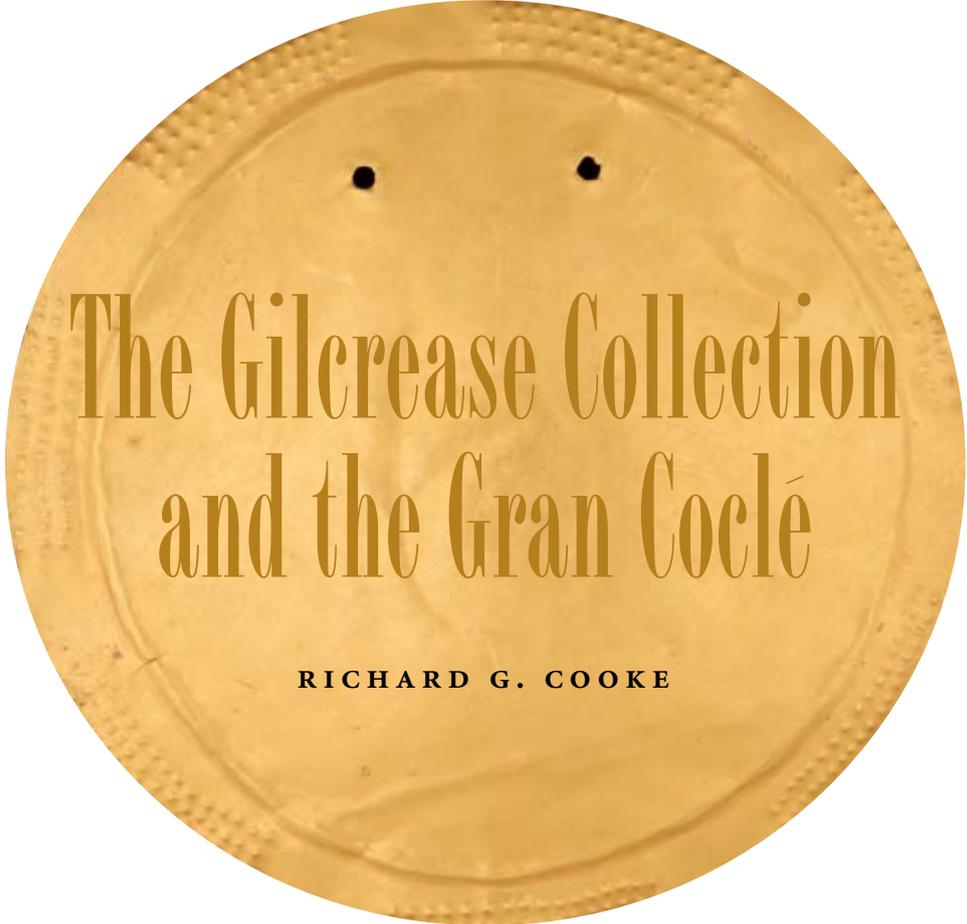




Embossed pectoral,  
Gran Coclé, 700–1000, gold.  
GM 5645.223



# The Gilcrease Collection and the Gran Coclé

RICHARD G. COOKE

Gran Coclé pottery in the Gilcrease Museum is stylistically quite uniform. The majority of the vessels may have come from one site since they are typical of a single stage in the development of the tradition: the Conte style, first described on the basis of a large sample recovered at Sitio Conte 80 years ago (Lothrop 1937, 1942). Samuel Lothrop thought that this pottery was produced not long before Spanish conquest in 1520. But it is now dated by the radiocarbon method to a maximum span of 300 years, beginning around 700 (Cooke and Sánchez 2003; Labbé 1995; Mayo-Torné 2006; Sánchez-Herrera 2000). The Spanish adjective *Gran*, meaning “greater,” distinguishes the more expansive area covered by the culture from that of the modern province of Coclé, where Sitio Conte is located. Some Gilcrease goldwork is coeval with the Conte style pottery, according to evidence from the Sitio Conte graves, and may have been found alongside it in the same funerary settings.

The Gilcrease collection of gold from ancient Panama is more heterogeneous than the related pottery collection. Some gold objects are not of isthmian origin, although they could have arrived there by trade. Others may have been made and/or used in Panama or, more specifically, in Gran Coclé. But without contextual data from a professional excavation we cannot be sure of this, since cast and hammered artifacts employ similar imagery and techniques

throughout the Isthmo-Colombian metallurgical province, making it difficult to assign a provenance to objects found by looters. It is for this reason that Bray (1992) coined the term International Style for a group of widely distributed human and animal figurines. Besides, some metalworking traditions were not co-terminous in space with painted pottery traditions.

Museum notes indicate that the most likely venue of the Gran Coclé pottery is Veraguas, probably the southern (Pacific) part, which has experienced a long history of *huaquería*, or looting (Cooke and Sánchez 2004a: 18, 50 & fig. 13; see also, Cooke 1997). Pacific Veraguas is a mostly hilly landscape of pastures and wooded savannas. Many small rivers empty into a large estuary, the Gulf of Montijo. The westernmost foothills around the towns of Soná and Las Palmas are home to small groups of Buglé Native Americans who are possibly the descendants of the pre-Columbian people who resided in this area.

Formerly, Veraguas was considered to have had its “own” pre-Columbian culture—the “Veraguas Culture”—typified by monochrome pottery that emphasized modeling and appliqué decoration. This idea was promoted by Lothrop (1950: 16, 33), who believed that painted pottery and fine stone ornaments found in Veraguas graves had all arrived by trade from the eastern side of the Azuero Peninsula or Coclé province. Lothrop also proposed that a distinctive goldworking tradition existed here in which open-back casting and pendants of spread-eagled birds prevailed. He considered that this goldwork (later named the Veraguas-Chiriquí tradition by Warwick Bray [1992]), metates, or corn-grinding stones, that were shaped like big cats, and tripod pots, all linked Veraguas culturally to the neighboring Chiriquí province (Lothrop 1942: fig. 486; Lothrop 1948: 159-160; Lothrop 1950).

Lothrop befriended the infamous *huaquero* Juan Gratacós, whom he addressed as “Don Juan” and “maestro.” “As [Gratacós’s] workmen had all opened scores of graves, and I had no experience in this region,” he remarked, “it seemed best to let them proceed in their customary way, stopping them when I wanted to measure or record. The men worked in pairs, alternating with pick and shovel.” (Lothrop 1950: 20) This strange relationship is one reason for Lothrop’s insistence in the regional idiosyncrasy of the “Veraguas Culture” since the *huaqueros* concentrated on late pre-Columbian graves with surface stone markers, in which most pottery was monochrome. The other reason is his earlier discovery of the Sitio Conte mortuary precinct in Coclé province, which logically influenced his concept of cultural geography. Lothrop believed that the “Veraguas” and “Coclé” cultures were coeval. More recent archaeological data show that the communities of southern Veraguas interacted socially and economically with communities located further east during the period between 200 BCE and 1150, i.e. during the apogees of the La Mula, Tonosí, Cubitá, Conte, and Macaracas polychrome styles of the Gran Coclé tradition.



Frog effigy pendant, Gran Coclé,  
500–1520, gold. GM 5645.14

## Sitio Conte

Lothrop and his colleagues worked at Sitio Conte between 1931 and 1934. J. Alden Mason of the Museum of the University of Pennsylvania returned in 1940 (Briggs 1989; Hearne and Sharer, eds., 1992; Lothrop 1937, 1942; Mason 1940, 1941, 1942). Their discoveries drew archaeologists' attention for the first time to the artistic brilliance and impressive elite wealth of Panamanian chiefdoms or *señoríos* (for discussions of Panamanian chiefdoms, see Briggs 1989; Cooke and Ranere 1992; Drennan 1996; Fitzgerald 1998; Haller 2008; Helms 1979; Isaza-Aizuprúa 2007; Linares 1977). The radiocarbon dating method was not available to Lothrop, who used instead an ingenious comparison of grave stratigraphy and superimposition, and stylistic progression in pottery, to infer that the interments with "Coclé" pottery and metalwork represented a 170-year period, 1330 to 1490 (Lothrop 1942: 183-199, Table 6, figs. 383, 384). He assigned the last 30 years to a "period of decline" since the pottery he found in the uppermost graves looked very simple to him. Lothrop's ethnohistorical research suggested that the gold artifacts recovered in the richest graves at Sitio Conte were strikingly similar to ones that Spanish Captain Gaspar de Espinosa had ripped off the enshrouded body of the native chieftain París (or Parita) whose burial rites he interrupted in 1519: a helmet, cuffs and greaves, disks (*patenas*) and beaded belts and necklaces with bells dangling from them (Cooke and Bray 1985: 35; Cooke, Isaza, et al. 2003: 120; Lothrop 1937: 46; for the original description see Espinosa, in Jopling 1994: 63-64).

### RADIOCARBON CHRONOLOGY AND CULTURAL GEOGRAPHY

Lothrop identified two stages in the pottery found at Sitio Conte—"Early" and "Late"—acknowledging that they represented a temporal and stylistic gradient. He also identified "foreign styles," which recent research has shown not to be foreign but representatives of an earlier style (Cubitá), defined in 1995 by Sánchez-Herrera, and a later one (Macaracas), first described by Ladd (1964). Currently, eight sequential styles have been identified in the Gran Coclé tradition: La Mula, Tonosí, Cubitá, Conte, Macaracas, Parita, El Hatillo and Mendoza, all supported by radiocarbon dates. It is important to stress, however, that one style evolves gradually into another so that transitions between the existing divisions are apparent. Also, considerable regional variability within Gran Coclé has been documented. For example, during the apogee of the Late Conte and early Macaracas styles, a chromatically distinctive regional variant called Joaquín was in vogue in the south of the Azuero Peninsula (Ichon 1980: 230-268). A chronological table illustrates the most recent dating estimate for the Conte and Macaracas styles with data from Cerro Juan Díaz on the northeastern (Parita Bay) coast of the Azuero Peninsula.

200 BCE

**La Mula**



250 CE

**Tonosí**



500 CE

**Cubita**



700 CE

**Conte**



1000 CE

**Macaracas**



1150 CE

**Parita**



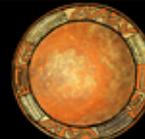
1400 CE

**El Hatillo**



1520 CE

**Mendoza**



1550 CE

CHRONOLOGICAL CERAMIC STYLES IN THE GRAN COCLÉ TRADITION

Four radiocarbon-dated vessels found in funerary features. A, B, and C correspond to the Late Conte styles, and D to the Macaracas style. Photos by Marcos Guerra.



Above are four radiocarbon-dated vessels found in funerary features at this site. Three correspond to the Late Conte styles, and one to the Macaracas style (Ladd's Higo or Cuipo varieties). The human humpback effigy (A) and the small jar (B), deposited in Feature 44 of Operation 4 at Cerro Juan Díaz, were associated with an adult woman whose tooth dentin dated to  $1240 \pm 40$  BP (680 [710] 885 CE) (Beta145038).<sup>1</sup> A charcoal date of  $1140 \pm 60$  BP (775 [810] 1015 CE) was recovered from the floor of the same grave (Cooke et al. 2000: 167). The plate decorated with opposing crocodile images—frequent in the latest Sitio Conte graves—was found in Feature 51 of Operation 4 (C). This grave contained eight human individuals, all but one buried inside red-slipped urns (Diaz 1999: 29-31). Charred residue scraped off the interiors of two urns returned dates of  $1100 \pm 60$  BP (800 [975] 1030 CE) and  $1140 \pm 50$  BP (785 [895] 1005 CE). Charcoal recovered alongside a primary adult burial in the same feature

dated to  $1250 \pm 90$  BP (640 [780] 990 CE). These dates strongly suggest that the late Conte vessels were deposited in this grave between 680 and 1030. Their intercept range is 710–975.

The fourth vessel (D) belongs to the Higo or Cuipo varieties of the Macaracas polychrome. The twinned animal image is painted *en negatif*, i.e., highlighted in the pale slip color. A similar image painted in positive is represented in triplicate on a Macaracas pedestal plate in the Gilcrease Collection. The Cerro Juan Díaz vessel was found at the bottom of the largest and most complex grave in Operation 4 (Feature 4), a circular shaft cut into bedrock that opens out into a semicircular vault, 2.6 m wide and 3.4 m deep (Díaz 1999: 34-36). Twenty-seven human skeletons were found within the feature. Díaz reckons that the last human interment was Individual 80 whose tooth dentin returned a date of  $1100 \pm 50$  BP (815 [970] 1000) (Beta-143060). Tooth dentin of Individual 93, who was probably interred at the same time, was dated to  $920 \pm 70$  BP (990 [1060, 1080, 1150] 1260). Charcoal deposited by the ritual activities that accompanied the placement of the Macaracas (Higo/Cuipo) vessel (D) produced a date of  $960 \pm 60$  BP (985 [1035] 1200) (Cooke et al. 2000: 168). These dates (intercept range: 970-1150) imply that the Macaracas Higo/Cuipo vessel was manufactured at a slightly later time than the Late Conte vessels.



A plate from the Gilcrease Collection decorated with opposing crocodile images. The design is found frequently in the latest Sitio Conte graves. Gran Coclé, 750–900, earthenware. GM 5445.3422



A red-painted  
Early Conte carafe,  
750–900, earthenware.  
GM 5445.3394

Significantly, no vessels that depict an animal image painted in negative were recovered at Sitio Conte. Gradually the Gran Coclé polychrome designs became more rectilinear with less realistic and often fragmented animal motifs. New shapes such as bottles with tall spouts and long painted pedestals appeared. Purple paint was used less frequently. Graves with Parita style pottery were not found at Cerro Juan Díaz; but six charcoal dates obtained from refuse lenses in which this is the most recent painted pottery style have a 2 $\sigma$  maximum range of 985–1450, and an intercept range of 1065–1305 (Cooke et al. 2000). The Parita style was probably well-defined by 1150.

The Early Conte style pottery, typified by the many Gilcrease plates with “drooping lips,” has only been associated with two radiocarbon dates. At the large village site, AG-73, El Cristo (Coclé), a red-painted Early Conte carafe very similar to the Gilcrease one shown at left was associated with a date of 1290  $\pm$  55 BP (650 [705] 880) (Beta-46389). At the DO-27 site on the Atlantic slopes in Colón province, carbonized residue scraped from a sherd of a Conte Red

vessel returned a date of 1250  $\pm$  40 BP (675 [770] 880) (Griggs 1998:82-88, fig. III.12).<sup>2</sup> These sparse data suggest that the Early Conte style corresponds to the period 700–850. Many more dates have been obtained for Cubitá style at Cerro Juan Díaz and on the Pearl Islands (Cooke et al. 2000, 2007; Cooke 2009). They show that this style, clearly antecedent to Conte, was in vogue between ca. 500 and 700 (Sánchez and Cooke 2000; Sánchez-Herrera 1995).

### UNSTABLE BOUNDARIES

Gran Coclé is one of three north-south culture areas into which archaeologists divide the isthmus during the last 2000 years of the pre-Columbian period (the others being Gran Chiriquí in the west and Gran Darién in the east). Maps in publications give the impression that boundaries between them were immutable in space and time. This is not true (Cooke and Ranere 1992: 247). Each culture area comprised cores and peripheries, which waxed and waned in response to changing social interactions, i.e., trade, alliance formation, and group fissioning due to tensions among settlements, lineages, and individuals (Cooke 1998a; Linares et al. 1975). Current assessments of the relative abundance of decorated pottery types—the criterion used to define Panama’s culture areas—are excessively qualitative. Statistical-spatial analyses of the relationship between painted pottery, pigments, clays, and geography have not

been undertaken. Non-intuitive approaches to artifact analysis that use microscopic and other kinds of instrumental analysis are very poorly developed. This means that archaeologists are underinformed about the relationship between raw materials, pottery production, local circulation, and longer-distance trade.<sup>3</sup>

People lived in the three culture areas for a very long time before the development of painted pottery and fine metalwork, shellwork, and stonework. In fact, there is evidence for the continuous occupation of the Pacific lowlands and foothills of Gran Coclé from Paleoindian times (12,000–11,200 cal BCE) (Cooke 2005; Cooke and Sánchez-Herrera 2004b; Pearson and Cooke 2008). People began to cultivate plants here soon after the climate became warmer and wetter after the end of the last Ice Age (Piperno 2009). Some important cultigens—e.g., maize (*Zea mays*), squash (*Cucurbita* spp.), yams (*Dioscorea* spp.), and manioc (*Manihot esculenta*)—were widely planted by the Late Preceramic period (Dickau 2010; Piperno 2009; Piperno et al. 2000). Pottery can be traced back to ~3500 BCE when the monochrome and red-painted Monagrillo style was widely distributed from the Atlantic foothills of Coclé to Parita Bay. But it has not been reported further east or west (Cooke 1995; Griggs 2005; Iizuka et al. in press).

The florescence of the Gran Coclé semiotic tradition can be related to largely indigenous demographic and social developments stimulated by population growth, the expansion of agriculture, settlement nucleation, and increasing disparities in regional, group, and individual wealth. These developments, which gained momentum in the latter half of the first millennium BCE, are exemplified by sites like La Mula-Sarigua (Hansell 1988) and Cerro Juan Díaz (Cooke et al. 2000; Hansell 1988; Isaza-Aizuprúa 2007; Sánchez-Herrera 1995).

The first evidence for metallurgy, polished stone jewelry, and ornaments exquisitely carved out of pearl and thorny oysters (*Pinctada mazatlanica* and *Spondylus* spp.) appears at the beginning of the Common Era. Metallurgy was clearly not an indigenous technology but was introduced into Panama from Colombian metallurgical centers. On the other hand, there is no need to introduce “foreigners” to explain the appearance and development of the Gran Coclé polychrome tradition, whose styles grade into each other through time with no evidence of sudden change.

Ironically, the person who first proposed that southern Veraguas formed part of the Gran Coclé culture for at least part of its pre-Columbian history, was another looter, Philip Dade, whose knowledge of polychrome pottery distribution was based on the large number of funerary features he opened personally in the 1950s and 1960s (Dade 1960, 1961, 1970, 1972).<sup>4</sup> Other graves excavated or described by archaeologists and “amateurs” more responsible than Dade reinforced the inference that polychrome vessels were deposited in such numbers in southern Veraguas mortuary sites that they were most unlikely to represent only trade wares (Biese 1962, 1964, 1966; Casimir de Brizuela 1972; Cooke et al. 2000; Mahler 1961; Mitchell 1962; Wassén

1960). Confiscated looters' finds of hundreds of beautiful examples of vessels painted in the La Mula, Tonosí and Cubitá styles vouch for a large and wealthy regional population in the plains and foothills that border on the Gulf of Montijo between 200 BCE and 700 CE. Art historian Armand Labbé (1995: 32-33, figs. 23, 24) coined the term "Montijo Transitional Ware" for a distinctive group of collared jars with polychrome decoration on the shoulder, which is transitional between the Cubitá and Early Conte styles (Cooke et al. 2000: fig. 8.9, f; Sánchez-Herrera and Cooke 2000; Sánchez-Herrera 1995). As implied by the name, hundreds of vessels of this kind have been looted from sites around Montijo Bay.

Dwelling sites often enable archaeologists to trace longer-term stylistic changes in artifacts than funerary sites. C. R. McGimsey's (1964) test pits in deep shell-mounds near Mariato are the only excavations conducted at stratified dwelling sites around the Gulf of Montijo. They produced sherds painted in the Tonosí style. In the 1980s a four-year survey project in the Santa María river drainage located many sites along the Veraguas section of this river including two large villages whose refuse lenses include much Conte and Macaracas style pottery. Clearly, these sites were occupied by people who participated in the Gran Coclé interaction sphere. Bajo Chitra (CL-4) was probably the seat of the contact period chieftain Esqueva or Esquegua. The painted pottery found here belongs to the last of the Gran Coclé painted styles, Mendoza, whose production probably extended for a generation or two into the early colonial period (Cooke, Sánchez et al. 2003).

The monochrome and red-painted pottery found at late sites like SE-203 and Bajo Chitra includes handles, lugs and appliqué decorations that Lothrop considered to typify his "Veraguas Culture." In fact, a monochrome vessel variety, which is characterized by animal faces modeled on the edge of a medial bevel, is widespread across Veraguas, Azuero and Coclé at sites, associated with Parita, El Hatillo, and Mendoza pottery (Cooke's *Appliqué-Buff Ware* [1972:216-221, figs. 112-113] and Ichon's Jobero Bisquit type; Ichon 1980: fig. 110c, cf Lothrop 1942: fig. 438 and Lothrop 1950: fig. 49). The development of a distinctive suite of plastic decorative modes on pottery is as notable across Gran Coclé after 1150, as is the stylization and geometricization of painted designs. It is thus likely that the pottery Lothrop considered typical of a "Veraguas Culture" is a fairly recent manifestation: the majority of graves that were opened by Don Juan Gratacós and his friends in southern Veraguas are later than those, which produced the Gran Coclé polychrome pottery illustrated here.

To sum up, the monochrome pottery found in graves and at dwelling sites on the Pacific side of Veraguas after 1150 is much less different from that of coeval sites in the Azuero Peninsula and Coclé than Lothrop supposed. This suggests that this zone still formed part of the Gran Coclé sphere. That said, it is prudent to consider another scenario: that group fissioning and changing social and economic relationships did create a distinctive cultural entity in

southern Veraguas after 1150, centered on the western foothills adjacent to Chiriquí near Soná and Las Palmas (see also Bray 1992). A similar process is evident in Gran Darién. Archaeologists have identified a regional florescence and expansion of the Cubitá and Conte styles of the Gran Coclé tradition on the Pearl Islands, and along the coastal plains of Panama province between 500 and 800. Preliminary observations suggest that some painted pottery was locally made on the Pearl islands while a few vessels were imported from the mainland. Subsequently the Gran Coclé pottery tradition contracted and was replaced in Panama province and the islands by a very different ceramic assemblage that emphasized modeled and incised over painted decoration (Martín-Rincón 2002). Cooke (1998a) proposed that this change may have been related to a re-orientation in social and economic interactions as gold-work gradually replaced coral reef shell jewelry the prime mover of the exchange networks. It may also be connected to the consolidation of the polity the Spanish called “Cueva” at first contact (Cooke 1998a; Cooke and Sánchez 2004c: 54-55; Cooke 2009; Cooke et al. 2007; Sánchez -Herrera and Cooke 2000; Sánchez-Herrera 1995).

It is conceivable that a similar situation occurred in Veraguas after 1150: the Gran Coclé pottery tradition contracted as new social and economic relationships developed. Support for this scenario is provided by the goldworking tradition that Bray (1992) calls Veraguas-Chiriquí. It includes many open-back cast images of “eagles,” spread-winged birds of heterogeneous taxonomic affiliation. Several such “eagles” are present in the Gilcrease Collection. The Veraguas-Chiriquí goldworking tradition extended westwards as far as southern Costa Rica where gold “eagles” were still being cast in the 18th century and where Native American leaders still wore “eagle” pendants (presumably acquired in pre-Columbian graves) in the late 19th century (Ferrero 1981; Quilter and Hoopes, ed., 2003, Frontispiece).

## Pottery

The fact that 73 vessels in the Gilcrease collection are painted in the Conte style of the Gran Coclé tradition is one reason for supposing that they were obtained at a single funerary site. Another reason is the homogeneity of the group of 19 “drooping lip” plates, mostly decorated with animal images. Lothrop (1942: 9) found hundreds of these vessels at Sitio Conte, where nearly all the specimens are from the early period. The stylistic uniformity of many of the Gilcrease “drooping lip” plates points toward their having been made by the same potter or group of potters. (An anomaly is plate 54.3431, shown on the following page, whose execution is more slapdash). The third reason is the unique group of 18 polychrome whistles shaped like birds, which appear to have been made by the same potter.



Bowl, Gran Coclé, 750–900, earthenware.  
GM 5445.3431

Bowl, Gran Coclé, 750–900, earthenware.  
GM 5445.3427



Bowl, Gran Coclé, 750–900, earthenware.

GM 5445.3385

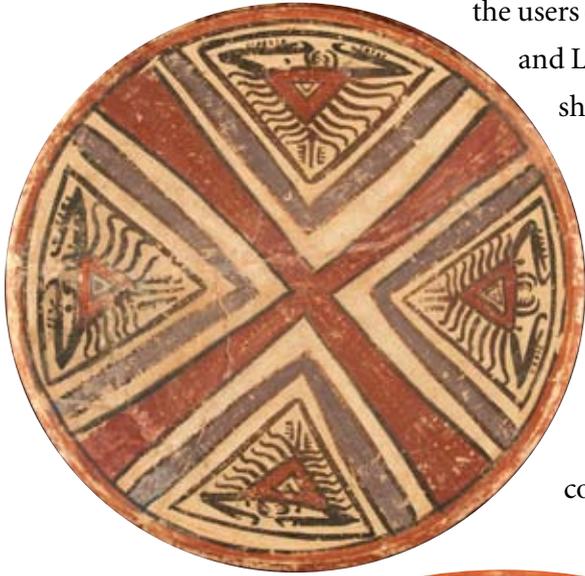
The flatness and quite large size of the “drooping lip” plates suggest that they were used for serving victuals—and not restrictively in ritual or feasting contexts, as might be expected. Other bowl forms (called “rounded bowls” and “outflaring” bowls by Lothrop [1942]) were probably also serving vessels. A very fine example is 54.3427, shown at bottom on the facing page. Polychrome sherds of “drooping lip” plates are frequent in refuse deposits at large village sites like Cerro Juan Diaz and Sitio Sierra, where there is no evidence for high rank burials like those of Sitio Conte. One can imagine that a magnificent plate decorated with realistic fish (Pacific lookdowns, *Selene peruviana*)—found at Cerro Juan Díaz—was actually used to serve fish! (Cooke 2004: 281, fig. 10). Gran Coclé symbolism must have permeated regional communities in life as well as in death. When one reads in the Spanish chronicles about the fine textiles produced in Parita Bay communities such as Natá, one can envisage mantles and blankets decorated with designs similar to the ones found on pottery and goldwork. In fact many characteristic images, like the humanized crocodile, were depicted on the most splendid gold artifacts, the most beautiful polychromes, and the humblest of bone artifacts (Cooke and Jiménez 2010). This reinforces the idea that this ubiquitous icon was the badge of a social group and not a symbol of high rank.

Over the years specialists have attempted to relate animal images to biologically meaningful taxa while accepting that Gran Coclé artisans created fantastic beasts, which are amalgams of different animals (Cooke 1984, 1998b, 2004 a,b; Cooke and Jiménez 2010; Helms 1977, 1979, 1995, 1998, 2000; Linares 1977; Lothrop 1937, 1942). Gran Coclé potters resorted to “split representation” whereby a single image will represent more than one animal depending on how it is observed (Cooke 2004a: fig. 8). This is evident on a “drooping lip” plate (above right, this page) whose central figure has a shark-like mouth at the end of a snake- or eel-like body whose eyes form two pelican-like birds.



Bowl, Gran Coclé, 750–900,  
earthenware. GM 5445.3416  
Bowl, Gran Coclé, 750–900,  
earthenware. GM 5445.3420

Sometimes animal images may be exclusively decorative, like the realistic crabs in the bowl at left. This may be true also for some images with fantastic or human-like attributes. But it is more likely that the latter were symbolically imbued, having a role in the regional cosmology or being characters in myths, legends and histories whose relevance and exploits would have been familiar to the users of this pottery (for discussions of this topic, see Helms 1977, 1995, 2000 and Labbé 1995; Linares [1977] provides an in-depth analysis of the relationship between animal images and human social behavior).



Convention and aesthetics standardize mouths, beaks, feet, and tails so that reptiles, birds, and mammals can look similar, defying anatomical and taxonomical logic. Many animal images painted on plates and bowls terminate in a very long and sinuous “tail,” often with alternating blue and red “feathers.” Mary Helms (1995) proposed that some snake-like bodies are stylizations of the boa constrictor—the “rainbow serpent”—which she believes is a prime player in the regional cosmology.

Gran Coclé potters often resort to “signals” or “badges” to identify an animal on an image that is fragmented or abstract, for example branched antlers to symbolize a white-tailed deer (Cooke 1992, 2004a).



Facing: Gran Coclé bowls, 750–900.

Top to bottom, left to right:

GM 5445.3400, 5445.3421, 5445.3417,  
5445.3413, 5445.3425, 5445.3393





A bowl that depicts the carapace and tail of a freshwater turtle, Gran Coclé, 750–900, earthenware.

GM 5445.3432

Such signals of identity are evident in the figure depicted on the rounded bowl at left, whose oval body represents the carapace, and the basal curlicue the tail, of a freshwater turtle. This association is clearer on more realistic turtle images, including modeled ones, which depict the distinctive stripes on the head of a pond slider (*Trachemys scripta*) — a common species in Panama that was frequently used as food.

An interesting symbiosis is that of parrots and humans. On the rounded bowl on the facing page, the ears of the seated human figure are crescent-shaped. In other images (e.g. Lothrop 1942: fig. 57b and fig. 58a,b) it is more obvious that these ears represent parrot or macaw beaks. Elsewhere (1984a: 249) I have proposed that this relationship emphasized “the role of the bird-that-sees-and-hears-all, a generally benign personage that aids the warrior and shaman through its remarkable linguistic and aural abilities” pointing out that, according to Reichel-Dolmatoff (1975: 111), the Desana associated the yellow and red plumage of the macaw with shamanistic practices, both as a helper and bearer of fertilizing colors, and also as a spy, a messenger who may overhear an enemy’s conversation or warn of approaching danger. Some seated parrot-eared personages, however, appear to be female since they exhibit a vulvar notch (Cooke 2004a, Lothrop 1942: fig. 57b and fig. 58a,b).



Turtle effigy vessel,  
Gran Coclé, 750–900,  
earthenware.  
GM 5445.3445



Bowl with a seated human  
figure, Gran Coclé,  
750–900, earthenware.  
GM 5445.3396

## EFFIGY VESSELS

Gran Coclé effigy vessels, which depict modeled animals or humans, are often quite realistic. The two vessels shown here depict a long-snouted mammal whose head markings, overall head shape, and striped tail suggest a coatimundi (*Nasua narica*) although it is possible the artist had in mind another procyonid, the raccoon (*Procyon lotor*)—which today is much a more frequent element of the fauna of southern Veraguas than the coati (cf Lothrop 1942: fig. 219a). The Gilcrease examples recall a reclining coati effigy from a looted site near the Gulf of Montijo (Cooke 1984b, Cover).

Coatimundi effigy  
vessel, Gran Coclé,  
750–900, earthenware.  
GM 5445.3443





Coaticundi effigy vessel  
(three views), Gran Coclé,  
750–900, earthenware.  
GM 5445.3479





Ocelot effigy, Gran Coclé, 750–900,  
earthenware. GM 5445.3384

Another superb effigy, shown on the facing page, is a felid with spotted pelage. The ocelot (*Leopardus pardalis*) is the most widespread spotted cat in this area of Panama. Ocelot teeth perforated through the roots were reported in graves at Cerro Juan Díaz (Cooke and Jiménez 2010: fig. 3.8, c). One Gilcrease effigy, shown below, depicts a ray, a life form that was modeled on Conte vessels at Sitio Conte, sometimes with spots that denote the spotted eagle ray (*Aeteobatus narinari*) (Lothrop 1942: fig. 211b, b', fig. 212c). Lothrop assigns the Sitio Conte ray effigies to the Late Conte style. Gilcrease vessel 54.3483, shown on the following page, is a realistic crocodile ensconced beneath a carafe rim with YC scrolls.

Sting ray effigy vessel,  
Gran Coclé, 750–900,  
earthenware.  
GM 5445.3415





A realistic crocodile ensconced beneath a carafe rim with YC scrolls, Gran Coclé, 750–900, earthenware. GM 5445.3483

Five human effigies show individuals wearing face paint, as do most of these ubiquitous vessels across Gran Coclé. In real life the red paint would have been anatto (*Bixa orellana*) and the black paint jagua (*Genipa americana*). One of these effigies depicts a humpback—a disorder that was highlighted on human effigy vessels across Panama (Dade 1959, 1968; Lothrop 1950: fig. 45a).

The intriguing set of bird-shaped whistles exemplifies the interplay between convention, standardization and biological identity. The fact that each whistle is different suggests that the artisan wanted to convey a real category of birds (biological or ethnobiological) taking into consideration the inaccuracies made inevitable by the aesthetics of the art tradition (i.e., color balance) and the small size and shape of the artifacts. Probably, if the artisan were alive today he or she would have no compunction about saying “that whistle is such-and-such a bird.”



Five human effigies wearing face paint,  
Gran Coclé, 750–900. Clockwise from upper  
left: GM 5445.3390, 5445.3478, 5445.3442,  
5445.7890, 5445.3451

GRAN COCLÉ CERAMIC BIRD WHISTLES, 750–900, WITH POSSIBLE IDENTIFICATIONS



GM 54.3403, red-headed woodpeckers



GM 54.3411, red-crowned woodpecker



GM 54.3481, ruddy turnstone



GM 54.3482, pied water-tyrant



GM 54.3449, yellow-headed caracara



GM 54.3406, great currasow



GM 54.3408, wading bird such as killdeer



GM 54.3441, duck



GM 54.3407, crested caracara



GM 54.3402, white ibis



To enhance the objectivity of this assumption I asked a specialist in Neotropical ornithology, George Angehr, which bird species may have provided the models for the whistles. This is his verdict. 54.3403 recalls a red-headed woodpecker—perhaps the crimson-crested woodpecker (*Campephilus melanoleucos*), which in life sports an almost completely red head. 54.3411 could represent the red-crowned woodpecker (*Melanerpes rubricapillus*). The speckled black and white plumage with red elements of 54.3481 is vaguely reminiscent of the ruddy turnstone (*Arenaria interpres*). The plumage pattern of 54.3482 recalls the pied water-tyrant. The plumage pattern of 54.3449 suggests the yellow-headed caracara (*Milvago chimichima*). The reticulated brown monochromy and bushy crest of 54.3406 whose bill is broken off, may be the “badges” of a female great curassow (*Crax rubra*). The plumage of 54.3408 a could refer to a wading bird such as a killdeer (*Charadrius vociferus*), which has a reddish rump, but two black chest bands. 54.3441 is undoubtedly a duck. No duck species in Panama has a red crest although adult male Muscovy ducks (*Cairina moschata*), which were domesticated in pre-Columbian Panama (Cooke et al. 2008, 2010), have a bare red face. 54.3407 shares dark crown, black belly, light rump, and white and black tail with the crested caracara (*Caracara cheriway*). 54.3402 has a long, curved bill, which is red on top; it may represent the white ibis, which is depicted on Tonosí style vessels (Cooke 2004a: 115)

Obviously there is a steep scale of likelihood in this evaluation, with the duck at the top. But this exercise is not trivial: the point I wish to emphasize is that the maker intended these delightful whistles to portray real bird species. All the species mentioned above except the pied-water tyrant are encountered in the appropriate habitat in southern Veraguas. Particularly intriguing is the fact that a red-headed woodpecker congeneric with the crimson-crested, the pale-billed woodpecker (*Campephilus guatemalensis*), was identified by David Steadman in archaeofaunal samples at Cerro Juan Díaz. It is possible that this very rare, colorful and raucous species was kept in captivity at this site along with other birds (e.g., macaws, parrots and parakeets, passerines with bright plumage, and owls), not for food but as a curiosity, because it was attributed special supernatural powers, or because it provided feathers for personal or ritual attire (Cooke et al. 2010).



Gran Coclé bird whistle likely representing a turkey vulture (*Cathartes aura*), 750–900. GM 54.3401



### MACARACAS AND PARITA STYLE VESSELS

Left: Pedestal Plate,  
Gran Coclé,  
900–1000,  
earthenware.  
GM 5445.3437

Right: Pedestal plate,  
Gran Coclé,  
900–1000,  
earthenware.  
GM 5445.3439

At Sitio Conte Lothrop (1942: 119-122) found eight vessels in Grave 5 most of whose finely drawn painted designs depict a crocodile in different poses (his “Foreign Style A”). Many more vessels of this type, recovered by Stirling and Willey at funerary sites on the Azuero Peninsula, were assigned by Ladd (1964) to the Macaracas style (Pica-Pica and Higo varieties). Three vessels in the Gilcrease collection represent these categories. The vessels above are shallow plates set on a pedestals with diamond-shaped slits. The lips of the plate rims are divided into different colors, a feature which Lothrop calls a “coral-snake rim.” Both these modes appeared at Sitio Conte during the Late Conte period (Lothrop 1942: 81). The zoomorphic design consists of three heads of a feathered crocodile or snake arranged in three panels. The same head image is depicted on a small collared jar shown facing. The third vessel, above right, exemplifies the growing complexity of the designs of Macaracas vessels: four panels depict a walking crocodile and two in the center, crocodile heads.

The standing humanized crocodile image is present on the Early Conte style but becomes more popular in the Late Conte and Macaracas styles. Although Helms (1977) argued coherently that most saurian images represent iguanas (*Iguanidae* spp.) I have expressed doubts about this association (Cooke 1998b, 2004a) being party to the idea their model is a crocodilian—a “mythological or historical personage (perhaps with genealogical connotations), which represented a social group that venerated the deeds of humanized crocodiles who manifested themselves in natural and supernatural guises” (Cooke and Jiménez 2010: 48).



Vessel, Gran Coclé, 900–1000,  
earthenware. GM 5445.3453



Pedestal Bowl, Gran  
Coclé, 1200–1400,  
earthenware.  
GM 5445.3436

The single Parita style vessel in the collection, seen at left, is a typical example of the Yampí variety of this style comprising a shallow plate on top of an elegant thin-waisted pedestal decorated with bands and lines. The plate has a flattened rim with small elevated nubbins and black bands, two of which enclose a polychrome motif. The image on the interior has a snake-like body and a head with lateral projections that has been interpreted as a stylization of a hammerhead shark head (*Sphyrna* spp.) (Ladd 1964:79-82).

### VESSELS WITH EXCLUSIVELY GEOMETRIC DESIGNS

A small number of vessels are decorated with exclusively geometric designs. The bowl with a horizontal ribbon handle shown on the facing page at upper left is unusual. Next to it is a fine example of an Early Conte style plate with a zigzag pattern consisting of alternating red, purple and white bands (cf Lothrop 142: fig. 17b). On the facing page at lower left is an example of the “panelled red” mode on an Early Conte “drooping lip” plate. A spouted vessel beside it shows two different modes of YC scrolls in opposing panels. The Gilcrease plate below left, an Early Conte drooping-lip plate with four YC scrolls enclosed in purple triangles, is compared with a very similar vessel found in the River San Pablo valley, Veraguas, 4 miles above Soná.

Left: Plate, Gran Coclé,  
750–900, earthenware.  
GM 5445:3382

Right: A403458-0,  
Dept. of Anthropology,  
NMNH, Smithsonian  
Institution; photo by  
Donald E. Hurlbert





Geometric designs, Gran Coclé, 750–900,  
earthenware. Clockwise from upper left:  
GM 5445.3412, 5445.3418, 5445.3380, 5445.3491



The small collared vessel, GM 3424, shown on the facing page at top left, is very close to a Late Conte example from Sitio Conte (Lothrop 1942: fig. 176b) which also has two pairs of holes on the rim. Presumably the holes were used to hold down a lid. The vessel shown below it, 54.3454 is stylistically intermediate between the Late Conte and Macaracas styles. Below that vessel is 54.3388, decorated with a delicate rendering of the YC scroll, which is also highlighted in one of only two painted versions in this collection of the carafe shape (54.3395, facing page at top right)—ubiquitous at Sitio Conte—and also on a spouted vessel shown below it. The YC scroll may have been a social group identifier. A very fine effigy depicts a seated male figure on a wooden seat (or “duho”) who has YC scrolls painted on his arms probably with a clay roller stamp (Cooke and Jiménez 2010: fig. 3.2a; Linares 1977: Frontispiece).

Facing: Gran Coclé vessels,  
750–900, earthenware.

Top to bottom, left column:  
GM 5445.3424, 5445.3454,  
5445.3388

Top to bottom,  
right column:  
GM 5445.3395,  
445.3389

## Metal Artifacts

I remarked in the introduction that attributing unprovenienced gold artifacts to a specific culture area is considerably more complicated than with pottery. Several metal artifacts in the Gilcrease Collection do not seem to be Panamanian. Others could have been made in Panama or elsewhere on the Central American isthmus. A few artifacts, however, are likely to be coeval with the Conte and Macaracas style pottery and may have been found together with these vessels in the same funerary features.

The beautiful embossed disk (page xx) is a typical example of Gran Coclé goldwork. It is very similar to an example from Sitio Conte (Lothrop 1942: fig. 85) found in the late Grave 26, a very rich interment. It shows two standing humanized crocodiles connected by a belt and wearing headdresses (see also Hearne and Sharer 1992: Plate, p. 79). As Lothrop argued (1942: 115), the small holes in the disk suggest that it was sewn onto a fabric, probably a cotton shirt or apron. A Spanish chronicle dated to 1527 relates how the chieftain Pocoa, whose territory was in southwestern Veraguas, attacked the Spaniards of Natá at the head of 500 troops “with a great paten on his chest and spears in either hand” (Cooke, Isaza et al. 2003: 120). Fernández de Oviedo (1853: 118) says that “it was the custom in those parts for the chiefs and important men to bring to battle some gold jewel on their chests or head or arms in order to be known to their own men and also by their enemies.” The largest disk found at Sitio Conte had a diameter of 30 cm and weighed 361.8 grams (12.8 ounces) (Lothrop 1937: 115). Although it is sometimes said that hammering gold is “simple” (e.g. Helms 1979: 3; Lothrop 1942: 162), metallurgists avow that it is not.<sup>5</sup>

Embossed disk, Gran Coclé, 1150–1520,  
gold. GM 5645.228

Arm cuff, Gran Coclé, 700–1000, gold.  
GM 5645.54



Another kind of embossed plaque has conical nubbins arranged circumferentially, centerwards of smaller nubbins. One example, shown on the facing page at top, has five cones and a stylized human face. Patens with geometric embossed decoration are quite widespread from Colombia to Costa Rica (Lothrop 1950: fig. 117a, b). An example similar to the Gilcrease ones was found at Bajo Chitra (CL-4) in a road fill, and had been cut in half (Cooke, Sanchez et al. 2000: 170, fig. 8.12 a). The complete object probably had ten embossed cones. The only painted pottery found at this site represents the Mendoza style, which may represent a survival of Gran Coclé polychrome techniques for a generation after 1520 (Cooke 1993; Cooke, Sánchez et al. 2003). I mentioned earlier that Bajo Chitra is likely to have been the seat of the highland chief-tain Esqueva (or Esquegua) who would have worn gold disks to battle to draw attention to his high rank and bellicosity. This variety of embossed plaque was not reported at Sitio Conte (Lothrop 1937). This negative evidence supports a late date. Lothrop (1950: fig 117 c, d) reported two examples from looted graves in Veraguas.

Other artifacts that symbolized high rank at Sitio Conte are golden cuffs and greaves. A superb example with embossed decoration, shown on the facing page at bottom, is decorated with four highly stylized images of the crocodile motif, of a kind Lothrop (1937: 25) calls “property marks.” Lothrop (1937: 162) found some cuffs encircling the bones of the forearms in Sitio Conte burials.

Another category of high status artifact is the elongated ear ornament consisting of a thin, long shaft and a gold cap. Ten Gilcrease examples have complete or fragmented rods made of gold and stone or combinations of these materials (see examples on the following page). Thirteen caps lack shafts perhaps because they were made of perishable material like palm wood. At Sitio Conte, shafts were of made of stone and gold, wood and gold, and gold and gum. An intriguing example shows that the gold cap was fixed to the shaft with a wine palm (*Acrocomia mexicana*) spine fixed in chicle (tree latex, probably *Achras sapota*) (Lothrop 1942: 147, and fig. 125). When worn, the tubes projected forwards and downwards; the gold caps placed behind the ear prevented the object from slipping out. This is illustrated on an embossed gold plaque that represents the standing humanized crocodile depicted frontally, brandishing batons (Hearne and Sharer 1992: Plate 1). Ear spools are also represented in the Gilcrease collection. Some are plain and others are decorated with very finely wrought geometric designs (Lothrop 1937: fig. 128). Noses were also decorated with metal objects. Four undecorated nose clips, among them the one shown at right, recall a type reported at Sitio Conte (Lothrop 1942: Plate II, d.f, fig. 151 a, e).

Nose ornament,  
Gran Coclé, 700–1000,  
gold. GM 5645.104





Ear rods, Gran Coclé, 700–1000,  
gold, stone. From top: 5645.24,  
5645.22, 5645.133;  
At right: GM 5645.17, 5645.16





Ear spools, Gran Coclé, 700–1000, gold.

GM 5645.87b, 5645.12a

## SPREAD-EAGLED BIRDS

Many cast birds with spread-eagled wings, the “águilas” of the Spanish chroniclers, are present in the collection. These objects are unlikely to be coeval with the Conte and Macaracas style pottery in the Gilcrease Collection although they may have been found in Veraguas where they are frequent in looted graves whose pottery indicates a post-1150 date. Bray (1992) argued that a distinct metallurgical tradition developed in Veraguas and Chiriquí after this date in which large spread-eagled bird figurines were a prominent feature. The concept of the spread-eagled bird appears to have arrived from Colombia when metalworking appeared on the Isthmus. Cast “eagles” have been reported on the Azuero Peninsula, but in tombs dated before 700 where they are associated with Tonosí and Cubitá style pottery. Stylistically they differ from the Veraguas-Chiriquí “eagles.” Two fragmented “eagles” found in fills at Sitio Conte probably represent this early type of pendant (Lothrop 1937: fig. 176). Bray (1992: 44) proposed that two Veraguas-Chiriquí “eagles” found in two late graves excavated by Mason at Sitio Conte were actually imports from Veraguas. This may well be true. But very little metalwork that dates after 1150 has been obtained in professional excavations on the Azuero Peninsula and in Coclé province. A Veraguas-Chiriquí “eagle” pendant was found with a group of exquisite cast figures of human and animal forms at the site of El Hatillo which Bray (1992: 84) calls the “Parita Assemblage” (Biese 1967). Philip Dade, who excavated the funerary feature in which many of the “Parita Assemblage” figurines were found, reported a charcoal date of  $415 \pm 90$  BP (Ladd 1964: 151)—supposedly recovered at the bottom of this feature. Although Bray (1992: 45) considers this date “implausibly late,” the El Hatillo site produced many vessels in the El Hatillo style, which is definitely immediately pre-contact in age (Ladd 1964). The  $2\sigma$  range of the date (1395–1660) overlaps with the last century of the pre-Columbian period.

To sum up, future excavations of post-1150 funerary sites on the Azuero Peninsula and in Coclé are likely to demonstrate that the Veraguas-Chiriquí metallurgical tradition encompassed the former areas as well. Of course, we should not expect that metalworking traditions on the isthmus were necessarily co-terminous with pottery-making traditions. Gold objects, being more portable than pottery and having clear associations with power and wealth, circulated more widely than pottery. We know that cast gold objects were produced in Veraguas and Coclé provinces (Cooke et al. 2003), but we do not know where the major gold-working centers were located. Finding field evidence for metallurgical workshops would be a real coup for isthmian archaeology.



Cast birds with spread-eagled wings, Gran Coclé, 700–1150, gold.

Top row: GM 5645.49, 5645.152;

Middle row: 5645.153, 5645.159;

Bottom: 5645.227

## ANIMAL MATERIALS WITH GOLD CAPS

One of the salient features of the goldwork found at Gran Coclé sites is the large number of artifacts that use gold in conjunction with other materials, such as polished stone, resin, animal teeth, and whalebone ivory. The one on the facing page is most unusual: the material that is capped in gold is Spondylus shell—to judge from the color, *S. princeps*. Spondylus shell was not reported at Sitio Conte (Lothrop 1937). It was commonly used, however, during the apogee of the La Mula, Tonosí and Cubitá polychrome styles for making a great variety of ornaments. Another artifact with a gold cap (shown below left) is also of shell—to judge from its color and size, a fragment of a conch, *Strombus* sp., shaped like a large cat canine. It is similar to a whale tooth artifact capped in gold from Sitio Conte (Lothrop 1937: fig. 166 a). Mayo-Torné (2004; Mayo-Torné and Cooke 2005) found a workshop for shell artifacts at Cerro Juan Díaz, associated with Cubitá pottery, in which conch was the most frequent material.

Tooth effigy pendant,  
Gran Coclé, 700–1000,  
gold, shell.  
GM 5645.106



## OTHER CAST FIGURES

Cast figurines in gold are ubiquitous throughout the Isthmo-Columbian metallurgical province. Some of the Gilcrease cast figurines that represent animals other than birds, i.e. frogs grasping snakes, resemble items found in looted graves in Veraguas and are considered archetypical of the Veraguas-Chiriquí metallurgical tradition (Lothrop 1950: fig. 97 c, fig. 98a, c & f). One of the most striking cast figurines in the collection is the sea horse (following page). It is remarkably similar to an artifact recovered at Playa Venado, located just west of the Panama Canal (Lothrop 1956: fig 4). In fact, it is so similar that I imagine it is the same artifact! Playa Venado was an important regional center during the apogee of the Cubitá and Early Conte styles and therefore, at this point in time, participated in the Gran Coclé interaction sphere.



Tooth effigy pendant,  
Gran Coclé, 700–1000,  
gold, shell. GM 5645.155



Seahorse effigy pendant,  
Gran Coclé, 500–850, gold.  
GM 5645.208

## CONCLUSION

The Gilcrease Collection consists entirely of artifacts found in nonprofessional excavations of mortuary features whose goal was the rapid and clandestine acquisition of saleable “art” objects without regard for contextual information or scientific analyses. Museum records indicate that the pottery painted in the Gran Coclé tradition was found in southern Veraguas. Therefore I decided to concentrate on gold artifacts, which excavation records at Sitio Conte and other sites in Gran Coclé suggest were coeval with the Conte and Macaracas style vessels in the collection, i.e. the cuff or greave, embossed plaque and ear-rods. At Sitio Conte these items were used only by the richest individuals (Briggs 1989).

Very few academically trained archaeologists have worked in southern Veraguas. More research projects in this area would help us better tell its complex story—not just excavations, which would help solve the many chronological and distributional problems, but also instrumental analyses of artifacts without which our discussions of important aspects of pre-Columbian behavior, i.e., trade, specialization, group formation and splitting, and the impact of new technologies on regional communities, will remain speculative and unsatisfactory.

## NOTES

1 Dates in brackets were calibrated by Beta Analytic Inc. and represent the 2 $\sigma$  range [95% probability] with intercept dates in square brackets.

2 The recently defined cultural record from the Caribbean slopes of Gran Coclé (Coclé and Colón provinces) indicates that pre-Columbian communities in the humid forests of this area interacted socially with coeval communities on the drier Pacific slopes as far back as the Early Ceramic A (Monagrillo) period (Griggs 2005, Griggs et al. 1998). They used the same kinds of monochrome wares (e.g. “Conte Red”) but seem to have limited access to polychromes, which were presumably manufactured at localities near appropriate pigment

and clay sources on the opposite side of the cordillera.

3 Fumie Iizuka (University of Arizona) is currently engaged in an instrumental study of the pre-polychrome Monagrillo Ware (3520-1300 cal BCE) – Panama’s oldest pottery (Cooke 1995; Iizuka et al. in press). This study is providing precise data about firing techniques, manufacturing processes, and the provenance of some of clays and tempers at the dawn of pottery-making on the isthmus. It is hoped that the same analytical techniques will subsequently be applied to painted wares as well. Contact period documents are uninformative about the transport of pottery on the isthmus. But it is likely that vessels circulated quite widely on peoples’

backs and in the bottoms of dugout canoes. Finds of Gran Coclé pottery at sites in the Chiriquí and Bocas del Toro provinces of Panama and in Costa Rica show that these wares were transported over large distances and with sufficient care to maintain heavy and cumbersome vessels intact (Cooke 1980; Holmes, 1888: figs. 185 & 207-215; Lothrop 1963: figs. 67 & 69 a,b; MacCurdy, 1911: Frontispiece, Plates XLIV and XLV and figs. 246 & 255–258; Wake and Mendizábal-Archibold in press).

4 Dade operated under the protection of a permit granted by the old Museo Nacional in Panama City and an official recognition as spokesperson for the archaeology of Panama by the prestigious Goteborg Ethnographic Museum of Sweden.

5 These embossed plaques often have very high surface gold content. For example, a plaque housed in Panama’s Anthropology Museum (Aa-1-0384), which shows two standing humanized crocodiles, had the following values estimated by X-ray fluorescence: Au 86.2%, Ag 4.3%, Cu 9.5%. Four other patens embossed with typical Conte-like designs represent the following values: 1) Aa-1-305: Au 82.3, Ag 16.6, Cu 7.2, 2) Aa-1-0306: Au 82.6, Ag 17.4, Cu 0.0%, 3) Aa-10311: Au 94.5, Ag 5, Cu 0.5, 4) Aa-1-0323: Au 99.2, Ag 0.6, Cu 0.2 (Beaubien 2008). Although it is sometimes said that hammering gold is “simple” (e.g. Helms 1979: 3; Lothrop 1942: 162), it is not. According to Beaubien (2009) the technique is multi-stage comprising

shaping, decoration, joining and various finishing techniques. The starting metal is in native nugget, ingot or rod, created by melting (unaltered or alloyed with other metals) and casting into some kind of stock form. The stock is then further worked using, for example, hammering on an anvil. These steps increase hardness but also the metal's brittleness (work-hardening). The artisan has to compensate for this with periodic controlled heating (annealing), which restores malleability or further working. Embossed decoration is created by pressing rounded tools (punches) from the back. If the metal is well annealed, it should respond to the tool's pressure. If it is work-hardened, the tools may skid or bounce back.

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