

# The Context and Significance of Copper Artifacts in Postclassic and Early Historic Lamanai, Belize

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*We consider the archaeological contexts in which copper objects have been recovered at the ancient Maya site of Lamanai in northern Belize and the significance these objects had for the residents of the community during Postclassic (ca. A.D. 950–1544) and Spanish colonial (post 1544) times. More copper objects have been recovered from controlled archaeological contexts at Lamanai than any other site in the southern Maya lowlands area. Bells make up the majority of the assemblage during the centuries just prior to and during historical times, but high status objects such as rings and clothing ornaments found in elite burials dominate in the Early Postclassic period. All of these objects were imported from outside the Maya area. Utilitarian objects, including needles, axes, and fish hooks, are found in a variety of contexts during Late Postclassic and Spanish colonial times, as are bells and rings. Production materials, including prills, blanks, and pigs/ingots, in addition to mis-cast objects that are production failures, also appear during this time. Nearly all of the copper objects found at Lamanai are distinctly Mesoamerican in form and design, and based on metallurgical analyses it appears that manufacturing technologies were distinctly Mesoamerican as well. The presence of production materials and mis-cast pieces, along with the results of chemical compositional and microstructural analyses, support the idea that the Maya at Lamanai were engaged in the on-site production of copper objects by late pre-columbian times.*

## Introduction

The advent of metallurgy in the Maya area followed millennia of non-metallic tool and ornament production, during which time sophisticated lithic, ceramic, and other material traditions developed throughout both the highland and lowland areas. In contrast, metal objects appear late in Mesoamerican history and Maya metallurgy developed over a considerably shorter period, perhaps several centuries. The first copper objects were produced in West Mexico sometime between A.D. 600–650, but it was not until roughly six centuries later that the Maya were active participants in the extensive trade network in copper objects that had spread throughout much of Mesoamerica

(Hosler 1994). While metal never fully replaced stone, bone, or shell for either utilitarian or non-utilitarian purposes, metallurgy was embraced by some Maya groups in the centuries just prior to and during Spanish contact (Paris 2008; Simmons 2005a; Simmons and Shugar 2008). Despite calls more than three decades ago (Bray 1971, 1977) for more intensive study of this important technological innovation, metallurgy in the Maya area is still poorly understood (Paris 2008; Simmons 2005a; West 1994).

Recent research in Belize is beginning to shed new light on Maya metallurgy and excavations at the ancient site of Lamanai (FIG. 1) have produced a rich and varied body of

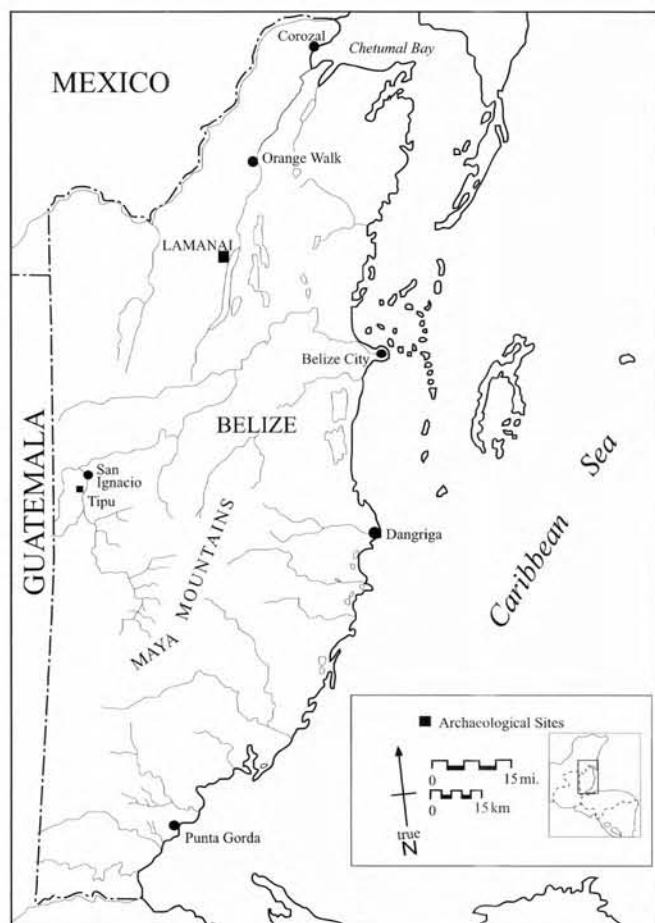


Figure 1. Location of Lamanai, Belize

evidence on Maya life that dates from about 1500 B.C. through Postclassic (A.D. 950–1544) and Spanish colonial times (A.D. 1544–1700) (Graham 1987, 2004; Graham, Pendergast, and Jones 1989; Jones 1989; Pendergast 1981, 1986, 1991). The 1974–1986 Royal Ontario Museum (ROM) archaeological project at Lamanai succeeded in defining the site's chronology, settlement characteristics, and range of material culture types and architectural features. Among the many important and little-known aspects of Postclassic and early Spanish colonial period Maya life at Lamanai—the focus of interest here—is the presence of significant numbers of copper artifacts.

Ongoing archaeological investigations as part of the Maya Archaeometallurgy Project (Simmons 2004, 2005a, 2005b; Simmons and Howard 2003), as well as recent excavations focused on periods of transition (Graham 2004, 2006) have added to our understanding of Lamanai's relative stability in the face of the collapse experienced at a number of Maya sites in the 9th and 10th centuries. This work has also contributed much to our knowledge of com-

munity adaptation and survival at the time of Spanish contact (Chase and Chase 2006; Demarest, P. Rice, and D. Rice 2004; Webster 2002). Here, we discuss the archaeological contexts of copper objects recovered at Lamanai beginning with the appearance of metal at the site by around A.D. 1150. We use the term “copper” for brevity's sake and because it is, by far, the dominant metallic element; however, all of the copper artifacts found at Lamanai were alloyed with other metals such as tin or arsenic and could technically be considered bronze (Hosler 1994: 210–213). In addition, we consider the forms, styles, and probable functions of Lamanai's copper artifacts and present a summary discussion of the sources of the copper from which these objects were made based on provenience information on copper sources (Hosler 1994; Hosler and Macfarlane 1996). While broader discussions of the contexts, meanings, and associations of copper production activities throughout the ancient Maya world are clearly needed, they are beyond the scope of this paper.

We first examine the contexts, forms, styles, uses, and sources of copper objects dating from the Buk ceramic phase, which coincides with the Early Postclassic period (A.D. 950–1200). Much of the information for this part of the discussion is derived from excavations at several important elite ceremonial/administrative structures situated very close to one another on the shore of the New River Lagoon. Next, we present information on the archaeological contexts, object forms, styles, uses, and sources of Cib ceramic phase or Middle Postclassic period (A.D. 1200–1350) copper artifacts. Like the assemblage of copper objects from Buk phase contexts, this is a comparatively small but nonetheless informative sample of material.

We discuss the contexts, forms, styles, uses, and sources of copper objects from Late and Terminal Postclassic (A.D. 1350–1544) and Spanish colonial times (A.D. 1544–1700). Substantial numbers of metal artifacts were recovered in association with Yglesias phase ceramics, which were produced during the final centuries of the Postclassic through the 17th century. Beginning in the mid-16th century Lamanai was one of a number of Spanish mission towns in Belize (Jones 1989) and each was visited periodically by circuit-riding secular priests and Franciscan friars. Contact between the Maya residents of Lamanai and Spanish authorities was intermittent and there is no evidence of permanent Spanish occupation (Graham, Pendergast, and Jones 1989; Jones 1989). It was during the Yglesias ceramic phase that the Maya at Lamanai produced their own metal objects, and although there was contact with the Spanish during the latter part of this phase it appears that the Spanish had little, if any, influence on copper metallurgy at the site.

The contexts in which copper objects were found at the site differ over time and yet it is clear that both continuities and discontinuities exist in their forms, styles, and the ways they were used in the centuries prior to and during Spanish contact. Finally, we examine the manner in which the Maya may have regarded the various copper objects that were relatively new to their world. Our discussion focuses on the social, cultural, and economic significance these objects may have had through the centuries for the people of Lamanai.

### Copper as a Postclassic Maya Commodity

Trade was an essential component of Mesoamerican life in the Postclassic period and the Maya were active participants in a vast macroregional trade network (Alexander and Kepecs 2005; Andrews 1990, 1993; Berdan 2003; Sharer and Traxler 2006; Smith and Berdan 2003). A wide variety of objects circulated around the Yucatán peninsula before the time of Spanish contact via a well-developed, circum-peninsular exchange system that itself appears to have been part of a larger, "Postclassic Mesoamerican world system" (Smith and Berdan 2003: 4). The movement of commodities as well as information and ideas into interior areas of the peninsula was facilitated by canoe travel along the coast and the extensive river systems in Belize. The importation of finished copper objects into the Maya area during Postclassic times was made possible by a vibrant, well-established exchange network that included Lamanai and a number of smaller Postclassic sites in northern Belize (Andres and Pyburn 2004; Chase and Chase 1988; Guderjan 2005; Guderjan and Garber 1995; Jones 1998; Masson 2002, 2003).

Diego de Landa noted that for the contact period Maya "the occupation to which they had the greatest inclination was trade" (Tozzer 1941: 94). Lamanai's key location on the New River Lagoon provided the site's inhabitants with access to a variety of Mesoamerican trade goods throughout of the site's 3500-year occupation (Pendergast 1981, 1986, 1991, 1993). Among the durable goods that moved within this coastal and riverine trade network was a considerable range of copper objects, many of which were small bells. Smith notes that alloyed copper bells "were the most extensively traded metal objects in Postclassic Mesoamerica" (2003: 124). Indeed, copper bells were so highly valued that by Spanish contact they were used throughout the Maya area as currency (see below). Copper objects such as bells, rings, and tweezers not only had great economic value but were also highly charged symbolic objects whose sounds and colors made them particularly important for use in ritual performances and as ornaments reflecting social status (Hosler 1994, 2003).

Our knowledge of trade in copper objects from sites in West Mexico, southeastern Mesoamerica, and lower Central America to the Maya lowland area is derived from archaeological investigations, chemical compositional and fabrication analyses of the copper artifacts, and from ethnohistorical documents. The earliest Spanish account of Maya trade in copper objects comes from 1502 when Columbus reported encountering Maya canoes off the Bay Islands of Honduras during his fourth voyage to the New World (Keen 1959). Among the items of their cargo, the traders carried "hatchets resembling the stone hatchets used by the other Indians, but made of good copper; and hawks bells of copper, and crucibles to melt it" (Keen 1959: 231–232). By Terminal Postclassic times the Maya were not only engaged in the exchange of copper objects, but were also actively trading implements used in metallurgy. We can assume that along with finished objects and production tools, ideas were circulating between individuals and groups engaged in coastal and riverine trade. In the case of the objects of interest here, the ideas were related to the methods and technological processes used in the production of metal objects (Hosler and Macfarlane 1996).

### Copper Artifacts at Lamanai

With the exception of artifacts removed from the Sacred Cenote at Chichén Itzá during dredging operations in the first decade of the 20th century (Coggins and Shane 1984; Lothrop 1952), those excavated during controlled archaeological excavations at Mayapan (Paris 2008; Root 1962), and those that came from the Quemistlan "bell cave" in Honduras (Blackiston 1910), more copper artifacts have been recovered at Lamanai than at any other site in the ancient Maya world (Simmons 2005a). To date, a total of 187 copper artifacts have been excavated, including bells, rings, tweezers, various clothing ornaments, pins, axes, chisels, needles, and fish hooks (TABLE 1). Many of these are forms that have been found at sites throughout Mesoamerica (Bray 1977; Graham and Wayman 1989; Hosler 1986; Paris 2008; Pendergast 1962; West 1994).

Evidence for on-site copper metallurgy at Lamanai consists of pigs, blanks, sheet pieces, mis-cast objects, and casting debris. (Note that we use the term "pigs" here instead of ingots as the term "ingot" refers to metal cast in a particular shape, usually oblong. Pigs are the product of pouring remainder metal from a cast out to cool; in contrast to ingots, pigs are usually not formed into standardized or even semi-standardized shapes or sizes.) All of these production-related objects come from Yglesias phase deposits at the site. Metallurgical and limited metallographic analyses of a broad sample of the copper objects from Lamanai have been reported previously (Hosler 1994: 208–215;

Table 1. Copper artifact types by ceramic phase from Lamanai, Belize

Object type	Number by ceramic phase				Total number
	Buk (A.D. 950–1200/1250)	Cib (A.D. 1200/1250–1350)	Yglesias (A.D. 1350–1700)	Unknown	
Bells (whole)	6	1	11	3	21
Bells (incomplete/mis-cast)	0	0	24	3	27
Bells (flattened, distorted)	1	0	29	1	31
Axe/celt/chisel	0	0	12	0	12
Axe fragments	0	0	11	0	11
Axe blanks	0	0	1	0	1
Rings	3	0	5	6	14
Ornaments	7	6	0	0	13
Sheet fragments	1	0	11	0	12
Needles	0	0	10	0	10
Ingots/pigs	0	0	3	1	4
Casting reservoirs	0	0	2	0	2
Prills	0	0	10	0	10
Fish hooks	0	0	5	0	5
Pins	0	0	2	0	2
Tweezers	0	0	2	2	4
Bell-headed pins	0	2	0	0	2
Pin tips	0	0	0	2	2
Pin heads	0	0	2	0	2
Tinkler	0	0	1	0	1
Necklace	0	0	1	0	1
Total	18	9	142	18	187

\*Totals as of August 2006

Hosler and Macfarlane 1996: 1822–1823; Shugar 2005a), and the significance of metal artifacts with regard to trade links and the development of metallurgy in ancient Mesoamerica have also been investigated (Bray 1971, 1977; Lothrop 1952; Pendergast 1962; West 1994). We are concerned here not with the techniques and alloys employed in the manufacture of the objects, or with the distribution of isolated metal artifacts in the Maya lowlands as a whole, but rather with the contexts in which the objects occur at Lamanai, and with the information that is conveyed by contextual analysis of the data.

Metal artifacts appear at Lamanai in the Early Postclassic period and in considerable numbers around the time of Spanish contact. As a mirror of broader trade relations in the southern Maya lowlands, and as a reflection of technological change, the history of metal artifact use at Lamanai is an invaluable element in the reconstruction of Postclassic and early historical dynamics.

### The Forms and Styles of Lamanai's Copper Objects: Typological and Contextual Designations

The discussion of the forms and styles of copper artifacts from Lamanai follows Pendergast's (1962) typology of metal artifacts in Mesoamerica. This classification is based on the division of objects into one of three major functional categories: utilitarian objects, objects of personal

adornment, and ceremonial objects (Pendergast 1962: 521). Hosler's (1986: 104–105) more recent typology for metal artifacts in Mesoamerica takes into consideration both stylistic criteria as well as certain other attributes such as mechanical properties of metal (for such objects as axes and tweezers) and volume and pitch (for bells). Since these data could not be obtained for all of the copper objects in the Lamanai assemblage, and since our discussion focuses primarily on the contexts and significance of copper objects at the site rather than technical properties of metal, we prefer to use Pendergast's (1962) typology. We do, however, supplement the typology with Hosler's (1986: 104–105) classification for certain objects, such as needles, for which more detailed typological categories exist.

The contexts in which copper artifacts from Lamanai were found include the following: burials, middens, caches, architectural features, and surface contexts (TABLE 2). Copper artifacts in burials account for more than one quarter ( $n = 49$ ; 26.2%) of all of the copper artifacts found thus far at Lamanai. Middens at Lamanai include discrete refuse accumulations, a number of which have depths approaching 50 cm or more, as well as refuse deposits that are generally thinner and horizontally dispersed, which we referred to as sheet middens. Over 43% ( $n = 82$ ) of the copper artifacts recovered at Lamanai have come from middens. Copper artifacts found associated with Maya construction, i.e., those included in the architecture category,

Table 2. The contexts of copper artifacts from Lamanai, Belize

Temporal phase	Context					Total
	Burial	Midden	Architecture	Cache	Surface	
Early Postclassic Buk	16	1	0	1	0	18
Middle Postclassic Cib	9	0	0	0	0	9
Late/Terminal Postclassic-Spanish Colonial Yglesias	18	81	41	2	0	142
Unknown	6	0	0	0	12	18
Total	49	82	41	3	12	187

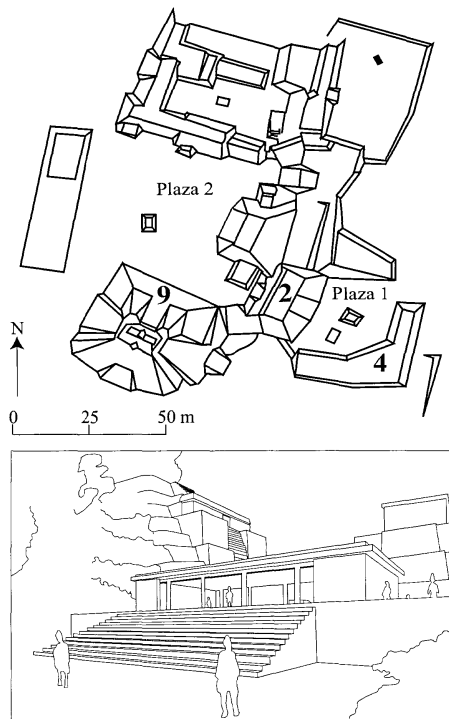


Figure 2. Plazas 1 and 2 of the N10 grid block and Structures N10-2 and N10-4; all of the Buk and Cib phase copper artifacts recovered at Lamanai come from these two structures. Str. N10-2 is shown in a perspective drawing by Stan Loten, with Str. N10-9 in the background at left.

were recovered in core deposits and collapse debris, atop and within floor ballast materials (typically unmodified limestone pieces mixed with soil), and in other contexts clearly linked with architectural features at the site. Only three copper artifacts were recovered from caches during investigations at Lamanai and 12 copper artifacts were found on the ground surface of the site (TABLE 2).

### The Contexts, Forms, and Styles of Early Postclassic Buk Phase Copper Objects

Copper artifacts from the first centuries of the Postclassic period come from a very limited range of contexts at

Lamanai; all were found associated with elite burials except for one object found in a cache and one found in a midden (TABLE 2). All 18 copper objects associated with Buk phase ceramic vessels come from two structures, N10-2 and N10-4, which lie very close to the New River Lagoon (FIG. 2). These structures are believed to be at the heart of an area that witnessed Maya ceremonial and probably administrative activities from the 11th to the 13th centuries (Pendergast 1981). Copper objects were found in six of the 97 burials excavated in these two structures. Two of the finely crafted copper objects are shown in Figures 3 and 4. Dates assigned to the archaeological contexts in which copper artifacts were found at Structures N10-2 and N10-4 are based largely on relative stratigraphy and on the presence of typologically distinctive Buk phase ceramic vessels (Graham 1987).

All but one of the 18 Buk phase copper artifacts recovered from excavations at Structures N10-2 and N10-4 are what Hosler (1994: 208) describes as status display and ritual objects. These include seven bells, seven false wirework ornaments (FIG. 4), and three filigree rings. The remaining object is a non-diagnostic piece of sheet copper.

The most common copper artifacts recovered at Lamanai (TABLE 1)—bells—are represented in the Buk phase by seven examples (8.8% of the site total of 79). Following the Pendergast (1962) typological classification, bell Types IA1a-i, IC1a, IC4a, IC6a, and ID1a are represented, with plain or elongated globular and pyriform types (IA1a-i, IC1a and ID1a) the most common (FIG. 5). Early Postclassic bells with designs on resonator bodies are not common, although several have raised, horizontally or vertically oriented wirework bands. In addition, a few are adorned with false or simulated wirework on resonators. Only one bell (Type IC4a), found with Burial N10/4-3, is elaborately ornamented with wirework eyes, nose, and upper lip decorations. Lothrop terms these “head effigy” bells in his discussion of metals recovered from the Sacred Cenote at Chichén Itzá (1952: 91). Bell suspension loops are either single or double wires, with very modest to fairly prominent sprue projections. Bell clappers are almost exclusively copper beads; a small pebble clapper was identified in only one of the bells from this phase.



Figure 3. Filigree copper finger rings (Type IVA3) from Buk phase burials. LA 118/11 (top) from Burial 16 in Str. N10-2; ring has an outside diameter of 2.0 cm. LA 68/3 (bottom) false wirework ring from Burial 2B in Str. N10-4; ring has an outside diameter of 1.9 cm.

Two rings, both of filigree strapwork form (Type IVA3), were associated with Buk phase burials, one in Structure N10-2 and the other in N10-4 (Pendergast 1962: 529, 1981: 47). They are characterized by intricate and delicate ornamental strapwork and with linked and separated S-scroll motifs (FIG. 3). Both are edged with bands divided by a center line, which creates a double-band effect. One of the rings, LA 68/3, is among a number of copper objects worn by the Maya at Lamanai that Hosler notes “represent a local southeastern Mesoamerican metalworking tradition” (1994: 208). Another Buk phase ring, a simple undecorated example of Type IVA1, was found at the base of the midden abutting the NE corner of Structure N10-9, located immediately west of Str. N10-2 (FIG. 2).

Seven oval-shaped ornaments were recovered during excavations of Burial N10/4-3 (FIG. 4). These objects are the only ones of their kind found at Lamanai, and, to our knowledge, the form has not been reported from any other sites in the Maya area (Bray 1977: 385). The ornaments are made of interconnected S-scroll wires attached to an elliptical frame. This S-scroll design is fairly common in the lost-wax (*cire perdue*) casting tradition of lower Central

America (Hosler 1994). They were presumably attached to clothing by their wide cruciform rear straps, and it is possible that they functioned either as garment fasteners or as personal adornments.

### The Contexts, Forms, and Styles of Middle Postclassic Cib Phase Copper Objects

Nine copper artifacts have been recovered from unequivocal Cib phase contexts (TABLE 2), all from elite burials in Structure N10-4. The relatively small number of copper objects is likely to be a reflection of the general underrepresentation of Middle Postclassic activities in the archaeological record of Lamanai. The information we have from this critical period comes from excavations that have taken place at Str. N10-4 (FIG. 2). Other Middle Postclassic residential structures at the site have been tested, but no other copper artifacts from definitive Cib contexts were recovered.

One bell, two bell-headed pins, and six dome-shaped clothing ornaments comprise the copper artifact assemblage from Str. N10-4. The bell from Burial N10-4/46 is a sub-pyiform example with shallow, false wirework on its upper body and an undecorated lower resonator. The bell is a variant of Type IC2a, with what was probably a strap for suspension, but only a small portion remains. Its clapper is a small, globular bead. The two bell-headed pins from Burial N10-4/29 are composed of small, plain, globular bells of Type IA1a-i attached to relatively short pins, with a small, cup-like element situated between the bell and the shaft of the pin. The small amount of cloth found adhering to these pins suggests that they were used as clothing fasteners (Pendergast 1981: 47). To our knowledge, no other examples of the form have been recovered in the Maya area (Bray 1977: 385).

The six domed copper ornaments with Burial N10-4/28 consist of hollow hemispheres with applied beading around their edges and applied double straps across their backs for attachment. These are identical to gold ornaments found in Tomb 7 at Monte Albán dating to Late Postclassic times (Caso 1969: Plate 22). The functions of these clothing ornaments are not entirely clear, although several lines of evidence, discussed below, suggest how they may have been used.

### The Contexts, Forms, and Styles of Late Postclassic-Spanish Colonial Period Yglesias Phase Copper Objects

The vast majority of the copper artifacts from Lamanai come from the contact period community, which lies in a vaguely defined area around the two Spanish churches. Most are associated with residential structures apparently



Figure 4. Right elbow area of Burial N10-4/3 with shell-shaped ornaments and globular bells. This juvenile was buried with the greatest number of copper objects at Lamanai. The largest shell-shaped ornament in the left-center of the image is 2.9 cm in length. Note the two globular bells in the right of the image above one of the two bone circlets. A number of barrel-shaped marcasite beads are also shown in this image.

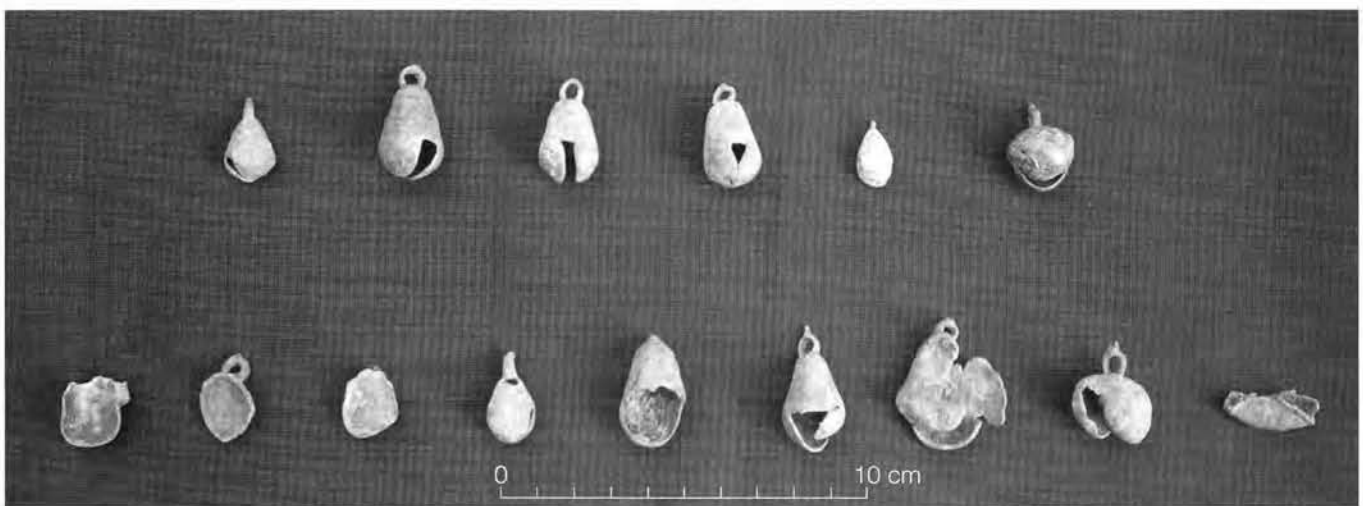


Figure 5. Bell varieties from Lamanai. In the top row all bells are pyriform Type ICIa except the globular bell (Type Ia1a-i) on the right end of the row. On the bottom row are mis-cast globular and pyriform bells while the two on the right are laterally mashed. The three specimens on the bottom left are partially cast bell walls.

occupied by elite members of the community. A total of 142 of 187 (75.9%) of the copper objects found at Lamanai are believed to date from sometime shortly before mid-16th century Spanish contact to the late 17th century. Dating of these metal artifacts is based primarily on their association with stylistically diagnostic ceramic forms. The archaeological contexts in which copper artifacts were found in the Spanish Church Zone have yielded distinctive Yglesias phase ceramics, which were made during the Spanish colonial period, but introduced at an unknown date prior to that time. Their introduction could have taken place around 1500 to 1510, when the effects of European presence were first felt in the circum-Caribbean region, but it is also possible that their manufacture began as early as A.D. 1450 (Graham 2004). Alloyed copper artifacts are associated with materials of European origin, such as glass beads and Spanish majolica and olive jar sherds, in several contexts (Simmons 2004, 2005a, 2005b; Pendergast 1985), but the European materials are not necessarily indicators of the time of manufacture of the metal objects. Analyses of late precolumbian Maya ceramic artifacts from this critical transitional period are ongoing (Aimers 2007; Howie 2007). It is likely that other ceramic phases will be defined (Elizabeth Graham, personal communication 2008), further assisting us in refining our understanding of the advent of on-site metallurgy at Lamanai.

At the time of Spanish contact, most of Lamanai's inhabitants were settled in the southern third of the site, but reduction efforts probably led to further concentration of the community in the area that includes the Spanish churches and a number of other nearby structures. The extent of the contact period community, the architectural characteristics of its residential and special use structures, and the material culture of its residents are still being explored (Simmons 2005a; Wiewall 2005). A number of the structures that have been investigated thus far have yielded copper artifacts; the most prominent of these is Structure N11-18.

More copper artifacts have been recovered at Structure N11-18 than at any other structure or locus at Lamanai. Over 37.9% (71 of 187) of the entire assemblage of copper objects from the site comes from various contexts within and immediately around this important building and half (49.6%) of the copper objects associated with Yglesias ceramic artifacts come from this one structure. The building is very likely to have had a variety of functions, and may have served as a residence for Lamanai's colonial period native authority, the *cacique* (Pendergast 1993: 128). It also may have functioned as a guest house for visiting dignitaries, i.e., a *casa comunidad* or *casa real*, with attendant storage and cooking areas (Jones 1989: 67).

In addition to the copper artifacts recovered during excavations of several other Late Postclassic to contact period structures, a cluster of seven copper artifacts was found together in a lagoon-side midden deposit located approximately 60 m east of the second Spanish church. Five of the seven are axe fragments that fit together to form two complete axes (see below). The remaining two artifacts appear to be casting reservoirs from lost-wax casting (Simmons and Shugar 2008). We use the term "casting reservoir" to describe a portion of a lost-wax cast mold that acts as a funnel into which molten copper is poured; once the cavity of the mold is filled, the reservoir acts as a receptacle for excess metal (Long 1964: fig. 1). After the metal has cooled sufficiently both the reservoir and the sprue (the tube leading from the reservoir to the cast object) are detached and may be remelted for later casting.

The majority of copper artifacts (45%; 64 of 142) recovered from the Spanish Church Zone are bells. Smaller numbers of status display objects, including finger rings and tweezers, have been found associated with Yglesias phase ceramics in the Spanish Church Zone. Utilitarian objects from this period include woodworking tools such as axes, chisels, and wedges, as well as fish hooks, needles, and pins (TABLE 3). The remaining objects from late contexts include copper pigs, pieces of sheet metal, prills, and other manufacturing materials.

With only two exceptions, bells from this area of the site are either plain or elongated globular or pyriform types (IA1a-i, IC1a and ID1a) (FIG. 5). Two very small bells, possibly functioning as buttons or other kinds of personal ornaments, also come from late deposits. Designs or decorative elements of any kind are virtually absent on the bells from the Spanish Church Zone. Bells from this period typically have only single suspension loops, although ten have double suspension loops. Sprue projections are present on nearly all of the bells from this period, and in only a few cases does it appear that any effort was made to remove or minimize sprue remnants. Almost all sprue remnants are found on the tops of the suspension loops. With only one exception, bell clappers are exclusively small pebbles.

Only 11 of the 64 bells recovered from very late deposits at the site are whole or complete (TABLE 3). The remaining 53 are either fragments ( $n = 24$ ), or have been smashed or flattened and distorted ( $n = 29$ ). At least some of the bell fragments found in Yglesias phase deposits at the site represent production failures. In some cases only portions of bell walls or suspension loops have been cast, whereas in other instances bells are largely complete but have prominent holes in their resonating chambers (FIG. 5). In a great many cases bells are not only mis-cast, but also damaged, often severely, apparently prior to their deposition in ar-



Table 3. Copper artifacts from Yglesias phase contexts at Lamanai, Belize.

	<i>Burial</i>	<i>Midden</i>	<i>Architecture</i>	<i>Cache</i>	<i>Total</i>
Bells (whole)	2	7	2	0	11
Bells (incomplete/mis-cast)	0	18	6	0	24
Bells (flattened, distorted)	0	17	12	0	29
Axe/celt/chisel	1	3	6	2	12
Axe fragments	0	9	2	0	11
Axe blanks	0	1	0	0	1
Rings	2	3	0	0	5
Sheet fragments	1	5	5	0	11
Needles	1	6	3	0	10
Ingots/pigs	0	2	1	0	3
Casting reservoirs	0	2	0	0	2
Prills	6	2	2	0	10
Fish hooks	0	4	1	0	5
Pins	1	0	1	0	2
Pin heads	2	0	0	0	2
Tweezers	1	1	0	0	2

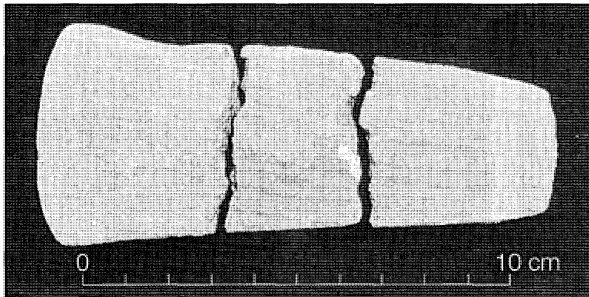


Figure 6. Axe (Type IVB) in three pieces recovered from Spanish contact period midden deposit located at the edge of the New River Lagoon approximately 60 m east of Lamanai's Spanish churches. These axe fragments, along with two others (forming a smaller axe) were found together with the remains of two probable casting reservoirs. All of these objects may have been destined for melting and recasting by Lamanai's metalsmiths.

chaeological contexts. Almost 45% ( $n = 29$ ) of the bells dating to this period show some kind of gross deformity in shape. Descriptions in Pendergast's field notes of such bells include "crumpled," "torn," "laterally flattened," "distorted with one part of side ripped away," and "apparently sacrificed, torn and smashed."

All 24 of the axes, axe blanks, axe fragments, and chisels recovered from Lamanai come from Late/Terminal Post-classic and Spanish colonial period contexts. They make up 16.9% of the 142 copper objects found in the Spanish Church Zone. Various sizes of axe Type IVB were the most common (FIG. 6), whereas lesser numbers of chisel Type VA were also found (Pendergast 1962: 525). A probable axe or chisel blank was recovered as an isolated find just below the ground surface in the Spanish Church Zone. Metallographic analysis of the probable blank shows a ham-

mered structure that has been annealed to some extent, indicating that the object has been partially worked; this is what would be expected of a blank destined to later be worked into a finished form (Shugar 2005a: 12).

Many of the axes and chisels from this period show evidence of very heavy use, with battered polls and dulled bits common. Others, however, show only minimal modifications of their working edges (Aaron Shugar, personal communication 2007). Eight axe fragments have also been recovered from the Spanish Church Zone. Interestingly, five of the eight fragments (mentioned above) found in a group fit together to form two Type IVB axes, one of which is shown in Figure 6.

Five rings were recovered from contact period contexts. Three of the five are plain, narrow bands (Types IVA1 and IVA2). One of the two exceptions is a ring with three raised border bands edging a panel of conjoined circles that produce a triangular piercing at its borders (Type IVA3). Like a great number of the bells recovered from late contexts, this ring is smashed flat and the metal is partly torn. The other decorated finger ring has two lines of small, delicate chevrons located very close to the edges, with the two lines pointing in opposite directions. It appears to be a variant of Type IVA1 (Pendergast 1962: 529).

All four pairs of tweezers in the assemblage were recovered in the Spanish Church Zone; three were from burials. The remaining half pair of tweezers was recovered from a surface context and may date to the final phase of pre-columbian occupation at Lamanai. The tweezers vary slightly in size, but three of the four are small. All have circular blades and can be classified as Type IIIC (Pendergast 1962: 524). One is somewhat larger in size, with a blade diameter of 4.1 cm and weight of 21.2 g.

The five fish hooks recovered at Lamanai come from

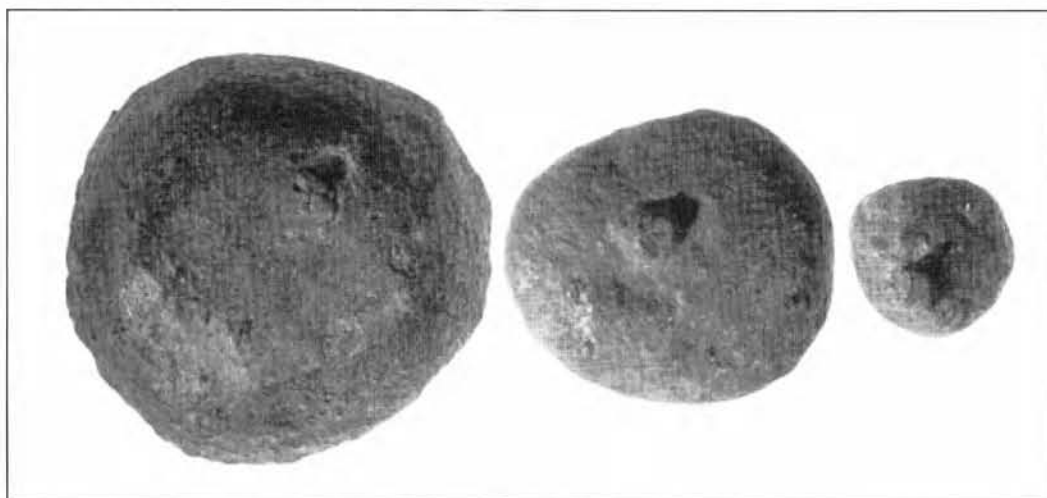


Figure 7. Copper pigs from Lamanai. The ingot on the left measures  $6.3 \times 6.5$  cm and weighs 275.5 g. The pig in the center measures  $4.8 \times 5.0$  cm and weighs 125.5 g. The pig on the right measures  $2.5 \times 2.6$  cm and weighs 34.5 g.

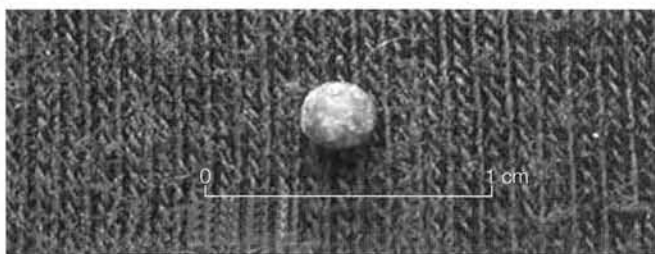


Figure 8. Copper prill recovered from the south side midden of Str. N11-27/ north side midden of Str. N11-18.

Late Postclassic to Spanish colonial period contexts. All are classifiable as Type IXA2 (Pendergast 1962: 525). Hook shanks are of varying size, but all are looped at their tops for line attachment. Ten needles were recovered in the Spanish Church Zone, six from Str. N11-18. Most are Type 2a, with a small piece of metal looped over to form the eye (Hosler 1986: 377). Several are of Type 1, with a perforation through the shank of the needle serving as the eye (Hosler 1986: 369). All of the needles are made of cold hammered, rolled sheet metal with either a rounded or an elongated eye. Two pins and four pin fragments were also found associated with Yglesias phase ceramic material. Finally, a possible tinkler with a double loop suspension, made from what may be a cut pyriform bell, was found at Str. N11-18.

#### *Copper Production at Lamanai*

Compelling evidence for the production of copper objects at Lamanai comes from pigs, prills, mis-cast copper

objects, and by-products of lost-wax casting found in the vicinity of the Spanish churches. Four pigs of varying size have been recovered thus far. The smallest pig weighs 5.8 g, and the largest weighs just over 275 g. All have a slightly irregular circular shape and are plano-convex in section (FIG. 7). Sprues vary in size, and surfaces are typically pitted and granular.

Other evidence of copper production at Lamanai is diminutive in size and weight, but no less important in helping us to understand the nature of Maya metallurgy. It consists of the prills mentioned above, which are very small beads of metal that are by-products of casting activities. Prills are formed when molten metal is poured into molds. They are generally quite round in shape but are sometimes deformed by the impact produced when liquefied metal splashes, falls, and strikes the ground. Owing to their minuscule size, prills typically go unnoticed during excavation. One, found during excavations in the Spanish Church Zone, is shown in Figure 8. To our knowledge, no other objects that might definitively be called prills have been reported from the Maya area.

Fragments of copper sheet of various sizes were also found in the Spanish Church Zone. Five of the 11 recovered are from Structure N11-18 and three are from an adjacent structure. Most weigh between 1 and 2 g, with the largest weighing just over 6 g.

Two large lumps of copper that appear to be remnants of the lost-wax casting process were found together with the group of axe fragments mentioned above (Simmons and Shugar 2008). These two masses of copper weigh approximately 21 and 86 g and appear to be remnants of cast-

ing reservoirs of the kind described by Long (1964: fig. 1) in his experimental study of lost-wax casting techniques.

Twelve copper objects from Lamanai came from surface contexts and thus cannot be assigned to a temporal phase with any confidence (TABLE 2). All were recovered in the Spanish Church Zone and most came from the area of Str. N11-18. Their association with this structure makes it likely that most, if not all, of the objects, which include one pig, one ring, one half pair of tweezers, two probable pin tips and seven bells, are very late in date. The remaining six copper artifacts that cannot be assigned to any temporal phase come from a burial within a small structure located in the Spanish Church Zone. Excavations revealed a burial of two individuals, a middle-aged female seated with her left arm around the shoulders of a seated, middle-aged male, described as "The Loving Couple" (Pendergast 1989; White et al. in press). Unfortunately, no ceramic or other temporally diagnostic material accompanied the couple, although Pendergast (1989: 2) notes that the stair block under which the couple was interred was probably rebuilt at some point between roughly A.D. 1450 and 1500. A pair of disc-bladed copper tweezers, of Type IIIC (Pendergast 1962: 524) and five plain rings of Type IVA1 (Pendergast 1962: 529) were recovered in direct association with the skeletal remains. The location of the tweezers, to which a small amount of cotton cloth still adhered at the time of their discovery, suggests the man wore the object suspended from a cord or thong around his neck. The rings, which enclosed a quantity of cotton cloth, were found between the scapulae of the female, a position that suggests they served as ornaments for her hair braid or queue.

### The Functions and Meanings of Copper Objects at Lamanai

#### *Early and Middle Postclassic: Copper Objects as Imported Wealth*

Commencing around A.D. 1100, the ceramic traditions of Early Postclassic times at Lamanai, some of which grew out of those of the Late and Terminal Classic (Graham 1987: 73–81), underwent significant change. New forms emerged, many of which were radical departures from the approach to pottery-making in preceding centuries. Almost certainly of local origin, the shapes and decoration of the Buk ceramic phase quickly supplanted what had gone before, but at the same time retained certain elements of the earlier ceramic canon (Graham 1987: 81–87). With the changes in pottery came the development of limited ceramic ties with polities in the northern Yucatán peninsula that, on chronological grounds, appear to involve the

transmission of ideas, and perhaps of the ceramic products of those ideas, from Lamanai to recipients in the north (Pendergast 1986: 236–245). Possibly in return for ceramics and other materials sent northward, metal artifacts of non-Maya manufacture began to flow into Lamanai.

The results of chemical compositional studies conducted by Hosler (1994: 208–213) indicate that the sources of the copper objects that began to be imported into Lamanai during Early Postclassic times are West Mexico and southeastern Mesoamerica. In addition, some of the objects, particularly the finely made rings and ornaments, are similar in form and style to examples from the West Mexican states of Michoacán and Guerrero. The exotic origin of the metal objects found at Lamanai, combined with the symbolic significance of the objects in their areas of manufacture, appears to have conferred upon the artifacts a special value as markers of rank or status in the Early to Middle Postclassic Lamanai community. Metal artifacts had an entirely personal association and meaning in Buk and Cib phase times. The occurrence of metals in interments marked by a considerable range of grave goods reinforces the role of the objects as indicators of the owners' elevated standing in the community. All but one of the 27 Buk and Cib copper artifacts recovered at Lamanai are what Hosler (1994: 208) describes as status display or ritual objects. These include bells (one of which was a centerpiece in a jade and shell necklace), elaborately made false wirework and dome-shaped ornaments, and finely crafted filigree rings, all made by lost-wax casting (FIG. 3). It seems likely that the exotic designs and origins of these and other metal artifacts from the period, all crafted from an unfamiliar material with unique properties, helped to make such objects highly appealing to elite members of the community. The flow of exotic items such as these into Lamanai has been cited as one of the clear indicators of the community's continued vitality, as reflected in long-distance social and commercial ties, following the collapse of so many other southern lowland Maya polities in the 9th century A.D. (Pendergast 1991, 1993).

#### *The Late Postclassic and Spanish Colonial Periods: Copper Objects as Items of Local Manufacture*

The contexts in which copper artifacts were found dating from the centuries just prior to and during Spanish contact differ significantly from those in which Early and Middle Postclassic copper artifacts were recovered. Most copper objects from very late deposits were recovered from middens or from architectural contexts and a considerable number appear to have been manufactured at the site, probably within the Spanish Church Zone. Copper ores are not locally available in the Maya lowland area (Bateson

and Hall 1977; Bray 1971, 1977; West 1994). The results of Hosler's (1994) chemical compositional studies indicate that at the time of Spanish contact the Maya at Lamanai were crafting their own metal tools and status symbols using material apparently produced by melting copper objects imported in earlier times. She notes that by historical times, "artisans were crafting objects at Lamanai itself, and they seem to have been doing so by using recycled metal" (Hosler 1994: 214). The majority of copper artifacts produced during this time were made from metal cast into molds using the lost-wax method; most are undecorated bells. Hosler (1994: 53) notes that available evidence indicates that all bells manufactured in Mesoamerica were cast in one piece using the lost-wax method. Various aspects of this metalworking technique have been described using information obtained from archaeological investigations (Bruhns 1972; Bruhns and Hammond 1982, 1983; Pendergast 1962), experimental studies (Long 1964), ethno-historical accounts (Motolinía 1950; Sahagún 1959), and material analyses (Hosler 1994; Noble 1975).

We do not know when copper metallurgy began at Lamanai, but there is evidence that the Maya there were actively engaged in the production of copper objects during Spanish contact times and probably earlier, perhaps by the end of the Cib ceramic phase. The strongest evidence for indigenous metallurgy at Lamanai comes from Yglesias phase contexts and consists of three pigs, ten prills, an axe blank (or ingot, possibly), and two probable lost-wax casting reservoirs, all representing production debris (TABLE 3). In addition, 24 bell fragments that are production failures were recovered from Yglesias phase deposits in the Spanish Church Zone. Along with the pigs and prills these mis-cast bells add weight to the idea that copper production was taking place at Lamanai, since casting failures are not likely to have been trade items. It is even possible that the 29 flattened bells found in Yglesias phase contexts were crushed by Lamanai's metalsmiths in preparation for re-casting. In addition to the crushed bells, several other smashed and torn copper objects were recovered from these late deposits. Minimizing the surface area of the metal by crushing or flattening would have facilitated melting for reuse in two ways (Aaron Shugar, personal communication 2006). Reducing the size of the objects by flattening would have allowed a greater number of bells to fit into a crucible for melting. Also, crushing would have reduced the length of time required for maintenance of temperatures high enough (1083°C) to melt all of the material in the crucible.

In sum, two separate but related lines of evidence suggest that metalsmiths were experimenting with the production of copper objects at Lamanai sometime just prior

to or during early Spanish colonial times. The evidence includes the presence of mis-cast copper artifacts, most notably bells, along with the pigs, blanks, and other production materials mentioned above, and the anomalous artifact chemistry noted in a number of the copper objects recovered at the site (Hosler 1994). In some cases, Lamanai's metalsmiths were successful in creating whole bells, needles, axes, finger rings, fish hooks, and pieces of sheet copper. The recovery of numerous lost-wax production failures, however, indicates that at other times success eluded them. Noble (1975: 369) suggests that mis-cast objects could be the result of low melting temperatures for the copper, the presence of gas bubbles in residual wax left in molds, or movement of the clay and sand core within lost-wax molds. Whatever the causes, the production failures, pigs, prills, and blanks are the kinds of metal objects one would expect to encounter at a site where the occupants were actively experimenting with metallurgy (Craddock 1995; Young et al. 1999).

Given the intermittent nature of Spanish mission activity in the region, the almost complete absence of European copper objects, and the relatively small quantity of metal involved overall, we believe that metallurgy at Lamanai had its roots in Late or Terminal Postclassic times, and therefore reflects a Maya technological innovation. One of the most notable aspects of the assemblage of copper objects from Lamanai is the absence of Spanish religious items such as devotional medals, personal crosses and crucifixes, rosaries, copper-alloy stars, reliquaries, seals, stamps, and rings. These kinds of objects are common at 16th and 17th-century Spanish colonial sites throughout Florida and the Caribbean (Deagan 2002). All but possibly one of the copper objects found thus far at Lamanai are distinctly Mesoamerican in form and design, and based on preliminary metallurgical analyses (Shugar 2005a) it appears that manufacturing technologies were distinctly Mesoamerican as well.

### **Maya Metalsmiths and the Meanings of Copper**

Maya metalsmiths have been the focus of very little discussion among scholars (Bray 1971, 1977; Hosler 1986, 2003; Pendergast 1962; West 1994). As a result, their status in ancient Mesoamerican social and economic realms remains unclear. Smith (2003: 122) notes that the production of copper and bronze objects required the technical expertise of highly skilled craftspeople; it is difficult, however, to determine the extent to which technical skill in metallurgy might have been correlated with certain levels of social status in the Postclassic Maya world. At Lamanai mis-cast copper objects, manufacturing debris, pigs, and other raw materials have been recovered in domestic mid-



Figure 9. Metalsmith depicted in the Florentine Codex, Folio 796. Note the open mold of an axe into which it appears molten metal is flowing. Also note the brazier, possibly ceramic, into which the metal-smith is forcing oxygen through a hollow tube tipped with a tuyere (blowpipe tip).

dens associated with what appear to be the remains of both commoner and elite households. Although the results of ongoing archaeological investigations are encouraging, it is still difficult to assess the roles that Maya elites and commoners may have had in copper production activities *vis-à-vis* current models of craft specialization (Brumfiel and Earle 1987; Costin 1991; Earle 1987, 2002).

It is clear, however, that brilliantly colorful copper bells, with their wondrous sounds and sacred connotations, were regarded by Postclassic Mesoamericans as prestige goods and hence served as powerful symbols of social identity (Hosler 1994: 155–156; Smith 2003: 119–121). The complex designs of the finely crafted rings, ornamental clothing fasteners, and tweezers speak to the highly developed technical abilities of the craft specialists who created them. Metalsmiths are identified in Maya lexicons of the Spanish colonial period as *Ab chnuen kaak*, or “artificers of fire” (Clark and Houston 1998: 44–45). *Ab chnuen kaak* is translated into Spanish in the Motul Dictionary as “*fundidor de metales*,” or “one who founds and casts metals” (Clark and Houston 1998: 44–45). The Florentine Codex shows a Mesoamerican metalsmith casting a metal axe in a mold using a *tuyere* or blowpipe (FIG. 9); the receptacle for

melting the copper is depicted as a brazier, apparently ceramic (Sahagún 1959: folio 796). Bray (1977: 397) suggests that Maya metalsmiths may have been itinerant craft specialists, traveling with their own metalworking tools such as tuyeres, crucibles, and molds. It is also possible that copper workers were full-time residents of certain communities such as Lamanai, and the crucibles mentioned by Columbus may have been destined for use by metalsmiths who resided in such communities.

To date, we have not identified copper production features or tools, such as furnaces, ceramic braziers, crucibles, or tuyeres, at Lamanai. If we were to find such elements in direct association with residential or other architectural remains, or if copper-working tools were to be recovered in individual burials, we might be able to establish tentative associations between the objects and the metalsmiths who used them. In addition, the study of households with associated metal objects and production materials and workshop areas, as well as osteological analysis of certain burials, might provide information regarding the lives of ancient Maya metalsmiths and the organization of their specialized craft activity. At present, however, the data shed little light on the identities of Maya metalsmiths. To our knowledge, copper production features have not yet been identified archaeologically in the Maya lowlands, and very few copper-working tools have been found (but see Bruhns and Hammond 1982, 1983; Paris 2008; Shugar 2005b). The presence of a single copper pig at Tipu, in the western Cayo District of Belize (FIG. 1), is indicative of metalworking in that community as well (Graham and Wayman 1989). Current archaeometallurgical studies at Lamanai are aimed at exploring the social and economic positions of metalsmiths in late Maya society (Simmons 2005a; Simmons and Shugar 2008), but until we know more about the features and tools such individuals used, how they organized productive activities, and where they lived, it will be difficult to understand the roles that Maya metalsmiths played in Postclassic period communities.

Fortunately, we know more about how the objects produced by metalsmiths were regarded by the Maya. Lexical data from Spanish colonial period dictionaries provide some insights into the various meanings assigned to copper objects by the people who used them. In the Tzotzil dictionary, the term used for *campana* (bell) is *tak'in* (Laughlin 1988: 643), the same term that is used for “money” in both the Tzotzil Dictionary (Laughlin 1988: 631) and the San Francisco Dictionary (Michelson 1976: 584). In contemporary Chontal Maya, the word *tak'in* is translated as “money, metal, literally: the sun’s excrement” (Knowles 1984: 462).

This last usage of the term suggests an underlying mean-

ing that is related to Maya perceptions of metals and their properties. The significance of metallic sound and color among some Mesoamerican peoples, particularly those in West Mexico, has been explored in Hosler's seminal work, *The Sounds and Colors of Power* (1994). We would argue, as Hosler (1986, 1994, 2003) has in the case of West Mexican peoples, that certain metallic colors and sounds were considered divine by the Maya. The association of metal with the sun, a deity known as *Kinich Ahau* or God G (Miller and Taube 1993), suggests that metal objects were perceived by the Maya as having animate qualities that they considered to be divine.

In the 17th century, the Spanish Friar Diego Lopez de Cogolludo provided unambiguous information regarding how copper bells were used and perceived by the Maya at the time of Spanish contact in Yucatán. "*La moneda de que usaban, era campanillas y cascabeles de cobre, que tenían el valor, según la grandeza ...*" ("The money that they used was little bells, and bells of copper, that had value, according to their size...") (1688: 181). The writings of Diego Quijada, a 16th-century *alcalde mayor* (head of a provincial administration in the Spanish colonial period), also include references to the value ascribed to copper bells during the Spanish colonial period in Yucatán. In discussing fines levied on Maya convicted of idolatry, Quijada notes that cacao, red stones, beads, and "*campanillas y cascabeles de cobre que tenían de tiempo de su infidelidad*" (small bells and bells of copper that they had from the time of their infidelity) were to be paid to Spanish authorities (Scholes and Adams 1938, Book 2: 214).

Diego de Landa's 16th-century work, *Relación de las Cosas de Yucatán* (Tozzer 1941) provides further information on how the contact period Maya used some copper status and utilitarian objects. Landa notes: "They had a certain soft brass, and with a slight mixture of gold from which they made their hatchets by casting them, and some little bells with which they danced" (Tozzer 1941: 186). Information from the Cordemex Dictionary supports the idea that Maya dancers used bells; the terms *ch'eh ok* and *ch'eh ok mascab* are translated as "*cascabeles que usan los danzantes*" (bells that the dancers use) (Vásquez 1980: 87). Evidently bells were attached to bands, possibly of woven cotton, that were worn around the lower leg, just under the knee. Figure 10 shows a partially reconstructed Postclassic ceramic vessel from Lamanai used to burn incense with what appear to be bells worn in this manner. Thompson notes that a censer found at Mayapan, believed to represent the deity Xipe Totec, has "at about knee level bells painted yellow, presumably to represent gold or burnished copper" (2005: 9).

Other metal objects, including copper axes, also held a

certain value for the Maya. In a manuscript written in 1620 following his travels through central Guatemala, Friar Gabriel Salazar notes: "Once, when in charge of searching very carefully among the Indians of San Marcos, Cobán, or Manché for as many as possible of the small copper axes used in these lands in pagan times, I bought them even though they were expensive" (Feldman 2000: 52–53).

## Conclusion

The number and variety of copper objects recovered at Lamanai indicate that, as a new commodity with remarkably unique aural and visual properties, metal artifacts played an important role for at least some members of Postclassic and later contact period society. Masson notes that "metal was probably the most highly valued luxury good in this region of the Postclassic Maya world" (2003: 279). The inclusion of copper bells, elaborate rings, and button-like ornaments in Early and Middle Postclassic elite burials shows that at least some residents of the site displayed such items in certain social and ritual settings. Copper bells worn during performances acted as auditory reminders of the high social standing of those who displayed them, and the lustrous copper finger rings and elaborate clothing ornaments served as visual indicators of elevated status.

The results of chemical analyses indicate that during the Buk and Cib ceramic phases finished copper objects worn as items of personal adornment were imported into Lamanai from West Mexico and southeastern Mesoamerica (Hosler 1994: 210–213). The sample of Buk and Cib phase copper artifacts is small, but the size of the assemblage is not the product of sampling bias, given the extensive nature of survey and excavation in the areas occupied during these times (Pendergast 1981). It is conceivable that the sample is not representative of the level of importation of metal artifacts in Buk and Cib times because the artifact quantity was reduced by recycling a portion of the objects as material for later Yglesias phase metalworking at the site. The fact that copper artifacts have not been recovered from non-elite Buk or Cib phase contexts suggests that elite residents at the site during the first few centuries of the Postclassic period were the beneficiaries of the strong trade relationships that the community enjoyed beyond the Maya area.

The contexts from which metal artifacts have been recovered suggest that the view of metals at Lamanai changed over the course of the last few centuries of the site's existence. During the Early and Middle Postclassic periods, copper objects appear to have had a personal meaning for members of the community's elite. Elaborate copper ornaments, finger rings and bells originating from

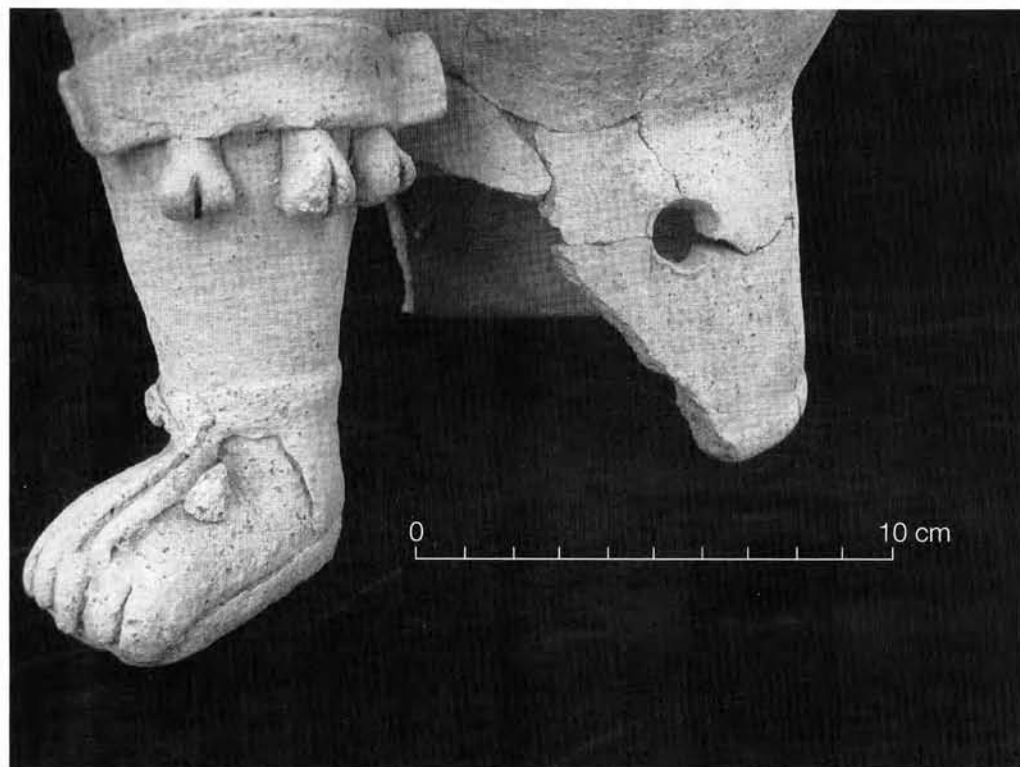


Figure 10. Late Postclassic incensario from Lamanai with apparent copper bells on left leg, probably depicting a Maya dancer.

regions located well outside the Maya lowlands, adorned elite individuals during their lives and accompanied them to their graves. Ethnohistorical accounts indicate that such objects were symbols of elevated social rank among the Maya; their gleaming visual quality, which may have been seen as reflecting the power of the sun on those who wore them, helped to reify that status.

The absence of copper objects in Buk and Cib phase middens and architecture stands in sharp contrast to the pattern of intrasite distribution just prior to and during Spanish colonial times. During the later Yglesias phase, both elite and non-elite individuals appear to have had access to copper objects, including status/ritual objects imported from West Mexico and southeastern Mesoamerica. Elite and non-elite community members also had access to objects made of recycled copper produced at Lamanai. Copper artifacts found in elite residential and burial contexts include imported and recycled objects, in roughly equal numbers. Copper objects produced in Yglesias times were both decorative and utilitarian in nature, whereas those imported from outside the Maya area in earlier centuries were exclusively for status display purposes.

Since the Maya at Lamanai were producing copper ob-

jects from what Hosler describes as “stock metal derived from melted-down artifacts” (1994: 214), we find it puzzling that such a large proportion of those from Yglesias contexts (57%) were discarded along with domestic refuse. Potentially recyclable bells, rings, needles, and other finished objects have been recovered in substantial numbers during our excavations in Terminal Postclassic-contact period middens in the vicinity of the Spanish churches. In addition, raw materials for production, such as the axe fragments and lost-wax casting reservoirs mentioned above, along with all four copper pigs, come from rubbish dumps or locations without apparent structural association. The presence of these and other copper artifacts, including all of the production failures found around Structure N11-18 and in the area of the Spanish churches, suggests that this portion of the site was a center for the production of copper objects (Simmons 2004, 2005a; Simmons and Shugar 2008).

Over thirty years ago, Warwick Bray noted that the quantity and diversity of copper objects at Lamanai “is best accounted for by local manufacture in Belize” (1977: 397). Although we have made solid strides in the past three decades toward understanding where and how copper ob-

jects were produced in the southern Maya lowlands, we still have some distance to go. It is our hope that further investigations will bring us closer to an understanding of the advent of copper metallurgy, the organizational aspects of this specialized craft activity, and the roles and status of metalsmiths in ancient Maya society.

### Acknowledgments

The 1974–1986 Lamanai excavations were funded by the Social Sciences and Humanities Research Council of Canada, the Royal Ontario Museum, and the Richard Ivey Foundation of London, Ontario. Simmons' 1999–2001 excavations at Lamanai, along with chemical analyses of the copper artifacts recovered there, were made possible by research grants from the H. John Heinz III Fund for Latin American Archaeology. Technological analyses of the copper artifacts from Lamanai were supported in part by a Charles L. Cahill Award from the University of North Carolina Wilmington. We appreciate the efforts of Drs. Dorothy Hosler and Aaron Shugar in conducting these analyses. Thanks to Stan Loten for the perspective drawing of Structure N10-2. We also appreciate the thoughtful comments of three anonymous reviewers. At Lamanai, logistical support was provided by the Gonzalez family, the Esquivel family, Las Orquedias Women's Group, and the Lamanai Field Research Center. Our sincere thanks go to all of the men and women of San Jose Succotz, Indian Church, and San Carlos who have helped us over the years to gain a better understanding of Lamanai's rich history.

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