Replicating Writing: Moulding and Stamping Hieroglyphs on Classic Maya Ceramics

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A fundamental distinction is made in craft production between custom or bespoke creation and mechanical reproduction that generates multiple iterations of the same form. In Mesoamerica, technologies of reproduction are attested by around the sixth century BC *in the form of moulding and stamping, and they become increasingly common in ceramic production in the Maya and neighbouring regions in the third or fourth century. Beginning in the Late Classic period (*c. *600–830* AD*), Maya artisans applied them to the hieroglyphic script as well, generating a corpus of texts that are at once fundamentally distinct from and intimately linked to the broader scribal tradition dominated by hand-written texts. This article examines Classic Maya texts moulded and stamped on ceramics in the context of scribal practice and the social and cultural role of the script. I argue that these artefacts manifest changes not only in hieroglyphic production, but also in writing's role in user communities. Consequentially, they invite reconsideration of scribal practice's relationship to other crafting traditions, as well as the diversity of modes of engaging in Classic Maya scribal tradition.*

Introduction

Since ancient times, a basic difference in craft production has distinguished custom or bespoke production from modes of mechanical reproduction. In the former tradition, objects are made by hand on an individual basis, often with a particular recipient or user in mind. Mechanical reproduction, in contrast, utilizes some sort of pre-form, such as a mould or stamp, as a model for the intended product. Significantly, the latter has the capacity to generate multiple iterations of an object using the same pre-form, although the faithfulness of reproduction hinges on the nature of the pre-form, the material and the precise technology in use, among other factors. Because of this potential, techniques like moulding and stamping facilitate efficient (re)production of like objects and simultaneously discourage formal variation. Custom-made items may be more labour-intensive, but can be tailored to individual specifications.

Technologies of mass reproduction transform an object's relationship to its producers by engaging distinct constellations of practitioners relative to bespoke craftsmanship (Eisenstein 1979, 56–7). For Maya potters during the Late Classic (*c.* 600–830 AD) and Terminal Classic periods (*c.* 830–925 AD), texts hand-written on pottery *versus* those moulded or stamped in clay implicated dissimilar production methods and often correlated with differences in form, region and contents. Fine polychrome ceramics, for example, were collective, custom productions, with trained specialists and less proficient assistants variously responsible for preparing the recipe and forming, firing and painting the vessels (Reents-Budet 1994, 218–22; Rice 2009, 128–36). Hence, generating the substantial quantities of polychrome pots with painted texts attested today, as well as the unknown number that may never be recovered, would have employed a sizable number of specialists familiar enough with Maya script to be able to produce, copy, or at least imitate the glyphs they were rendering.

Potting with stamps and moulds, in turn, requires less training and skill and fewer personnel (Arnold 1999, 64–6, 69; Halperin 2009, 381–7; 2014,

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155, 159; see overview of manufacturing process in Causey 1985, 26–61). The major labour investment was in creating the pre-form itself, particularly if it required specialised artistic or scribal knowledge (Arnold 2008, 248; see Hammond 1975, 371–2). But generating objects with that pre-form would have required no technical knowledge beyond that necessary to harvest and prepare the clay, press it into the mould and fire it. Consequentially, sizable quantities of ceramic texts could have been—and, as will be discussed below, in some cases were—generated in communities with just a handful of artisans versed in the hieroglyphic writing system.

This technological distinction in ceramic production has significant implications for Classic Maya scribal tradition. Most epigraphic studies of Maya ceramics have focused on painted and, to a lesser extent, incised hieroglyphs (e.g. Coe 1973; Coe & Kerr 1997; Reents-Budet 1994). Although moulded and stamped pottery by no means represents a new research topic in Maya archaeology, much prior work has focused on its consequences for understanding socio-political or economic organization (e.g. Halperin 2009, 387–96; 2014, 143–85; Ting & Helmke 2013, 45–7). Scholars have examined subsets of ceramics with mould-made or stamped glyphs (e.g. Card & Zender 2016; Helmke & Reents-Budet 2008; Houston 2012; 2016a; Pérez Galindo 2006; Werness 2003), but without exploring their collective implications for Maya aesthetics, ceramic technology and scribal practice (see Causey 1985, 89–91).

This article addresses the consequences of moulded and stamped ceramic texts for understanding scribal practice and the social and cultural role of the hieroglyphic script during the Late and Terminal Classic. The principal distinction of these texts lies in their technological origin: unlike their hand-written counterparts, they are generated by moulding and stamping, modes of reproduction that could and often did generate multiple iterations of the same form. These methods of hieroglyphic writing influenced the form and content of the texts themselves. But, perhaps more significantly, their adoption indicated a shift in the social conditions of production: moulding and stamping technologies permitted, at least in theory, the same number of artisans to generate more objects than would be possible in bespoke production, and required the input of fewer expert artisans to do so. Critically, moulding and stamping were thus well-adapted for writing in contexts where literacy among producers was relatively limited. Moreover, the potential recipients of copies generated with the same pre-form were necessarily more diverse than the intended users of a single, custom-made text. Thus, moulded texts manifest a relationship between user, producer and object that was distinct from that implicated in hand-written texts, which comprise most of the epigraphic corpus.

I argue that moulded and stamped texts on ceramics manifest changes in scribal practice, as well as in values concerning text use and access. The application of moulding and stamping to scribal production paradoxically generated hieroglyphic material that was distributed to a wider population than had access to polychrome ceramics with hand-painted hieroglyphs, but using a technology that required significantly fewer literate producers than would a comparable quantity of bespoke texts. Nonetheless, the evidence indicates that potters did not consistently use these technologies to replicate texts in multiples, suggesting that potential volume of production was not necessarily a key factor underlying this shift in writing technology. Some characteristics of moulded and stamped writing, such as repetition of specific glyphic sequences attested in other media or adherence to basic canons of visual presentation, indicate that producers were familiar with broader trends in Classic Maya scribal tradition. Yet these features are juxtaposed against other material and contextual traits, such as a proliferation of non-linguistic pseudo-glyphs and the unusual forms of many ceramics on which these texts occur, which indicate that their production was fundamentally rooted in the more immediate cultural conditions of their creation and use.

Technologies of reproduction in early societies

Compared to bespoke craft production, technologies of mechanical reproduction imply a significant difference in the nature of the objects they generate. The key twentieth-century theorist on this distinction, Walter Benjamin ([1936] 2008, 21), argues that the 'authenticity' of artwork, its 'aura', depends on both 'the here and now' of its present context and the parallel 'tradition' or history by means of which it came to be. Technologies of reproduction obscure or lessen the aura, because the work's '*existence*' becomes '*mass*' or multiple, rather than '*unique*' (Benjamin [1936] 2008, 22, emphasis in original; see also McLuhan 2003, 217; compare Egan 2011, 41, 51–2). With more iterations available, the object becomes 'common' and 'exchangeable' by virtue of its multiplicity, and is revalued and thus open to circulation as a commodity (Kopytoff 1986, 69; see Appadurai 1986, 3; Benjamin [1936] 2008, 21). Furthermore, replication technologies change an object's relationship with its user. As Benjamin ([1936] 2008, 36, emphasis in original) posits, '*technological reproducibility of the artwork changes the*

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relation of the masses to art' by allowing more people to participate at a larger scale than when unique pieces were generated by hand (see also McLuhan 2003, 19–20; compare Anderson [1983] 2006, 42–5).

At the same time, the fundamentally transformative process of replication destabilizes an object's aura and, almost ironically, reveals discrepancies between resultant iterations (Boon 2010, 35, 91). In this respect, copying is not mere imitation, but rather creation of something different, albeit not completely novel (Boon 2010, 91–2). Hence, copies may and often do possess an aura distinct from the object that they mimic, if indeed one exists (compare Harrist 1999, 17–20). In some cases, objects may be reproduced with a pre-form from which they fundamentally differ, like a cast or mould, in which case the pre-form could be conceptualized as an 'original' that is nonetheless not copied by the objects produced with it (Gumbrecht & Marrinan 2003, 131). Thus, copies may co-exist as an 'original' in the absence of one version generally recognized as the predecessor to the others (Gumbrecht & Marrinan 2003, 131–2; Siegert 2003, 30–31; Wong 2013, 16).

This situation in which the products of mechanical reproduction were valued as goods in their own right seems more akin to that of the Late and Terminal Classic Maya than that privileging a single, higher-status 'original' over pre-formed copies thereof. Maya moulded and stamped ceramics have been recovered from elite burials and other ritual contexts, where they were interred as offerings along with other precious, bespoke goods, including painted ceramics (Bill 1997, 537; Eppich & Loughmiller-Cardinal 2014; Helmke & Halperin 2001, 47–50; Werness 2003, 3–4; e.g. Card & Zender 2016, 280–81; Navarro Farr *et al.* 2013, foto 1.15; Źrałka & Hermes 2012, 175, fig. 22). This pattern suggests that their users did not consider them inherently less significant because they were made by mould or stamp or existed in multiple replications. Their mode of production may have even been a source of value, as suggested by other ceramics whose motifs appear to have been crafted by hand to mimic the effects of a pre-form (Stephen Houston pers. comm., 2016).

Although they developed independently from Old World traditions, moulding and stamping in Mesoamerica may be considered part of the same technological phenomenon found in early societies across the globe. In many of these contexts, reproduction technologies were mobilized to write, and often on a much greater scale than among the Classic Maya. The earliest texts moulded or stamped on material surfaces tended to be relatively concise and general, like the name tags found on mechanically replicated rings at Amarna, Egypt, from the fourteenth century BC (Quirke & Tajeddin 2010, 343–4). Later, moulding and especially stamping were applied to mass-produce texts as artefacts themselves. This innovation is first attested in China, where xylography (woodblock printing) appeared *c.* 700 AD, followed by movable type around the mid eleventh century (Tsuen-Hsuin 1985, 1–2). Scholars continue to debate the extent to which these developments influenced comparable practices elsewhere in Eurasia, if at all (Tsuen-Hsuin 1985, 3), although writing was not mass-produced in Europe until the fifteenth century (see Eisenstein 1979).

These innovations fundamentally transformed scribal practice in these regions relatively soon after their introduction (see Chia & De Weerdt 2011; Eisenstein 1979), albeit to differing effects (Eisenstein 2011, xii). Iterations of writing were (re-)valued based on whether they were printed by hand or machine, as well as whether their producer was legitimate or illicit (Mellot 2007, 43). In eleventh- and twelfth-century China, for instance, scribal copying retained currency even after the rise of woodblock printing, due to the cultural and aesthetic value attached to the practice (Egan 2011, 41, 51–2; Harrist 1999, 12–15). Yet in the Islamic world, printed books assumed 'a degree of solidity and authority that went far beyond the solidity and authority of the manuscript copy or copies of the same book' (Mahdi 1995, 5). Indeed, the relative value attributed to 'originals' *versus* 'reproductions' is dynamic and culturally situated (e.g. Harrist 1999, 17–20; Wong 2013, 13–16; see Appadurai 1986). Thus, technologies of writing cannot be understood outside their contexts of use and reception.

Moulding and stamping in Mesoamerica and the Maya region

Moulding and stamping have long histories in Mesoamerica, with ceramic seals and stamps attesting to their presence since at least the Middle Preclassic (c. 1100–400 BC) (Halperin 2014, 6; see Kelley 1966; Lee 1969, 71–87; Sedat 1992, 87–8, fig. 4.5). In the Maya and neighbouring regions, ceramic figurines appear during the Early Classic (*c.* 250–600 AD) as the first known products of these replication technologies (see Causey 1985, 12–18). Impetus for mass reproduction among Maya potters seems to have come from the west. Some stylistic and technological input came from Veracruz on the Gulf Coast of Mexico and the Pacific Coast of Guatemala (Bove & Busto 2003, 51–72; Halperin 2009, 381; 2014, 6–7; Kidder 1965, 150; Wyllie 2002, 91–125). But the more significant player was probably Teotihuacan, the dominant Central Mexican polity whose cultural and political

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influence throughout Mesoamerica long outlasted the centre itself (Wyllie 2002, 92–4; see Halperin 2014, 47–50, 211, fig. 3.4; Kidder *et al.* 1946, 169–71, 197–201, 253). Ceramic moulds and their products, especially figurines, are abundant there, where they appear by the fourth century AD and persist in the region even after the polity's decline in the seventh century (Goldsmith 2000, 9, table 1; Pasztory 1997, 167, 227; Scott 1994, 47–52). And it was precisely after the spectre of Teotihuacan began to retreat that moulded ceramics took off in the Maya region, beginning in the eighth century during the Late Classic (Halperin 2014, 6–7). The reasons for this pattern are unclear, but adoption of the technique may have been inspired by economic exchange (Wyllie 2002, 92). This may particularly have been the case along the Pacific coast, where some of the earliest moulded and stamped Maya ceramic texts may have been produced as a burgeoning class of non-royal elites sought new material expressions of their societal roles (Stephen Houston pers. comm. 2016; compare Halperin 2014, 7).

Given that Teotihuacan moulded ceramics include figurine plaques and bowls with glyphic or glyph-like contents like those produced in Maya communities, Teotihuacano influence on Maya practices likely was not just technological, but also formal and stylistic (Wyllie 2002, 92; e.g. Halperin 2014, fig. 3.4b; Pasztory 1997, 120; Taube 2000, 10–11, fig. 18). Yet despite the conceptual and technological foundations and materiality shared by these traditions of moulded and stamped ceramics, Maya potters incorporated their own stylistic interpretations into their wares, rather than merely imitating foreign elements wholesale (Wyllie 2002, 92). The products created with these imported (or at least foreign-inspired) technologies of reproduction often diverge from the forms and functions typical of their prototypes from Teotihuacan, Veracruz, or the Pacific Coast, for example by recombining adopted motifs in innovative configurations (Wyllie 2002, 92), even while drawing on more Central Mexican iconographic elements like atlatls (e.g. Sabloff 1970, fig. 46b; Smith 1955, fig. 86d). Furthermore, moulding and stamping were frequently combined with other, bespoke techniques (e.g. Halperin 2014, 7, 158–9; Smith 1955, 28, 43; see Causey 1985, 11–18), with the result that relatively few Maya figurines or vessels were produced without some intervention by the artisan's hand.

Maya texts were moulded or stamped in ceramic traditions with both explicitly local and more broadly regional spheres of distribution (Fig. 1). Of these traditions, moulded-carved (sometimes 'modelled-carved') vessels are the most widespread and certainly the best studied ceramics with pre-formed glyphs (Fig. 2). The three most widely attested types, Pabellon, Sahcaba and Ahk'utu', seem to have developed in parallel as part of a shared ceramic system (Helmke & Reents-Budet 2008, 39). Nonetheless, they are distinct with respect to paste composition and slip (Sabloff 1975, 32, see fig. 21; Sayre & Chan 1971, 165; Smith 1955, 34; Ting & Helmke 2013, 45–6; Willey 1978, 48, fig. 53; see also Graham *et al.* 1980, 165; Helmke & Reents-Budet 2008, 39). They also assume different forms, although barrel-shaped cylinders and bowls seem to be especially common among those vessels with moulded or stamped glyphs (see Foias & Bishop 2013, 287–8; Helmke & Reents-Budet 2008, 40; Sabloff 1970, 365, 369; 1975, 198; Smith 1955, 43).

The combined distribution of Pabellon, Sahcaba and Ahk'utu' Moulded-Carved covers the better part of the southern Lowlands (Helmke 2001, fig. 2; Wyllie 2002, 115, fig. 6.12). The centre of confluence appears to have been in central Belize and the central and eastern Petén, where all three are attested. However, each type manifests a somewhat different individual distribution, possibly reflecting 'three principal and slightly discrete zones of socio-political interaction' (Helmke & Reents-Budet 2008, 44). Pabellon is the most widespread, found across the Petén west into the Usumacinta drainage and down into western Honduras and El Salvador. Evidence from archaeological excavations and chemical sourcing suggests that a key locus of Pabellon production was the region of the upper Usumacinta and Pasión rivers, where it was produced at multiple sites before being distributed across much of the Maya region (Bishop & Rands 1982; Foias & Bishop 2013, 350–61). Sahcaba and Ahk'utu' are more localized, the former in the northeastern Petén and northwestern Belize and the latter across northern Belize and the eastern Petén (see Helmke 2001, fig. 2, tables 2–3).

Even more variation is apparent among Modelled-Carved pottery when considering types that share key traits with Pabellon, Sahcaba and Ahk'utu'—namely, very fine paste and use of a pre-form in production—but were produced and distributed more locally. On the southeastern periphery of the Maya region, for instance, Molanphy Modelled-Carved ceramics with 'glyphic and other complex designs' occur in very small quantities between 600–700 AD (Willey *et al.* 1994, 49–50), somewhat earlier than Modelled-Carved vessels' initial appearance in the Maya Lowlands to the north and west (Alexandre Tokovinine pers. comm., 2017). A slightly later Modelled-Carved type from that area, Madrugada/Don Gordon, appears from approximately 600–900 AD in the form of cylinder vessels and bowls frequently elaborated with bands of moulded

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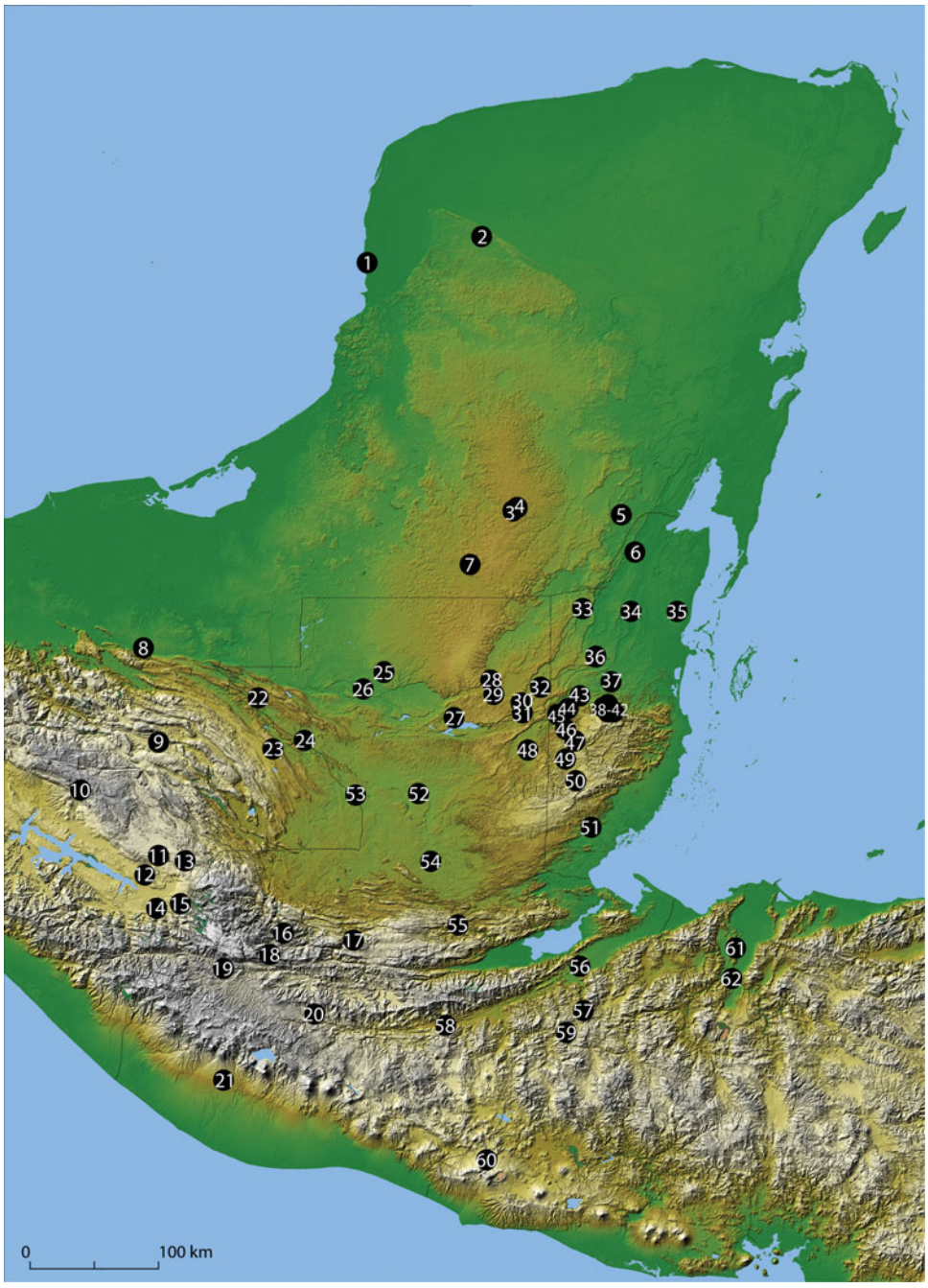


Figure 1. *(Colour online) Map of the Maya region showing the sites of origin for provenienced ceramics with moulded or stamped texts that were referenced for this study. (Detail of image PIA03364, courtesy of NASA/JPL-Caltech/NIMA, modified by the author.) Sites: (1) Jaina; (2) Uxmal; (3) Chicanna; (4) Becan; (5) Kohunlich; (6) Nohmul; (7) Calakmul; (8) Palenque; (9) Tonina; (10) Rancho San Nicolas; (11) Tenam Rosario; (12) Finca El Salvador; (13) Los Cimientos; (14) Guajilar; (15) Lagartero; (16 Kixpek; (17) Chajcar; (18) Chipal; (19) Zaculeu; (20) Zacualpa; (21) Mazatenango; (22) Piedras Negras; (23) Ojo de Agua; (24) Yaxchilan; (25) El Peru-Waka'; (26) La Joyanca; (27) Motul de San José; (28) Uaxactun; (29) Tikal; (30) Nakum; (31) Yaxha; (32) Holmul; (33) La Milpa; (34) Lamanai; (35) Altun Ha; (36) San José; (37) Valley of Peace; (38) Actun Tunichil Muknal; (39) Footprint Cave; (40) Chanona Cave; (41) Actun Nak Beh; (42) Pook's Hill; (43) Baking Pot; (44) Cahal Pech; (45) Xunantunich; (46) Minanha; (47) Caledonia; (48) Ucanal; (49) Caracol; (50) Actun Balam Cave; (51) Lubaantun; (52) Ceibal; (53) Altar de Sacrificios; (54) Cancuen; (55) Chipoc; (56) Quirigua; (57) El Cafetal; (58) Acasaguastlan; (59) Copan; (60) Tazumal; (61) Campo Dos; (62) Cerro Palenque.*

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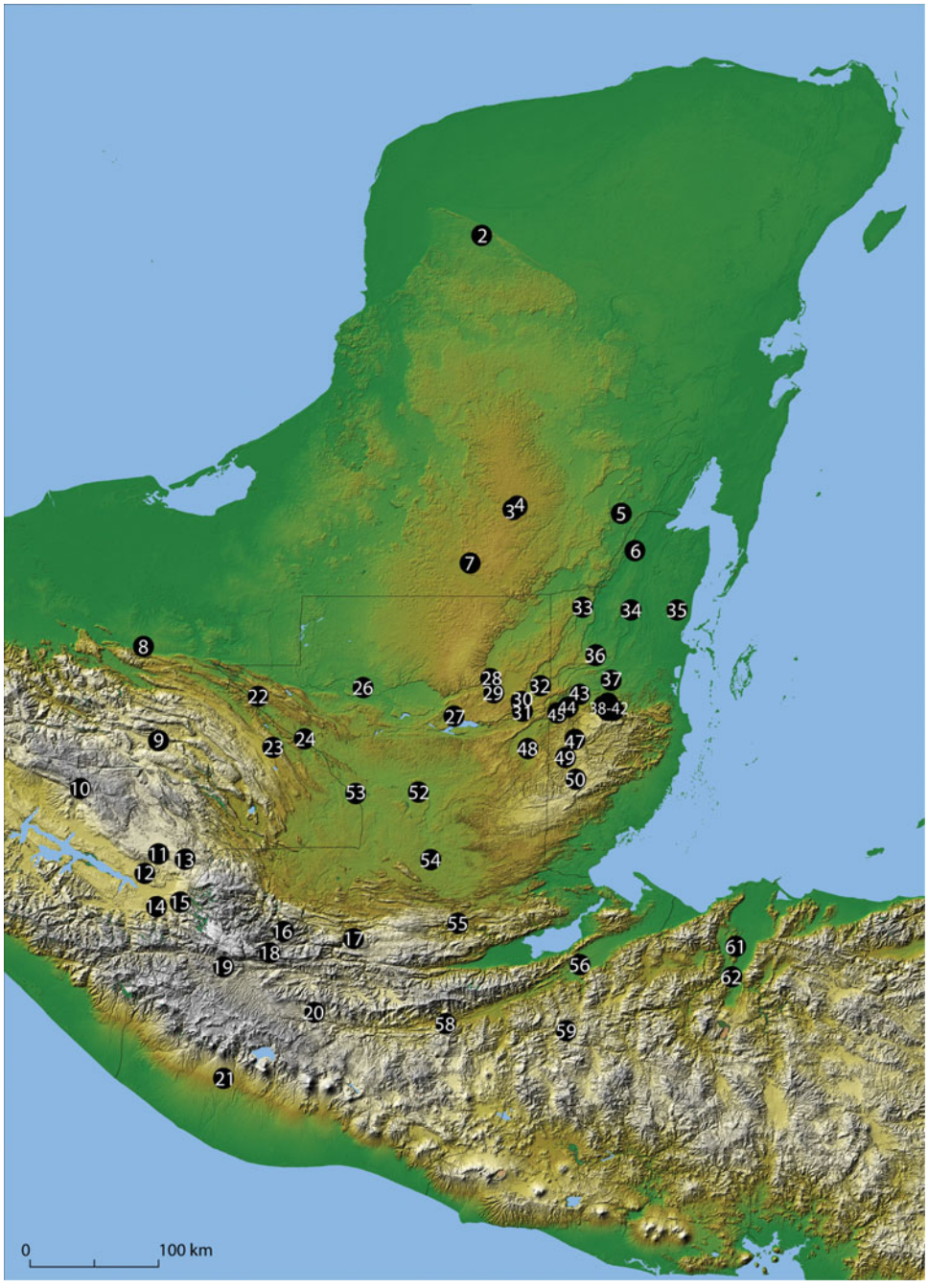


Figure 2. *(Colour online) Sites of origin for provenienced moulded-carved ceramics with moulded or stamped texts that were referenced for this study. Site numbers are the same as those used in Figure 1. (Detail of image PIA03364, courtesy of NASA/JPL-Caltech/NIMA, modified by the author.)*

glyphic motifs (Bill 1997, 12–15, 265–8, 294–5; Viel 1983, 524–5; Willey *et al.* 1994, 59–62), much like other Moulded-Carved traditions. Other local fine paste wares with moulded or stamped glyphic elements are attested in the Ulúa River Valley to the east (e.g. Joyce 1987; 1991, 31, 62–3; Lopiparo *et al.* 2005), including at Campo Dos, a small-scale production site for Late and Terminal Classic mould-made fine paste vessels of the Taramite Group (Lopiparo *et al.* 2005, 116–17).

Certain forms seem to be particularly well represented in the collection of ceramics with impressed hieroglyphs, regardless of their relationship to these Modelled-Carved traditions identified by ceramicists. Figurine plaques, for instance, appear to be a

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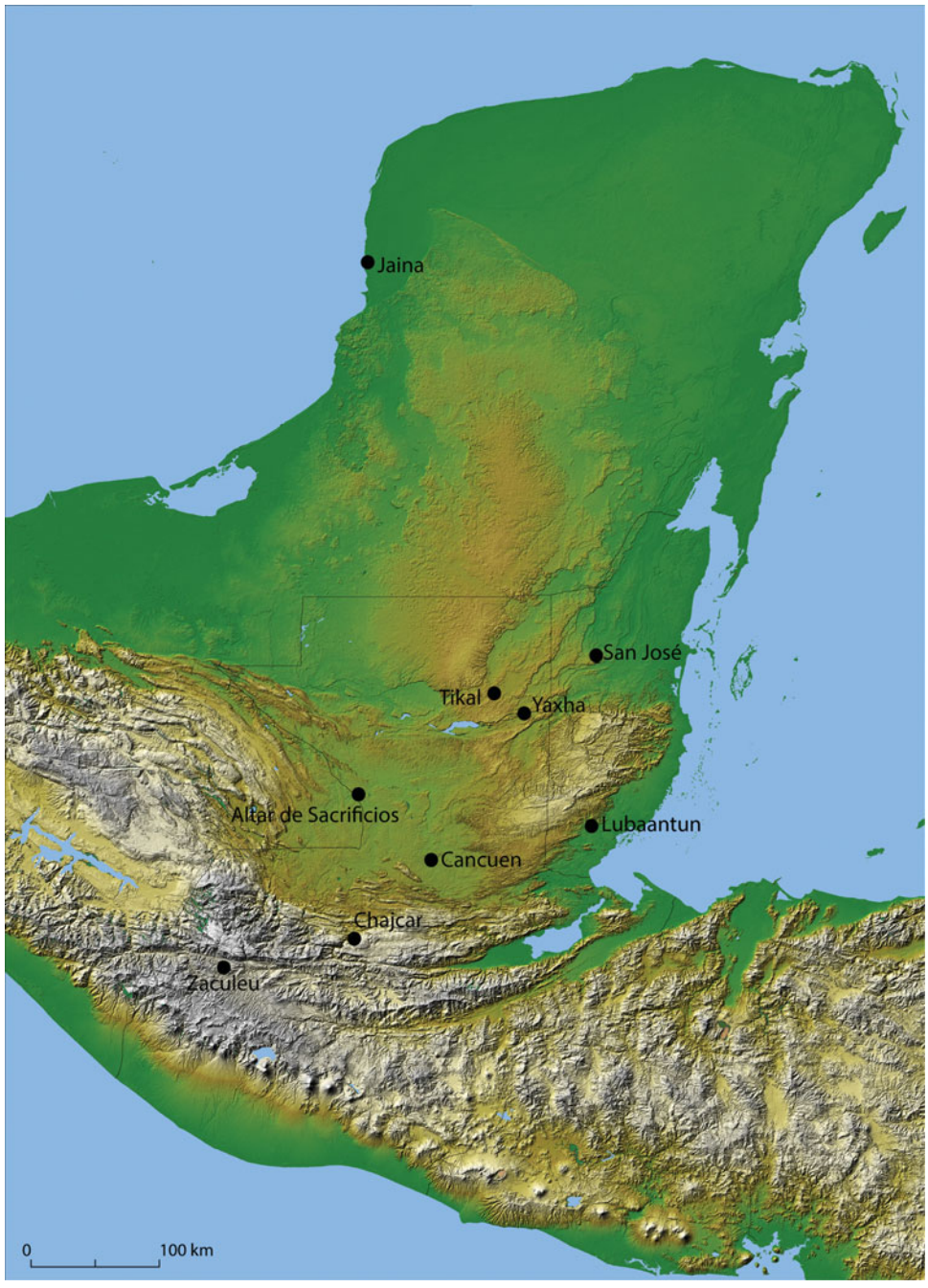


Figure 3. *(Colour online) Sites of origin for provenienced figurine plaques with moulded or stamped texts that were referenced for this study. (Detail of image PIA03364, courtesy of NASA/JPL-Caltech/NIMA, modified by the author.)*

phenomenon localized at certain sites in the Maya area (Fig. 3; see Halperin 2014, 6–7; Houston 2016a; Rands & Rands 1965, 535–6, 557). The relatively flat, quadrilateral pieces originally comprised the sides and legs of a hollow box- or bench-like form, with moulded glyphs tending to occur on the horizontal sides or vertical legs (Fig. 4). Many feature built-in mouthpieces and holes, making them functional whistles (see Pérez Galindo 2006, 19). They are sometimes referred to in the literature as 'thrones' because of the modelled anthropomorphic figures seated atop of some of the best-preserved examples (e.g. K7191:[1] Dieseldorff 1926, pl. 5, figs. 18–19; Hammond *et al.* 1975, 21).

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Figure 4. *(Colour online) Figurine plaque collected by Erwin Dieseldorff from Chajcar Alta Verapaz, Guatemala, now in the Ethnologisches Museum Berlin (21058). (Photograph: Claudia Obrocki, © Ethnologisches Museum, Staatliche Museen zu Berlin – Preußischer Kulturbesitz.)*



Figure 5. *(Colour online) Medallion-shaped bottle with seated deities, K'awiil on the viewer's left and God L on the right, facing each other across a central column of hieroglyphs, National Museum of the American Indian, Smithsonian Institution (24/7045). (Photograph: NMAI Photo.)*

Small bottles,[2] which stand no more than 15 cm tall with a volume of some 12 cm^3 (Houston *et al.* 2006, 115), also often have pre-formed hieroglyphs on their outer faces, especially those bottles that are rectangular or medallion-like in shape (Figs. 5–6). Their morphological diversity and archaeological association with various substances, particularly tobacco, copal and pigment, suggest that they served a range of functions (Carlson 2007a; Houston *et al.* 2006, 114–16; Reents-Budet 1994, 68 n. 2 & 7, 214, 232 n. 102–3; e.g. Willey *et al.* 1994, 59, fig. 162). Provenienced examples with moulded glyphs have been recovered across the central and southern Lowlands, as well as a few locations in the Highlands (Fig. 7). Moulded hieroglyphs occur on more typical anthropomorphic figurines as well. Nonetheless, although these ceramics are quite widespread in the Maya area (Halperin 2014, 6; Rands & Rands 1965, 535–6), the number of examples impressed with glyphs is significantly fewer. To my knowledge, they are attested at only at Lagartero (Ekholm 1979) and Lubaantun (Joyce 1933, pl. VII fig. 7, also pl. X fig. 1), although this could change as more corpora are published. Even more unusual are the two 'pendantlike objects', perhaps handles of 'small pottery rattles', with a paste 'near-Fine Orange' that were found at Ceibal, each with three impressed glyph blocks now eroded beyond recognition (Willey 1978, 48, fig. 53). In summary, although the clay objects on which moulded and stamped glyphs occur were produced within different ceramic traditions and vary morphologically, the range of traditions and forms is relatively limited. Additionally, many forms that these artefacts assume are rare within the broader ceramic corpus.

Content and context of moulded and stamped hieroglyphs on Classic Maya ceramics

Within the diverse corpus of ceramics with moulded and stamped glyphs, some of the most common themes seem to be masculinity and political authority, often in association with ritual behaviour (Houston 2016a; see also Rands & Rands 1965, 556–7). On figurine plaques, these motifs manifest most obviously in the seated figures modelled on top of them (e.g. K7191: Dieseldorff 1926, pl. 5, figs. 18–19; Hammond *et al.* 1975, 21; Pérez Galindo 2006, 7–19). However, they also appear in the headdress-bearing figures rendered on the sides, some presenting traits symbolic of ritual authority or the supernatural (Houston 2016a; e.g. Fig. 5). Likewise, iconography on small bottles with pre-formed texts tends to highlight at least one subject, usually male (e.g. Carlson 2007a,b; Loughmiller-Cardinal & Zagorevski 2016), frequently

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Figure 6. *(Colour online) Rectangular bottle with a woven mat motif on one side and a dedicatory phrase (**ALAY? T'AB-yi**) in the top two glyph blocks on the other. (Photograph: Los Angeles County Museum of Art.)*

associated with motifs of the otherworld (e.g. Fig. 5; Reents-Budet 1994, fig. 5.54) or of kingship (e.g. woven mat motif in Fig. 6: see K6176; K7122; Robicsek 1975). The iconography on Moulded-Carved vessels also overwhelmingly depicts men, often identifiable by their accoutrements as warriors (e.g. Smith 1955, fig. 86d) or supernatural beings (e.g. K3414; K4966: see Werness 2003, 13–53). The figurines from Lagartero that represent seated females are, to my knowledge, the only clear association of moulded and stamped writing with women (see Ekholm 1979, figs. 10–13a–d, 10–14a), and even these impressed glyphs may simply be reproducing motifs found on their *huipiles*, rather than forming texts *per se*.

These iconographic associations are sometimes reinforced by texts referring to males, especially youths or elites (e.g. Helmke 2000, figs. 4–5, 7). Some texts refer to elite political status, for example with the titles *baah tz'am* ('head/first [person of the] throne') (Fig. 8), *yanabil* of unknown meaning (Houston 2016; e.g. Pérez Galindo 2006, fig. 25), or *chak tok' wayaab*, a designation characteristic of the area around Holmul (Callaghan & de Estrada 2016, 187, fig. 7.12c6). Others reference young people specifically, like *kelem* ('strong one': e.g. Carlson 2007a; Willey *et al.* 1994, fig. 162) or *ch'ok* ('youth': e.g. K7121; Reents-Budet 1994, fig. 5.54; see Houston 2009, 154–7, 159). The latter is often accompanied by the opaque syllabic sequences **ko-lo** or **che-ha-ka**, the latter perhaps spelling a name (Card & Zender 2016, 283, see n. 8; e.g. Fig. 9; K7122). Some more legible texts denote specific personages, such as the 12th Copan ruler on the Tazumal flask (Card & Zender 2016, 286–9, figs. 7–8) or the Lady Olom on several Ahk'utu' Moulded-Carved vases (Helmke & Reents-Budet 2008, 42–3, fig. 4). This latter feature especially, as well as the *ch'ok* and *kelem* labels, is common in painted ceramic texts as well (see Houston 2009, 154–9) and thus attests to the position of moulded and stamping writing within Classic Maya scribal tradition more broadly.

Yet beyond these tendencies to present themes of masculinity and authority or object dedication, the diverse corpus of moulded and stamped texts belies easy generalization by genre or theme. A number of texts present content typical of other bespoke contexts, such as Calendar Round dates (e.g. Hammond 1970, pl. XXXIIIb; Pérez Galindo 2006, 297, 312). Dedicatory formulae primarily known from painted ceramic texts (see MacLeod 1990, 342; Stuart 1998, 409–17) are also attested in moulded and stamped form, especially the introductory glyph of uncertain reading and the verb form **T'AB-yi** ('rises up') (e.g. Fig. 10; Helmke 2000, fig. 5; K6176; Pérez Galindo 2006, 318, fig. 332; Smith 1955, fig. 86d; see Werness 2003, 60–64), and occasionally a reference to the vessels as someone's 'drinking cup' (**yu-k'i-bi**) (e.g., Smith 1955, figs. 3h, 10s, 81a; Willey *et al.* 1994, fig. 77d). These moulded and stamped texts thus directly share content with many of their painted counterparts, indicating that some scribes were involved in both production processes or at least using related models for text production.

However, many glyphic sequences are difficult or impossible to interpret, as they are eroded beyond recognition (e.g. Joyce 1926, pl. XXVI, fig. 1; Pérez Galindo 2006, 326, 332) or highly stylized (e.g. K6963; Pérez Galindo 2006, 313–15). In other cases, individual glyphs may be legible, but do not form linguistically coherent phrases (e.g. Joyce 1926, pl. XXV, fig. 2; Pérez Galindo 2006, 322–3). Although some reading difficulties may be due to substandard documentation (e.g. Joyce 1933, pl. VII, fig. 7; pl. X, fig. 12), many texts indeed feature so-called 'pseudo-glyphs' (Fig. 11; see Werness 2003, 56–9). These signs are either

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Figure 7. *(Colour online) Sites of origin for provenienced small bottles with moulded or stamped texts that were referenced for this study. (Detail of image PIA03364, courtesy of NASA/JPL-Caltech/NIMA, modified by the author.)*

standard hieroglyphs from the Classic Mayan corpus combined in unconventional sequences, or they merely resemble known hieroglyphs in form; in any case, pseudo-glyphs are thought to be void of linguistic value (Calvin 2006, 24–6). Most commonly in the moulded and stamped corpus, the elements resemble glyphs in general form and placement on the vessel—especially within a sublabial band on the vessel exterior—but are not signs known from the writing system (e.g. Fig. 12). As will be discussed below, such deviations from canonical Classic Maya scribal tradition are key to interpreting moulded and stamped texts' cultural value and their relevance for scribal practice, particularly in light of the aforementioned similarities with hand-written texts with which they may co-exist.

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Figure 8. *(Colour online) Figurine plaque collected by Dieseldorff with the title baah tz'am ('head/first [person of the] throne') on one leg. The figurine plaque was previously held in the Ethnologisches Museum Berlin (21158), but is currently listed as having gone missing during the Second World War. (Photograph: © Ethnologisches Museum, Staatliche Museen zu Berlin – Preußischer Kulturbesitz, modified by the author.)*



Figure 9. *(Colour online) Rectangular bottle with the enigmatic phrase* ***che-ha-ka ch'o-ko ko-lo*** *in the first three glyph blocks. (Photograph: Los Angeles County Museum of Art.)*

Moulded and stamped ceramic texts and Classic Maya scribal practice

Classic Mayan hieroglyphic writing was, as far as we can tell, largely under the purview of elites, who controlled much of the formal scribal production on both monuments and portable objects (see Inomata 2001, 329–32; Rossi *et al.* 2015, 125–8). Rates of literacy as commonly defined—the ability to decode and compose texts—were probably rather low, with the spectrum ranging from total proficiency to familiarity with certain key signs to complete unfamiliarity with the writing system (Houston 1994, 28–37, 40). Evidence of intermediate levels includes graffiti and other less formal manifestations of writing, which hint that more spontaneous, non-elite engagement with the script may have been more common than the material record indicates (Houston 1994, 39; see e.g. Steede 1984; Trik & Kampen 1983; Źrałka 2014). Still more members of society probably recognized the hieroglyphs as an elite mode of communication affiliated with the spoken Classic Mayan language, especially in urban communities with more publicly visible, inscribed monuments. Pseudo-glyphs provide some of the best evidence that the script's cultural valuation

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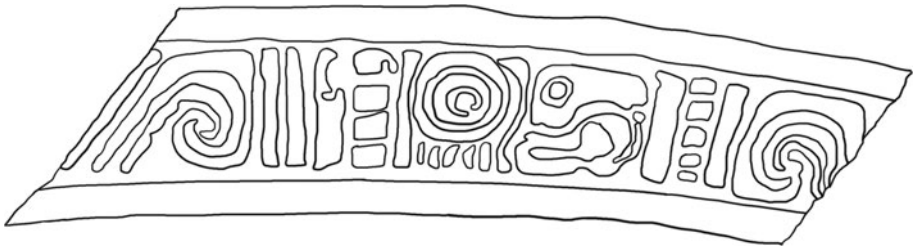


Figure 10. *Sub-labial band of pseudo-glyphs on a Pabellon moulded-carved sherd from Altar de Sacrificios. (Drawing: author.)*

extended beyond proficient users, as many sequences seem to mimic a writing system that was familiar, but not completely mastered (see Calvin 2006).

Custom-made or bespoke texts comprise the dominant majority of the extant epigraphic corpus for Classic Mayan writing. Hence, the application of moulding and stamping to scribal production clearly represented a technological shift that correlated with specific ceramic forms and cultural contexts. However, Maya scribes referred to mechanically replicated glyphs with the same phonetically undeciphered root used to reference carved, incised and modelled texts (Houston 2016b, 392; Stuart 1989, 154; e.g. Pérez Galindo 2006, 318; Smith 1955, fig. 3h). In doing so, they situated moulded and stamped texts within the broader tradition of three-dimensional writing. Nikolai Grube (1991, 228) has proposed the value **xu** for the problematic 'bat head' glyph in this term, but no clear cognate in a Mayan language has been identified, and more recent work indicates that there are multiple 'bat head' glyphs that likely convey different values (see Boot 2009; Grube & Krochock 2007, 223 n. 226; Houston 2016b, 393; MacLeod 1990, 200–212; Zender, cited in Lacadena 2004, 186 n. 118). Moreover, spellings are inconsistent, making even the reading order of the constituent glyphs uncertain. In particular, the 'bat head' is sometimes followed by (e.g. K8242), sometimes preceded by (e.g., K3844), but more often ambiguously conflated with the syllable **lu** (e.g. K8786).

The 'bat head' term occurs most prominently on carved monumental inscriptions, where it is often prefixed by a third-person singular possessive pronoun (written as **yu-**, in this case) to denote 'his/her/its carving'. It most frequently occurs in a signature that renders visible a craftsman's (often collaborative) role in the monument's production (see Houston 2016b, 397–420). In a few instances, the same root occurs in a verbal phrase, either referring to the act of 'carving' (Houston 2016b, 397; e.g. Emiliano Zapata panel: Stuart 1990, 9, 11, fig. 1) or describing a given surface as 'carved', as in a rare stucco text (Stephen Houston pers. comm., 2016; see Thompson 1939, 32, pl. 6c, e). Although its phonic reading and precise valence remain unclear, the enigmatic term nonetheless seems to capture Maya preoccupation with the physicality of these forms of the written word, which distinguished glyphs etched into stone, modelled in clay or shaped in stucco from two-dimensional *tz'ihb* [writing, painting] brushed onto ceramic, bark paper and other surfaces (see Stuart 1987; 1989).

Mould-made and stamped ceramic texts likely had different functions and contexts of use than did bespoke writing, given the media on which they appear and their contents and distribution relative to the rest of the corpus. They probably would have been used primarily in private contexts, much like handwritten texts on portable objects and quite unlike those on monuments or architecture, which could only be contemplated at their site of display and whose audiences could be more easily regulated. Their invariable appearance on portable artefacts, as well as their actual or potential replicability, suggests that they could have been traded or exchanged across distances, again like their painted analogues (Andrew Scherer pers. comm., 2016; e.g. Card & Zender 2016, 287–9; Eppich & Loughmiller-Cardinal 2014; Foias & Bishop 2013, 350–78; Sabloff 1975, 198). In fact, ceramics from the same mould have been recovered at different sites (Helmke & Reents-Budet 2008, 38; e.g. Graham *et al.* 1980, 164–5; Hammond 1975, 371–4), and the name for the Ahk'utu' Moulded-Carved type comes from their common designation as *ahk'utu'*, objects being given (Helmke 2001, 51). In other cases, differences in paste between moulds and the ceramics shaped from them suggest that the moulds or ceramics were fabricated elsewhere, or at least used imported clay (Pérez Galindo 2006, 19).

But compared to many hand-made texts, even those on portable media, moulded and stamped ceramic texts appear to have been distributed among a wider range of social backgrounds (Helmke 2001, 35–8). Scholars have previously assumed that Moulded-Carved vessels in particular were prestige

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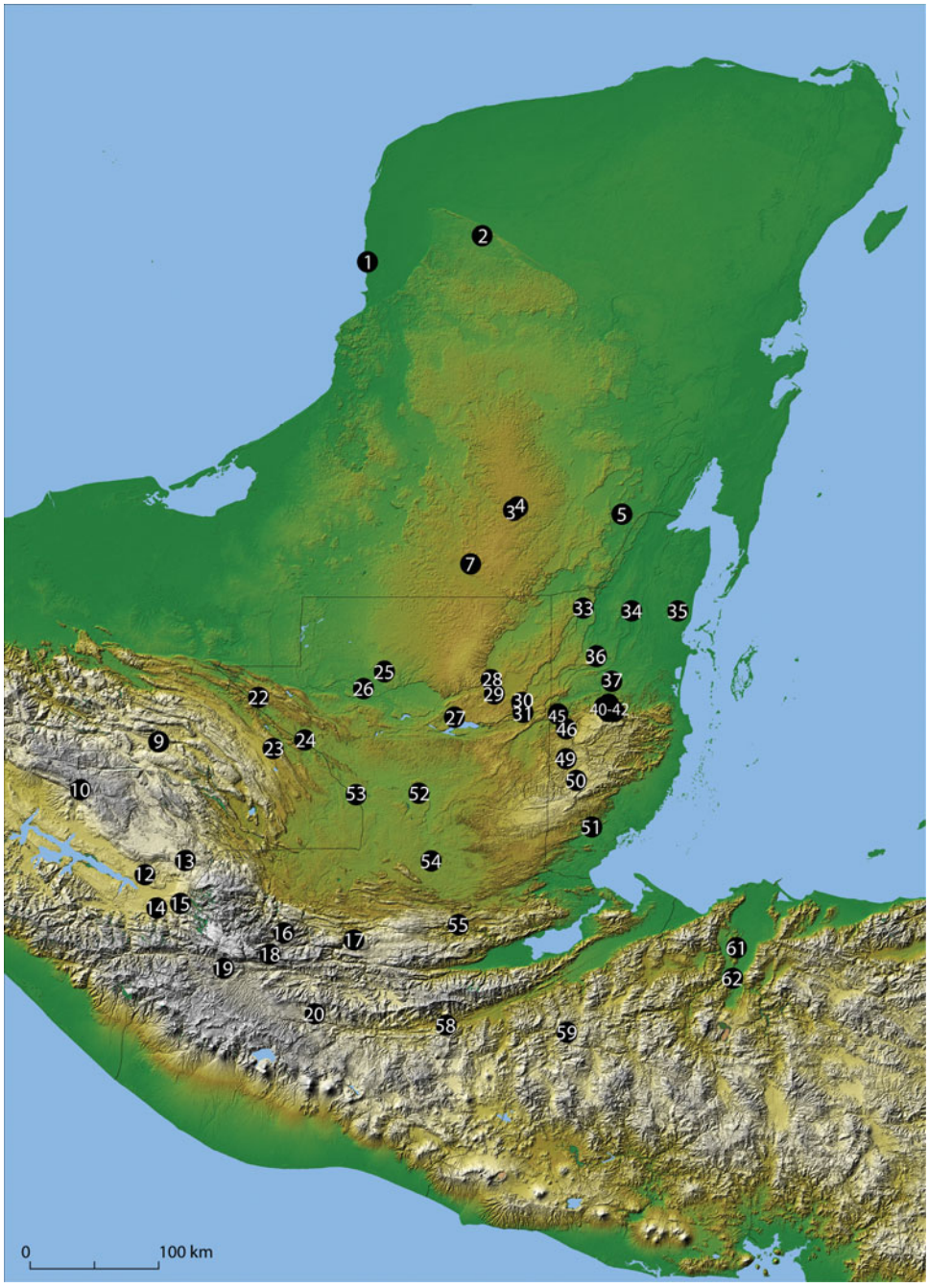
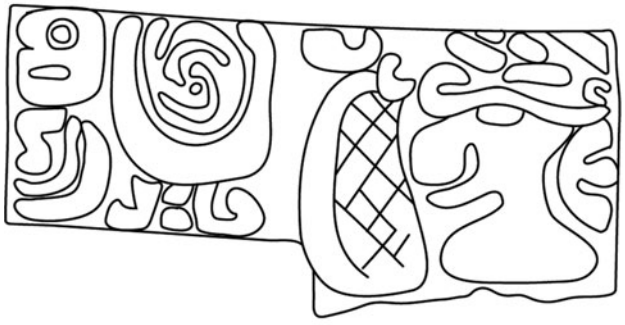


Figure 11. *(Colour online) Sites of origin for provenienced ceramics referenced for this study whose moulded or stamped texts include probable pseudo-glyphs. Site numbers are the same as those used in Figure 1. (Detail of image PIA03364, courtesy of NASA/JPL-Caltech/NIMA, modified by the author.)*

wares associated with the upper tiers of society, based in part on their recovery in association with elite architecture and prestige trade goods (e.g. Graham *et al.* 1980, 165–6; Helmke & Reents-Budet 2008, 41; Źrałka & Hermes 2012, 176). However, at some sites, they are common in non-royal contexts, and even those recovered in palace structures may have been deposited by non-royal, perhaps even non-elite, residents occupying the area after the court's decline (Helmke 2001, 35–41; Helmke & Halperin 2001, 47–50; e.g. Sabloff 1970, 369; 1975, 198, 238). Their extensive distribution at some settlements like Lubaantun and Copan fur-

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(a)



(b)

Figure 12. *(Colour online) (a) Unusual allograph of the logograph* ***T'AB*** *on the right side of a figurine plaque fragment from the Dieseldorff Collection (drawing by the author from Pérez Galindo 2006, fig. 32); compare to (b) the more common* ***T'AB*** *allograph (detail from Figure 8).*

ther suggests that they were utilized by a much larger segment of the population than were many polychrome vessels, which typically circulated among the Maya elite (e.g. Bill 1997, 542–3; Hammond 1975, 371–4; though cf. Rice 2009, 147). At the same time, access to these goods appears to have varied regionally, based on the paucity of moulded or stamped ceramic texts in other areas (e.g. Forné 2006, 184; Helmke 2001, tables 1–4), particularly those on forms other than Moulded-Carved bowls or vases (Figs. 3, 7). As commodities produced in multiple iterations, moulded and stamped texts would have had different economic and social values from their bespoke counterparts, making their 'social lives' correspondingly distinct (Appadurai 1986, 3; see Kopytoff [1969] 1986, 69). This distinction from hand-written texts would have been particularly salient if the pre-formed glyphs were circulating among groups who had not traditionally engaged with the script in any significant way.



Figure 13. *(Colour online) Detail of Figure 4 showing unusual pre-posed phonetic complementation in the spelling of* ***k'u-K'UH*** *'god'. (Photograph: Claudia Obrocki, © Ethnologisches Museum, Staatliche Museen zu Berlin – Preußischer Kulturbesitz; detail, modified by the author.)*

The specific personae and events referenced in moulded and stamped texts may not have been known to all their users, if they were historical at all (Helmke 2000, 21). Nonetheless, the potential of multiple versions being in simultaneous circulation meant that artisans probably genericized their contents, adapting them for a more diverse audience than would have been reached by a custom, polychrome vessel. Unlike many of their painted counterparts (see Beliaev *et al.* 2010, 259–67; Coe 1973, 17–22; Houston *et al.* 1989; Stuart 1989; though cf. Houston 2009, 154–9), glyphs moulded or stamped on vases or bowls typically do not specify the owner, for instance (e.g. K8786; Smith 1955, fig. 10s; though cf. e.g. Card & Zender 2016). The male figures portrayed on these ceramics also tend to be non-specific or supernatural (e.g. Carlson 2007a,b,c; K3414; K9261). Similar motivations may underlie the higher frequency of syllabic signs in these texts, perhaps to facilitate reading by increasing phonetic transparency or to record a local vernacular, rather than the elite-associated Classic Mayan language (Houston 2016a; see Houston 1994, 37; Wichmann 2006, 290; e.g. unusual pre-posed phonetic complement **k'u** in **k'u-K'UH** 'god', Fig. 13; syllabic spelling **tz'a-ma** instead of the logograph **TZ'AM** 'throne', Fig. 14).

The contexts of moulded and stamped ceramic texts provide additional insight into the nature of the communities, especially with respect to scribal practice. Nuanced provenience studies are complicated by the high percentage of looted artefacts in the extant corpus, as well as inconsistent publication

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Figure 14. *Detail of Figure 8 showing the syllabic spelling* ***tz'a-ma*** *'throne' instead of the logograph* ***TZ'AM****. (Photograph © Ethnologisches Museum, Staatliche Museen zu Berlin – Preußischer Kulturbesitz; detail, modified by the author.)*

of excavated pieces (e.g. Hammond 1975, vii, 371–4; see also West 2002, 160). Nonetheless, these traditions, especially those producing texts on atypical ceramic forms, seem to have operated in a limited geographic range relative to the broader Maya ceramic corpus (see Figs. 1–3, 7). What is more, the regions in which they occur demonstrate significant differences in their use of the hieroglyphic script more generally. Many ceramics with mould-made hieroglyphs—particularly figurine plaques, figurines and bottles (e.g. Carmack 1973, 11–19; Houston 2016a; Joyce 1926, 229)—originate from outside the central southern and northern Lowlands, the core area of Classic-period text production. In general, these areas present little to no evidence of monumental inscriptions, comparatively few painted ceramics with legible hieroglyphs, or a corpus of texts that is not only small, but also anomalous in its high frequency of syllabic or otherwise unusual spellings and alternative grammatical forms or graphemes (e.g. Hammond 1975, 317–21, 326, fig. 119; Houston 2016a). Some of these sites, especially in the Highlands and the southern and eastern Lowlands, also demonstrate significant affiliations with non-Maya groups (e.g. Card & Zender 2016; Willey *et al.* 1994, fig. 162; see Carmack 1973, 11–19; Henderson & Hudson 2012).

The tradition of moulding and stamping hieroglyphs in clay is temporally restricted to the Late and Terminal Classic, based on those artefacts with known provenience (see Ekholm 1979, 174; Hammond 1970, 222; 1975, 295–6; Helmke 2001, 7; Helmke & Reents-Budet 2008, 45; Pérez Galindo 2006, fig. 13, 33–6; Willey *et al.* 1994, 59; Wyllie 2002, 114). At many settlements, moulded and stamped texts date to the final years of occupation preceding abandonment (see Adams 1973, 140, 143–4; Bill 1997, 537–9; Helmke & Reents-Budet 2008, 45; Smith 1971, 19; also Helmke 2000, 26–7). Thus, they were being created and used at a time of significant cultural change characterized by weakening elite hegemony, widespread depopulation, cessation of monumental construction, an increase in inter-polity warfare and the weakening of divine kingship (see Culbert 1973; Demarest *et al.* 2004). Critically, this era also saw substantial transformations in scribal practice across the Maya region, highlighted by a general decline in the number of texts and sites producing them, particularly on monuments and painted ceramics. Texts from this era often manifest increasing syllabicity, innovative grammatical and orthographic forms and reduced legibility of individual graphemes (Houston 2008, 240–8; Houston *et al.* 2003, 458–61).

Notably, these broader scribal phenomena are apparent in moulded and stamped ceramic texts. As previously noted, many demonstrate a high proportion of syllabic signs. Individual glyphs often deviate from their typical forms, and not only because of restrictions inherent to moulding technology or subsequent erosion or breakage of the artefacts. The texts often contain signs that differ notably from known hieroglyphs in form (Fig. 12), or that combine in sequences that are syntactically unusual, redundant or even nonsensical (e.g. K8779). Moreover, many signs fall into the category of pseudo-glyphs, devoid of linguistic content (Fig. 10; see Calvin 2006). Furthermore, stamping or moulding texts was itself an innovation from this period, one of the changes in media for recording the glyphs whose rise was intimately tied to systemic changes in scribal practice and the script itself (Stephen Houston pers. comm., 2016; Houston 2008, 240–48).

The relative lack of epigraphic attention that has been granted to moulded and stamped texts, due in part to their relatively high frequency of pseudo-glyphs, underscores the perception that many sites at which they occur were minimally or not at all participating in Classic Maya scribal tradition (e.g. Braswell & Prufer 2009, 50, for Lubaantun). Cultural, linguistic and artistic participation in the tradition of Maya hieroglyphic writing is typically gauged by evidence of

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bespoke text production. The most imposing and visible manifestation is monumental texts, but other commonly cited measures include painted and incised texts on portable objects, such as ceramics or items of personal adornment (e.g. Houston 1994, 38). By these standards, many sites with mould-made or stamped hieroglyphs were not well integrated into the same scribal tradition that generated the hand-painted ceramic vessels prized and exchanged across the region (e.g. Hammond 1975, 317–21, 326, fig. 119; Reents-Budet 1994, 170–207), nor were they part of the communities of practice that carved the monumental inscriptions recording the historical and political affairs of the elite (e.g. Hammond 1975, 375–8, see fig. 148; Houston 2016a).

But as mould-made and stamped ceramic texts indicate, the people producing them were not isolated from this tradition. Their participation simply assumed a different form. Particularly for communities with otherwise few attestations of hieroglyphic writing, these artefacts provide key insight into local scribal practice, as well as the cultural status of the writing system more broadly. Many scribes of stamped and moulded texts seem to have been less proficient in the script, as indicated by relatively frequent departures from standard orthographic and grammatical features. Unlike their counterparts at sites with prolific traditions of hand-written production, they clearly prioritized the distinct mode of mechanical reproduction and, in cases in which they were generating multiple copies, the potential for disseminating a shared artefact among multiple recipients, rather than customizing texts for more individualized distribution.

Manifestations of writing in clay were always a minority in the ceramic record, and some sequences of moulded and stamped hieroglyphs may have been reproduced no more than a handful of times. But as extant sets of copies attest (e.g. Figs. 4 & 8; Pérez Galindo 2006, 230, 232–4, 236, 241–4, 248–51), the Maya did recognize and at times exploit the technological potential for generating a common text for multiple readers. This development in scribal practice, as well as the transportable nature of the products themselves, allowed a potentially larger and more diverse audience to interact with shared linguistic and cultural artefacts than was possible with custom-made objects (see Anderson [1983] 2006, 42–5; e.g. Halperin 2014, 167–73; see Houston 2008, 232–6). Those interacting with these moulded texts as both material objects and linguistic and cultural symbols of elite culture participated in a social phenomenon beyond their individual selves (see Anderson [1983] 2006, 42–5). As members of a 'script community', they were united by their use of a common writing system and shared textual artefacts, although not necessarily a uniform degree of literacy (Houston 2008, 232–6; see Anderson [1983] 2006). Access to shared experience through common material culture, in turn, fostered the development of collective identity across temporal and geographic boundaries that rarer, less accessible hand-made texts could not so readily traverse (Anderson [1983] 2006, 44–5).

Conclusions

Technologically, the Maya practice of moulding and stamping hieroglyphs on ceramics allowed scribes efficiently to manufacture texts with a mould or stamp that few among them had the skill to create, while still allowing artisans potentially to modify the product by hand using other techniques. Materially, it represented a new method for creating three-dimensional writing in clay using a pre-form as an interface between the potter's hand and the clay. Socially, it offered the potential for wide dissemination of writing to a diverse audience, even if few possessed the literacy needed to compose the text that were replicated. As such, moulding and stamping marked a significant social and technological departure from Classic Maya scribal practice as traditionally defined—one largely by and for elites and overwhelmingly favouring bespoke text production—while simultaneously expanding participation in that practice by circulating hieroglyphic writing to a broader audience, even one in which understanding of that writing was limited. In this respect, moulding and stamping the Maya script in clay during the Late and Terminal Classic are merely another manifestation of humans innovating technologies of mass production and applying them to scribal practice.

Yet the Maya hieroglyphic script had been used on ceramics and other media since at least the Late Preclassic (*c.* 400 BC–AD 100) and technologies of reproduction had been used in ceramic production throughout the region for several centuries before they were applied to writing beginning in the Late Classic. Thus, the integration of mechanical replication into scribal practice was a relatively late development, eliciting the questions—to be addressed in future research—of why this scribal phenomenon developed when and where it did. What is more, despite its potential advantages with respect to efficiency and mass production, moulding and stamping never became as prevalent among Maya scribes as the practices of painting text on ceramics or bark paper, or of carving or modelling glyphs in other media, such as stone and stucco. Within the moulded and stamped textual corpus, many exemplars are attested only

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once; the 'mass' component does not seem to have been the main appeal of this mass-production technology after all (e.g. Werness 2003, 3–4). Compared to other pre-industrial traditions of mechanically replicating written content in the ancient world, the Maya produced relatively small quantities in a less diverse range of material forms. Ceramics with moulded and stamped texts remained a minority in the ceramic assemblage, even during their period of peak production. They were also created only in certain regions and on select pottery forms, many of which were morphologically unusual. Even after the Maya began stamping glyphs on metal surfaces, this phenomenon was even later, rarer and more localized than that on clay (see Hosler 2009; e.g. Lothrop 1952, 51, figs. 35–7, 40). And interestingly, although they were producing copious amounts of paper (see Von Hagen 1944), as well as stamps to apply motifs to textiles and other surfaces (see Halperin 2008, 112–13), there is no evidence that they ever combined these two media to mass-produce writing on paper.

Understanding changes in how people interact with a script can provide insight into the social conditions that motivate—or discourage—developments in writing practice, both in the Maya region and elsewhere. Among the Late and Terminal Classic Maya, it seems that there was no critical cultural need for mass-produced texts. Alternatively, perhaps the social conditions of craft and scribal production were not conducive to the development of printing (compare Tsuen-Hsuin 1985, 3–10). Despite the lower production costs of ceramics with moulded and stamped writing, painted texts were notably more prevalent and their temporal and geographic distribution was much broader throughout Maya history (West 2002, 162–5). Thus, there may have been a general aesthetic and cultural preference for the fine, coloured lines of hand-painted texts. Nonetheless, at some sites like Holmul and Copan, moulding, stamping, and other modes of generating three-dimensional glyph seem to have been preferred over painting for writing on local ceramics (Alexandre Tokovinine pers. comm., 2017; see Bill 1997, 297–366, 534–8; Callaghan & de Estrada 2016, 219–20). Indeed, the phenomenon of replicating texts was fundamentally rooted in local practices and preferences, as illustrated in the great diversity in form and content evident among ceramics with replicated texts. Study of regional variation in writing practice can thus shed light on the interaction by means of which scribal knowledge was created and transmitted, and the social connections that sustained it.

At the same time, the practice of moulding and stamping writing remained tied to—and ultimately dependent upon—broader regional developments in Classic Maya scribal practice. Like other modes of hieroglyphic writing, moulding and stamping largely fell out of use by the Early Postclassic, as the script communities in which they had been produced and circulated dissipated. It is unclear how these technologies would have fared if the broader tradition of primarily elite-dominated literacy across the Maya region had not declined during the Late and Terminal Classic. What is clear, however, is that they could not survive without the same scribal tradition from which their method of production fundamentally deviated. Writing, like other technologies, is intrinsically embedded in its social context of development and use. In the Classic Maya case, the scribal experiment of mechanically reproducing glyphs may have diversified, broadened and coalesced the script's material base and audience, but its continuance was ultimately impossible outside of the elite-dominated political and cultural milieu in which the producers and users existed.

Notes

1. All images cited with a number prefixed by the letter 'K' refer to photographs by Justin Kerr that are viewable in his databases *A Pre-Columbian Portfolio* (http://research.mayavase.com/kerrportfolio.html) or *Maya Vase Database* (http://research.mayavase.com/kerrmaya.html).
2. These are sometimes referred to as 'tobacco flasks', 'snuff jars', or, especially in earlier publications, 'poison bottles' (e.g. Carlson 2007a,b; Loughmiller-Cardinal & Zagorevski 2016). Although a few have been classified as Moulded-Carved (e.g. Card & Zender 2016, 281; Eppich & Loughmiller-Cardinal 2014; Willey *et al.* 1994, 60, 219–20), they are discussed here, rather than with the other Moulded-Carved ceramics discussed later, based primarily on their morphology.

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