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**Breaking the Mold**

THE SOCIOECONOMIC SIGNIFICANCE OF METAL ARTIFACTS AT MAYAPÁN

*Elizabeth H. Paris and Carlos Peraza Lope*

The Postclassic Period was a dynamic era for the Maya residents of the Yucatán Peninsula. The increase in volume and diversity of trade goods in circulation (Sabloff and Rathje 1975; Smith and Berdan 2003), the creation and combination of cross-cultural iconography and symbol sets, the circulation of new forms of currency and standards of value, and the expansion of coastal trade routes brought new opportunities for the creation of wealth, status, political power, and intercultural communication. New consumer goods and production techniques—along with the knowledge, values, and meanings that accompanied them—were adopted and adapted by the Maya in ways that gave them local values and meanings. For the residents of the Postclassic political center of Mayapán, metal artifacts became visible indicators of elite social and political power as sacred objects incorporated into major religious ceremonies and as storable and portable wealth (Pollard 1987, 741). However, because metallurgy was a nonindigenous technology that arrived late in the Maya region, metal objects and metal production technologies were incorporated into the existing cultural fabric in ways that reflected the uses and meanings of other “precious objects” in Maya culture, particularly objects such as jade and shell ornaments. Like jade and shell ornaments, the metal objects created and consumed at Mayapán were used for display.

In daily life, tools such as needles made from valuable metals were simultaneously utilitarian and exotic markers of status;<sup>1</sup> metal ornaments could be attached to clothing or worn as jewelry. They could also be used for special functions and occasions—displayed through special rituals or interred in burials or caches—and they could denote offerings. In this chapter we argue that the exotic nature of metal in the Maya region made metal objects visible indicators of wealth and desirable interregional commodities, while the plastic properties of metal enabled local producers to create and re-create objects particularly suited to the needs of Mayapán consumers and production capacities.

### COMMODITIES AND VALUE

Commodities such as metal objects were economically, socially, and ritually valuable in Maya culture. The Maya were not unique in this, nor was this multifaceted valuation limited to metal. Commodities, defined as “anything intended for exchange” (Appadurai 1986, 9), often have multiple meanings and are assigned value (Renfrew 1975, 22) according to the economic, social and ritual roles they fulfill in particular contexts. These multiple meanings may be expressed simultaneously or may change according to context. Commodities may be perishable or nonperishable; however, nonperishable craft items generally have higher archaeological visibility. They may include food and necessities, raw materials, domestic or industrial tools and materials, clothing, jewelry or display items, luxury items, money, and ritual paraphernalia, and may have widely variable spheres of distribution, from local to interregional in scope.

Within cultures or regions, commodities made from particular materials tend to be assigned a relatively high value due to the physical or visual properties of these materials, especially in regions where these materials are considered rare and exotic. For example, items made from gold, silver, copper, and lead metals (Roberts 2009), as well as ivory and precious stones, became highly valuable in economic, social, and ritual contexts in the Western world (Abu-Lughod 1989) before and after the introduction of formal currency. By transforming metal from its raw state into finely crafted items, producers could greatly increase the economic, social, and ritual value of metal items. Such items were highly regarded throughout the ancient world, including in ancient Mesoamerica.

Cross-culturally, craft items used as commodities often reflect multiple aspects of social identity, such as wealth, social status, religion and ideology, political position, occupation, age, gender, and ethnicity (Costin 1998, 3). Craft objects can also be used to complete economic transactions or create and solidify social and political relationships (Dalton 1982, 184). Modern

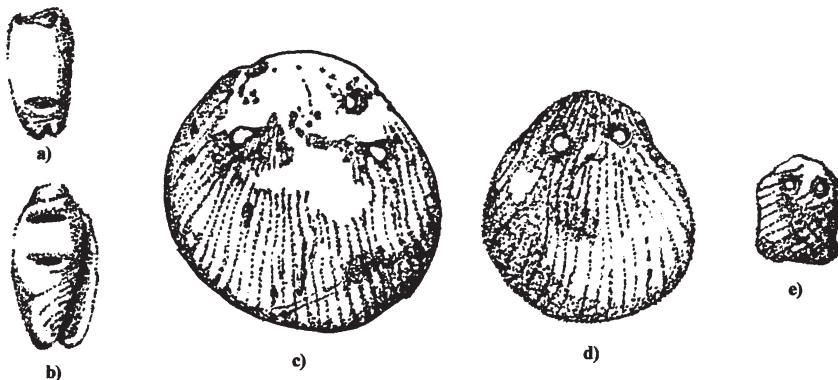


FIGURE 7.1. Olive shell (a, b) and Spondylus shell (c–e) ornaments from Caye Coco, Belize. Illustration by Anne Deane, courtesy of Marilyn Masson.

Western examples of such items include engagement and wedding bands, jewelry displaying religious symbols, paintings or decorative architectural elements, clothing worn at religious services or ceremonies, religious paraphernalia, and elaborated visual religious symbols at a variety of scales. Such items may express economic wealth through size, style, craftsmanship, and the origin, cost, or rarity of the raw materials. They may express social status by associating the individual with a particular group, age, gender, or stage in life. Moreover, they can be used to express the association of the individual with a particular religion, ritual, or ideology (Douglas and Isherwood 1996; Smith 1987). The criteria on which the value of a particular item is judged may vary diachronically and cross-culturally (Wright 1998, 59); they may reflect technical skill or creativity of the artisan, technical quality or effects—visual, auditory, or tactile—of the end product, or the value of the raw materials.

Maya conceptions of value and the subsequent development of standards of value may be closely tied to the development and exchange of exotic luxury items. These items could simultaneously connote and evoke concepts of wealth, status, and sacredness. Iconography and artifacts from Late Formative Period sites in the Maya Lowlands reflect the growing use of prestige items created to adorn the body or to be easily portable, such as jade and Spondylus shell ornaments, obsidian ear spools, labrets and nose plugs, and chert eccentrics. These items became important symbols of elite status, abundant wealth, and sacred ritual at sites located far from the origin of the raw materials found there. In particular, the value of jade and shell ornaments varied considerably according to size, scale, degree of elaboration, function, and use (Figure 7.1; Freidel, Reese-Taylor, and Mora-Marín 2002, 43).

While the Maya cultural repertoire included a number of prestige goods—such as foreign pottery, obsidian and ground stone tools, hematite, pyrite, iron ore, and ritual paraphernalia such as censers and stingray spines (Becker 1993; Chase and Chase 1992, 1998; Krejci and Culbert 1995; McAnany et al. 2002)—jade and shell artifacts are notable for the broad continuum of uses to which they were adapted. At one end of the continuum, Late Formative artisans created elaborate ornaments such as pectorals, axes, ear flares, and pendants (Freidel, Reese-Taylor, and Mora-Marín 2002, 43). Elaborate jade and shell ornaments are often found in elite ceremonial contexts such as burials and caches, suggesting that they may have been “inalienable possessions” (Weiner 1992, 10) that were used in Formative Period Maya society as sources of social and political power attached to elite rulers and lineages. Freidel, Reese-Taylor, and Mora-Marín (2002, 43) argue that the meanings of shell and jade objects were symbolically manipulated by Maya elites through art, architecture, royal performance (as depicted in art), and formal caching behavior. On the other end of the continuum of value were small jade and shell beads, which were widely used by the general population as currencies, as well as axes and other utilitarian tools (Freidel, Reese-Taylor, and Mora-Marín 2002, 43). It is important to note that these beads and tools derived their value from the elite promotion of their constituent materials, jade and shell, as symbolic and culturally meaningful. In addition, beads and small ornaments were used in much the same way as their more elaborate counterparts; they were displayed publicly as personal ornaments and portable accessories or placed in ritual deposits, also a public act (Pearson 1999). At Cuello, Belize, for example, jade and shell beads were commonly included in Formative Period burial offerings as pendants, bracelets, knee bands, and belts (Hammond, Clarke, and Robin 1991).

From their earliest appearance in Maya sites, metal items became an addition to, rather than a replacement of, jade and shell commodities that played prominent roles in Late Preclassic and Classic Period exchange systems of prestige goods. Due to their initial scarcity, they have been found in predominantly elite ceremonial contexts at large Maya urban centers dating to the Classic and Terminal Classic Periods, and represent luxury items for display or adornment. The earliest known metal artifact in the Maya region, a *tumbaga* (copper alloyed with gold) bead in the shape of a jaguar claw, was found in an Early Classic Period cache at Altun Ha, Belize (Pendergast 1970). This cache was found in Structure A-3, a temple located along the southern edge of the central ceremonial precinct, and likely represents an elite ceremonial offering. Although its style suggests that it was a trade piece from Coclé, Panama, the jaguar claw symbolism would have been highly meaningful to Maya audiences. However, metal was largely unknown to the Maya until the Terminal Classic Period, when Chichén Itzá began importing relatively

large quantities of metal artifacts via its coastal trade networks around the Yucatán Peninsula. The majority of these objects eventually became ritual offerings in the Cenote of Sacrifice, also an elite ceremonial context (Coggins and Shane 1984; Lothrop 1952). These items were used almost entirely for display and personal adornment. They included plain and embossed gold disks; sheet gold ornaments in a variety of shapes; gilded ceremonial objects, gold caps, sandals, bracelets, and cups; copper celts and copper rings; plain, decorated, and effigy copper bells; figurines; figurine pendants; and ear spools (Coggins and Shane 1984; Lothrop 1952). Some of these objects, particularly the embossed gold discs, depict unique scenes with warriors and nobles, and may have been produced specially for investiture ceremonies or other important, sacred rituals (Coggins and Shane 1984). Stylistically, the objects reflect Chichén Itzá's far-reaching connections with metal-producing regions both to the east—including Panama, southern Costa Rica, Peru, and Colombia—and to the west—including Oaxaca, West Mexico, and central Mexico (Coggins and Shane 1984; Lothrop 1952).

In the Early Postclassic Period, the expansion of commercial networks throughout Mesoamerica created an unprecedented availability of exotic luxury items at sites throughout the northern Yucatán Peninsula (Figure 7.2). These items were available to commoners and elites alike (Hirth 1998; Masson and Peraza Lope 2004; Paris 2008; Smith 1999, 2003a, 2003b), possibly reflecting increased opportunities for economic affluence among nonelites (Masson and Peraza Lope 2004, 214) and their economic role as commodities produced for market exchange. During this period Mayapán and Lamanai, Belize, rose in political and economic importance following the decline in power of Chichén Itzá (Masson and Peraza Lope 2004; Milbrath and Peraza Lope 2003; Simmons, Pendergast, and Graham 2009). Like Chichén Itzá, these sites became economically central in the circumpeninsular exchange of metal objects, and similarly used their hegemonic positions in their economic networks as a source of political and cultural influence. Mayapán and Lamanai imported exotic metal items from affluent metal production zones, along with metallurgical tools and techniques, using ingots or recycled metal items to produce metal objects onsite using imported casting technology (Cruz Alvarado, Carlos Peraza Lope, and Elizabeth H. Paris 2009; Paris 2008; Simmons 2005a, 2005b; see Simmons and Shugar, Chapter 6 of this volume). As a result, metal items became available to a broader socioeconomic spectrum of the population at these locations (Paris 2008). Residents of other Postclassic sites in northern Yucatán, including San Gervasio (Pinto Bojorquez 1997; Robles Castellanos 1980), Santa Rita Corozal (Chase and Chase 1988), Cerros (Garber 1989), Dzibilchaltun (Moore 1975; Taschek 1994), Sarteneja (Boxt 1993), Laguna de On (Gann 1927; Masson 2000), Leona Vicario (Pantoja Díaz 1997), Yaxuná (Ardren 2003), and even Postclassic



FIGURE 7.2. Map of Mesoamerica with sites mentioned in the text and other sites where metal artifacts have been recovered.

Period Chichén Itzá (Coggins and Shane 1984; Lothrop 1952; Thompson 1968), also obtained and used metal goods through these expanded networks (see Paris and Peraza Lope 2009).

Postclassic Maya ethnohistorical sources suggest that metal items were economic commodities that were also portable status symbols associated with powerful deities. Early Colonial Period accounts identify copper bells among other standards of value and media of exchange. Both Gaspar

Antonio Chi and Diego de Landa included copper bells among the media of exchange used by the Maya, and also included copper axes, cacao beans, feathers, red shell beads (*Spondylus*), and jade beads (Tozzer 1941, 95, 231). Bartolomé Colón, in describing his encounter with a trading canoe off the coast of Yucatán in 1502, mentioned that the canoe contained a variety of commodities, including cotton clothing, cacao beans, wooden sword-clubs edged with flint, copper axes for cutting wood, bells, and certain discs and crucibles for melting the copper (Columbus 1959; Piña Chan 1978, 39). Fray Diego López de Cogolludo (1957 [1688]) wrote, “The money which they used was copper bells of different sizes which had a value according to their size” (Tozzer 1941, 95–96; see also Piña Chan 1978, 43). Ethnohistorical sources are equally clear that metal objects had important roles in clothing, adornment, and religious rituals, in addition to their economic value. Diego de Landa mentioned the role of copper bells in dance (Tozzer 1941, 186). The *Chilam Balam of Maní*, written in the town of Maní located just to the south of Mayapán, emphasizes the use of bells as items of dress, specifically associated with the war costume of Kukulkan: “[i]n the Katun 5 Ahau, Kukulkan beckoned with his hands, his bells tinkled, and he gathered his tribute of honey and quail. In the nineteenth year Kukulkan beckoned a second time, and again his war bells were heard, and he took his donation of the miserably poor ones” (Craine and Reindorp 1979, 114; see also Hosler 1995). The footnote by Eugene Craine and Reginald Reindorp adds that this passage means that Kukulkan was dressed for war with bells on his wrists in this mythological narrative, and that the sound of the bells signaled the advent of war and suffering. The *Chilam Balam of Chumayel* also mentions bells attached to clothing: “[t]his is the bead collar: it is its little bells” (Roys 1967, 98).

### METAL AND EXCHANGE IN MESOAMERICA

During the Postclassic Period metal items became important, valuable commodities that were widely exchanged through interregional trade networks (Hosler 2002). The low bulk and durability of metal items produced at Mesoamerican sites would have made them easy to transport over large distances (Hassig 1985, 25), while their physical properties also allowed them to be remelted, alloyed, or recast into new objects. These processes could potentially add value to a metal object through the creation of new functions, different colors, and different physical properties such as hardness, cutting edge, sound (bells), or elasticity (tweezers) (Hosler 1994). They could also divide value by recasting a single object, whether a metal ingot or a finished consumer item, into multiple smaller objects. The resulting consumer items would also have had exotic visual properties—such as gold, silver, and copper colors—while copper bells would have had the added dimension of

unique tinkling sounds that evoked, yet would have been audibly distinct from, olive shell tinklers and stone or shell celts (Hosler 1994, 1995; see also Freidel, Reese-Taylor, and Mora-Marín 2002).

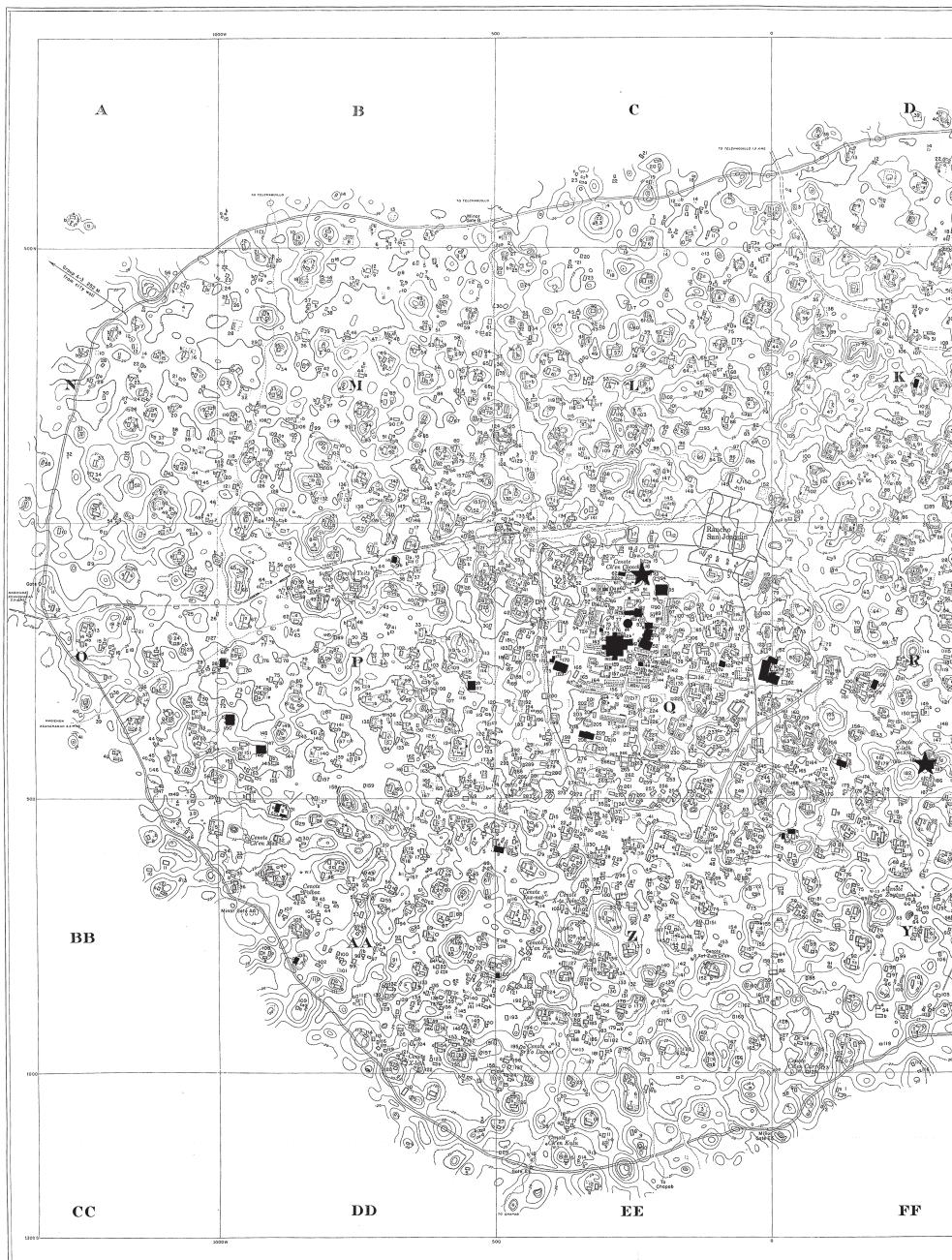
Certain metal objects may have also held value through use as currency, for instance, copper axe-monies: thin, T-shaped items found primarily in eastern Morelos, Guerrero, Oaxaca, and Chiapas, and often found outside the Maya area grouped together in standardized packets (Hosler 2003; Hosler, Lechtman, and Holm 1990). They have been found, however, in very limited numbers in the Maya area, including at San Agustín Acasaguastlán, Guatemala (Smith and Kidder 1943). Also, an unprovenienced axe-money is housed at the Museo Na Bolom in San Cristóbal de las Casas, Chiapas. Fray Diego López de Cogolludo (1957 [1688]) mentioned the use of small copper bells as currency and that they were valued according to their size. Metal may also have been exchanged in the form of ingots (Simmons 2005a; Weeks 1975, 1983) or thin sheets (Lothrop 1952; Tozzer 1941, 187). Ingot molds and mold fragments have been recovered at the sites of Chisalín and El Resguardo in Greater Utatlán (Weeks 1975, 1983, and John M. Weeks, Chapter 5 of this volume), while thin sheets of copper, gold, and alloys such as tumbaga have been found at sites throughout Mesoamerica (Bray 1971, 38), including Mayapán (Paris 2008, 48).

In the Maya Lowlands—where karst terrain predominates and natural metal ores are located in distant regions such as West Mexico, central Mexico, Oaxaca, and Honduras (Bray 1977, 397)—metal would have been a valuable, exotic item that would have maintained its economic value through space and time. Its rarity and foreign associations would therefore have enhanced its social value (Paris 2008; Simmons n.d.). In Mesoamerica the production of metal objects began in West Mexico by around AD 600 (Hosler 1988a, 1988b, 1994; Hosler and Macfarlane 1996), and continued under the Tarascan Empire and into the Colonial Period (Maldonado 2008; see Blanca Maldonado, Chapter 3 of this volume, and Hans Roskamp and Mario Rétiz, Chapter 2 of this volume). Most other metalworking sites are similarly located in affluent production zones (Smith and Berdan 2003) with native metal resources, such as those in Honduras (Blackiston 1910; Richardson et al. 2008; see Patricia Urban, Aaron N. Shugar, Laura Richardson, and Edward Schortman, Chapter 4 of this volume), the Huastec region (Hosler and Stresser-Pean 1992), and Oaxaca (Hosler, Lechtman, and Holm 1990). In contrast, the larger Maya centers of the Postclassic Period, such as Lamanai (Simmons 2005a, 2005b; Simmons, Pendergast, and Graham 2009; Simmons and Shugar 2008; see Simmons and Shugar, Chapter 6 of this volume), Utatlán in the Guatemala highlands (Fox, Wallace, and Brown 1992, 185; Wallace and Carmack 1977; Weeks 1975, 1983, and his Chapter 5 of this volume), and Mayapán (Paris 2008), were not located in affluent production zones, yet supported the

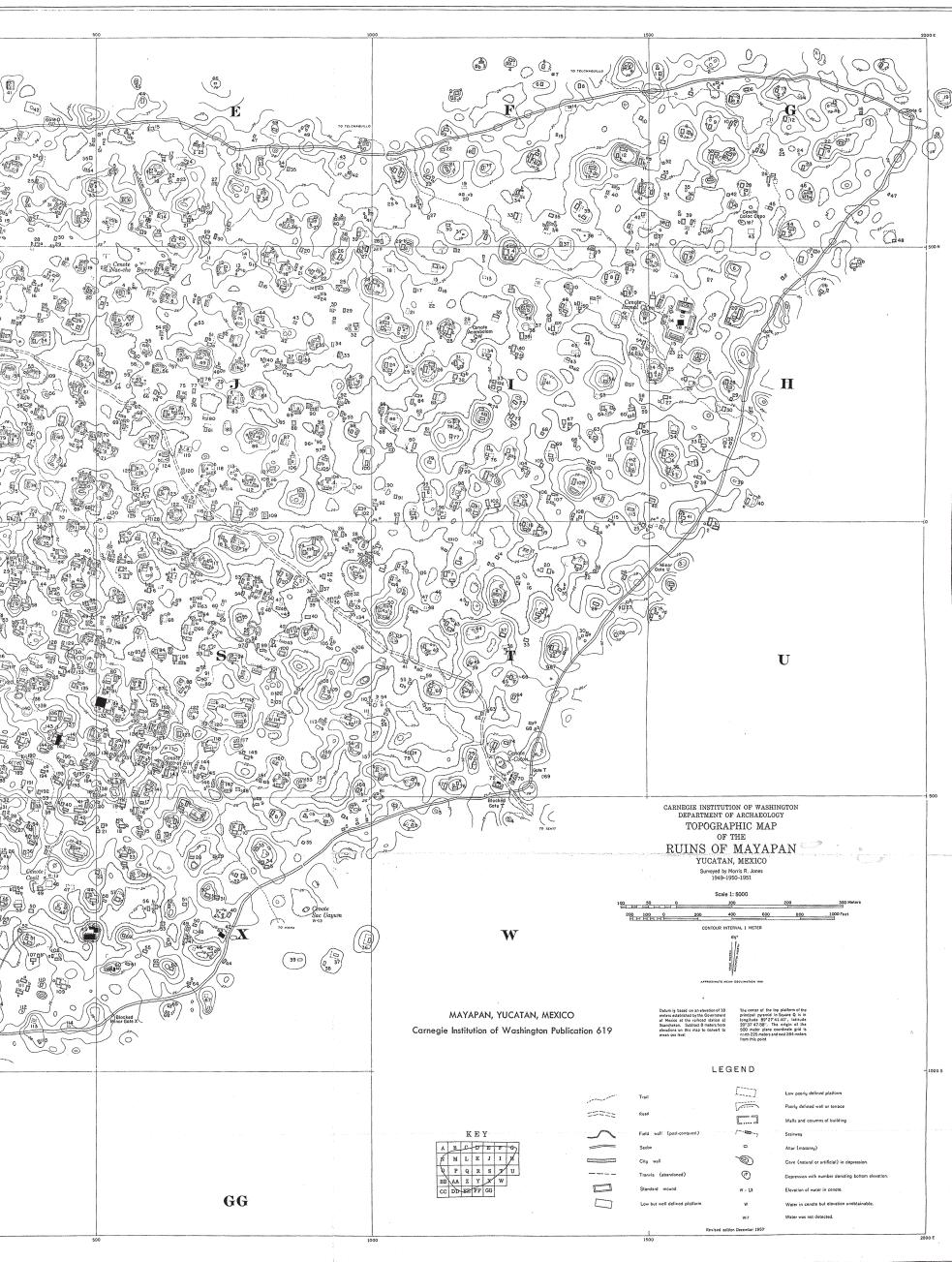
small-scale production of metal objects by a small number of elite specialists or attached specialists working in close proximity to elite residential settings. The Aztec capital of Tenochtitlán also had a well-developed, highly specialized metalworking industry at Spanish Contact (Sahagún 1950–1975a, 14:73–78; see Niklas Schulze, Chapter 8 of this volume). Metalworkers at these urban centers were able to obtain tools, raw materials, and production techniques from distant production zones, and were able to maintain a small sphere of local production despite the distances separating them from sources of metallic ore and a native metalworking tradition. These cities were likely able to maintain metallurgical industries due to their large, diverse, nucleated, urban populations that were capable of supporting small groups of specialists producing high-value luxury items (Hirth 2000, 9).

### THE SITE OF MAYAPÁN

Mayapán (Figure 7.3) was a political and economic core zone and the most powerful regional center in the Maya area during the Late Postclassic Period. It was notable among its contemporaries for its large size and high population density, its diverse social composition, and its central role in religious institutions (Masson 2000; Masson and Peraza Lope 2007; Masson, Peraza Lope, and Hare 2008; Pollock et al. 1962). Russell's 2003–2005 survey suggests a population of 15,000 to 17,000 individuals who inhabited 8.8 to 10.1 square kilometers, including the settlement outside the city wall (Masson, Peraza Lope, and Hare 2008; Russell 2008). As an ancient urban center it was a focus for political, economic, social, and religious activity (Smith 2002, 13–15). Its commercialized economy (Smith 2004a, 2004b) supported both long-distance merchants and local artisans alike who made a wide range of goods available to its residents and to surrounding communities. The city is thought to have been the nucleus of religious teachings for the Yucatán Peninsula (Tozzer 1941, 25–26), and it exhibits a diverse array of religious architecture and artifacts including pyramid temples, round temples, burial shaft temples, shrines, oratories, stucco and stone sculpture, effigy and noneffigy incense burners, figurines, and caches (Chase 1992; Masson 2000; Pollock et al. 1962). “Mayapán-style” temples and effigy incense burners found archaeologically in northern Belize (Masson 2000) and the Petén Lakes (Pugh 2003) attest to a regional sphere of religious influence. The civic-ceremonial center of Mayapán also had administrative functions, represented by colonnaded halls and elite palaces and residences. A possible marketplace located just north of this center may have provided a forum for commercial exchange of agricultural products, locally produced craft items, and exotic goods provided by long-distance merchants (Masson and Peraza Lope 2007; Masson, Peraza Lope, and Hare n.d.).



**FIGURE 7.3.** Map of Mayapán: structures where finished metal items have been recovered are highlighted in black; structures where miniature vessels filled with metal, casting sprues, and failed bells are highlighted with grayscale stars. Modified from Jones (1962).



- ★ Metal production debris and miniature vessels
- Finished metal items

Ethnohistorical accounts suggest that Mayapán society was highly diverse in terms of wealth, status, occupation, and office. Colonial Period descriptions of the already abandoned site describe a system divided into nobles, commoners, and slaves (Tozzer 1941, 26), although this may represent a simplification or idealization of a more complex system with individuals of intermediate status (Chase 1992, 121). Within this social system, elites and commoners possessed variable levels of wealth and a diverse array of specialized occupations. Mayapán's elites would have been employed in civic and religious offices, such as neighborhood administrators, speakers, and proclaimers; secondary governorships, scribes, or notaries; district deputies, judges, or tribute collectors; military captains; logistical officials; *k'atun* lords; ball-game counselors; territorial administrators; and a variety of specialized priests, singers, and sacrificers (Carmack 1981, 15–17; Chase 1992, 120; Masson and Peraza Lope 2007, 4; Masson, Peraza Lope, and Hare n.d.; Roys 1943, 33). Commoners fulfilled roles as agricultural producers, various types of craft specialists, warriors, local merchants, and mercenaries (Masson and Peraza Lope 2004; Masson, Peraza Lope, and Hare n.d.; Tozzer 1941). As described below, while metallurgical craft specialists were a small portion of the numerous specialists that inhabited this powerful and diverse urban center, they created objects with both exotic and divine connotations (Hosler 1994) that would have been highly visible in a variety of both social and ritual contexts.

## CRAFT PRODUCTION AND ECONOMIC ORGANIZATION AT MAYAPÁN

Mayapán was an important center of craft production that supported a variety of craft industries. Craft production activities were dispersed throughout the city in neighborhoods that were adjacent to the monumental center as well as in outlying locations (Masson and Peraza Lope 2007, 2, Masson, Peraza Lope, and Hare n.d.). Production activities were based mostly in house lots, barrios, or both, and were conducted at small elite houses, commoner houses, out-buildings, and large platforms, although the majority of such contexts were small commoner houses. House-lot craft industries included copper bell and shell ornament production, in addition to ceramic production, obsidian and chert tool production, weaving, woodworking, figurine making, bone tool carving, and stucco sculpture production (Masson and Peraza Lope 2007, 3). Mayapán's artisans were often dependent on local towns and other regions of Mesoamerica for raw materials critical to their craft industries (Masson and Peraza Lope 2007, 4), including chert (France and Paris 2010), obsidian (Escamilla Ojeda 1999; Milbrath and Peraza Lope 2003, 25; Piña Chan 1978, 42), and shell (France and Paris 2010) in addition to metallurgy (Paris 2008). Mayapán likely exported the high-quality salt resources it obtained from the

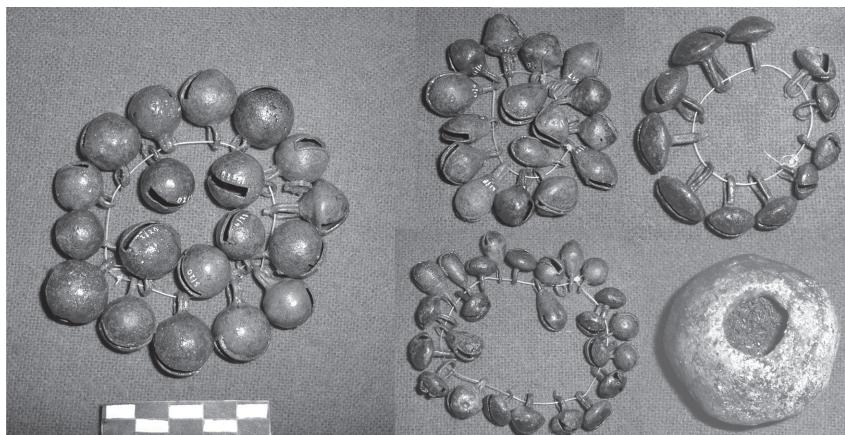


FIGURE 7.4. Bells and miniature tecomate vessel filled with copper from the cache in Structure R-183b. Photos by E. Paris.

northwestern Yucatán Peninsula and may have succeeded Chichén Itzá as an exporter of cotton to other parts of Mesoamerica (Piña Chan 1978, 42).

Recently discovered metal production contexts at Mayapán reveal that metalworkers combined lost-wax casting techniques and metal objects obtained from distant regions with locally manufactured production implements such as miniature ceramic vessels filled with metal (which may be crucibles). Evidence is derived from two production contexts at the site. In 1998, a small cache consisting of a small *olla* (ceramic vessel) containing 282 bells, 2 miniature ceramic vessels (1 miniature *tecomate* [ceramic vessel] and 1 miniature tripod vase) filled with discarded casting sprues and failed bells (Figure 7.4) was found along with 24 bell clusters and 3 failed bells. These objects were surrounded by manufacturing debris consisting of a possible prill and loose casting sprues (Peraza Lope 1998). Complete details of this cache, which was found during excavations of Structure R-183b, are described in Paris (2008) and are only briefly summarized here. This residential structure was part of an elite domestic group located in the southeast quadrant of the city, and the cache was buried at the base of the exterior of the western wall of the structure. The R-183b cache may have held a third miniature tecomate, inferred by the presence of 10 lumps of metal composed of failed bells and casting sprues that appear at one time to have been inside a miniature ceramic vessel (Paris 2008). The quantity and variety of production tools and debris suggest that copper production took place in or near the residential group (Paris 2008). A second potential production context is suggested by the contents of a burial in Structure Q-92, which included two miniature tecomate vessels similar to the one described above. The structure itself is

a small one-room house behind the “Pescador” burial shaft temple in the civic-ceremonial precinct, and may have been an attendant house for that temple. These tecomates were interred as offerings in a multiple burial containing five individuals located under the floor along the interior back wall of the house (Peraza Lope et al. 2003). No other production tools or debris were included in the burial; however, failed copper bells and discarded casting sprues were found inside both tecolate vessels, raising the possibility that at least one of the interred individuals had an association with metal production (Paris 2008). Alternatively, they could be caches of raw material or vessels designed to store production debris for future reprocessing in a different area, interred in the burial as representations of wealth or social status, as opposed to the occupation of metalworking.

Miniature vessels from both Structures Q-92 and R-183b exhibited characteristics of local ceramic types: Navula Unslipped and Mama Red (Smith 1971). The miniature vase and tecolate from Structure R-183b were both Navula Unslipped, while of the two miniature tecolates from Structure Q-92, one was Navula Unslipped and one was Mama Red. This suggests that all four vessels were manufactured locally. The variation in their forms and sizes (fully described in Paris 2008) suggests that they were not produced in a standardized manner. Other miniature tecolates of similar size and appearance were found in the Temple X-Coton (T-70) and an altar cache in a temple, Structure Q-59, by the Carnegie Institution of Washington (Shook 1953, 218, fig. t; Shook 1954, 280, fig. r). While the published descriptions of these two vessels do not include metallic contents or residues, they are of Navula Unslipped paste, and may have been special-purpose vessels produced locally at Mayapán. These miniature vessels could have functioned as crucibles, particularly the larger tecolate vessel from Structure Q-92, which has a tapered base and a slight ridge around the widest part of its diameter; this particular feature could have been used to suspend it over a fire. These vessels could also have been specially produced to store production debris that could be recast into other metal items. Recent excavations at Mayapán have also uncovered ceramic molds that may be related to lost-wax or open-mold casting of metal objects (or both), a hypothesis currently under investigation. Several of these artifacts have been fully described elsewhere (Cruz Alvarado, Carlos Peraza Lope, and Elizabeth H. Paris 2009). However, no furnaces, hearths, or casting sites have yet been identified at Mayapán; thus the precise contexts of metalworking activities remain unknown at present.

The sizes and design choices of copper bells produced at Mayapán, as inferred from the finished artifacts and production debris recovered from the Structure R-183b Cache, attest to the degree of skill of Mayapán metalworkers and to the orientation of their products toward small sizes and simple designs. In general, bells in the R-183b Cache reflect design choices

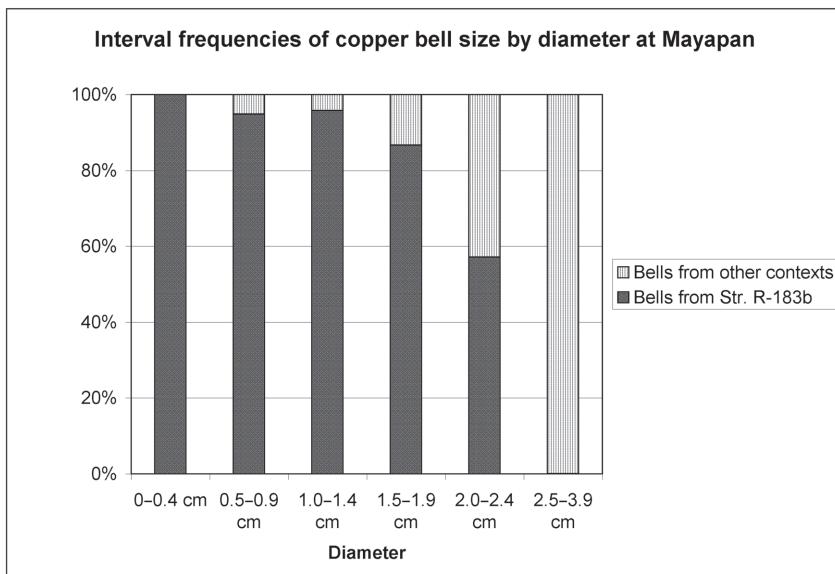


FIGURE 7.5. The stacked column graph shows the contribution of each interval category to the total number of bells. Bells from the Structure R-183b Cache proportionally dominate the lower, smaller-interval categories, while bells from other contexts at Mayapán (recovered from excavations from 1996 to 2007) proportionally dominate the higher, larger-interval categories.

that appear to emphasize small sizes and plain designs, particularly when compared with West Mexican and Central American designs, or the offerings of the Cenote of Sacrifice at Chichén Itzá (Paris 2008). The mean diameter of bells in the R-183b Cache is 0.83 cm, with a standard deviation of 0.4 cm and a range of 0.3 to 2.3 cm (Paris 2008, 55–56). Bells from this cache are smaller on average than bells recovered from other structures at Mayapán, which include temples, colonnaded halls, round platforms, elite palace groups, elite residential groups, commoner residential groups, and isolated residential structures (Paris 2008, 56). Bells from these other structures have a mean diameter of 1.35 cm, with a standard deviation of 0.8 cm and a range of 0.6 to 3.9 cm (these measurements do not include bells from the Carnegie excavations). When viewed in 0.5 cm interval categories (see Table 7.1, Figure 7.5), bells with a diameter of less than 1.5 cm form a far greater proportion of the total in the Structure R-183b Cache than the bells found in other contexts. It is notable, however, that for both samples, the majority of bells fall within the 0.5 to 0.9 cm-diameter interval, constituting 65.48 percent of the Structure R-183b Cache bells and 50 percent of bells from other structures.

**TABLE 7.1** Counts and Percentages of Bells by Diameter-Interval Categories: Comparison between Bells from the Structure R-183b Cache and Other Contexts at Mayapán

Diameter Interval (cm)	Bells from Structure R-183b		Bells from Other Contexts	
	#	% of Total	#	% of Total
0–0.4	22	7.83	0	0
0.5–0.9	184	65.48	10	50
1.0–1.4	45	16.01	2	10
1.5–1.9	26	9.25	4	20
2.0–2.4	4	1.42	3	15
2.5–3.9	0	0.00	1	5
Total	281	100.00	20	100

Note: Bells recovered from excavations from 1996 to 2007. Data not available on one bell from Structure R-183b.

Metalworkers at Mayapán may have been intentionally recasting ingots, sheets, or large objects into large numbers of small bells,<sup>2</sup> similar to what is being proposed for Lamanai by Simmons and Shugar (Chapter 6 of this volume). The practice of casting small bells would have simultaneously divided the value of the raw metal among numerous artifacts, while adding some value to each due to the challenges associated with successfully casting such small objects. The difficulty of this practice is attested to by the large number of failures found with production debris; failed bells had resonators and/or suspension loops filled with metal, while the bell clusters were fused together, potentially from being cast too closely to one another in the same mold (Paris 2008).<sup>3</sup> Because of their size all copper bells were easily portable, and could have been worn in a highly visible manner at the wrists and ankles, or attached to clothing. The discovery of several small threads interred with the R-183b Cache suggests that they may have been used for this purpose (Paris 2008).

Stylistically, the finished copper bells distributed throughout Mayapán as consumer items are similar to those recovered from the R-183b Cache (Table 7.2). Excluding artifacts from the Carnegie Project, for which data are incomplete, four out of the six bell forms represented in the R-183b Cache are also represented in other contexts at the site<sup>4</sup> excavated from 1996 to 2007. The two forms not represented in other contexts at Mayapán, flattened pyriform and bivalve-shaped bells, are the rarest types in the R-183b Cache, representing 6.38 percent and 0.71 percent of the bells in the cache, respectively. Pear-shaped bells are much more strongly represented in Mayapán at large than in the R-183b Cache, while the relative proportions of globular, button, and D-shaped bells in the R-183b Cache are remarkably similar to the proportions of these styles found in other contexts. Button and globular

**TABLE 7.2** Bell Forms Recovered from Excavations at Mayapán, 1996 to 2007

Bell Form	R-183b (%)	R-183 Bell Clusters (%)	Other (%)
Bivalve	0.71	0.00	0.00
Button	48.23	78.00	45.00
D-shaped	9.93	0.00	10.00
Flattened pyriform	6.38	0.00	0.00
Globular	26.60	20.00	20.00
Pear-shaped	8.16	0.00	25.00
Unknown	0.00	3.00	0.00

Note: Bells recovered by the Carnegie Project are not included.

bell forms are the most popular in both sets of contexts, representing over 65 percent of bells in each set of contexts. The forms of the failed bells in the fused bell clusters reflect the dominance of these forms; the failed bells range from 0.3 to 0.7 cm in diameter, 0.2 to 0.6 cm in height, and consist of 78 percent button forms, 20 percent globular forms, and 3 percent deformed such that the intended form cannot be determined. In both size and style, bells in the bell clusters are identical to the complete bells in the smallest size interval in the R-183b Cache (see Table 7.1). Generally speaking, compared with the elaborate bell designs represented throughout Mesoamerica (Bray 1977; Pendergast 1962), at the Cenote of Sacrifice at Chichén Itzá (Coggins and Shane 1984; Lothrop 1952), at the Quimistán Bell Cave in Honduras (Blackiston 1910), and in West Mexico (Hosler 1988a, 1988b, 1994), Mayapán bells are small in size and stylistically plain, with simple coiled wirework designs present on only two pear-shaped bells. The reason for the prevalence of small bells in simple designs is unknown; it could represent the stylistic preferences of Mayapán consumers. Alternatively, metalworkers at Mayapán might have been attempting to divide the value of the metallic raw material into as many discrete units as possible, possibly in relation to their use as currency, as described in ethnohistorical sources (as described above).

Within the context of Mayapán society the social status of metalworkers and their relationship to the means of production are presently ambiguous. Although the metalworkers were probably few in number, the degree of specialized knowledge required to perform their craft could have been a source of great prestige relative to other craftpersons, a pattern noted in some African polities (Reid and MacLean 1995). Rather than being itinerant tradespersons (Bray 1971, 1977; Proskouriakoff 1962b), it is more likely that metalworkers at Mayapán were permanent or semipermanent residents of the city residing in, or attached to, elite residences (see Inomata 2001). The elite contexts in which items associated with metal production have been

recovered suggest that metalworkers were either elites participating in craft production or attached specialists producing for elite patrons. However, current evidence supports the latter interpretation; the data from Structure R-183b suggest that the metalworking activities at the house lot reflected by the cache were not similarly reflected in the burial rituals of house-lot residents. Six individuals were buried under the floor of House R-183b. Five of these individuals were adults, buried together in a multiple interment, while a single infant was buried apart in a small cist. Only one copper bell was recovered among the numerous offerings that accompanied the adult individuals, which included ceramic dishes, ceramic figurines, a ceramic figurine mold, obsidian blade fragments, chert projectile points, chert flakes, fragments of coral, and stalactites. This suggests that the occupation of metallurgical craft specialist was not central to the identity of the high-status house-lot residents as reflected in burial ritual, potentially because the occupation was performed by attached specialists patronized by the structure's residents. Alternatively, the finished copper bells recovered from the R-183b Cache may not have been intended for internal household consumption, but may instead have been destined for local or regional markets or patrons. The social context of the Q-92 miniature tecomates is similarly ambiguous; the house is centrally located near a burial shaft temple in the central monumental zone, suggesting association with elites or temple patronage; however, its small size and the relative poverty of other funerary goods included with the burial raise the possibility that the inhabitants may have been in the service of the city's elites.

## METAL CONSUMPTION AT MAYAPÁN

Metal artifacts were consumed by a diverse range of individuals in Mayapán society, at high-status residences, low-status residences, ritual structures, and administrative buildings, in a wide variety of depositional contexts (Table 7.2, Table 7.3, and Figure 7.3; see also Paris 2008, table 7). Many of the finished metal artifacts found at Mayapán simultaneously reflect the storage of economic value, the public display of social status, and religious symbolism. Many of these artifacts were used for personal adornment, such as bells, rings, tweezers, copper discs, and fragments of gold, tumbaga, and copper sheets (Paris 2008; Proskouriakoff 1962a; Root 1962). A single "utilitarian" item is a copper alloy needle; however, this item was recovered from the monumental zone, where its use by a wealthy individual would have been highly visible and socially prestigious, particularly in contrast to its bone and catfish spine counterparts (Novic 2008). The presence of tumbaga is notable due to its associations with lower Central America and Colombia and its rarity in most Mesoamerican contexts (Hosler 1994, 183), with the exception

of Altun Ha (Pendergast 1970) and the Cenote of Sacrifice at Chichén Itzá (Coggins and Shane 1984; Lothrop 1952; Root 1962). While metal consumption at Mesoamerican sites in general tends to emphasize personal adornment, some Mesoamerican sites often contain greater proportions of utilitarian items such as needles, axes, chisels, and fishhooks than at Mayapán (Bray 1977; Hosler 1994, 1995; Paris 2008; Paris and Peraza Lope 2009; Pendergast 1962; Simmons 2005a; Smith 2003b).

Within Mayapán's urban center, metal artifacts were associated with structures both within ( $n = 17$ ) and beyond ( $n = 25$ ) the monumental zone. These structures included domestic, ceremonial, and administrative buildings, and palaces, shrines, temples, and cenotes (Table 7.3; see Paris 2008, fig. 2). The structures included elite and commoner residential structures, and elite ceremonial structures located both within and beyond the monumental zone. To date, metal has been recovered from only one context outside of the city wall: the Cenote Dzantun Ch'en. As shown in Table 7.4, the highest ratios of metal items per structure are found in elite palace groups and elite residential structures. Yet, surprisingly, commoner residential structures averaged higher ratios of metal items per structure than structures in the monumental center, outlying elite administrative structures (Structure H-18a at Itzmal Ch'en), outlying elite palace R-106, and the unranked Cenote Dzantun Ch'en.

Relative to other contexts metal artifacts are found disproportionately in burials and caches at Mayapán; these contexts account for 91.6 percent of all the metal objects recovered in excavations at the site from 1952 to 2007. The inclusion of metal objects in burials and caches is highly significant; these are socially constructed ritual deposits in which metal objects were situated at the intersection of economic, social, and ritual contexts; they are usually found in association with other ritual objects, offerings, and architecture (Pearson 1999, 5). There is currently no evidence suggesting that metal items at Mayapán were produced specifically for burial ritual; our working hypothesis is that they were buried with the individuals who owned them (or as gifts/offering, particularly in the case of infants). In contrast, 43 percent of metal artifacts excavated at Lamanai have been recovered from midden contexts (Simmons, Pendergast, and Graham 2009). This is a significant difference since both Mayapán and Lamanai were regionally dominant urban centers, supporting local secondary production (Maldonado 2008) and metalworking. However, an important caveat is that most of the metal items found in burials were excavated by two different projects (the Carnegie Institution of Washington Project and the Proyecto Mayapán by Peraza Lope and colleagues). Both projects have focused their excavations in and around standing masonry architecture, with additional test pits in close proximity to exterior structure walls and platforms. Excavations by the Carnegie Institution

TABLE 7.3 Metal Artifacts Recovered from Excavations at Mayapán, 1952 to 2007

Q162	Monumental zone	1	2
Q169	Elite house	1	1
Q172	Elite house	1	2
Q173	Elite house	*	0
Q208	Elite house	10	10
R86	Elite palace group	2	2
R87	Elite palace group	2	26
R89	Elite palace group	1	24
R106	Elite palace	1	
R142c	Elite house	4	
R173b	Elite house	1	
R183b	Elite house	283	
S133b	Upper-status commoner house	1	
X43	Commoner house	3	
Y2a	Elite house	*	
Y2d	Elite house	2	
Y45	Elite house	2	
Z120	Commoner house	1	
Z4b	Elite house	1	
Context unknown		1	4
TOTAL		225	281

**Source:** Metal artifacts are detailed in the Carnegie Institute of Washington's Current Reports series, the Economic Foundations of Mayapán Project, and the Proyecto INAH-Mayapán

(revised from Paris 2008, table 7).

\* Presence/absence was described by the Carnegie Project, but exact artifact counts were not included.

<sup>†</sup> Does not include one chisel of Colonial provenience (Root 1962) and one pair of scissors of historical provenience (Root 1962). The scissors were acquired by Mrs. E. G. Root.

Does not include one clause of colonial povetement (from 1792), and one pair of scissars of historical pieces.

**TABLE 7.4** Types of Structures in Which Metal Artifacts Have Been Recovered from Mayapán Excavations, 1952 to 2007

Structure Type	# Structures	# Metal Items*	Avg. # Metal Items per Structure
Commoner house	9	14	1.56
Elite administrative group	1	1	1.00
Elite house	11	24*	2.18
Elite palace	1	1	1.00
Elite palace group	3	29	9.67
Monumental zone	15	20	1.33
Unranked	1	1	1.00
Upper-status commoner house	1	1	1.00
Total	42	91	2.17

\* Excludes the contents of the R-183b Cache.

(Proskouriakoff 1962a; Proskouriakoff and Temple 1955) and the Economic Foundations of Mayapán Project (Masson, Peraza Lope, and Hare 2008) also recovered metal artifacts in midden contexts, fill contexts, or through surface collection. In the Carnegie Institution excavations, most burials were found either under the floors of structures and structure platforms or under the court floor in front of the platform supporting the structure (Smith 1962, 252–253). However, excavations by Brown (1999, 125) suggest that structure-focused excavations often miss the numerous off-platform burials at Mayapán, which are located in the deep pockets of soil formed by undulating bedrock and household midden (see also Masson and Serafin 2008, 927). Thus, the artifact patterns discussed here may not be representative of burial patterns of the site as a whole, but may serve as a comparative sample for future investigations.

There is a high degree of variation in the type, location, function, and social status of structures with which burials containing metal artifacts are associated (Table 7.5). From 1952 to 2007, thirty-two metal artifacts and two miniature vessels filled with metal were recovered from fifteen burial contexts at Mayapán. Thirteen of these structures were excavated by the Carnegie Institution of Washington (Smith 1962); these were designated Burials 11, 15, 22, 24, 25, 30, 33, 35, 36, 39; Burial vault 15; two undesigned burials in Structure Q-84; and the “Pescador” burial shaft temple, Structure Q-95. The two other burials associated with metal artifacts were excavated by Peraza Lope (1998) at houses Q-92 and R-183b. Among these contexts, six are in the monumental zone, with the other nine in various locations near the monumental zone and midcity, and one context near the wall to the west.

Structures include both elite ( $n = 5$ ) and commoner ( $n = 1$ ) ritual structures, as well as both elite ( $n = 4$ ) and commoner ( $n = 5$ ) domestic structures, based on architectural size and elaboration (Table 7.5). Elite and commoner burials with metal were most common in cists ( $n = 4$ ) and crypts ( $n = 6$ ), and also included simple burials with no tomb enclosure ( $n = 3$ ). Elite burials with metal also were placed in two tomb types not found among commoners: a burial shaft with over forty-one individuals, and an unarticulated skeleton found in the surface debris of the circular platform in the central plaza.

While we acknowledge the limitations of our existing sample size, the data do not suggest that the number of metal items in a burial correlates well with other variables, including the number of individuals in the burial, or the type and quantity of funerary items.<sup>5</sup> A very small positive correlation was observed between the number of individuals in the fifteen burials containing metal and burial location in a ceremonial structure ( $r = 0.298$ ). The number of individuals in the burial also has a very slight positive correlation with the total number of grave goods in the burial ( $r = 0.233$ ), when all sherds are counted as a single artifact. With the exception of Burial Shaft Q-95, burials with metal funerary offerings contained 1 to 6 individuals, with an average of 3.41 individuals per burial. Individuals interred with metal offerings included males and females of all ages, including old, middle-aged, and young adults, and children and neonatal infants, often in the same burial. Those interred with metal items were buried in extended, flexed, and partially flexed positions, although some were scattered or disarticulated as a result of secondary burial. Supine, left-side, and right-side positions were represented, with a slightly greater proportion of left-side burials. Burials containing metal offerings were located in a variety of contexts throughout the overlying structures: underneath floors, benches, altars, passageways, and platforms. The Carnegie Institution excavation records did not provide sufficient data to assess correlation of interment variables such as age, sex, body position, and orientation of the individuals in the burials with the number of metal artifacts interred with them. However, the qualitative data reflect a wide variety in burial types and practices, suggesting a lack of association between specific burial types and the presence of metal goods.

Nonmetallic burial goods were highly variable in number, type, and value. The quantity of metal artifacts did not correlate with any other variable, including social status (as reflected by the type of architecture) or the quantity of any other artifact type (Table 7.5). With a few exceptions, the same general types of offerings were found in both elite and commoner contexts, and in both domestic and ceremonial structures. However, among the burials in this sample, combined numbers of jade and shell artifacts had a moderate positive correlation with a ceremonial center burial location ( $r = 0.466$ ). Jade beads were found only in elite burials in this sample; stalactites,

TABLE 7.5 Metal Artifacts Recovered from Excavation of Mayapán Burials, 1952 to 2007

Status/Structure	Commoner					
	P-14a	Y-2d	Q-62	AA-103a	Z-4b	Q-92
Function	Cerem.	Dom.	Dom.	Dom.	Dom.	Dom.
Tomb type	crypt	cist	cist	crypt	crypt	simple
# individuals	5	2	3	2		6
Metal bells					1	
Metal rings		2		3		
Metal tweezers	1			1		
Other metal			1 fragment copper			2 crucibles
Jade beads						
Shell beads			22	1		
Shell ornaments	1	1	1			
Shells, unworked or fragmentary	1+		2		2	
Whole vessels				1		
Censers			4			
Figurines			2	3	2	
Figurine mold						
Whistle			7			
Sherds	1+	78	1+	1+	1+	
Obsidian tools	4	1	2	1	3	
Chert tools	2	1				
Chert flakes					9	
Lithic product (unspecified)					2	
Ground stone				1	6	
Stingray spine	3					
Shark tooth						
Coral					1	
Stalactite						
Textile						
Iron pyrite						
Antler/bone	3	1		2	4	1
Total <sup>a</sup>	16	7	42	14	31	3

Note: Cerem. = Ceremonial; Dom. = Domestic. Horizontal gray shading used for metal finds in burial.

<sup>a</sup>All ceramic sherds are counted as 1 in totals; plus signs represent presence/absence data and are counted as 1 in totals.

Elite										Total				
R-142c		R-86		Q-172		Q-95		Q-84		Q-169	S-133b	Q-208	R-183b	15
	Cerem. cist 3	Cerem. cist	Cerem. crypt 4	Cerem. shaft 41+	Cerem. surface 1	Dom. crypt 1	Dom. crypt 5	Dom. simple 4	Dom. simple 5					82+
		2			1	1				10		1		16
	4		1							1				10
				1 fragment gold, 1 copper disc										3
														5
	1	3		2	1		1			1				8
		2	1	14							5			45
		2	1	7		12								13
														17
		32				12				2	1+			48
			1+		1	1				1	1+			8
										4	1+			12
											1			1
											1			8
1+	18,433	1+		1+	1+			1+	1+	1,800+				20,320
2	6			1							1+			21
	6			2	1						1+			13
				8							1+			18
														2
		7							1					15
		1												4
		1												1
											1			1
											1+			2
1+											1+			2
		1												1
		1	1	5						1				19
9	65	6	42		17	14		5		25	10			294

pottery whistles, figurines, and figurine molds were found only in domestic contexts; and stingray spines were found only in ceremonial contexts. Collectively, elite burials contained greater quantities and varieties of most nonlocal commodities, such as ground stone items, stingray spines, shark teeth, coral, and iron pyrite. However, certain nonlocal items—including obsidian tools, shell beads, and shell ornaments—were more numerous in commoner burial contexts. Commoners as a group had only a slightly lower average of goods per burial than elites ( $\bar{x} = 18.5$  goods per burial for commoners,  $\bar{x} = 21.4$  for elites), and total number of burial goods did not correlate with burial location in an elite status structure ( $r = 0.085$ ).<sup>6</sup> By quantity, the Q-92 burial with two possible crucibles and an incised bone had the fewest offerings of those in the sample. In contrast, a burial in the palace R-86 (Proskouriakoff and Temple 1955, 217–273) consisted of a wide variety of rich offerings, including a stone idol; a stone temple; a stone tripod; a stone axe; three worked fragments of stone; five flint blades or points; an arrow point; one complete obsidian flake blade; five fragments of obsidian flake blades; three jade beads; a perforated, rectangular piece of iron pyrite; two copper bells; two shell beads; two shell discs; a perforated human tooth; a stingray spine; a shark tooth; 18,433 sherds, of which 16,795 sherds were from effigy censers; and 16 vessels: 9 tripod bowls, 3 tripod cups, 2 gray jars, and 2 nearly complete large tripod bowls. According to the excavators, most of the smaller artifacts and five of the small tripod bowls may have been part of the original grave offerings, while the rest were probably added when the cist was reopened, just before the structure was abandoned. The small sculptures and the effigy censers, which were found near the surface, are particularly likely to have been added later, just before the structure was abandoned.

This high degree of variation in grave goods suggests that metal objects were part of a greater sphere of activity in which items representing both economic wealth and social relationships were incorporated into funerary ritual. They included not only metal artifacts, but also local utilitarian items (lithic tools and pottery vessels); local luxury or ritual items (incense burners, figurines, bone beads, pottery whistles, stalactites, and elaborate pottery vessels); regional and interregional luxury or ritual items such as marine products, shell, shark teeth, stingray spines, coral, obsidian, jade, and ground stone; items related to craft production (figurine molds, shell-burnishing tools, lithic flakes, spindle whorls); and items related to food production (metates). Metal items and other types of regional and interregional luxury items were significant burial inclusions; not only were they relatively rare and made of a highly valuable material of foreign origin, but they would have been highly visible offerings in funerary rituals. Such items may have reflected the wealth and status of the deceased, and could also have enhanced the status of surviving family members in the eyes of other funerary ritual

participants or onlookers (Pearson 1999). Eighty percent ( $n = 12$ ) of the burials containing metal also contained either jade or shell; in these contexts, metal artifacts added to, rather than replaced, jade and shell prestige items. Thus, metal artifacts were one option among many types of exotic luxury items that were used to perform value in funerary contexts. The other items in the burials likely expressed other aspects of the wealth, occupation, and social identity of the deceased.

Metal items found in burials were invariably items of personal adornment, with the exception of the metal-filled miniature vessels (termed crucibles in Table 7.5) in the Q-92 burial (Table 7.5). The majority of burials include some combination of items made from copper or copper alloy: small bells ( $n = 16$ ), three shell tweezers that resemble West Mexican styles ( $n = 3$ ), and finger rings ( $n = 10$ ), one of which is an anthropomorphic face resembling Oaxacan styles (Root 1962). Burial Shaft no. 15 in Structure Q-95 contains gold foil and a copper disc, while a fragment of copper was found in Structure Q-62. These metal fragments were likely part of ornaments attached to clothing or headdresses.

Both elite and commoner burials had similar types of artifacts (bells, tweezers, rings, and sheet-metal ornaments), suggesting that the possession of metal artifacts was not restricted to individuals of elite status. Collectively, the number of metal items in elite burials ( $n = 23$ ) was double the number of metal items in commoner burials ( $n = 11$ ). Similarly, elite burials contained an average of 2.56 metal items per burial, while commoner burials contained an average of 1.83 metal items per burial. This mirrors the sitewide distribution of metal items in elite and commoner contexts, both within and beyond the monumental zone of the site (see Table 7.3 and Table 7.4). This pattern suggests that metal items were commercially distributed commodities (Hirth 1998; see Paris 2008) and that they were used as ritual offerings independent of the social status of the deceased. Furthermore, elites and commoners used an identical repertoire of metal items in burial rituals (and caching rituals; see below), suggesting that elites and commoners practiced highly similar burial rituals that varied in scale but not in substance. However, the higher proportion of metal items in elite contexts suggests that elites had a greater amount of wealth invested in metal items.

Many of the metal artifacts found in burials were likely worn by the deceased during interment, rather than being placed separately in the burial. Some finger rings were found still on the fingers of their owners. One male individual had a pair of tweezers placed underneath his skull; another had a copper bell just below the knee, where it could have been attached to clothing. A burial in Structure Q-208 was particularly notable because it contained four children, one of whom was an infant less than six months old. Around each ankle of the infant was a cotton anklet band with five copper bells that

had once been attached with thread. The bells on the left anklet were separated by minute shell beads. The copper bells and shell beads adorning the body of this infant were a socially visible symbol of the wealth of its family and likely symbolized high social status. The bright colors and the sounds of the bells would have called attention to its wearer both in life and during the funerary ritual (see Hosler 1994, 1995).

The bell anklets found in the Q-208 burial are particularly notable for their ritual significance. According to Sahagún (1950–1975b, 3), some of the most important gods in the Aztec pantheon wore ankle bells—for example, Quetzalcoatl, associated with fertility, and Huitzilopochtli, the god of war (see also Roskamp and Rétiz, Chapter 2 and Schulze, Chapter 8 of this volume, for other discussions of the role of metal objects in veneration of gods). The *Relación de Michoacán* depicts the chief Tarascan warrior wearing ankle bells as he and his men attack a village (Tudela 1977 [1541], 190). Tarascan kings were interred with gold shields at their back and golden bells on their ankles (Tudela 1977 [1541], 219). Other items in the Q-208 burial at Mayapán also suggest ties to central Mexico: approximately 1,800 censer fragments piled indiscriminately above the skeletal remains (some of which depicted the central Mexican deity Xipe Totec), and two pottery vessels that depicted a long-nosed god on front (possibly representing the merchant god, Ek Chuah). It is possible that ideas concerning the ritual uses of metal objects were transmitted from central or West Mexican sources to Mayapán along with the technology for secondary metal production itself. Caches represent another set of ritual contexts into which metal artifacts are incorporated as part of a larger group of artifacts representing wealth and status (Table 7.6). These caches are associated with elite shrines in the Palace Group (Structure R-87), Itzmal Ch'en (Shrine H-18a), and Hall Shrine Q-148, a shrine in the monumental center associated with a colonnaded hall (Proskouriakoff and Temple 1955; Smith 1962). Two caches (designated Cache 3 and Cache 4 by the Carnegie Institution Project) in Structure R-87 (Cache 16) contained metal objects. Cache 4 was excavated and refilled before the collapse of the building, but still contained a jar ("whole vessel" in Table 7.6), an obsidian blade, and ten paper-thin fragments of gold, some with small perforations, suggesting they may have been part of an ornament or sewn onto clothing or a headress (Proskouriakoff and Temple 1955, 328). Cache 3 was also excavated and refilled, and was located on the dais in front of an altar (Proskouriakoff and Temple 1955, 328–329). It contained a pointed biface made from chert ("chert tool" in Table 7.6), a redware sherd with a glyph of the name of Itzamna (God D) painted on it, a number of ceramic sherds, and seven paper-thin fragments of gold with perforations similar to those in Cache 4. A small stone sculpture of a turtle with a hole in its back was deposited above the refilled layers of the cache. The cache in the Itzmal Ch'en outlying administrative group was

TABLE 7.6 Metal Artifacts Recovered in Caches from Excavations at Mayapán, 1952 to 2007

Structure	H-18a	Q-148	R-87	R-87	R183b	Total
Function	Ceremonial	Ceremonial	Domestic	Domestic	Domestic	
Feature name	.	.	Cache 3	Cache 4	Cache 16	.
Bells		1				
Other metal	1 copper fragment	1 gold fragment, 1 copper fragment	7 gold fragments	10 gold fragments	7 gold fragments	2 crucibles, production débris*
Jade beads	2	3				5
Shell beads		4				4
Whole vessels				1		1
Censers		1				1
Shards			196	173	196	3
Obsidian tools	1	1		1		3
Chert tools		1	1		1	3
Ground stone		1				1
Shark tooth				1		1
Total*	4	14	9	13	10	285*
						335

\* All ceramic sherds are counted as 1 in totals; all metal production debris is also counted as 1 in totals.

located in Shrine H-18a beneath a carved stone slab, and contained two jade beads and a fragment of copper (Chowning 1956, 455). The cache in Structure Q-148 was found under a looted altar and contained a small square flake of gold with a faint stamped design, a small copper bell, and a shell bead (Smith 1955, 119). Between two of the front stones of the altar were a small effigy censer base depicting the god Chac, two jade beads, three shell beads, a fragment of copper, and a small piece of jade (counted as one of the three jade beads in Table 7.6). Unfortunately, apart from a single copper bell, the delicate gold and copper ornaments included in these caches did not survive in their original condition; however, they attest to the role of metal objects in religious offerings and dedicatory rituals.

The Structure R-183b Cache, described above, contrasts sharply with the other caches containing metal artifacts. Most caches containing metal, even the ones located in the palace Structure R-87, were associated with shrines and altars. The R-183b Cache was buried next to an exterior wall of a residential structure in an elite patio group. The R-183b Cache also contained production debris in addition to finished bells. In contrast, the other caches contained exclusively finished consumer goods. The R-183b Cache contained exclusively copper or copper-alloy bells, whereas the other caches contained gold and copper sheet items. Several of these items had perforations, suggesting that they were ornaments meant to be sewn to clothing or headdresses. The other caches contained other valuable materials, such as jade and shell beads, chert and obsidian tools, ground stone implements, ceramic vessels/sherds, and shark teeth, whereas the R-183b Cache contained exclusively metal artifacts. This suggests that the R-183b Cache is qualitatively different from the other caches at Mayapán. While most caches represent ceremonial offerings, the R-183b Cache exclusively represents the tools, debris, and finished products of metal artifact production activity.

## DISCUSSION AND CONCLUSIONS

By the Postclassic Period metal artifacts were widespread, though not common, throughout the Maya region. From their first introduction to Maya culture in the Early Classic Period, metal was used and valued by Maya individuals in ways similar to jade and shell ornaments, that is, as items of personal adornment, media of exchange, and sacred offerings in caches and burials. These systems of valuation were not accidental; Freidel and colleagues suggest that as early as the Late Formative Period, the ruling Maya elite promoted the valuation of jade and shell materials in iconography and through their own creation and use of luxury items made from these materials (Freidel, Reese-Taylor, and Mora-Marín 2002). At sites such as Chichén Itzá and Mayapán, elites in the monumental centers, palaces, and residences

also used gold and copper ornaments, copper bells, tweezers, and rings as personal ornaments. Their inclusion in caches and burials denotes their functions as offerings.

Metal objects closely mimic their jade and shell counterparts as raw materials that were both valuable and sacred. They were used in a broad range of contexts in the economic, social, and ritual life at Mayapán and could be purchased, owned, and used by elites and commoners alike. Like jade and shell, metal objects belonged to individuals of both sexes who varied widely in age, status, occupation, and wealth. While certain metal objects may have been “inalienable possessions” made for exclusive use by certain elite individuals (Weiner 1992), metal objects were widely available across Mayapán society for those who could afford to purchase them. While most metal, jade, and shell objects were likely commodities that were purchased in the marketplace and often worn by their owners as personal ornaments, the ethnohistorical evidence discussed above suggests that bells, in particular, may also have served as media of exchange, which stored the wealth of their owners in a nonperishable form and which could be used to purchase other items in times of economic necessity. Metal items, like jade and shell objects, were also incorporated into the wide range of items that were used as offerings to deceased individuals and powerful gods through burials and caches. Furthermore, elites and commoners incorporated a surprisingly similar array of metal items into their funerary rituals, which included bells, rings, tweezers, and sheet-metal ornaments. Unlike with jade and shell, however, skilled local metalworkers at Mayapán could remelt and recast metal items into new objects, subtracting and adding value to the original objects through changes in their size, design, or chemical composition.

The status of metalworkers at Mayapán is far more uncertain. The two contexts at the site containing production debris and implements are also ceremonial contexts: a cache and a burial. It is clear that production debris was considered appropriate offerings for at least some types of religious rituals. In addition, the interment of production debris at Structures Q-92 and R-183b may reflect the wealth, status, or occupation of the individuals interred in these structures or may suggest their close association with the production of metal objects (i.e., as patrons of attached craft specialists). The presence of production debris could also indicate that Structures Q-92 and R-183b were locations in which metalworking activities took place. While no hearths or furnaces were found at either location during excavation, such activities could have been spatially removed from the structures for safety reasons. Both structures are “elite” in association, but in different aspects: Structure Q-92 is a small house in the monumental center, possibly a temple attendant house, whereas Structure R-183b is a residential structure in an elite patio

group, although the size and elaboration of the architectural group suggest that its residents were secondary elites rather than the highest-ranking individuals at the site. The near absence of finished metal items in the multiple-interment burials associated with both of these structures is surprising; it suggests that the occupation of metallurgical craft specialist was not central to the identity of the high-status residents as reflected in burial ritual, potentially because the occupation was performed by attached specialists patronized by the structure's residents. Alternatively, the finished metal items produced at one or both structures may not have been intended for consumption by their residents, but may instead have been destined for general exchange. It remains uncertain whether metal producers themselves were elites or whether they were attached specialists working for elite patrons.

Although the first metal objects imported into the Maya region were already oriented toward personal adornment, local metalworkers at Mayapán adopted metallurgical technology and adapted it still further to suit the needs of Mayapán society. Initial metal imports from Central America (Bray 1977; Lothrop 1952; Pendergast 1971) and West Mexico (Hosler 1988a, 1988b, 1994, 1995) often included ornaments and items of personal adornment, as represented by the items deposited in the Cenote of Sacrifice at Chichén Itzá. At Mayapán, production debris and implements suggest that some locally produced artifacts, represented by those in the R-183b Cache, are almost exclusively small, plain copper bells created through the imported technique of lost-wax casting. This suggests that producers were attempting to divide the value of the metallic raw material into as many discrete units as possible by recasting finished objects or ingots imported through long-distance exchange networks. More elaborate artifacts, such as gold foil ornaments, may have been imported as finished goods, or cut and decorated by local producers from imported sheet gold.

Understanding the underlying concepts of value in any society provides a useful framework for interpreting action. The depositional contexts in which metal artifacts have been recovered at Mayapán—such as burials, caches, ceremonial structures, and common households—reveal the variety of ways in which they were used and, by extension, their associations with specific realms of action. Metal items “performed value” by expressing the economic wealth and social status of the people who produced and purchased them; by visually associating the wearer with exotic, foreign locations and attracting attention through color or sound (Hosler 1994); by connecting individuals to the divine by evoking visual and auditory associations with particular deities; by playing a role in religious ceremonies and ritual offerings such as funerals and the dedication of caches; by serving as nonperishable, durable, and portable media of exchange; and by serving as rare, exotic commodities available to those who could afford them. Through comparisons with other

regions of Mesoamerica, we can gain a better understanding of metal items and the ways that they were made, valued, and used.

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### **NOTES**

1. Apart from the production debris, the only “utilitarian” object is a needle (also discussed later in this chapter), which was found in the monumental center, and would have inferred considerable social visibility compared with the more common needles made from large mammal bone fragments and modified catfish spines (Novic 2008, 734). There are two Colonial/Historical Period artifacts (a pair of scissors and a small chisel) that were interpreted by Root (1962) as postdating Spanish Contact.

2. This point may be clarified by the ongoing chemical composition analysis of metal artifacts from Mayapán; results are forthcoming.

3. The bell clusters may also have been the products of partial remelting of failed bells in which the remelting process was prematurely halted (Aaron Shugar, personal communication, 2010). Ongoing analysis of ceramic mold fragments may clarify this point; results are forthcoming.

4. Forthcoming results of fieldwork by Masson and colleagues during 2009 are expected to modify these proportions; they should be considered as representative only of data from fieldwork dating from 1996–2007.

5. Correlation coefficients were determined for the burial data listed in Table 7.2, in which  $r$  values approaching 1 suggest that the observed values are highly correlated, whereas  $r$  values approaching 0 suggest that the observed values are not correlated.

6. The presence of potsherds was often mentioned, but not quantified, in Carnegie Institution reports; in all cases, presence counted toward the total as 1. In the

few instances where the quantity of sherds is listed, it appears that elites were interred with greater average quantity of sherds.

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