitung zur Kenntniss der römischen Inschriften*, 2nd ed., Carl Winters Universitätsbuchhandlung, Heidelberg.
Zender, M. (2008). One hundred and fifty years of Nahuatl decipherment. *The PARI Journal* **8**: 24–37.
Zender, M. (2014). On the reading of three Classic Maya portrait glyphs. *The PARI Journal* **15**: 1–14.
Zimmermann, G. (1956). *Die Hieroglyphen der Maya-Handschriften*, De Gruyter, Hamburg.

Bibliography of Recent Literature

Adamo, A., Bassetto, S., Bitelli, G., Girardi, F., and Girelli, V. A. (2012). 3-D scanning of sculptures and inscriptions at Karkemish. *Near Eastern Archaeology* **75**: 138–138.
Andreu, J., and Serrano, P. (2019). Contributions of the digital photogrammetry and 3D modelling of Roman inscriptions to the reading of damaged tituli: An example from the Hispania Tarraconensis (Castiliscar, Saragossa). *Digital Applications in Archaeology and Cultural Heritage* **12**: e00091.
Aurora, F. (2015). DĀMOS (Database of Mycenaean at Oslo): Annotating a fragmentarily attested language. *Procedia—Social and Behavioral Sciences* **198**: 21–31.
Avanzini, A., Gallo, M., De Santis, A., Marotta, D., and Rossi, I. (2015). Computational lexicography and digital epigraphy: Building digital lexica of fragmentary attested languages in the Project DASI. *2015 Digital Heritage* **2**: 405–408.
Barker, E., and Terras, M. (2016). Greek literature, the digital humanities, and the shifting technologies of reading. *Oxford Handbooks Online*, https://doi.org/10.1093/oxfordhb/9780199935390.013.45.
Bauer, A., Kleivane, E., and Spurkland, T. (eds.) (2018). *Epigraphy in an Intermedial Context*, Four Courts Press, Dublin.
Ben, F. S. A., and Thomas, M. (2014). Shedding new light on ancient objects. *Arion: A Journal of Humanities and the Classics* **22**: 53–74.
Bhuvaneswari, G., and Bharathi, V. S. (2016). An efficient method for digital imaging of ancient stone inscriptions. *Current Science* **110**: 245–250.
Biagetti, S., Kaci, A. A., and di Lernia, S. (2015). The "written landscape" of the central Sahara: Recording and digitising the Tifinagh inscriptions in the Tadrart Acacus Mountains. In Kominko, M. (ed.), *From Dust to Digital*, Open Book Publishers, Cambridge, pp. 1–30.
Bizzarro, A. (2014). Digital graphic documentation of the newly acquired blocks of the Paikuli monument. *Iranica Antiqua* **49**: 383–412.
Blakely, S. (2015). Human geography, GIS technology, and ancient mysteries: A case study from the island of Samothrace. *Getty Research Journal* **7**: 133–141.
Blanke, T., Hedges, M., and Rajbhandari, S. (2013). Towards a virtual data center for Classics. *Bulletin of the Institute of Classical Studies, Supplement* **122**: 81–90.
Brey, A. (2016). Quantifying the Quran. In Muhanna, E. (ed.), *The Digital Humanities and Islamic and Middle East Studies*, De Gruyter, Berlin, pp. 151–174.
Broekaert, W. (2013). Financial experts in a spider web: A social network analysis of the archives of Caecilius Iucundus and the Sulpicii. *Kilo* **95**: 471–510.
Brookes, S., Stokes, P. A., Watson, M., and De Matos, D. M. (2015). The DigiPal project for European scripts and decorations. In Conti, A., Da Rold, O., and Shaw, P. (eds.), *Writing Europe, 500–1450: Texts and Contexts*, Boydell and Brewer, Suffolk, pp. 25–58.
Brumfield, S. (2019). The key to the city: Using digital tools to understand tablet provenience. *Journal of Ancient Near Eastern History* **6**: 97–116.
Cabrera, F. (2017). Cladistic parsimony, historical linguistics and cultural phylogenetics. *Mind and Language* **32**: 65–100.
Carrero-Pazos, M., and Espinosa-Espinosa, D. (2018). Tailoring 3D modelling techniques for epigraphic texts restitution: Case studies in deteriorated Roman inscriptions. *Digital Applications in Archaeology and Cultural Heritage* **10**: e00079.
Carter, N. P. (2017). Epigraphy and empire: Reassessing textual evidence for Formative Zapotec imperialism. *Cambridge Archaeological Journal* **27**: 433–450.

Corpus des inscriptions khmères. (2017). Electronic database, https://cik.efeo.fr/, accessed 12 Apr. 2020.
d'Lorenzo, A., and Annick, P. (2016). The paleography of Anatolian hieroglyphic stone inscriptions. *Journal of Cuneiform Studies* **68**: 107–127.
Davies, V., and Laboury, D. (eds.) (2020). *The Oxford Handbook of Egyptian Epigraphy and Paleography*, Oxford University Press, Oxford.
De Santis, A., and Rossi, I. (eds.) (2018). *Crossing Experiences in Digital Epigraphy: From Practice to Discipline*, De Gruyter, Berlin.
Déléage, P. (2018). Pseudographies: L'écriture révélée d'Emily Babcock. *L'Homme* **227/228**: 49–68.
Di Giuseppantonio Di Franco, P., Galeazzi, F., and Vassallo, V. (eds.) (2018). *Authenticity and Cultural Heritage in the Age of 3D Digital Reproductions*, McDonald Institute for Archaeological Research, University of Cambridge, Cambridge.
Doyle, J. A., Garrison, T. G., and Houston, S. D. (2012). Watchful realms: Integrating GIS analysis and political history in the southern Maya lowlands. *Antiquity* **86**: 792–807.
Dulikova, V., and Marik, R. (2017). Complex network analysis in Old Kingdom society: A nepotism case. In Bárta, M., Coppens, F., and Krejší, J. (eds.), *Abusir and Saqqara in the Year 2015*, Faculty of Arts, Charles University, Prague, pp. 63–83.
Englehardt, J. (2015). *Archaeological Paleography: A Proposal for Tracing the Role of Interaction in Mayan Script Innovation via Material Remains*, Archaeopress, Oxford.
Ezzat, A. (2015). Technological and scientific challenges for digital conservation of cultural heritage in Egypt: The digital library for inscriptions, calligraphies and writings (DLIC) exemplar. In Pinarello, M. S., Yoo, J., Lundock, J., and Walsh, C. (eds.), *Current Research in Egyptology 2014*, Oxbow Books, Oxford, pp. 209–216.
Faigenbaum, S., Sober, B., Finkelstein, I., Moinester, M., Piasetzky, E., Shaus, A., and Cordonsky, M. (2014). Multispectral imaging of two Hieratic inscription from Qubur El-Walaydah. *Ägypten und Levante/Egypt and the Levant* **24**: 349–353.
Felicetti, A., and Murano, F. (2017). Scripta manent: A CIDOC CRM semiotic reading of ancient texts. *International Journal on Digital Libraries* **18**: 263–270.
Felle, A. E. (2014). Perspectives on the digital corpus of the Christian inscriptions of Rome ("Epigraphic database Bari") contexts and texts. *Zeitschrift für Papyrologie und Epigraphik* **191**: 302–307.
Felle, A. E., and Rocco, A. (eds.) (2016). *Off the Beaten Track: Epigraphy at the Borders*, Archaeopress, Oxford.
Gardner, C. A. M., McIntyre, G., Solberg, K., and Tweten, L. (2017). Looks like we made it, but are we sustaining digital scholarship? In Sayers, J. (ed.), *Making Things and Drawing Boundaries*, University of Minnesota Press, Minneapolis, pp. 95–101.
Gautam, N., and See Chai, S. (2017). Optical character recognition for Brahmi script using geometric method. *Journal of Telecommunication, Electronic and Computer Engineering* **9**: 131–136.
Görz, G. (2018). Some remarks on modelling from a computer science perspective. *Historical Social Research/Historische Sozialforschung, Supplement* **31**: 163–169.
Graham, A. S. (2013). The word is not enough: A new approach to assessing monumental inscriptions. A case study from Roman Ephesos. *American Journal of Archaeology,* **117**: 383–412.
Griffiths, A., Hudson, B., Miyake, M., and Wheatley, J. K. (2017). Studies in Pyu epigraphy, I: State of the field, edition and analysis of the Kan Wet Khaung Mound inscription, and inventory of the corpus. *Bulletin de l'École Française d'Extrême-Orient* **103**: 43–205.
Hamann, B. E. (2012). Drawing glyphs together. In Pillsbury, J. (ed.), *Past Presented: Archaeological Illustration and the Ancient Americas*, Dumbarton Oaks, Washington, DC, pp. 231–282.
Heylen, A. (2018). Expressing dynamic maps through seventeenth-century Taiwan Dutch manuscripts. In Chen, S.-H. (ed.), *Big Data in Computational Social Science and Humanities*, Springer, Cham, pp. 95–116.
Hohls, R., Prinz, C., and Schlotheuber, E. (eds.) (2018). *Historische Grundwissenschaften und die digitale Herausforderung*, Clio-online und Humboldt-Universität zu Berlin, Berlin.
Hoogendijk, F. A. J., and van Gompel, S. (eds.) (2018). *The Materiality of Texts from Ancient Egypt: New Approaches to the Study of Textual Material from the Early Pharaonic to the Late Antique Period*, Brill, Leiden.
Huggett, J. (2020). Is big digital data different? Towards a new archaeological paradigm. *Journal of Field Archaeology* **45**: S8–S17.
Hunt, L., Lundberg, M., and Zuckerman, B. (2005). InscriptiFact: A virtual archive of ancient inscriptions from the Near East. *International Journal on Digital Libraries* **5**: 153–166.

Ippolito, A. (2015). Digital documentation for archaeology: Case studies on Etruscan and Roman heritage. *SCIRES-IT* **5**: 71–90.

Johnson, W. R. (2012). The epigraphic survey and the "Chicago method." In Green, J., Teeter, E., and Larson, J. A. (eds.), *Picturing the Past: Imaging and Imagining the Ancient Middle East*, Oriental Institute, University of Chicago, Chicago, pp. 31–38.

Juloux, V. B., Gansell, A. R., and di Ludovico, A. (eds.) (2018). *CyberResearch on the Ancient Near East and Neighboring Regions: Case Studies on Archaeological Data, Objects, Texts, and Digital Archiving*, Brill, Leiden.

Kelly, P. (2016). Introducing the Eskaya writing system: A complex messianic script from the southern Philippines. *Australian Journal of Linguistics* **36**: 131–163.

Kelley, K., and Wood, R. K. L. (eds.) (2018). *Digital Imaging of Artefacts: Developments in Methods and Aims*, Archaeopress, Oxford.

Knappett, C. (ed.) (2013). *Network Analysis in Archaeology: New Approaches to Regional Interaction*, Oxford University Press, Oxford.

Knoll, M. K., and Carver-Kubik, A. (2019). In-field digital photography and the curation of associated records: Not all prints are created equal. *Advances in Archaeological Practice* **7**: 302–310.

Lamé, M. (2012). *Epigraphie en réseau: Réflexions sur les potentialités d'innovations dans la représentation numérique d'inscriptions complexes*, Ph.D. dissertation, Centre Camille Jullian Université de Provence (Aix-Marseille 1) and Dipartimento di Storia Antica, Università di Bologna, Aix-Marseille.

Lanig, S., Höfle, B., Auer, M., Schilling, A., Deierling, H., and Zipf, A. (2011). Geodateninfrastrukturen im historischgeographischen Kontext—Buddhistische Steinschriften in der Provinz Sichuan/China. In Strobl, J., Blaschke, T., and Griesebner, G. (eds.), *Angewandte Geoinformatik 2011*, Herbert Wichmann, Berlin, pp. 740–749.

Lowe, A. (2015). Tomb recording: Epigraphy, photography, digital imaging, and 3D surveys. In Wilkinson, R. H., Kent R., and Weeks, K. R. (eds.), *The Oxford Handbook of the Valley of the Kings*, Oxford University Press, Oxford, pp. 528–543.

Mansurnoor, I. A. (2016). Enhancing knowledge through archaeology and epigraphy: Research and development. *Heritage of Nusantara: International Journal of Religious Literature and Heritage* **5**: 183–211.

Matsuura, F. (2017). Recent developments in Khmer epigraphy. *Asian Research Trends* **12**: 85–106.

Orlando, E. (2014). Geographic Information System—A suitable "bridge" between epigraphy and archaeology. Blog post in *Current Epigraphy*, https://currentepigraphy.org/2014/10/16/geographic-information-system-a-suitable-bridge-between-epigraphy-and-archaeology/, accessed Apr. 12, 2020.

Orlandi, S., Santucci, R., Casarosa, V., and Liuzzo, P. M. (eds.) (2014). *Information Technologies for Epigraphy and Cultural Heritage*, Sapienza Università Editrice, Rome.

Orlandi, S., Santucci, R., Mambrini, F., and Liuzzo, P. M. (eds.) (2017). *Digital and Traditional Epigraphy in Context*, Sapienza Università Editrice, Rome.

Ollett, A. (2017). *Language of the Snakes: Prakrit, Sanskrit, and the Language Order of Premodern India*, University of California Press, Oakland.

Palme, B. (2014). Electronic media and changing methods in classics. In Dávidházi, P. (ed.), *New Publication Cultures in the Humanities*, Amsterdam University Press, Amsterdam, pp. 117–128.

Papaodysseus, C., Rousopoulos, P., Giannopoulos, F., Zannos, S., Arabadjis, D., Panagopoulos, M., Kalfa, E., Blackwell, C., and Tracy, S. (2014). Identifying the writer of ancient inscriptions and Byzantine codices: A novel approach. *Computer Vision and Image Understanding* **121**: 57–73.

Parker, H. D. D., and Rollston, C. A. (2016). The epigraphic digital lab: Teaching epigraphy in the twenty-first century CE. *Near Eastern Archaeology* **79**: 44–56.

Parmington, A. (2011). *Space and Sculpture in the Classic Maya City*, Cambridge University Press, Cambridge.

Piquette, K. E., and Whitehouse, R. D. (eds.) (2013). *Writing as Material Practice: Substance, Surface and Medium*, Ubiquity Press, London.

Ponchio, F., Lame, M., Scopigno, R., and Robertson, B. (2018). Visualizing and transcribing complex writings through RTI. In *2018 IEEE 5th International Congress on Information Science and Technology (CiSt)*, IEEE, Marrakech, Morocco, pp. 227–231.

Raffaella Da, V. (2019). Interlocking networks and the sacred landscape of Hellenistic northern Etruria: Capturing social and geographic entanglement through social network analysis. *Open Archaeology* **5**: 505–518.

Ramírez-Sánchez, M., García Sánchez, M., and Giralt Soler, S. (2015). Epigraphia 3D: Un proyecto de innovación científica en la divulgación del patrimonio epigráfico de Hispania. *Epigraphica* **77**: 371–396.

Ramírez-Sánchez, M., Suárez Rivero, J. P., and Guerra Soto, H. (2017). La epigrafía romana de Augusta Emerita más allá del Museo: Digitalización, modelización 3D y difusión a través de dispositivos móviles. *Revista de Humanidades Digitales* **1**: 96–115.

Ruwanmini, D. A. S., Liyanage, K. V., Karunarathne, K. G. N. D., Dias, G. K. A., and Nandasara, S. T. (2016). An architecture for an inscription recognition system for Sinhala epigraphy. *International Journal of Research* **4**: 48–64.

Samaan, M., Deseilligny, M. P., Heno, R., De La Vaissière, E., and Roger, J. (2016). Close-range photogrammetric tools for epigraphic surveys. *Journal on Computing and Cultural Heritage* **9**: 1–18.

Schmidt, D. (2014). Towards an interoperable digital scholarly edition. *Journal of the Text Encoding Initiative* **7**: https://doi.org/10.4000/jtei.979.

Schmidt, N., Schütze, R., and Boochs, F. (2011). 3D-sutra: Interactive analysis tool for a web atlas of scanned Sutra inscriptions in China. *Photogrammetric Record* **26**: 488–505.

SEAlang. (n.d.). Corpus of Khmer inscriptions. Electronic database, http://sealang.net/classic/khmer/, accessed 17 Apr. 2020.

Seland, E. H. (2015). Writ in water, lines in sand: Ancient trade routes, models and comparative evidence. *Cogent Arts and Humanities* **2**: https://doi.org/10.1080/23311983.2015.1110272.

Sommerschield, T. (2019). A new Sicilian curse corpus: A blueprint for a geographical and chronological analysis of defixiones from Sicily. In Morais, R., Leão, D., Rodríguez Pérez, D., and Ferreira, D. (eds.), *Greek Art in Motion*, Archaeopress, Oxford, pp. 489–501.

Soumya, A., and Kumar, G. H. (2011). Automatic decipherment of ancient Indian epigraphical scripts: A brief review. *International Journal of Computer Science and Emerging Technologies* **2**: 139–143.

Streiter, O., and Goudin, Y. (2013). Tackling the question of Tanghao on Taiwan's tombstones in the framework of digital anthropology. *International Journal of Humanities and Arts Computing: A Journal of Digital Humanities* **7**: 120–143.

Strudwick, N., and Strudwick, H. (eds.) (2011). *Old Kingdom, New Perspectives: Egyptian Art and Archaeology 2750–2150 BC*, Oxbow Books, Oxford.

Tokovinine, A., and Estrada Belli, F. (2017). From stucco to digital: Topometric documentation of Classic Maya facades at Holmul. *Digital Applications in Archaeology and Cultural Heritage* **6**: 18–28.

Thum, J. G. (2019). *Words in the Landscape: The Mechanics of Egyptian Royal Living-Rock Stelae,* Ph.D. dissertation, Joukowsky Institute for Archaeology and the Ancient World, Brown University, Providence, RI.

Uesugi, H., Uesugi, M., and Tani, T. (2018). Image processing scheme for archiving epigraphs. In *2018 3rd Digital Heritage International Congress (DigitalHERITAGE)*, IEEE, Marrakech, Morocco, pp. 227–231.

Urcia, A., Darnell, J. C., Darnell, C. M., and Zaia, S. E. (2018). From plastic sheets to tablet PCs: A digital epigraphic method for recording Egyptian rock art and inscriptions. *African Archaeological Review* **35**: 169–189.

Vértes, K., and The Epigraphic Survey. (2014). *Digital Epigraphy*, The Epigraphic Survey, Oriental Institute, University of Chicago, Chicago.

von Hinüber, O. (2013). Behind the scenes: The struggle of political groups for influence as reflected in inscriptions. *Indo-Iranian Journal* **56**: 365–379.

Watrall, E. (2016). Archaeology, the digital humanities, and the "big tent." In Gold, M. K., and Klein, L. F. (eds.), *Debates in the Digital Humanities 2016*, University of Minnesota Press, Minneapolis, pp. 345–358.

Watrall, E. (2018). Public heritage at scale: Building tools for authoring mobile digital heritage and archaeology experiences. *Journal of Community Archaeology and Heritage* **5**: 114–127.

Watrall, E. (2019). Building scholars and communities of practice in digital heritage and archaeology. *Advances in Archaeological Practice* **7**: 140–151.

Wei, L. (2019). Epigraphy in the landscape: Intersections with contemporary ink painting and land art. In Gheorghiu, D., and Barth, T. (eds.), *Artistic Practices and Archaeological Research*, Archaeopress, Oxford, pp. 125–144.

Zeldes, A., and Schroeder, C. T. (2015). Computational methods for Coptic: Developing and using part-of-speech tagging for digital scholarship in the humanities. *Digital Scholarship in the Humanities* **30**: i164–i176.