

This PDF file of your paper in Behaviour Behind Bones belongs to the publishers Oxbow Books and it is their copyright.

As author you are licenced to make up to 50 offprints from it, but beyond that you may not publish it on the World Wide Web or in any other form.

*Proceedings of the 9th Conference of the International Council
of Archaeozoology, Durham, August 2002*

Series Editors: Peter Rowley-Conwy, Umberto Albarella and Keith Dobney

An offprint from

Behaviour Behind Bones

*The zooarchaeology of ritual, religion,
status and identity*

Edited by

Sharyn Jones O'Day, Wim Van Neer
and Anton Ervynck

© Oxbow Books 2004

ISBN 1 84217 113 5

Contents

Preface	ix
<i>Peter Rowley-Conwy, Umberto Albarella and Keith Dobney</i>	
Introduction	xi
<i>Sharyn Jones O’Day, Wim Van Neer and Anton Ervynck</i>	

Part 1: Beyond calories: the zooarchaeology of ritual and religion edited by Sharyn Jones O’Day

1. Feasting with the dead? – a ritual bone deposit at Domuztepe, south eastern Turkey (c. 5550 cal BC)	2
<i>Sarah Witcher Kansa and Stuart Campbell</i>	
2. Animal offerings found in Necropoleis belonging to Santana of Mures-Cerniahov culture from the east and the south extra-Carpathian Zones of Romania	14
<i>Simina Stanc and Luminita Bejenaru</i>	
3. Caprines and toads: taphonomic patterning of animal offering practices in a Late Bronze Age burial assemblage	20
<i>Lior Weissbrod and Guy Bar-Oz</i>	
4. The butchering patterns of Gamla and Yodefat: beginning the search for <i>kosher</i> practices	25
<i>Carole Cope</i>	
5. Predynastic Egyptian bovid burial in the elite cemetery at Hierakonpolis	34
<i>Sylvia Warman</i>	
6. Typhonic bones: a ritual deposit from Saqqara?	41
<i>Salima Ikram</i>	
7. Bones and bowls: a preliminary interpretation of the faunal remains from the Punic levels in Area B, at the temple of Tas-Silg, Malta	47
<i>André Corrado, Anthony Bonanno and Nicholas C. Vella</i>	
8. An Iron Age bone assemblage from Durezza Cave, Carinthia, Austria: detecting ritual behaviour through archaeozoological and taphonomical analyses	54
<i>Alfred Galik</i>	
9. Ritual feasting in the Irish Iron Age: re-examining the fauna from Dún Ailinne in light of contemporary archaeological theory	62
<i>Pam Crabtree</i>	
10. The economic and non-economic animal: Roman depositions and offerings	66
<i>Roel C. G. M. Lauwerier</i>	
11. Roman <i>suovitaurlia</i> and its predecessors	73
<i>Barbara Wilkens</i>	
12. Gastronomy or religion? the animal remains from the <i>mithraeum</i> at Tienen (Belgium)	77
<i>An Lentacker, Anton Ervynck and Wim Van Neer</i>	

13. Prehispanic guinea pig sacrifices in southern Perú, the case of el Yaral	95
<i>Juan Rofes</i>	
14. Animals from the Maya underworld: reconstructing elite Maya ritual at the Cueva de los Quetzales, Guatemala	101
<i>Kitty F. Emery</i>	
15. Observations on the religious content of the animal imagery of the ‘Gran Coclé’ semiotic tradition of pre-Columbian Panama	114
<i>Richard Cooke</i>	
16. Identifying ritual use of animals in the northern American Southwest	128
<i>Robert J. Muir and Jonathan C. Driver</i>	
17. Facts and fantasies: the archaeology of the Marquesan dog	144
<i>Sidsel N. Millerstrom</i>	
18. Past and present perspectives on secular ritual: food and the fisherwomen of the Lau Islands, Fiji	153
<i>Sharyn Jones O’Day</i>	

Part 2: Equations for inequality: the zooarchaeology of identity, status and other forms of social differentiation in former human societies
 edited by Wim Van Neer and Anton Ervynck

19. Early evidence of economic specialization or social differentiation: a case study from the Neolithic lake shore settlement ‘Arbon-Bleiche 3’ (Switzerland)	164
<i>Elisabeth Marti-Grädel, Sabine Deschler-Erb, Heide Hüster-Plogmann and Jörg Schibler</i>	
20. Levels of social identity expressed in the refuse and worked bone from Middle Bronze Age Százhalombatta–Földvár, Vátya culture, Hungary	177
<i>Alice M. Choyke, Maria Vretemark and Sabine Sten</i>	
21. Animal husbandry and centralized cultures. How social and political factors can influence rural lifestyle	190
<i>Giovanni Siracusano</i>	
22. Food for the dead, the priest, and the mayor: looking for status and identity in the Middle Kingdom settlement at South Abydos, Egypt	198
<i>Stine Rossel</i>	
23. Remains of traded fish in archaeological sites: indicators of status, or bulk food?	203
<i>Wim Van Neer and Anton Ervynck</i>	
24. <i>Orant, pugnans, laborans</i> . The diet of the three orders in the feudal society of medieval north-western Europe	215
<i>Anton Ervynck</i>	
25. Dietary habits of a monastic community as indicated by animal bone remains from Early Modern Age in Austria	224
<i>Alfred Galik and Günther Karl Kunst</i>	
26. Status as reflected in food refuse of late medieval noble and urban households at Namur (Belgium)	233
<i>Fabienne Pigière, Ides Boone, Mircea Udrescu, Wim Van Neer and Sofie Vanpoucke</i>	
27. Food, status and formation processes: a case study from medieval England	244
<i>Jonathan C. Driver</i>	
28. Animal bones as indicators of <i>kosher</i> food refuse from 14th century AD Buda, Hungary	252
<i>László Daróczi-Szabó</i>	
29. Ethnic traditions in meat consumption and herding at a 16th century Cumanian settlement in the Great Hungarian Plain	262
<i>Éva Ágnes Nyerges</i>	

30. Rich, poor, shaman, child: animals, rank, and status in the ‘Gran Coclé’ culture area of pre-Columbian Panama	271
<i>Richard Cooke</i>	
31. Hunting and social differentiation in the late prehispanic American Southwest	285
<i>James M. Potter</i>	
32. Zooarchaeological evidence for changing socioeconomic status within early historic Native American communities in Mid-Atlantic North America	293
<i>Heather A. Lapham</i>	
33. Implications of risk theory for understanding nineteenth century slave diets in the southern United States	304
<i>Justin S. E. Lev-Tov</i>	
34. Cultural identity and the consumption of dogs in western Africa	318
<i>Veerle Linseele</i>	
35. Hunting practices and consumption patterns in rural communities in the Rif mountains (Morocco) – some ethno-zoological notes	327
<i>Marta Moreno-García</i>	

30. Rich, poor, shaman, child: animals, rank, and status in the 'Gran Coclé' culture area of pre-Columbian Panama

Richard Cooke

In pre-Columbian burials at eight sites distributed across the Pacific littoral of the 'Gran Coclé' culture area of Panama, artifacts made out of animal remains and biomorphic icons depicted on mortuary arts provide information about the social rank, status and occupation of the deceased. Some adult males, who were presumably of high rank, owned very large numbers of animal products, such as shark, domestic dog and peccary teeth, and smaller numbers of exquisite crafts made of bone and whale ivory, these often overlain with gold-copper foil. People of lower rank or status, including women and children, were buried with fewer and simpler objects, e.g., necklaces of teeth, shell and bone, and household tools. In some cemeteries, associations of animal products with other artifacts (for example, aprons sewn with felid teeth, Spondylus shell and gold) and clusters of sting-ray spines and stone and bone tools, allude to specific occupations, such as that of shaman, curer, chanter, warrior and hunter. The differential distribution of well-made Spondylus shell pendants shaped like animals may point to some kind of ranking among young people although evidence for unusually rich children, adolescents and adult women is absent. Some animal species commonly used for food, like the white-tailed deer, were depicted on craft objects. Other species apparently tabooed as food, eg., sea turtles and crocodiles, were painted and modelled frequently. The teeth of domestic dogs were used to make necklaces, but their flesh does not seem to have been consumed. It is likely, though impossible to prove with current data, that some animal icons represented specific sectors of the regional population, such as clans and descent-groups. One of these – a crocodylian – appears in high rank or high status graves dressed like an important human whereas in poorer peoples' burials it retains its unadorned animal guise.

Geography, time and the social environment

The socio-cultural focus of this paper is the 'Gran Coclé' culture area of central Panama (Fig. 1; Sánchez 2000), which is well known for its 'semiotic tradition' of geometric and biomorphic icons inter-linked by repetitive artistic conventions (i.e., standardized claws, tongues, frets, and scrolls) (Lothrop 1937; Lothrop 1942; Linares 1977; Helms 1995; Labbé 1995; Helms 2000). These icons are wrought in several media: hammered and cast gold-copper alloys, clay, stone, marine shell, bone, and wood. Since depictions of animals are quite realistic, but not necessarily biologically rational, they can be evaluated with observational taxonomic criteria (Helms 1977; Linares 1977; Cooke 1984; Helms 1977; Benson 1992; Helms 1995; Cooke 1998; Helms 2000). This paper focuses on the relationship between social inequality and mortuary arts made of animal products (e.g., bone, teeth

and shell), and comments briefly on some iconographic details relevant to this theme. The religious significance of 'Gran Coclé' imagery is dealt with in another paper (Cooke, *this volume*).

The 'Gran Coclé' semiotic tradition is manifest around 200 cal BC (Cooke *et al.*, 2003) and subsequently underwent continual stylistic and technical transformations until Spanish conquest and settlement between AD 1502 and 1550 (Ladd 1964; Ichon 1980; Cooke 1985; Labbé 1995; Sánchez 1995; Sánchez 2000; Cooke and Sánchez 2003, Fig. 2). During this 1800-year period, regional native peoples lived in hamlets and villages of palm-and-thatch houses whose maximum population likely did not exceed 2000 people *per* community. They buried their dead in earthen graves and low earth mounds, the structural simplicity of which belies, not only the impressive material wealth accumulated by a few people, but also the variety

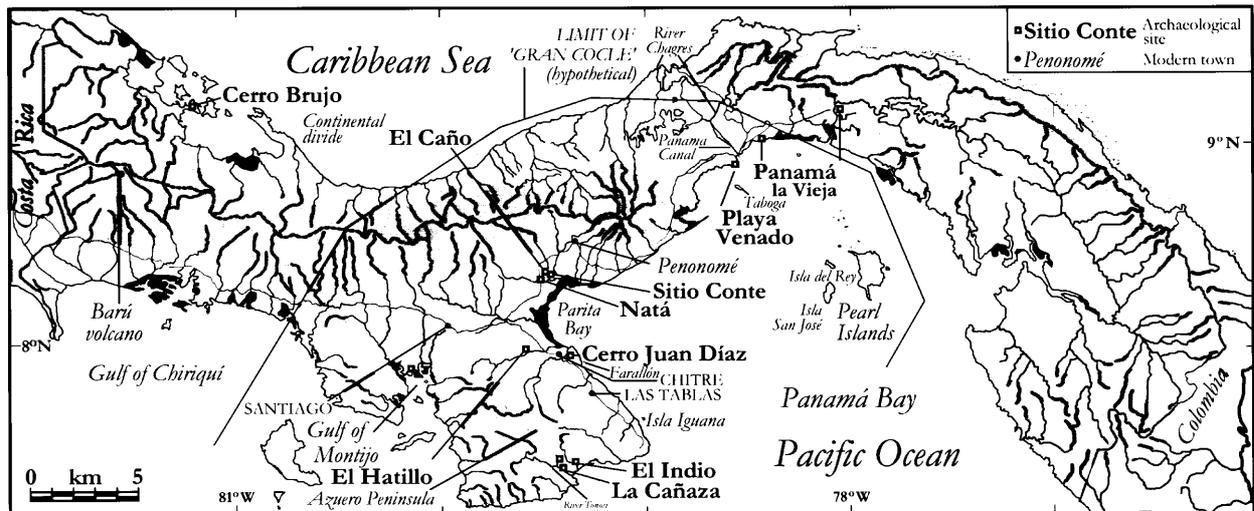


Fig. 1. Map of Panama, which shows the location of archaeological sites and geographical features mentioned in the text.

and complexity of mortuary treatments and placements of the dead, even those of low rank or status (Lothrop 1937; Ladd 1964; Briggs 1989; Hearne and Sharer 1992; Cooke and Sánchez 1998; Díaz 1999; Cooke *et al.* 2000). Undoubtedly, 'Gran Coclé' society was very concerned with the well being of ancestors in the after-life and with their continuing contact with the living (Díaz 1999; Cooke 2001).

At the time of Spanish contact 'Gran Coclé' was divided into many political units, which generally comprised one or more river valleys (or sections thereof) situated between less fertile land or natural barriers. Settlement nucleation is less pronounced on the Caribbean slopes where it appears to be correlated as much with the proximity of valuable 'point resources,' such as gold and copper ores and volcanic rocks for axes and grinding stones, as with ecological carrying capacity (Griggs 1998; Griggs *et al.* 2002; Cooke *et al.*, 2003). It is customary for anthropologists to uncritically accept assumptions made by Spanish soldiers and *literati* that each of these political units constituted a territorially stable 'chiefdom' ruled by a 'chief' who was a member of a hereditary elite (Helms 1979; Drennan 1991; Drennan 1996). There are good reasons for inferring that social groups on the isthmus were ranked in some way and that political leaders were drawn from top-ranked polities. Even so, although it is clear from the following discussions that a few individuals were considerably richer, in a material sense, than the majority of the population, it is difficult to determine with current archaeological data whether their wealth was due to inherited rank, acquired status or position, or occupation (Linares 1977; Linares 1979). As in several chiefdoms elsewhere in the world, heredity and ascription probably went hand-in-hand. An additional problem for interpretations of the data summarized herein is the likelihood

that, in pre-Columbian times, social relations were governed by the same kinds of complex behaviours that are described by, or can be inferred from contact-period documents and the ethnography of lowland Neotropical societies, such as multilingualism, constant group fissioning, complex marriage and residence rules and fickle descent group politics. My use of the term 'high rank' and 'high status', then, should not be construed as affirming that the power or wealth of the individual(s) concerned was necessarily inherited. The absence of unusually rich women and children in 'Gran Coclé' is an apposite *caveat* against this assumption (Cooke *et al.*, *in press*).

Environment

In spite of its small area, 'Gran Coclé' comprises a wide range of coastal and terrestrial habitats. The Atlantic and Pacific coasts, less than 100 km apart, are ecologically and physically very different (Jackson and D'Croze 1997). Some animal resources that are unique to the Caribbean were used by communities on the opposite coast (*e.g.*, manatee bone and some marine shells). The salient feature of the Pacific coastline are two estuarine systems, Parita Bay and the Gulf of Montijo, and several coral-fringed islands, some small and inshore (*e.g.*, Isla Iguana, Farallón de Chitré and Taboga), others large and a long canoe ride offshore (*e.g.*, Rey and San José islands in the Pearl island archipelago). Hard substrates fringing these islands probably provided most of the clear-water marine shells, which were used for making personal ornaments (*i.e.*, *Spondylus*, *Oliva* and *Pinctada*).

The east-west central *cordillera* is narrow and steep, and rises to over 2000 m. Another north-south mountain chain dissects the Azuero Peninsula rising to 1600 m at its

southern extremity. This T-shaped orography, in tandem with the annual migration of the Inter-Tropical Convergence Zone across the isthmus, leads to contrasting climatic regimes on the Caribbean and Pacific slopes and on the eastern and western side of the Azuero Peninsula. The steepest parts of the Caribbean are extremely wet (3000–5000 mm rainfall annually) and lack prolonged dry periods that allow fallen vegetation to be burnt effectively. Over most of the Pacific side, dry seasons last for 3–5 months and bring strong adiabatic winds, which desiccate the landscape quickly, especially where lowered elevations in the central *cordillera* accelerate wind velocity, as in the area bordering Parita Bay.

After several millennia of pre-Columbian agricultural activities (Cooke *et al.* 1996; Piperno and Pearsall 1998) by 200 cal BC much of the Pacific side would have been under grassy and wooded savannas interspersed with gallery forests along watercourses and wooded tracts on hills and in the mountains (Cooke and Ranere 1992). Extensive and minimally impacted forests would have remained only in the steepest and rainiest areas. The taxonomic composition and abundance of animal taxa recorded in archaeological sites throughout ‘Gran Coclé’ are logically conditioned by this longevally anthropogenic vegetation history.

One might expect external contacts and long-distance trade to have figured prominently in pre-Columbian isthmian life. Empirical evidence for it is, in fact, rather thin.

The archaeological sites to which I refer are all located within 30 km of Parita Bay. Archaeozoological research demonstrates that these sites’ inhabitants could have obtained all or most of the animal taxa they used for food or for making utilitarian artifacts within a day’s walking or canoeing distance. In samples of animal bones from kitchen middens, the white-tailed deer (*Odocoileus virginianus*) is by far the most abundant species, so much so, in fact, that its ease of capture probably influenced the low representation or absence of other widespread Neotropical mammals. Iguanas (Iguanidae) were also regularly consumed at all times and sites. Bird and turtle species reflect opportunistic hunting in the nearest available habitats, i.e., mud-flats, mangroves, swamps, and savannas. Fishing focused on abundant in-shore marine species, especially marine catfish (Ariidae), small, shoaling taxa (e.g., thread herrings [*Opisthonema*], lookdowns [*Selene*] and grunts [*Orthopristis*]), and large predators on the nektonic fauna [e.g., corvinas [*Cynoscion*], snook [*Centropomus*] and jacks [*Caranx caninus*]]. Littoral food resources, such as dried or salt fish, were transported to sites located further inland. At inland sites, a few freshwater fish taxa, such as catfish (*Parauchenipterus* and *Rhamdia*), gymnotid eels (*Sternopygus*) and characids (*Hoplias*), were important food sources. Spanish captains describe markets at large villages such as Natá. Although some of the non-food animal products which I discuss probably originated from beyond the normal subsistence

catchment of the territories where they were found, all could have been obtained within the ‘Gran Coclé’ culture area through regular, short-distance exchange channels (Ranere and Hansell 1978; Cooke 1979; Cooke 1992a; Cooke and Ranere 1992; Cooke 1993b; Zohar and Cooke 1997; Cooke and Ranere 1999; Jiménez 1999; Jiménez and Cooke 2001).

Mortuary samples and social hierarchies

The number of mortuary sites in ‘Gran Coclé’, which have provided samples of animal materials relevant to the research question, is very small (8) – so small, in fact, that it complicates interpretations of social inequality. Six sites are located around Parita Bay, in the driest area of the Pacific watershed, and two in the central part of Panama Bay, near modern Panama City, an area which represents the waxing and waning eastern boundary of the ‘Gran Coclé’ tradition (Fig. 1; Sánchez and Cooke 2000). The archaeologists who excavated these sites had different attitudes towards the value of faunal materials, which is why taxonomic precision, quantification and contextual associations are uneven.

One site – Sitio Conte (cal AD 750–950) – stands out from the others because it is only here that categorical wealth differences among graves, burials and individuals can be demonstrated. The wealthiest people – always adult males – were patently of high rank or status. Ethnohistoric evidence suggests that this was a society in which prowess in war was an important determinant of social worth and that the acquisition and display of booty were an integral part of this bellicose behavior. The placement of artifacts at Sitio Conte supports this relationship (Lothrop 1937; Helms 1977; Linares 1977; Helms 1979; Briggs 1989; Cooke *et al.* 2000). It is also likely that social rank was related to affiliation to hierarchized descent groups, which, to judge from recent ethnographic evidence (e.g., Stone 1961), may have had eponymous animal ‘ancestors’.

Sitio Conte is a unique locality in the ‘Gran Coclé’ culture area. If we assume that it constitutes a single, very large site – in conjunction with contiguous El Caño and Cerro Zuela – it is the only one, which contains monumental features suggestive of paramountcy, i.e., rows of un-carved and carved basalt columns, cobble stone pavements and stone-faced terraces (Fig. 2a; Lothrop 1937, 39–43, Figs. 16 and 17; Cooke *et al.* 2000). This suggests that Sitio Conte’s importance transcended the limits of the ‘chiefdom’ in whose territory it was located. I propose that it functioned as a pan-regional meeting-place used for affirming common ancestry and for celebrating ritual games and the funerary rites of esteemed people, such as the members of high-ranked descent groups. In recent times, the Ngöbére-speaking Guaymí of central and western Panamá used a ritual game, the *balsería*, for similar ends (Young 1976). *Balsérias* were held at maize and peach palm (*Bactris gasipaes*) harvest peaks and were

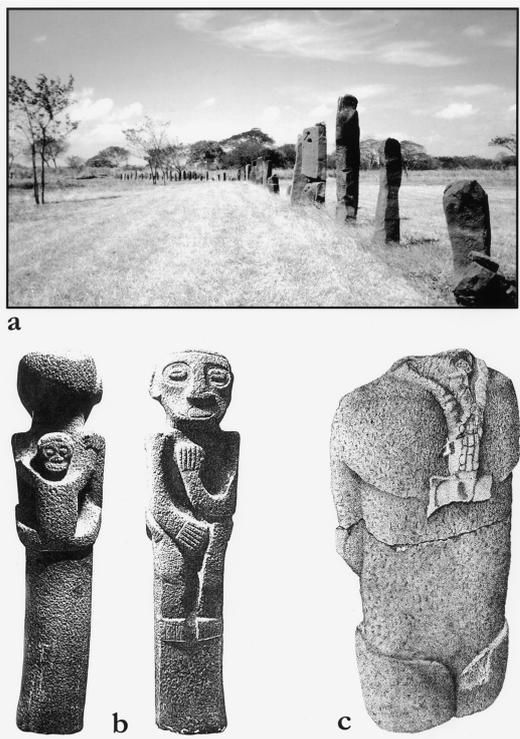


Fig. 2. El Caño, Coclé, Panamá. a: rows of columnar basalt that delineate a ceremonial space (photo: Carlos Fitzgerald B.), b: stone column of a human with a monkey on his back, perhaps a pet or a stuffed animal used in a ritual game like the modern *balsería* (from Museum Rietberg 1984), c: human male torso carved in stone, which wears a frog figurine presumably of gold-copper alloy (drawing: Arcadio Rodaniche).

sponsored by individuals who had both good political connections and the wherewithal to amass sufficient food and fermented drinks to satisfy the invitees. Successful players were well respected: usually they wore stuffed animals on their backs, which they considered to be symbolic of their prowess (Johnson 1948, plate 45). At a huge *balsería* celebrated at Canquintú, in the lower Cricamola valley (Caribbean, Bocas del Toro province), in November 1974, I observed *balseros* wearing the following animals: cayman (*Caiman fuscus*), giant anteater (*Myrmecophaga tridactyla*), tayra (*Eira barbara*), ocelot (*Leopardus pardalis*) and jaguar (*Panthera onca*). A stone statue found at the El Caño section of the Sitio Conte complex depicts a person who wears an animal that appears to be a monkey on his back (Fig. 2b). On another statue (Fig. 2c), a thick-set male displays a frog figurine dangling from a cord on his chest, which surely represents a golden image as a status symbol (albeit of unreal size). The monkey could, of course, be a pet! But, in view of the regional uniqueness of the stone-lined ceremonial space at El Caño, a possible parallel with the modern Ngöbé *balseros*' use of animals should be noted.

Another site at which lavish burials have been discovered is El Hatillo or Finca Calderón (He-4) (cal AD 750–1520). It was excavated by a Smithsonian Institution/National Geographic team in the 1940s and '50s (Ladd 1964) and subsequently ransacked by 'amateurs,' who discovered the richest burials (Biese 1967). El Hatillo is a very large site with evidence for dwelling zones as well as tumuli with burials (Ladd 1964; Haller, *in preparation*). It was probably the chief village of a confederation centered on the lower valleys of the La Villa and Parita rivers, which, at Spanish contact (AD 1516–17), was under the aegis of a regionally influential chieftain, 'Parita' ('París' or 'Antatará') (Lothrop 1937, 46; Cooke and Bray 1985; Cooke *et al.*, 2003). It lacks, however, the monumental features of the Sitio Conte centre (Cooke 1993a).

Playa Venado is another site whose mortuary arts suggest that high rank or high status people were buried there. Some of the 360 burials were excavated by a professional archaeologist (S. K. Lothrop) in the 1950s, but most were "studied" by amateurs in search of gold ornaments to sell. No monograph exists although some grave descriptions have been published (Lothrop 1954; Feriz 1956; Lothrop 1956; Bull 1958; Sander *et al.* 1958; Sander *et al.* 1959; Bull 1961). Most of the painted mortuary pottery found is comparable with the 'Cubitá' and 'Early Conte' styles of the 'Gran Coclé' polychrome pottery sequence, which were in vogue between cal AD 550 and cal AD 850 (Sánchez and Cooke 2000). Some fine shell ornaments and necklaces of animal teeth (Fig. 5c; Lothrop *et al.* 1957) cannot be related to particular individuals, but their quality alludes to people of high rank or status. Several finely worked cast gold-copper pendants and embossed hammered plaques were found here (Lothrop 1956; Lothrop *et al.* 1957; Cooke and Bray 1985, Figs. 10 and 15; Bray 1992, Fig. 3.7).

The five other sites that I will consider – Sitio Sierra, Cerro Juan Díaz, El Indio, La Cañaza and Panamá la Vieja – have cemeteries in which distinctions among grave goods appear to be symptomatic of age, sex and occupation, rather than of social rank or status. These cemeteries received children, adolescents and adults, men and women. Some people were buried with unusual artifacts, however, which probably relate to a special position or occupation (*e.g.*, that of 'shaman', 'curer' or 'chanter'). Archaeological survey shows that Sitio Sierra and Cerro Juan Díaz were quite large settlements, with a maximum extent of about 45 and 200 hectares, respectively. Particular areas within all these sites were set aside for burials. At Cerro Juan Díaz, it is likely that families, clans or similar social groups maintained particular sections of the intentionally levelled graveyard for several generations because it is evident that tombs were kept open and burials were continually being added to them (Ichon 1975; Cooke 1979; Ichon 1980; Briggs 1989; Isaza 1993; Cooke and Sánchez 1998; Cooke *et al.* 2000).

Animals and rich people at Sitio Conte

The universities of Harvard and Pennsylvania excavated about 100 graves at Sitio Conte in the 1930s and '40s. Briggs (1989, 73) estimated that 94% of the 93 skeletons that could be aged were adult; 77.4% were males and 22.6% females. Only two children's skeletons were found. According to Briggs (1989, 138–39), the placement of mortuary arts at Sitio Conte is characteristic of an “additive” pattern of status recognition: the more important the individual, the more objects and the more categories of artifacts he or she possessed. The richest people are adult males. Not only can they be identified on the basis of the quality and quantity of their mortuary goods, but also their graves are larger and have more people buried in them, often in layers with the primary occupant in the middle, *buried in a seated position* – as in two of the most splendid graves, 26 and 74 (Lothrop 1942, Fig. 31; Briggs 1989; Hearne 1992, Figs. 1.9 and 1.10). Some skeletons in graves, which have several people buried in them (particularly those placed face-down in an extended position) may be prisoners executed for inhumation with dead chiefs – a custom described by Spanish soldiers in the early 16th century AD. Alternatively, some may be the embalmed corpses of ancestors preserved in special mortuary houses – another historically recorded funerary custom in ‘Gran Coclé’, which has recently been identified archaeologically at Cerro Juan Díaz (Cooke 2001).

Certain artifacts accompany only the richest individuals (quantitatively defined [Briggs 1989]), *e.g.*, gold-copper disks, plaques, pendants, greaves, cuffs and helmets, which usually bear embossed or modelled animal designs (Fig. 3 c-f), and carved whale teeth and manatee bone, sometimes decorated with gold leaf (Fig. 3a-b; Briggs 1989; Hearne and Sharer 1992, Plates 22–28). Pre-1550 Spanish chronicles describe prominent warriors wearing such apparel to war (Cooke *et al.*, 2003). A Spanish captain happened upon the dead chieftain ‘Parita’ wrapped in fine mantles bedecked with similar golden apparel near the site of El Hatillo in AD 1517 (Lothrop 1937, 43; Cooke and Bray 1985). Lothrop identified the whale teeth as coming “from the lower jaw of a female sperm whale” (*Physeter macrocephalus*) (Lothrop 1937, 170). Sperm whales are frequently seen in Panama Bay, especially during the dry season, and around the Pearl Islands (Fig. 1). There is no evidence for whaling, and pre-Columbian teeth were surely collected from stranded animals. Lothrop (*op. cit.*) proposed that artisans chose the proximal ends of manatee ribs because of their similarity to the shape of whale teeth. Manatee bone must have been traded in from the Caribbean coast since there are no Quaternary records of this taxon from the eastern tropical Pacific. Manatees were hunted in pre-Columbian times on the Caribbean (Wing 1980) and are recorded as common in early historical documents as for example, in the Chagres river (Oviedo 1853, 148).

One of the three burials in a large, very rich grave

(number 32), had more carved bone and ivory objects than any other at Sitio Conte, including five spear-throwers, a comb, a set of six bone crocodile pendants with gold-copper overlay, four carved sperm whale teeth (one with gold-copper overlay) and a set of carved deer vertebrae (Fig. 4; Lothrop 1937, 283). Perhaps the deceased was a bone-carver. Or perhaps the cluster of spear-thrower parts alludes to his having been a hunter or warrior. One item depicts a realistic spotted cat (Fig. 4j). Felid images are notably few in number at this site (Cooke 1998).

Some top-ranked graves possess very large numbers of the products of ubiquitous animal taxa, which, as we shall see, also occur in much lesser quantities in the graves of lower ranked or poorer people (Fig. 5; Cooke 1998, Table 4.3). For example, one individual at Sitio Conte was buried with 200 peccary (*Tayassu*) tusks arranged as eight necklaces (Lothrop 1937, Fig. 130); another with a necklace or apron made of more than 300 domestic dog teeth (*Canis familiaris*) (Lothrop 1937, Fig. 33). The peccary tusks have not been identified to species. Peccaries (*Tayassu tajacu* and *T. pecari*) were apparently rare around Parita Bay settlements during the time period under consideration: surprisingly few peccary bones are present in dietary archaeofaunas that date after 200 cal BC (Cooke and Ranere 1989; Cooke and Ranere 1992; Jiménez 1999; Jiménez and Cooke 2001; Cooke and Ranere). A necklace with so many tusks, then, points to acquisition from afar or very good trade contacts – and an object of considerable value and prestige.

Worthy of note is the clustering in some Sitio Conte graves of items of marine origin: in the upper level of grave 74, for example, one individual (number 5) was associated with two carved whale teeth, about 200 sting ray spines and 100 shark teeth (Briggs 1989, 112 and 202–3). One individual in grave 32 owned 248 perforated shark teeth (Lothrop 1937, Figs. 32 and 34 top, Fig. 132a). The ray-shark association may have a military connotation. Spanish documents record wooden sword-clubs, called *macanas*, which had shark teeth fixed to their edges (Jopling 1994, 57). Lothrop's (1937, 98–9) proposal that sting-ray spines were used as projectile points is in line with Spanish chronicler Fernández de Oviedo's (1853, 129) reference to “fish bones” serving this purpose. A grave at Panama la Vieja, which contained a single adolescent aged between 13 and 15, presents an interesting association of 82 *Spondylus* shell ornaments, at least 46 sting-ray spines and 30 well-made stemmed unifacial chalcedony blades (Fig. 6 b-d; Proyecto Arqueológico Panamá la Vieja 1998). The position of the fish spines and stone blades at the side and feet of the deceased suggests that each group of objects was buried in individual bags. (At nearby Playa Venado, Bull [1958] reported finding a robust adult male buried with a pouch decorated with shell and gold beads). As far as I can tell, all the spines are from rays of the genus *Dasyatis*. The largest are comparable in size and robustness to spines from two *Dasyatis longus*, housed in the Smithsonian Tropical



Fig. 3. Primary symbols of rank and power in 'Gran Coclé.' a-b: sperm whale ivory with gold-copper leaf, c: ear-rods, d: helmet, e: plaque embossed with humanized bird figures, f: cuff embossed with crocodile figures. a-c, e-f, from Hearne and Sharer 1992, reproduced with permission. d, from Lothrop 1937, reproduced with permission of the Trustees of Harvard University.

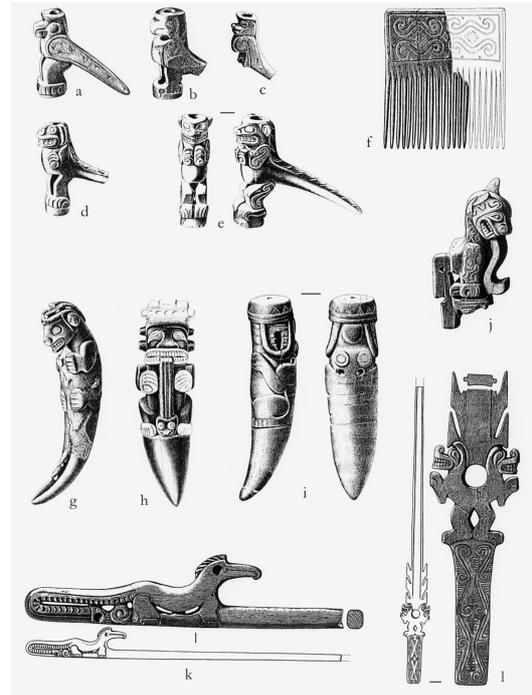


Fig. 4. Bone artifacts found in the middle layer of burials in grave 32 at Sitio Conte. a-e: carved deer vertebrae, f: comb, g-i: sperm whale teeth, j-l: parts of spear throwers. From: Lothrop 1937, reproduced with permission of the Trustees of Harvard University.

Taxon	Article	Maximum number in a single grave	Grave number
Emydid turtle	Carapace (whole)	9	1
Whale	Carved teeth	7	32
Stingray	Caudal spines	>205	74
Rabbit	Incisors	176	74
Shark	Perforated teeth	248	32
Peccary	Tusks	186 = 4 necklaces	1
Deer	Carved vertebrae	16	32
Manatee	Carved ribs	8	1
Dog (domestic)	Perforated canine teeth	321	74

Fig. 5. Maximum numbers of animal remains, which were found only in the richest graves at Sitio Conte or were present in them in unusually large numbers. "Richest" means graves in clusters 1-4 of Briggs' (1989) analysis; see Cooke (1998) for a list of all animal products found at Sitio Conte.

Research comparative skeleton collection, which weighed 28.9 and 50.9 kg, respectively (Fig. 7e-f). Some of the archaeological examples have been thinned and tapered at their proximal ends and scored with a sharp instrument, presumably for hafting (Fig. 7a-d). This modification would, of course, be appropriate for using them as spear points. It is also possible that the spines and stone blades represent another kind of activity, such as blood-letting: Oviedo (1853, 138) mentions that stone flakes were used

on the isthmus for bleeding legs when people "felt tired". Sting-ray spines were used for elite blood-letting rituals among the Maya and figure prominently on Maya art, as they do on 'Gran Coclé' polychrome plates (Benson 1988). A bizarre ritual using a "particular fish spine" was recorded by Fray Adrián de Ufeldre, a Flemish priest who worked among the Ngöbé in the seventeenth century: piercing the foreskin with the spine, running a cotton cord through the hole and then having two people pull at either end in order

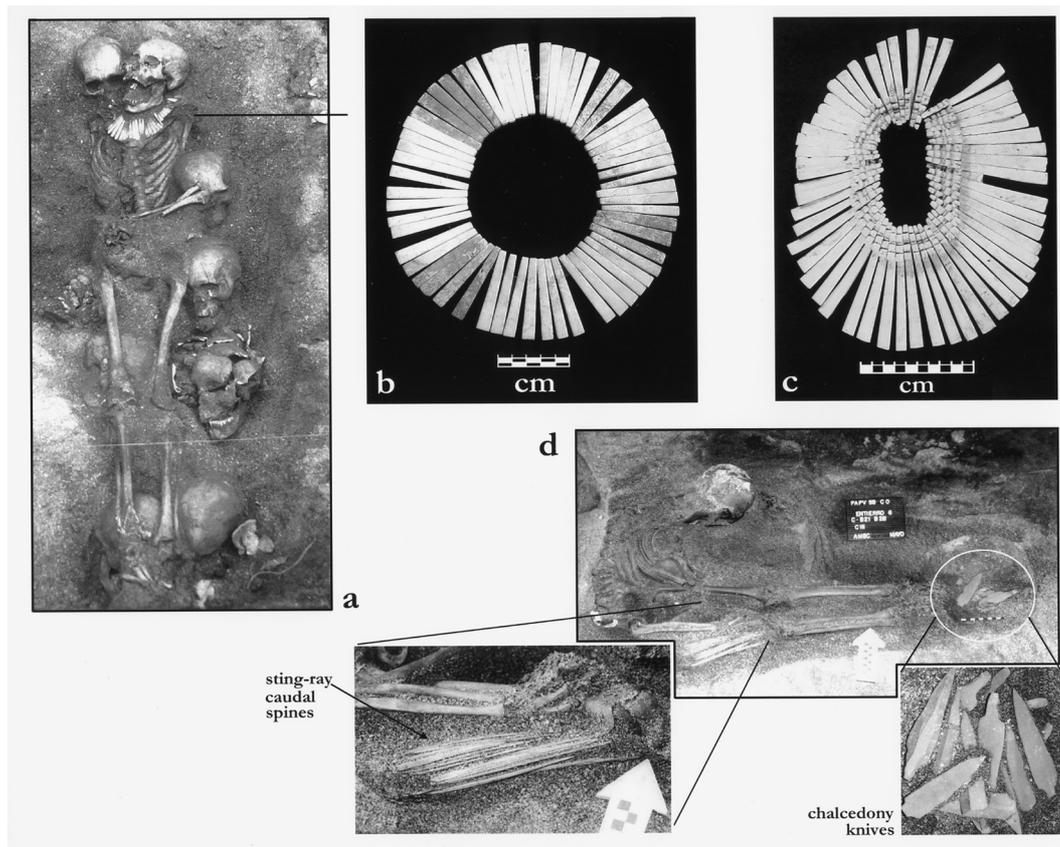


Fig. 6. Two burials at Panamá la Vieja. a: a young adult woman who wears a *Spondylus* pendant necklace and was buried with seven human skulls, b: close-up of *Spondylus* necklace, c: *Spondylus* necklace found at Playa Venado, d: an adolescent whose mortuary arts consisted of *Spondylus* beads and pendants, 30 stone blades (circled) and about 46 caudal spines of sting-rays (*Dasyatis*). Photos: a: Richard Cooke, b: Tomás Mendizábal, c: Luís A. Sánchez, reproduced courtesy of the Dumbarton Oaks Museum, Washington, D.C., d: Tomás Mendizábal, published with the approval of the Fundación Panamá Viejo, Panamá.



Fig. 7. a-d: Sting-ray spines (*Dasyatis*) found in a grave occupied by a single adolescent at Panamá la Vieja (see Fig. 5d). They have been tapered and thinned distally. e: caudal spine from *Dasyatis longus*, total length: 2.78 m, weight: 58.86 kg, f: caudal spine from *Dasyatis longus*, total length: 1.6 m, weight: 20.88 kg.

to bleed the penis. This ceremony was apparently practiced by groups of males in order to placate a “lightning deity” when a bolt fell to earth (Torres de Araúz 1965).

Manatee bone at El Hatillo

In the 1960s a looter excavated a grave at El Hatillo in which he found about 30 cast gold effigies of humanized animal warriors who wear the headdresses and belts of high rank, and brandish spear-throwers and sword-clubs of palm wood, some of whose blades are made of manatee bone (Biese 1967; Bray 1992, Fig. 3.11; Cooke *et al.*, 2003 Fig. 8). Professional archaeologists found beautifully carved manatee bones in a grave whose pottery suggests a contact-period date (around AD 1500). It contained two urns with human bone and a necklace of 737 perforated human teeth (Ladd 1964, 245 and Plate 1a-c) – raw numbers that allude that the person who wore them had special status. Another set of carved bones (not identified taxonomically) found by amateurs at El Hatillo

(apparently in a single grave) is of exquisite workmanship. It includes a spear-thrower hook (Torres de Araúz 1972, 73). These finds reaffirm the importance of quality crafting to the 'Gran Coclé' value system (Helms 1993).

Cemeteries with mostly more modest mortuary goods

In contrast to Sitio Conte and El Hatillo, no one stands out as being unusually wealthy in two cemeteries at Cerro Juan Díaz, two at Sitio Sierra and three located at the southern tip of the Azuero Peninsula (two at El Indio and one at La Cañaza). Some people, however, were buried with special artifacts or unusual combinations of objects, which allude to particular occupations. At some of these sites, small ornaments of animal teeth, bone and shell appear to be proportionally more frequent with children and adolescents, than with adults.

At Cerro Juan Díaz, the oldest burial horizon was located underneath a circular arrangement of stone-lined ovens (Cooke and Sánchez 1998, Fig. 3; Cooke *et al.* 2000, Fig. 8.6). They represent the period cal AD 150–550. One grave contained the primary extended skeleton of an adult, one a flexed adult woman laid on top of a disturbed earlier burial, and two graves, several packets of secondary burials wrapped in bark cloth. The extended adult male (Operation 3, Feature 1) was buried with a special group of goods: two pottery incense burners, two gold plaques with raised spirals, 400 *Spondylus* beads, and 25 perforated canines of puma (*Puma concolor*) and jaguar (*Panthera onca*). The non-ceramic objects were probably part of a composite apron or shirt (Cooke and Sánchez 1998, Fig. 4; Cooke *et al.* 2000, Figs. 8.1, 1-m and 8.6; Cooke 2001, Fig. on p. 58).

An earlier grave (Feature 16) received at least 18 individuals buried in secondary bundles. One of these contained an adult and an adolescent, whose funerary goods are unique in this feature: two polished stone barpendants, a copper ring, and two necklaces, one of puma and the other of ocelot (*Leopardus pardalis*) and raccoon (*Procyon lotor*) canines (Cooke 1998; Cooke and Sánchez 1998, Figs. 4, 5 and 8; Cooke *et al.* 2000, Fig. 8.6 and 8.7). These individuals did not receive special burial treatment, unlike that afforded the central occupants of the richest Sitio Conte graves, but were rather wrapped in a bark cloth bundle like everyone else in the grave.

The mortuary associations of Features 1 and 16 at Cerro Juan Díaz allude to some ritualistic occupation, such as that of shaman or curer – a ubiquitous office in Neotropical societies, and one that is not necessarily commensurate with political power. The adult and adolescent buried together are perhaps evidence for a shaman (= "puma") and his younger apprentice (= "ocelot"). Given the fact that the gold-work found in Feature 16 is the oldest yet radiocarbon-dated in Central America (cal AD 130 [250] 370) (Cooke *et al.*, 2003), it lends support to the idea that the initial significance of gold-copper artifacts in isthmian society was ceremonial or arcane, and that only later did

it acquire a manifestly political association with power, influence and showing-off wealth that is so evident at Sitio Conte between cal AD 750 and 950. Confirmation of a metal – marine shell – animal tooth necklace association is provided by one of the four individuals buried in Grave 1 at Sitio Conte (one of the oldest at the site) who owned several exquisite gold pieces and hundreds of perforated dog teeth interspersed with hundreds of elongate beads, which are described as bone by Lothrop (1937, Fig. 33), but are in fact the same kinds of *Spondylus* beads that were found in Feature 1 at Cerro Juan Díaz.

In a grave in the second cemetery at neighbouring Sitio Sierra (dated to around cal AD 980–1270), an unusually small male aged between 20 and 35 had few burial goods, but among them was a greenstone necklace, a pelican bone flute (*Pelecanus occidentalis*) and the skeleton of a macaw – probably the scarlet macaw (*Ara cf. macao*), once common in Panamanian dry forests (Cooke 1984). A materially poor person, then, who, in spite of being buried face-down, seemingly had a special job, i.e., that of curer or chanter. At Sitio Conte, extended skeletons that are arranged around principal occupants, and may have been executed captives, are generally placed face-down. Therefore being buried in this position may have been a dishonor. The only other animal remains in this sample of 13 adults were two perforated teeth of two species of inshore shark (*Carcharhinus cf. limbatus* and *C. leucas*), each one representing a single amulet worn around the neck.

At Cerro Juan Díaz, hundreds of graves were placed over the stone-lined ovens between cal AD 650 and 1350. These were mostly shallow tombs, less than 1.5 m deep, which received bodies prepared in several ways (primary, secondary, cremated, and in urns) – often in the same grave. Some burial units are exact contemporaries of the later, richest graves at Sitio Conte (numbers 5, 24 and 26) and have the same style of polychrome pottery albeit in much smaller numbers (Cooke *et al.* 2000, Fig. 89 a-e). Claudia Díaz (1999) has aged and sexed a sample of 115 skeletons (see also Cooke 2001, Fig. on p. 58; Cooke *et al.* 2000, Fig. 8.5). Forty-nine (43%) belonged to children of which 10 were neonates and 11 infants under 5 years. Twenty-nine (74%) of the 35 adult skeletons, which could be aged and sexed, were women. Animal-derived paraphernalia represent many of the same taxa that adorned the rich dead at Sitio Conte – *but in much more modest numbers*. One adult owned a necklace of sixteen counterfeit big cat claws made of a very ordinary mud-flat bivalve (*Anadara grandis*), twelve mother-of-pearl beads, three *Spondylus* beads and a necklace of teeth: two bull shark (*Carcharhinus leucas*), nineteen domestic dog, one white-tailed deer, three raccoon (*Procyon lotor*), one tayra (*Eira barbara*), one jaguar and one howler monkey (*Alouatta*) (Fig. 71). Very similar counterfeit claws were reported by Ichon (1980, Plate LV) from La Cañaza (see below). The monkey tooth is one of only three occurrences of primate materials in all 'Gran Coclé' sites. Another is that of a

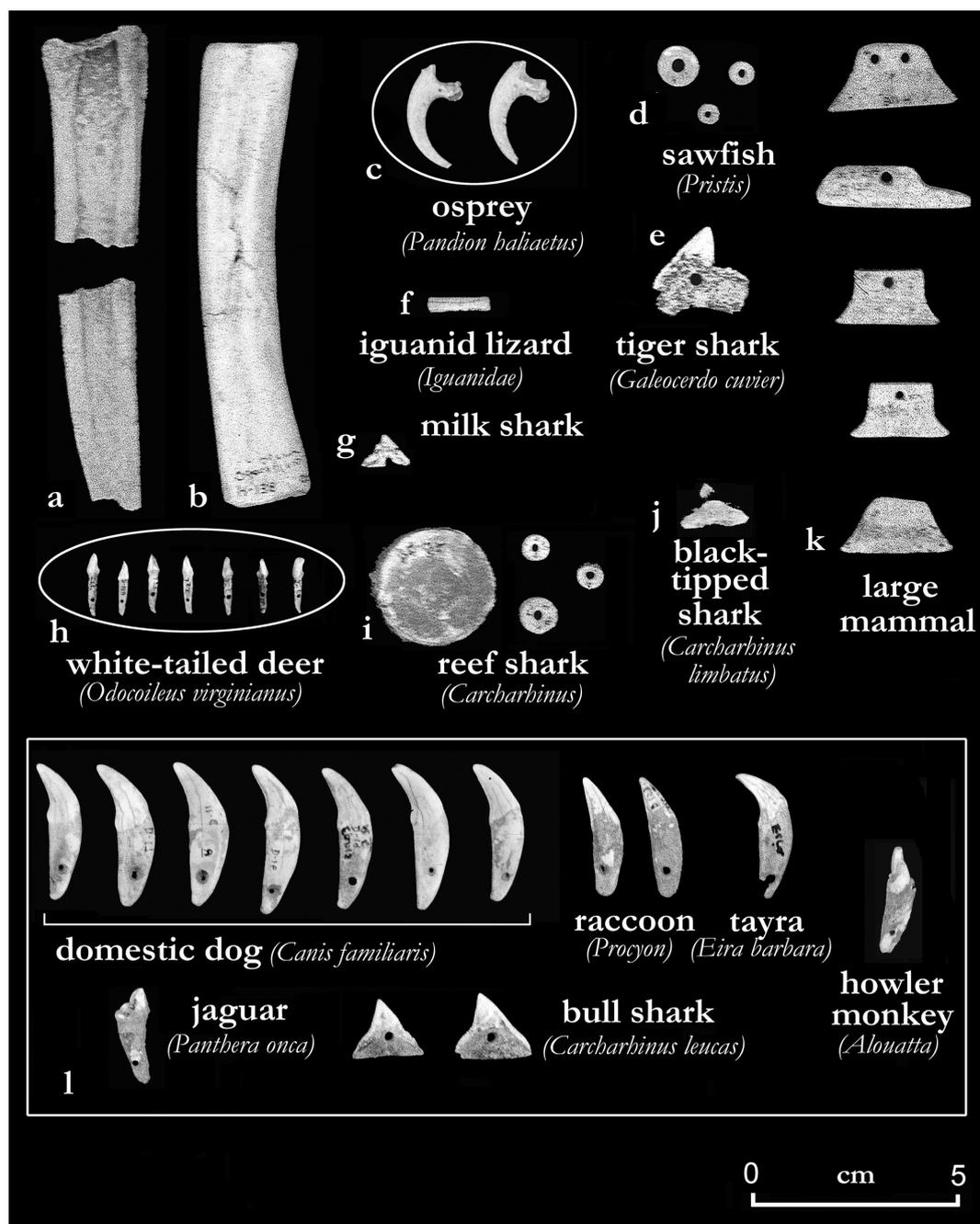


Fig. 8. Modest mortuary artifacts from the second cemetery at Cerro Juan Díaz, Panamá. a: split and polished metatarsal, b: split and polished humerus, c: distal phalanges, d: vertebrae, e: tooth, f: long bone, g: tooth, h: perforated incisors, i: vertebrae, j: burnt and polished tooth, k: long bone fragments, l: teeth belonging to a single necklace.

skeleton of a small monkey found complete alongside a burial at the El Caño section of Sitio Conte by Institute of Culture personnel. It was subsequently lost. I identified it without reference to a comparative skeleton as a white-faced capuchin (*Cebus capucinus*). Was it a pet or a *balsero*'s embalmed animal avatar (cf. Fig. 2b)? The third report refers to a six year old child buried in a lidded urn at Playa Venado, whose funerary offerings were limited to *Spondylus* pendants and a necklace of "monkey" and

"dog" teeth (archaeozoologically unconfirmed) with a solitary gold spacer bead.

Other animal products buried with the few people who possessed them in the second Cerro Juan Díaz cemetery were functional items, such as a deer metapodial tool and extremely simple personal adornments, e.g., bone tubes, between 1 and 14 perforated teeth used as amulets or necklaces, two osprey (*Pandion haliaetus*) claws, perforated dog teeth, a few perforated and unperforated

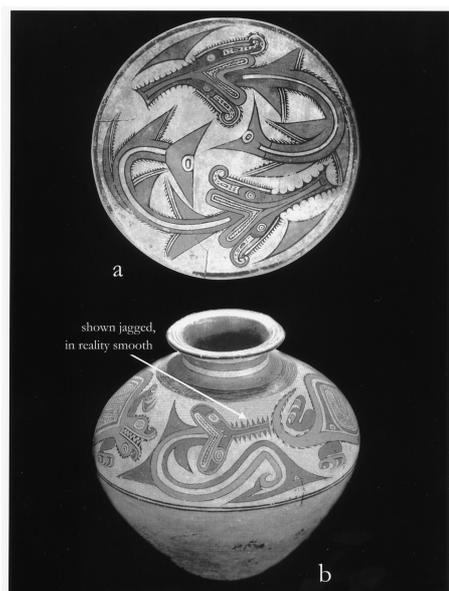


Fig. 9. Representations of sawfish (*Pristis*) on polychrome pottery from 'Gran Coclé'. From Labbé 1995, Figs. 88 and 89, reproduced with permission of Bowers Museum of Cultural Art, Los Angeles.

elasmobranch centra and teeth, and a single polished and burned tubular bead made out of an iguana (*Iguanidae*) femur! (Fig. 8a-k).

Sawfish (*Pristis*) were once common in inshore tropical waters (Fig. 9); they have a bizarre appearance, bear live young, live in fresh and salt water, and grow to a very large size. Their rostral spikes were often hafted, perhaps as projectile points and awls (Lothrop 1937, Fig. 65). But the abundant use of their vertebrae for beads suggests they possessed a significance that transcended their practical usage. That this may have had a cognitive basis is suggested by tiny sawfish spikes from a single rostrum small enough to have been an embryo, which were found alongside an 8-year old child at Cerro Juan Díaz (Carvajal, *personal information*).

According to Briggs (1989, 62–3), three cemeteries excavated by Alain Ichon in the Tonosí valley at the southern tip of the Azuero Peninsula – El Indio I (cal AD 250–550), El Indio II (cal AD 750–950) and La Cañaza (cal AD 550–950) – point to an 'egalitarian' society in which the acquisition of sumptuary goods nevertheless increases through time. None of the individuals buried in the two cemeteries contemporary with Sitio Conte (El Indio II and La Cañaza) approach the richness of this site's alpha males. The scatter of modest animal bone amulets, necklaces and functional items, e.g., shell and bone beads and pendants and a few perforated dog and shark teeth, is similar to that of the second cemetery at Cerro Juan Díaz. Twenty-five graves out of a total of 29 that had artifacts made of animal products contained the remains of children and adolescents. The largest numbers

of teeth in a necklace were 32 perforated dog's teeth buried with an adult at El Indio (II) – modest by Sitio Conte's standards. In the earlier cemetery at Sitio Sierra, with 25 graves (300 cal BC – cal AD 500), only two had animal products – a group of seven sting-ray caudal spines from the spotted eagle ray (*Aeteobatus narinari*) and thornback ray (*Dasyatis*), buried in a group alongside an adult, and a few tear-shaped shell beads with a child (Isaza 1993).

***Spondylus* shell pendants: special artifacts?**

Beautiful *Spondylus* shell pendants carved like animals (anurans, sea turtles, crocodiles, 'monkeys', 'dogs', 'felines' etc.) were recovered in several graves at Cerro Juan Díaz, El Indio (II), La Cañaza, Playa Venado and Panamá la Vieja (Lothrop *et al.* 1957; Ichon 1980, Figs. 86–89; Briggs 1989, Figs. 4 and 5; Cooke and Sánchez 1998; Cooke *et al.* 2000, Fig. 8.7 1-q). At Cerro Juan Díaz, many of these beads were found in Feature 16 (Cooke *et al.* 2000, Fig. 8.6) although the jumbled nature of the secondary packages jammed into this grave make it difficult to associate specific groups of artifacts with individual skeletons. Some shell beads were found inside the package, which held the remains of the purported 'shaman' and his 'apprentice,' and could have been the property of the latter. In the second cemetery at El Indio, Briggs (1989, 34–54) noted that shell pendants and beads were most prominent in children's graves, of which one (grave 42) had an unusual number of very large and beautiful *Spondylus* ornaments. Consequently, he inferred that the differential distribution of such artefacts pointed towards some kind of rank or status *among young people*. It is relevant that the beautiful necklace of club- or claw-shaped pendant from Panamá la Vieja adorned the neck of a 13–15 year old adolescent (Fig. 7a-b). This person was buried with seven human skulls placed carefully around the body – a custom that is also frequent at Cerro Juan Díaz, and, in my opinion, is more likely to represent the intentional hoarding of ancestors' remains, than the taking of trophy heads in battle. That *Spondylus* artefacts, however, were not the *exclusive* possessions of sub-adult people is indicated by finds of hundreds of long beads with the purported 'shamans' at Cerro Juan Díaz (Operation 3, Feature 1) and Sitio Conte (Grave 1).

Animal icons, food, and human society

The very small and geographically unrepresentative sample of professionally excavated mortuary sites in pre-Columbian 'Gran Coclé' makes it frustratingly difficult to identify and interpret the nature of wealth and social hierarchy and its correlation with the placement of animal products and icons in individual graves. Current knowledge suggests that high rank or high status people – always adult males, it seems – were not necessarily identified by a particular animal or group of animals, but by the biggest

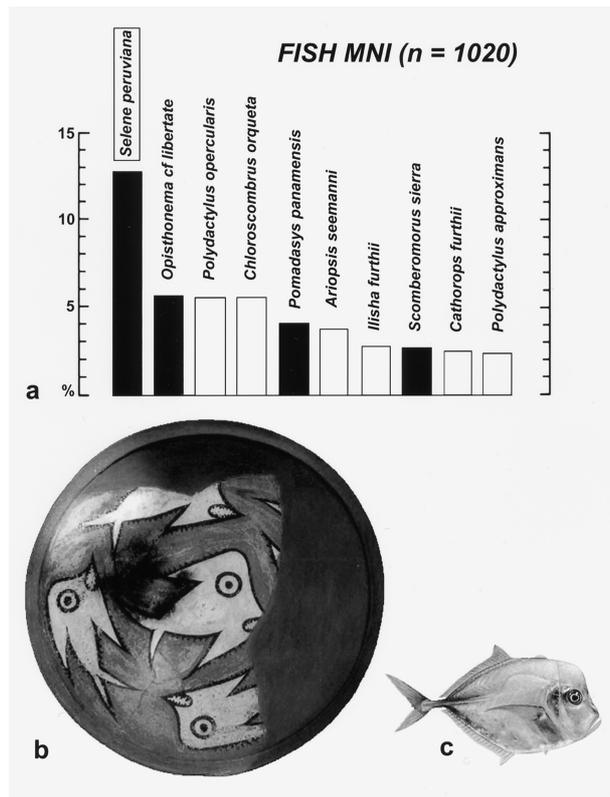


Fig. 10. a: Abundance (% minimum number of individuals [MNI]) of marine fish species in five middens at Cerro Juan Díaz, Panamá (after Jiménez and Cooke 2001). b: Red painted plate of the Early Conte style of the 'Gran Coclé' polychrome pottery sequence, which depicts a shoal of fish of the genus *Selene* (of which there are three species in the eastern Tropical Pacific). c: *Selene peruviana*, from Allen and Robertson 1986, reproduced with permission of Crawford House Press, Bathurst.

and best necklaces, belts and aprons, by the most exotic or scarcest materials (such as sperm whale teeth), and by the most elegantly crafted objects. It is also possible that necklaces made out of large numbers of felid, dog and peccary teeth; sting-ray caudal spines; macaw remains; *Spondylus* beads sewn to garments or used as pectorals with gold and felid teeth; and carved bone spear-thrower parts may identify people with a special *occupation*, such as that of shaman, curer or chanter, warrior and hunter, and their apprentices or offspring (Cooke and Ranere 1989; Cooke 1992b; Cooke and Ranere 1992; Cooke and Ranere, *in press*).

In 'Gran Coclé,' even the most mundane food species were painted and modelled, such as the Pacific lookdown or moonfish (*Selene peruviana*) depicted on the trichrome plate in Fig. 10b. This is the commonest fish taxon in Cerro Juan Díaz kitchen middens and the second or third most abundant at other sites around Parita Bay (Fig. 10a; Cooke 1992a; Cooke and Ranere 1999). The white-tailed

deer, by far the most frequent mammalian species in all sampled 'Gran Coclé' middens, is often depicted on polychrome pottery, recognizable by its branched antlers (Cooke 1992b; Labbé 1995, Figs. 63 and 114; Helms 2000). We have seen that its vertebrae were occasionally exquisitely carved (Fig. 4 a-e). Conversely, some animal taxa, whose bones are absent or extremely rare in Pacific-side middens, are iconographically prominent, especially crocodylians and sea turtles, and, to a lesser degree, monkeys and domestic dogs. Presumably these animals were tabooed as food because they possessed a special cognitive significance. Yet other animal species, whose flesh was regularly consumed, such as the abundant Neotropical rodent, the paca (*Agouti paca*), never appear on 'Gran Coclé' art in recognizable forms (Linares 1976). Dog teeth were frequently displayed as necklaces and amulets by rich and poor. In an area well endowed with animal protein, their value as guardians and hunting aids presumably outweighed their dietary potential.

Many authors (*e.g.*, Helms 1977; Linares 1977; Helms 1979; Briggs 1989; Cooke 1998) have noted that some animal icons are more frequent in some graves, sites and regions in 'Gran Coclé' than in others. One trend in iconography that appears to be diachronic is the reduction in diversity of animal icons depicted on 'Gran Coclé' art and, concomitantly, the increasing iconographic prominence of a few taxa. Some of these, such as the king vulture (*Sarcorhamphus papa*), probably had a religious significance (Cooke, *this volume*). Others may have been mythical figures well-known to the local audience (*e.g.*, Helms 1977; Helms 2000). Another possibility is that they were the animal counterparts of specific human groups. It is known that historic tribes in the isthmian region belonged to ranked clans with animal identifiers (Stone 1961). Many of the beautifully crafted artifacts in the top-ranked graves at Sitio Conte depict a humanized crocodile, which is dressed like *important* humans: with a headdress, baton or sword-club, ear rods and belt (Hearne and Sharer 1992, Plate 1). It is interesting that the crocodile is one of only two animal icons found in the second cemetery at Cerro Juan Díaz, where so many people of modest means were buried at the same time as Sitio Conte's rich and influential males. But none of these icons sports human attire. The hypothesis that, as time went on, the social group led in the supernatural world by the crocodile became progressively more dominant in the region bordering Parita Bay, accords with the increasing concentration of wealth, which is apparent from the archaeological record after around cal AD 750 at sites like Sitio Conte and El Hatillo. Sadly, although it is theoretically testable with mortuary remains, I doubt whether any high-rank cemeteries remain sufficiently intact in 'Gran Coclé' to provide the necessary data to evaluate this hypothesis.

Acknowledgements

The author expresses his gratitude for support granted to the Cerro Juan Díaz project (1991-2001) from the

following institutions: Instituto Nacional de Cultura (Panama), National Geographic Society, Smithsonian Institution ('Scholarly Studies' and 'Latino Initiatives' programmes), Smithsonian Tropical Research Institute, Universidad de Costa Rica, Universidad de Panamá, Centro Regional Universitario de Azuero (Panama), Instituto Enrico Fermi (Panama), London University Institute of Archaeology, Université de Montréal, Arcillas de Chitré. He also acknowledges gratefully the dedication and skills in field and laboratory of the following persons who were involved in the recovery, conservation and analysis of the materials presented in these two papers: Adrián Badilla, Diana Carvajal, Benoit Desjardins, Claudia Díaz, Claudia Espejel, John Griggs, Ilean Isaza, Máximo Jiménez, Luís Alberto Sánchez, Olman Solís, Conrado Tapia, and Aureliano Valencia.

References

- Allen, G. R. and Robertson, D. R. 1986. *The Complete Divers' and Fishermens' Guide to Fishes of the Tropical Eastern Pacific*. Bathurst: Crawford House Press.
- Benson, E. P. 1988. A knife in the water: the sting-ray in Mesoamerican ritual life. *Journal of Latin American Lore* **14**, 12–24.
- Benson, E. P. 1992. Motifs, meanings and myths: the iconography of Sitio Conte gold plaques, pp. 22–31 in Hearne, P. and Sharer, R. J. (eds), *River of Gold: Precolumbian Treasures from the Sitio Conte*. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.
- Biese, L. 1967. The gold of Parita. *Archaeology* **20**(5), 202–8.
- Bray, W. M. 1992. Sitio Conte metalwork in its pan-American context, pp. 33–6 in Hearne, P. and Sharer, R. J. (eds), *River of Gold: Precolumbian Treasures from the Sitio Conte*. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.
- Briggs, P. S. 1989. *Art, Death and Social Order: the Mortuary Arts of Pre-Conquest Central Panama*. (BAR International Series 550). Oxford: British Archaeological Reports.
- Bull, T. 1958. Excavations at Venado Beach, Canal Zone, Panama. *Panama Archaeologist* **1**, 6–14.
- Bull, T. 1961. An urn burial at Venado Beach, Canal Zone. *Panama Archaeologist* **4**: 42–47.
- Cooke, R. G. 1979. Los impactos de las comunidades agrícolas precolombinas sobre los ambientes del Trópico estacional: datos del Panamá prehistórico, pp. 919–73 in *Actas del IV Simposio de Ecología Tropical*, Vol. 3. Panama City: Instituto Nacional de Cultura and Smithsonian Tropical Research Institute.
- Cooke, R. G. 1984. Birds and men in prehistoric central Panama, pp. 243–81 in Lange, F. W. (ed.), *Recent Developments in Isthmian Archaeology*. (BAR International Series 212). Oxford: British Archaeological Reports.
- Cooke, R. G. 1985. Ancient painted pottery from central Panama. *Archeology* **July/August**, 33–9.
- Cooke, R. G. 1992a. Prehistoric nearshore and littoral fishing in the eastern tropical Pacific: an ichthyological evaluation. *World Archaeology* **6**, 1–49.
- Cooke, R. G. 1992b. Preliminary observations on vertebrate food avoidance by the Precolombian Amerinds of Panama, with comments on the relevance of this behaviour to archaeozoology and palaeoenvironmental reconstruction, pp. 59–107 in Ortiz-Troncoso, O. and van der Hammen, T. (eds), *Archaeology and Environment in Latin America*. Amsterdam: Instituut voor Pre-en Protohistorische Archeologie Albert Egges van Giffen, Universiteit van Amsterdam.
- Cooke, R. G. 1993a. Alianzas y relaciones comerciales entre indígenas y españoles durante el período de contacto: el caso de Urracá, Esquegua y los vecinos de Natá. *Revista Nacional de Cultura (Panamá)* **25**, 111–22.
- Cooke, R. G. 1993b. The past and present distribution of sea catfishes (Ariidae) in a small estuarine embayment in Panama: relevance to Precolumbian fishing practices, pp. 57–74 in Lanata, J. L. (ed.), *Explotación de Recursos Faunísticos en Sistemas Adaptativos Americanos* (Arqueología Contemporánea 4, Edición Especial). Buenos Aires: Universidad de la Plata.
- Cooke, R. G. 1998. The Felidae in Pre-Columbian Panama: a thematic approach to their imagery and symbolism, pp. 77–121 in Saunders, N. J. (ed.), *Icons of Power: Felid Symbolism in the Americas*. London: Routledge.
- Cooke, R. G. 2001. Cuidando a los ancestros: rasgos mortuorios precolombinos en cerro Juan Díaz, Los Santos, pp. 54–62 in Heckadon-Moreno, S. (ed.), *Panamá: Puente Biológico*. Panamá: Smithsonian Tropical Research Institute.
- Cooke, R. G. this volume. Observations on the religious content of the animal imagery of the 'Gran Coclé' semiotic tradition of pre-Columbian Panama, pp. xx-xx in O'Day, S. J., Van Neer, W. and Ervynck, A. (eds), *Behaviour behind Bones. The Zooarchaeology of Ritual, Religion, Status and Identity*. Oxford: Oxbow Books.
- Cooke, R. G. and Sánchez, L. A. 2003. Alain Ichon in Panama (1967–1970): A reappraisal of the Tonosí Research Project in the light of new research, pp. 13–27 in Arnauld, C., Breton, A., Fauvet-Bertholet, M. F. and Valdés, J. A. (eds), *Misceláneas en Honor a Alain Ichon*. Guatemala: Impresora Caudal.
- Cooke, R. G. and Bray, W. M. 1985. The goldwork of Panama: an iconographic and chronological perspective, pp. 35–49 in Jones, J. (ed.), *The Art of Precolumbian Gold: the Jan Mitchell Collection*. London: Weidenfield and Nicholson.
- Cooke, R. G., Isaza, I., Griggs, J., Desjardins, B. and Sánchez, L. A. 2003. Who crafted, exchanged and displayed gold in pre-Columbian Panama? pp. 91–158 in Quilter, J. and Hoopes, J. W. (eds), *Gold and Power in the Intermediate Area*. Washington D.C.: Dumbarton Oaks.
- Cooke, R. G., Norr, L. and Piperno, D. R. 1996. Native Americans and the Panamanian landscape: harmony and discord between data sets appropriate for environmental history, pp. 103–26 in Reitz, E. A., Newsom, L. A. and Scudder, S. J. (eds), *Case Studies in Environmental Archaeology*. New York: Plenum Press.
- Cooke, R. G. and Ranere, A. J. 1989. Hunting in prehistoric Panama: a diachronic perspective, pp. 295–315 in Clutton-Brock, J. (ed.), *The Walking Larder: Patterns of Domestication, Pastoralism and Predation*. London: Unwin Hyman.
- Cooke, R. G. and Ranere, A. J. 1992. Human influences on the zoogeography of Panama: an update based on archaeological and ethnohistorical evidence, pp. 21–58 in Darwin, S. P. and Welden, A. P. (eds), *Biogeography of Mesoamerica. Proceedings of a Symposium (Mérida, Yucatán, México, October 26–30, 1984)*. Tulane: Special Publication of the Mesoamerican Ecology Institute, Tulane University.
- Cooke, R. G. and Ranere, A. J. 1999. Precolumbian fishing on the Pacific coast of Panama, pp. 103–22 in Blake, M. (ed.), *Pacific Latin America in Prehistory: the Evolution of Archaic and Formative Cultures*. Pullman: Washington State University Press.
- Cooke, R. G. and Ranere, A. J. *in press*. Influencias humanas sobre la vegetación y fauna de vertebrados de Panamá: actualización de datos arqueozoológicos y su relación con el paisaje antrópico, in Leigh, E. G. (ed.), *Ecología y Conservación en Panamá*. Panama: Smithsonian Tropical Research Institute.
- Cooke, R. G. and Sánchez, L. A. 1998. Coetaneidad de metalurgia,

- artesanías de concha y cerámica pintada en cerro Juan Díaz, Panamá. *Boletín Museo del Oro* 42, 57–85.
- Cooke, R. G., Sánchez, L. A. and Udagawa, K. 2000. Contextualized goldwork from ‘Gran Cocle’, Panama: an update based on recent excavations and new radiocarbon dates for associated pottery styles, pp. 154–76 in McEwan, C. (ed.), *Precolumbian Gold: Technology, Style and Iconography*. London: British Museum Press.
- Díaz, C. P. 1999. *Estudio Bio-Antropológico de Rasgos Mortuorios de la Operación 4 del Sitio Arqueológico Cerro Juan Díaz, Panamá Central*. Unpublished graduation thesis, Universidad de los Andes, Santa Fé de Bogotá, Colombia.
- Drennan, R. D. 1991. Pre-Hispanic chiefdom trajectories in Mesoamerica, Central America, and northern South America, pp. 263–87 in Earle, T. K. (ed.), *Chiefdoms, Power, Economy and Ideology*. Cambridge: Cambridge University Press.
- Drennan, R. D. 1996. Betwixt and between in the Intermediate Area. *Journal of Archaeological Research* 4, 95–131.
- Feriz, H. 1956. Bericht über eine Ausgrabung an der “Venado beach”, Panama Canal Zone. *Wiener Völkerkundliche Mitteilungen Jahr 4–5*, 191–7.
- Griggs, J. C. 1998. Un estudio preliminar arqueológico de la Concesión Minera de Petaquilla, Provincia de Colón, República de Panamá. Reporte del Proyecto para Investigaciones Realizadas en la Concesión Minera de Petaquilla. Vancouver: Teck Corporation.
- Griggs, J. C., Sánchez, L. A., Cooke, R. G., Díaz, C. P. and Carvajal, D. R. 2002. Recopilación y Presentación de Datos Ambientales y Culturales en la Región Occidental de la Cuenca del Canal de Panamá. Tarea 6: Inventario de Sitios de Recursos Culturales y Evaluación del Potencial de Sitios Adicionales. Volumen 2: Informe de los Sitios de Recursos Culturales Fuera de las Areas de Impacto Directo y Sitios de Recursos Culturales dentro de las Areas de Impacto Directo en las Cuencas de los Ríos Caño Sucio e Indio. Panamá: Autoridad del Canal, Panamá.
- Hearne, P. 1992. The story of the river of gold, pp. 1–21 in Hearne, P. and Sharer, R. J. (eds), *River of Gold: Precolumbian Treasures from the Sitio Conte*. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.
- Hearne, P. and Sharer, R. J. (eds) 1992. *River of Gold: Precolumbian Treasures from the Sitio Conte. I*. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.
- Helms, M. W. 1977. Iguanas and crocodilians in tropical American mythology and iconography with special reference to Panama. *Journal of Latin American Lore* 3, 51–132.
- Helms, M. W. 1979. *Ancient Panama: Chiefs in Search of Power*. Austin: University of Texas Press.
- Helms, M. W. 1993. *Craft and the Kingly Ideal: Art, Trade, and Power*. Austin: University of Texas Press.
- Helms, M. W. 1995. *Creations of the Rainbow Serpent: Polychrome Ceramic Designs from Ancient Panama*. Albuquerque: University of New Mexico Press.
- Helms, M. W. 2000. *The Curassow’s Crest. Myths and Symbols in the Ceramics of Ancient Panama*. Gainesville: University of Florida Press.
- Ichon, A. 1975. *Tipos de Sepultura Precolombina en el Sur de la Península de Azuero*. Panama City: Instituto de Cultura.
- Ichon, A. 1980. *L’ Archéologie du Sud de la Péninsule d’ Azuero, Panama*. Etudes Mésoaméricaines – Serie II. México D. F.: Mission Archéologique et Ethnologique Française au Mexique.
- Isaza, I. I. 1993. *Desarrollo Estilístico de la Cerámica Pintada del Panamá Central con Énfasis en el Periodo 500 a.C.–500 d.C.* Unpublished graduation thesis, Universidad Autónoma de Guadalajara, México.
- Jackson, J. B. C. and D’Croz, L. 1997. The ocean divided, pp. 38–71 in Coates, A. G. (ed.), *Central America: a Natural and Cultural History*. New Haven: Yale University Press.
- Jiménez, M. 1999. *Explotación de Vertebrados Acuáticos y Terrestres por los Indígenas Precolombinos en Cerro Juan Díaz, Los Santos, durante el Periodo 300–700 d.C.* Unpublished graduation thesis, Universidad de Panamá.
- Jiménez, M. and Cooke, R. G. 2001. *La pesca en el borde de un estuario neotropical: el caso de Cerro Juan Díaz (Bahía de Parita, costa del Pacífico de Panamá)* (Noticias de Arqueología y Antropología). Buenos Aires: Grupo NaYa, CD-ROM.
- Jonson, F. W. 1948. The Caribbean lowland tribes: the Talamanca division, pp. 231–51 in Steward, J. H. (ed.), *Handbook of South American Indians, Vol. 4, The Circum-Caribbean Tribes*. Washington D.C.: United States Government Printing Office.
- Jopling, C. (ed.) 1994. *Indios y Negros en Panamá en los Siglos XVI y XVII: Selecciones de los Documentos del Archivo General de Indias*. Woodstock V.T.: C. Lutz.
- Labbé, A. J. 1995. *Guardians of the Life Stream: Shamans, Art and Power in Prehispanic Central Panamá*. Los Angeles: Bowers Museum of Cultural Art.
- Ladd, J. 1964. *Archaeological investigations in the Parita and Santa María zones of Panama* (Smithsonian Institution Bureau of the American Ethnology, Bulletin 193). Washington D.C.: Smithsonian Institution.
- Linares, O. F. 1976. Animals that were bad to eat were good to compete with: an analysis of the Conte style from ancient Panama, pp. 1–20 in Young, P. D. and Howe, J. D. (eds), *Ritual and Symbol in Native South America* (University of Oregon Anthropological Papers 9). Eugene: University of Oregon Press.
- Linares, O. F. 1977. *Ecology and the Arts in Ancient Panama: on the Development of Rank and Symbolism in the Central Provinces* (Studies in Precolumbian Art and Archaeology 17). Washington D.C.: Dumbarton Oaks.
- Linares, O. F. 1979. What is lower central American archaeology? *Annual Review of Anthropology* 8, 21–43.
- Lothrop, S. K. 1937. *Coclé: an Archaeological study of Central Panama, Part 1* (Memoirs of the Peabody Museum of Archaeology and Ethnology 7). Cambridge: Harvard University Press.
- Lothrop, S. K. 1942. *Coclé: an Archaeological Study of Central Panama, Part 2* (Memoirs of the Peabody Museum of Archaeology and Ethnology 8). Cambridge: Harvard University Press.
- Lothrop, S. K. 1954. Suicide, sacrifice and mutilations in burials at Venado Beach, Panama. *American Antiquity* 19, 226–34.
- Lothrop, S. K. 1956. Jewelry from the Panama Canal zone. *Archaeology* 9, 34–40.
- Lothrop, S. K., Foster, W. F. and Mahler, J. (eds) 1957. *The Robert Woods Bliss Collection of Precolumbian Art*. New York: Phaidon.
- Museum Rietberg 1984. *Die Kunst des Indianischen Amerika*. Zürich: Atlantis Verlag
- Oviedo y Valdés, G. Fernández de 1853. *Historia General y Natural de las Indias, Islas y Tierra Firme del Mar Océano* (edited by J. Amador de los Ríos). Madrid: Real Academia de Historia.
- Piperno, D. R. and Pearsall, D. M. 1998. *The Origins of Agriculture in the Lowland Tropics*. San Diego: Academic Press.
- Proyecto Arqueológico Panamá la Vieja 1998. Informe de la temporada de excavación mayo-junio, presentado por Alvaro Brizuela.
- Ranere, A. J. and Hansell, P. 1978. Early subsistence patterns along the Pacific coast of Panama, pp. 43–59 in Stark, B. L. and Voorhies, B. (eds), *Prehistoric Coastal Adaptation*. New York: Academic Press.
- Sánchez, L. A. 1995. *Análisis Estilístico de Dos Componentes Cerámicos de Cerro Juan Díaz: su Relación con el Surgimiento de las Sociedades Cacicales en Panamá*. Unpublished graduation thesis, Universidad de Costa Rica.
- Sánchez, L. A. 2000. Panamá: arqueología y evolución cultural,

- pp. 115–45 in *Artes de los Pueblos Precolombinos de América Central*. Barcelona: Institut de Cultura and Museu Barbier-Mueller.
- Sánchez, L. A. and Cooke, R. G. 2000. Cubitá: un nuevo eslabón estilístico en la tradición cerámica del “Gran Coclé, Panamá. *Precolombart* **3**, 5–20.
- Sander, D., Mitchell, R. H. and Turner, R. G. 1958. Report on Venado Beach excavations, Canal Zone. *Panama Archaeologist* **1**, 26–31.
- Sander, D., Mitchell, R. H. and Turner, R. G. 1959. Report on fabric and figurine, Venado Beach, Canal Zone. *Panama Archaeologist* **2**, 52–3.
- Stone, D. Z. 1961. *The Talamanca Tribes of Costa Rica* (Peabody Museum Papers 43). Cambridge: Harvard University Press.
- Torres de Araúz, R. 1965. Dimensión etnohistórica del misionero Fray Adrián de Santo Tomás. *Hombre y Cultura (Panama)* **1**, 66–122.
- Torres de Araúz, R. 1972. *Arte Precolombino de Panamá*. Panama City: Instituto Nacional de Cultura y Deportes.
- Wing, E. S. 1980. Aquatic fauna and reptiles from the Atlantic and Pacific sites, pp. 194–215 in Linares, O. F. and Ranere, A. J. (eds), *Adaptive Radiations in Prehistoric Panama* (Peabody Museum Monographs 5). Cambridge: Harvard University Press.
- Young, P. D. 1976. The expression of harmony and discord in Guaymí ritual, pp. 77–90 in Young, P. D. and Howe, J. (eds), *Ritual and Symbol in Native North America* (University of Oregon Anthropological Papers 9). Eugene: University of Oregon Press.
- Zohar, I. and Cooke, R. G. 1997. The impact of salting and drying on fish skeletons: preliminary observations from Parita Bay, Panama. *Archaeofauna* **6**, 59–66.

Richard Cooke

Smithsonian Tropical Research Institute,
Apdo. 2072, Balboa,
Ancón, Panama,
República de Panamá
E-mail: cooker@naos.si.edu