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Animals and Ritual in the Copán Acropolis: Zooarchaeology of Special Deposits



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Introduction

In 2004, FAMSI funds supported the zooarchaeological recovery, identification, and analysis of animal remains recovered from ritual deposits by the Early Copán Acropolis Project (ECAP).¹ Here I present the preliminary identification results and a discussion of methods used in the research project. The zooarchaeological identifications are still on-going, and will eventually be used to document associations between species and contexts in the Copán Acropolis deposits in an effort to describe animal-related archaeological markers of Maya ritual activities.

These final data will increase our understanding of the ancient use of animal symbols in the expression of personal identity (status, occupation, social role), politics (allegiances, transfer of power), and ceremony (the celebration of death, historical events, and calendrical cycles). The Copán Acropolis ritual zooarchaeological assemblages are particularly valuable for this type of research both because of the unique taxa and associations found within the assemblages and because the deposits themselves are well-preserved, undisturbed, and in many cases linked by epigraphy to known historical personages and events. These deposits therefore provide a unique perspective on animal use in very specific ritual events.

To accomplish this research, in the summer of 2004, zooarchaeological materials excavated by the ECAP and currently stored at the Copán Centro de Investigaciones Arqueológicas were examined and identified on the premises with generous permission of Profesor Oscar Cruz and under supervision of the institution personnel. However, some fascinating examples required more intensive analysis. The ECAP Acropolis excavations have revealed superbly preserved ritual deposits spanning the occupation of Copán (Sharer 2000; Sharer, *et al.* 1992; Sharer, *et al.* 1999), and frequently containing diverse, undisturbed, animal remains in direct association with other archaeological assemblages. Some examples of these are the vessels found in the Margarita tomb and still containing the remains of fish and invertebrates from the offerings laid in the tomb. Representative zooarchaeological samples were collected from these interesting assemblages. These were exported with permission of the Instituto de Antropología Hondureño (Licda. Margarita Duron de Galvez, Gerente) and are in the process of identification in the Florida Museum of Natural History (FLMNH) Environmental Archaeology (EA) Laboratory with using the FLMNH comparative collections (<http://www.flmnh.ufl.edu/databases>) and additional specimens collected from the neighboring Copán River and traditional market of Jocotán, Guatemala.

¹ The Early Copán Acropolis Program (ECAP) was directed by Dr. Robert Sharer between 1989 and 2001 as part of the broader Proyecto Arqueológico Acrópolis Copán (PAAC).

The Zooarchaeology of Ritual

Ritual deposits, as the archaeological manifestations of invisible religious and social beliefs, are of archaeological interest because of the formalized, symbolic, and repetitive nature of ritual activity (Flannery 1976:132; Rappaport 1999:24). As in most complex hierarchical agricultural societies, Maya rituals varied by type and scale (Brumfiel and Earle 1987; Clark and Blake 1994; Dietler 1996:92-97; Hayden 1995:27), celebrating a range of ritual cycles including life transition cycles, time cycles, and political cycles. Each of these ritual categories was associated with specific formalized behaviors and material correlates, modified by the identity of the celebrant and celebrators.

These Maya rituals often included animals in their symbolic roles as performative or communication devices (Dietler 1996; Drennan 1976; Flannery 1976; Goody 1982; Hayden 1995, 1996; Mennell 1996). For the ancient Maya, animals acted as metaphors (for conditions of nature including seasons, for social conditions like rulership or age, and for special circumstances like those of war), as totems (of the soul, of lineages, of social groups, or communities), as offerings (as sacrifices or as foods), and as measures for quantitative comparison between individuals and groups (of sacredness, power or wealth) (Emery 2000a, 2002, 2003). As a result of the detailed correlation between animals and ancient Maya beliefs and their expression, animal remains represent an excellent conduit to fully understanding the diversity of types, scales, and meanings of rituals and ceremonies as they are revealed in archaeological deposits.

Although other intriguing ritual assemblages of unusual taxa have been recovered and documented from the Maya world (Pendergast 1967a, b) and other Mesoamerican sites (Castro 2000; Guzman and Polaco 2000), these are often not as well preserved or documented as the Copán assemblages. The Copán Acropolis ritual assemblages offer superb preservation in highly unusual deposits including vessel contents and cache offerings in burials of individuals with well-documented historical backgrounds. Tunneling through the Acropolis structures, the ECAP excavations revealed superbly preserved ritual deposits spanning the occupation of Copán (Sharer 2000; Sharer, *et al.* 1992; Sharer, *et al.* 1999), frequently containing diverse, undisturbed, animal remains in direct association with other archaeological assemblages. Simultaneous epigraphic research provided historical links for many of the events celebrated by these ritual deposits, and allow us therefore to identify (with more or less accuracy) the specific nature of the deposits (Bell, *et al.* 2000; Sharer 2000; Sharer, *et al.* 1999). The preservational condition of the deposits means that the ritual assemblages are often still in fairly pristine association and include even the most fragile remains. These deposits are invaluable and allow us to ask, for example, which species were used to identify various ritual types or to perform ceremonial behaviors, which were indicative of rulership or political alliances, and how the individual (status, role, and occupation) was represented in a mortuary scene.



Figure 1. Animal remains from various deposits were examined, preliminarily identified, and photographed for verification with FLMNH comparative collections.

Methods

Recovery Methods

Our work began with recovery of samples from assemblages stored at Copán Ruinas. Our group included myself (a Mesoamerican zooarchaeologist since 1984); Erin Kennedy Thornton (a University of Florida doctoral candidate doing regional zooarchaeology dissertation research); and Irvy Quitmyer (Collection Manager of Environmental Archaeology at the FLMNH and a zooarchaeologist since 1980 with an expertise in fish and invertebrates in archaeological samples).

During our stay in Copán Ruinas, Honduras we worked intensively in the research and conservation lab with the generous permission of Profesor Cruz and assistance from Cameron McNeil, graduate student at CUNY, to recover representative zooarchaeological samples from assemblages excavated and currently stored there by the ECAP ([Figure 1](#), shown above). Cameron McNeil provided selected samples for our viewing and analysis, although others were not available due to a recent reorganization of the stored materials in the facility, and others were located only after the end of the project and will require further analysis at a later time.

Zooarchaeological assemblages provided to our team were examined, documented (using a Palm Tungsten Handheld data collector), and photographed (using a digital Nikon CoolPix 8.0), with data downloaded daily to a Toshiba Satellite Pro 4600. Preliminary identifications were made immediately, however many identifications required completion and verification (of photographic records) using the Florida Museum of Natural History comparative collections.



Figure 2. Diagnostic elements were removed from vessels (using a dissection microscope) for later identification and analysis at the FLMNH after a full survey of species and element diversity. Care was taken to maintain the integrity of the vessel contents for later exhibit.

Several fascinating deposits were sub-sampled for later analysis by Quitmyer at the FLMNH labs ([Figure 2](#), shown above). Although the Copán ritual deposits have already been excavated, appropriate sub-samples for zooarchaeological research must include all possible taxonomic, individual, and body element diversity, so these sub-samples were selected by our team. Samples were taken under the supervision of ECAP project and Centro personnel and according to methods suggested by both.



Figure 3. The macrozoom function of the digital Nikon CoolPix 8.0 will allow for further quantification of unsampled vessel contents.

The samples taken for export and additional analysis included the remains from eight vessels recovered from the Margarita tomb, all originally containing either fish or crustacean remains in an excellent state of preservation. Five of the samples were subsampled from residues removed from the original container by previous researchers. Three of the samples were removed directly from the vessels themselves with permission of Dr. Sharer. These three vessels will eventually be consolidated for exhibit, so our sampling process in these instances included photo documentation of vessel contents (using the macrozoom function of the digital camera, which should allow identification of unsampled elements), visual classification of species diversity to ensure the full range of species were sampled, and removal of diagnostic elements using a dissecting microscope ([Figure 3](#), shown above). By using this method we were able to ensure complete sampling of taxonomic and element diversity without destruction of the visually important segments of the vessel for later exhibit. All vessel samples will also be examined for pollen and residues, so we took care to avoid cross-contamination wherever possible (considering constant air-flow through the unenclosed spaces in this open-air facility, this was not always possible).



Figure 4. Fish and shrimp purchased at the Jocotán market were prepared for inclusion in the comparative skeletal collection, and initial osteological comparison suggests these were the same species recovered from the vessels in the Margarita Tomb.

Creation of a Comparative Assemblage

The species recovered from the ECAP ritual deposits included an unusual range of taxa that are not commonly part of zooarchaeological comparative collections. To ensure that our comparative collection was inclusive, we also collected modern specimens both in the neighboring Copán River and at the local market over the border in the neighboring town of Jocotán, Guatemala ([Figure 4](#), shown above). Additional information was gathered from local fishermen both during conversation and on a fishing trip (with Don Leonides and his family). The fishermen talked extensively about their fishing methods, the catches they prefer and their uses, and the seasonal and annual changes in fish population size, age structure, and availability ([Figure 5](#), shown below). Pictures of various taxonomic groups were shown to the fishermen for comparison with the daily catch and for information on local classification ([Figure 6](#), shown below). All modern specimens were photographed, weighed and measured following standard field collection methods, and were then skeletonized (by heating and decomposition) and dried.



Figure 5. Local fishermen from the village of Copán Ruinas were kind enough to show us their techniques and discuss the taxonomy, populations, and ecology of the local riverine fauna.



Figure 6. Using a Tungsten Palm Pilot loaded with photographs of local fish species, the fishermen and I were able to discuss the local taxonomy of species, the size ranges of the various taxa, and their frequency of harvest. (The fisherman to the left is illustrating the maximum size of a riverine ictalurid catfish.)

Zooarchaeological Identification Methods

On-site identifications were completed by all members of our team, but primarily by Emery and Thornton. Although zooarchaeological identification is possible without access to comparative collections, it is difficult, so all remains were also photographed and the digital images returned to the FLMNH for verification with comparative collections housed there. Images of molluscan remains were further analyzed by John Slapcinsky, malacologist at the FLMNH, to ensure the strictest accuracy of identification. It is possible that many of these species were imported originally from both coasts, so identification to the species level is valuable.

All sampled materials were exported with Honduran institute permission and permits, and were hand-carried by Quitmyer to the Florida Museum of Natural History (FLMNH) Environmental Archaeology Program (EAP) Laboratory for identification based on the FLMNH comparative collections (<http://www.flmnh.ufl.edu/databases>) and the additional specimens collected during the Honduras trip. Identification, whether of materials on-site or those removed to the FLMNH laboratory, followed accepted methods using standard protocols (Reitz and Wing 1999).

The accurate identification of these special archaeological remains is on-going and requires expert analysis by researchers such as Quitmyer, who has successfully identified shrimp from archaeological remains such as mandibles (Quitmyer 1987; Quitmyer, *et al.* 1985; Reitz and Quitmyer 1988), Robins, ichthyologist at the FLMNH, and Slapcinsky, malacologist at the FLMNH. However, to avoid biases introduced by the use of multiple researchers, I oversee all identifications and ensure that standardized methods are used.

Preliminary Results

Modern Fishes of the Copán Region: The Comparative Sample

Market trip: A total of thirteen specimens were collected from the Jocotán market, including examples from several taxonomic osteichthyan groups (chiclids, porcelids, siluriformes, and clupeids) and one crustacean taxon (freshwater shrimp). Several taxa (mojarras and catfish) were estuarine and peripheral, reportedly brought in from Río Dulce, and the rest, small fishes sold fresh or fried, were reportedly from local rivers.

A similar range of taxa were acquired or observed during the fishing expedition near Copán Ruinas with Don Leonides and his family. Some species appear to be local variants of the Jocotán fishes—probably separated color and morph variations from different river populations. It is possible in some cases though that the species, while closely related and used for similar purposes, are in fact distinguished by folk taxonomists. These taxonomies differ only slightly from the Linnean distinctions used by the FLMNH ichthyologists (all modern fish were identified by Robert Robins, Collection Manager, FLMNH Ichthyology).

The fish species collected from the Jocotán market included the riverine species cf. *Hyphessobrycon* (local: Pepesca), one Peciliidae species (local: Bute), and the cichlid cf. *Cichlasoma managuense* (local: Guapote). The estuarine Río Dulce species included a large ictalurid catfish (local: Filine), and two mojarras *Cichlasoma lentiginosum* species group and cf. *Cichlasoma maculicauda*. The species caught near Copán Ruinas included the *Astyanax aeneus* (local: Machaca), a small catfish *Rhamdia* sp. (local: Filine), two Poeciliidae species (local: Plateada and Pichira), and two cichlids, one of which was also locally called Guapote although it was identified at the FLMNH as cf. *Cichlasoma octofasciatum*, and the other cf. *Cichlasoma spilurum* (local: Sheta).

These fish species and the freshwater shrimp are excellent comparative osteological matches for the archaeological specimens recovered from the Margarita Tomb vessels.

Animal Taxa of the Copán Acropolis Ritual Deposits

A total of 257 archaeological artifacts/ecofacts from the Copán Acropolis structures were examined during the 2004 season. Additional samples (contents unquantified) were taken from several vessels for analysis at the FLMNH. Identifications are complete for approximately 75% of the collection although specialists continue to work with the invertebrate, fish, and bird remains. Here we present only the materials recovered from ritual or ceremonial deposits. These remains will eventually be compiled with previous identifications from the Hunal and Margarita Tombs and elsewhere (Emery 2000b), as well as with materials from non-ritual contexts (in progress), to complete the picture of Copán Acropolis ritual animal use.

Ante Offerings²

Offering 90-1: Three *Spondylus princeps* valves, complete or almost complete were recovered, each with the white inner valve matrix scraped away to reveal the brilliant color of the valve itself. This spondylus is Pacific in origin, and is predominantly the species found in the Copán ritual deposits despite the greater frequency of the Atlantic spondylus at other sites.

Offering 91-3 (cache in front of Ante stairway, robbed in antiquity): Three large mammal long bone artifacts were recovered in this cache, including one spatulate tool tip and one wide oval tool base (perhaps the base of the spatulate tool, but no join is obvious) and two fragments too eroded to classify. The inclusion of worked mammal bone implements in caches is fairly common at other sites, but seems quite uncommon among those assemblages reviewed here. A second cache reported in the Ante stairway (number unknown) included a single *Spondylus princeps* valve.

² Note that contextual information on the Ante caches is found in Sharer et al. (1992).

Offering 92-1: Here were found three pearls likely from a *Pinctada imbricata*, and each an unusual mammiform shape perhaps significant to the offering itself. As well there were two complete left *Pinctada imbricata* valves, one Dasyatid stingray spine, one *Arca zebra* valve, six *Astraea sp.* shells, eight *Chama macerophylla* shells, two *Cittarium sp.* shells, five cf. *Nephronaias sp.* valves, seven *Oliva caribaeensis* shells, seven *Oliva reticularis* shells, one marine pelecypod valve, one *Pleuroploca gigantea* shell, and four *Prunum apicinum* shells. Finally the assemblage included a variety of bird remains (still under identification but likely including both quails and quetzales, and interestingly including many examples of young or nest-bound birds).

Offering 92-7: This offering included twenty-six *Tectarius muricatus* shells, two complete *Strombus alatus* (conch, one with two perforations in the rear body whorl), one *Pachychilus indiorum* (river jute), and four spines from a Diodontidae (porcupine fish). The inclusion of river shells among the marine elements in both this offering and the 92-1 is intriguing since it suggests that the watery symbolism is the important image, rather than a symbolic reflection specifically of the marine or riverine environment.

Offering (number and location unknown): Three bryozoan accumulations and five complete Chamidae valves were found in this offering.

***Margarita Deposits*³**

Offering 93-16: The Margarita Mercury Cache, found northwest of the Margarita Tomb, included a rectangular, masonry, offering box sealed with a large stone slab and containing three ceramic vessels. The offering box contained a variety of organic materials including various faunal materials, squash seeds, and the remnants of a wasp nest (Bell n.d., Davis-Salazar and Bell 2000). The faunal materials included a single complete Dasyatid/Myliobatid stingray spine, 10 carapace and plastron elements from a single small *Dermatemys mawii* (river turtle), 23 elements from a single small Kinosternid (mud/musk turtle) including both carapace/plastron and limb elements, 10 elements from a medium-sized boney fish (further identification needed), and 28 elements from a single *Meleagris ocellata* (ocellated turkey).

The cache also held three ceramic vessels, one ceramic lid, and both jade and organic materials. Vessel 1 was inverted over Vessel 2, which contained a complete, articulated, charred female turkey (Emery 2000), an additional disarticulated cranium, and nine stones that may have been intentionally placed in the bird's body cavity (Bell n.d.) since they are too large to be gizzard stones. The second turkey cranium found inside the vessel was likely placed there intentionally but was clearly originally associated with the second disarticulated bird found in the offering box. A single white quartz stone may have been associated with the second disarticulated bird.

³ Note that detailed contextual information on the Margarita tomb and caches are found in Ellen Bell's doctoral dissertation (Bell n.d.), and in Bell et al. 2004.

Vessel 3 contained a layered deposit symbolically representative of the layers of the Maya cosmos. The upper layer included 3 *Spondylus princeps* valves, three complete Dasyatid/Myliobatid spines, and reportedly bird bones and *Oliva* sp. shells (these were not seen in the 2004 analysis). The central layer included a variety of carved and shaped objects, many of which were made of shell including both *Pinctada* sp. and *Spondylus* sp. The lowest level included 300 cc of liquid mercury on which floated a hematite mosaic mirror.

Margarita Tomb: The 2004 season concentrated on the sampling and recovery of materials from the vessels found in the Margarita Tomb, the hypothesized final resting place of the first queen of Copán. The vessel contents are still under investigation, however, the preliminary work has revealed the following.

Vessels 15 and 10 and 4 contain the remains of estuarine/freshwater shrimp very similar to those sold today in the local markets of the lowland Maya world. Vessel 15 contains exclusively the articulated remains of *Macrobrachium* sp., a decapod crustacean of the family Palaemonidae (Chance and Bruce, 1993; Holthuis, 1952).⁴ None of these bowls contain any other taxa (specifically, no crayfish were recovered or seen in any bowl), and several individuals of the single shrimp species are represented in each bowl. These shrimp are today considered a seasonal treat since they are available primarily in June and July when they move with the rising waters from the estuaries into the rivers to breed. It is possible that their discovery in the Margarita Tomb could tell us what time of year the tomb was filled and sealed. Interestingly, the presence of both mandibles and rostral fragments indicates that the shrimp were placed in the bowl without first removing the heads. We wonder as well whether they were placed into the bowl raw since cooking would have degraded the carapace and made it less likely to preserve.

Vessels 2, 3, 12, and 8 contain the remains of small, likely freshwater fishes. Preliminary identification (Quitmyer 2005) indicates these include cichlids, shads/herrings, and minnows, all of which are still fished today from the local waterways and are sold in the local markets. In all vessels, the presence of cranial and postcranial elements (including tail fins and scales) indicates that the fish were placed in the vessels whole and with their skins. Vessel 8 appears to contain the remains of two fish taxa, *Cichlasoma* sp. (cichlid fishes), and Poeciliidae (minnows), including the vertebrae, operculum, and frontal skeletal items. Vessel 12 contains the vertebrae and articular of a Clupeidae (shad/herring). Vessels 2 and 3 are still under investigation, although a brief review shows that Vessel 3 contains at least 11 individuals, all one species.

At the market of Jocotán, the fish are sold either raw or deep fried (complete with skins) as a tasty snack. The local fishermen informed us that they often gather these fish immediately before a family party since they're considered festive fare.

⁴ Identifications were made by Quitmyer (2005) based on comparison of mandibular fragments with materials collected at the Jocotán market in Guatemala, only a few kilometers from Copán Ruinas, and with drawings in Chance and Bruce (1993) and Holthuis (1952).

Continuing Research

Our analyses are far from complete. Although many of the identifications have been made, some of the most important are also the most difficult (including the small local fish and shrimp found in the Margarita tomb vessels). Therein lies the value of regional comparative collections such as those we have now created for the freshwater species of the area. A secondary value lies in the details of information about modern uses of these species and their importance as festival foods or famine foods for example.

Needless to say, the value of taxonomic identification is inherent for even a ritual-based zooarchaeological analysis. Certain species are clearly indicative of various symbolic events or meanings. The felines, for example, were underworld deities associated with dynastic ritual (Peterson 1980; Roys 1965; Saunders 1994), fish and deer were offerings demanded by the gods during the transfer of rulership (Pohl 1981; 1983:63, 74; Tozzer 1941:134, 155-156).

But identifications of species provide only one aspect of the information we need. The less apparent characters of age, body portion, and body side were also important elements in ritual symbolism. For example, the fact that immature animals are common in Maya ritual deposits (Carr 1996; Pohl 1981; 1983:62; Wing and Scudder 1991) and played a role in period-ending rituals (Pohl 1981, 1983) suggests that immaturity might be a symbolic metaphor for rebirth and renewal. Intriguingly, many of the avian elements in the Copán assemblages appear to be juvenile, nest-bound birds. Another obvious example of the importance of information beyond the taxonomic is the Margarita mercury cache vessel containing a complete ocellated turkey in addition to a second turkey cranium suggestive of the two-headed bird symbolism so prevalent in Maya iconography (Emery 2000b; Sharer 2000).

Once materials have been identified to taxon, age, sex, and element, it will be possible to correlate these findings with other information on archaeological context to suggest the specific role each species or assemblage played in the ancient rituals during which they were deposited. Here is where the excellent complementary research will be so valuable. Detailed work by authors such as Bell *et al.* (2004) and Sharer *et al.* (1992) provide information on both context and associated artifactual remains to firmly anchor the animal-based interpretations to their symbolic matrix.

This analysis of ECAP faunal materials is also complemented by several other zooarchaeological investigations at Copán. In the late 1990s Collins analyzed almost 25,000 remains (8,000 to the level of family and beyond) to elucidate status-differentiated animal use (Collins 2002). Although this was her major focus, she provided a strong foundation of basic taxonomy and animal use patterns for the region. Two other research projects, both more limited in scope, provide direct evidence of ritual use of animals in other areas of the site. Ballinger and Stomper (2000) published an interesting analysis of the jaguar remains recovered in association with Altar Q, while Beaubien (2004) and Fash *et al.* (2001) have provided a wealth of information through

their analysis of marine invertebrate remains from Burial XXXVII-4 in Copán Structure 10L-26.

In sum, the 2004 research season provided an excellent research opportunity and superb data from which to begin an analysis of the symbolic meaning of animal remains in ritual deposits.

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Sources Cited

Ballinger, D.A. and J. Stomper

2000 "The Jaguars of Altar Q, Copán, Honduras: Faunal Analysis, Archaeology, and Ecology." In *Journal of Ethnobiology* 20(2):223-236.

Beaubien, H.

2004 "Excavation and Recovery of a Funerary Offering of Marine Materials from Copán." In *Maya Zooarchaeology: New Directions in Method and Theory*, edited by K.F. Emery, pp. 45-54. Institute of Archaeology, UCLA Press, Los Angeles.

Bell, E.E.

n.d. *Early Classic Ritual Deposits in the Copán Acropolis: The Material Foundations of Political Power at a Classic Period Maya Center*, Ph.D. Dissertation, Department of Anthropology, University of Pennsylvania, Philadelphia.

Bell, E.E., R.J. Sharer, D.W. Sedat, M.A. Canuto and L.A. Grant

2000 "The Margarita tomb at Copán, Honduras: A research update." In *Expedition* 42(3):21-25.

Bell, E.E., M.A. Canuto and R.J. Sharer

2004 *Understanding Early Classic Copán*. Oxbow books.

Brumfiel, E.M. and T.K. Earle

1987 "Specialization, Exchange and Complex Societies: An Introduction." In *Specialization, Exchange and Complex Societies*, edited by T.K. Earle, pp. 76-85. Cambridge University Press, Cambridge.

Carr, H.S.

1996 "Precolumbian Maya Exploitation and Management of Deer Populations." In *The Managed Mosaic: Ancient Maya Agriculture and Resource Use*, edited by S.L. Fedick, pp. 251-261. University of Utah Press, Salt Lake City, UT.

Castro, A.V.

2000 *El Simbolismo de los Objetos de Concha Encontrados en las Ofrendas del Templo Mayor de Tenochtitlán*. Instituto Nacional de Antropología e Historia, México City, México.

Clark, J.E. and M. Blake

1994 "The power of prestige: Competitive generosity and the emergence of rank societies in lowland Mesoamerica." In *Factional Competition and Political Development in the New World*, edited by J.W. Fox, pp. 17-30. Cambridge University Press, Cambridge.

Collins, L.M.

2002 *The Zooarchaeology of the Copán Valley: Social Status and the Search for a Maya Slave Class*. Ph.D. Dissertation, Harvard University.

Davis-Salazar, K. and E.E. Bell

2000 "Una comparación de los depósitos funerarios de dos mujeres en la acrópolis de Copán, Honduras." In *XIII Simposio de Investigaciones Arqueológicas en Guatemala*, edited by J.P. Laporte, H.L. Escobedo, A.C.d. Suasnavar and B. Arroyo, pp. 1113-1128. Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, y Asociación Tikal, Guatemala City.

Dietler, M.

1996 "Feasts and commensal politics in the political economy: Food, power and status in prehistoric Europe." In *Food and the Status Quest: An Interdisciplinary Perspective*, edited by W. Schiefenhovel, pp. 86-126. Berghahn Books, Providence, RI.

Drennan, R.D.

1976 "Religion and Social Evolution in Formative Mesoamerica." In *The Early Mesoamerican Village*, edited by K.V. Flannery, pp. 345-368. Academic Press, New York.

Emery, K.F.

2000a "Fauna of Ancient Mexico and Central America." In *The Archaeology of Ancient Mexico and Central America: An Encyclopedia*, edited by D.L. Webster, pp. 255-265. Garland Publishing, New York.

2000b "Preliminary Faunal Analysis from Early Classic Copán Assemblages." Report prepared for R. Sharer and incorporated into FAMSI Report: [Early Copán Acropolis Program 2000 Field Season \(Zooarchaeological Analyses\)](#).

2002 "The Noble Beast: Status and Differential Access to Animals in the Maya World." In *World Archaeology* 34(3):498-515.

2003 "Animals from the Maya Underworld: Reconstructing Elite Maya Ritual at the Cueva de los Quetzales." In *Behavior behind Bones: The zooarchaeology of religion, ritual, status, and identity*, edited by A. Ervynck, pp. 101-113. Oxbow Books, Oxford.

- Fash, W.L., H.F. Beaubien, C.E. Magee, B.W. Fash and R.V. Williamson
2001 "The Trappings of Kingship among the Classic Maya: Ritual and Identity in a Royal Tomb from Copán." In *Fleeting Identities: Perishable Material Culture in Archaeological Research*, edited by P. Drooker, pp. 152-169. Southern Illinois University, Carbondale, IL.
- Flannery, K.V.
1976 "The Village and its Catchment Area." In *The Early Mesoamerican Village*, edited by K.V. Flannery, pp. 91-194. Academic Press, New York, NY.
- Goody, J.
1982 *Cooking, Cuisine and Class: A Study in Comparative Sociology*. Cambridge University Press, Cambridge.
- Guzman, A.F. and O.J. Polaco
2000 *Los Peces Arqueológicos de la Ofrenda 23 del Templo Mayor de Tenochtitlán*. Instituto Nacional de Antropología e Historia, México City, México.
- Hayden, B.
1995 "Pathways to Power: Principles for Creating Socioeconomic Inequalities." In *Foundations of Social Inequality*, edited by G.M. Feinman. Plenum Publishing Corporation, New York, NY.
- 1996 "Feasting in Prehistoric and Traditional Societies." In *Food and the Status Quest*, edited by W. Schiefenovel, pp. 127-147. Berghahn Books, Oxford.
- Holthuis, L.B.
1952 *A General Revision of the Palaemonidae (Crustacea Decapoda Natantia) of the Americas. Volume II. The subfamily Palaemoninae*. Allan Hancock Foundation Publications Number 12. The University of Southern California Press, LA.
- Mennell, S.
1996 *All Manners of Food: Eating and Taste in England and France from the Middle Ages to the Present*. University of Illinois Press, Urbana.
- Pendergast, D.M.
1967a "Altun Ha, Honduras Britanica (Belize): Temporada 1966-1968." In *Estudios de Cultura Maya* 8:35-56.
- 1967b "Altun Ha, Honduras Britanica (Belize): Temporada 1964-1965." In *Estudios de Cultura Maya* 6:149-169.

Peterson, J.F.

1980 *Precolumbian Flora and Fauna: Continuity of Plant and Animal Themes in Mesoamerican Art*. Mingei International Museum, San Diego.

Pohl, M.D.

1981 "Ritual Continuity and Transformation in Mesoamerica: Reconstructing the Ancient Maya Cuch Ritual." In *American Antiquity* 46(3):513-529.

1983 "Maya Ritual Faunas: Vertebrate Remains from Burials, Caches, Caves, and Cenotes in the Maya Lowlands." In *Civilization in the Ancient Americas*, edited by A. Kolata, pp. 55-103. University of New Mexico Press, Albuquerque, NM.

Quitmyer, I.R.

1987 "Evidence for Aboriginal Shrimping Along the Southeastern Coast of North America." Paper presented at the 43rd Meeting of the Southeastern Archaeological Conference, Charleston, SC.

Quitmyer, I.R., E.S. Wing, H.S. Hale and D.S. Jones

1985 "Aboriginal Subsistence and Settlement Archaeology of Kings Bay Locality." In *Volume 2: Zooarchaeology, Reports of Investigations 2*, edited by W.H. Adams. University of Florida, Department of Anthropology, Gainesville, FL.

Rappaport, R.A.

1999 *Ritual and Religion in the Making of Humanity*. Cambridge University Press, Cambridge.

Reitz, E.J. and I.R. Quitmyer

1988 "Faunal Remains from Two Coastal Georgia Swift Creek Sites." In *Southeastern Archaeology* 7(2):95-108.

Reitz, E.J. and E.S. Wing

1999 *Zooarchaeology. Cambridge Manuals in Archaeology*. Cambridge University Press, New York.

Roys, R.L.

1965 *Ritual of the Bacabs: A Book of Maya Incantations*. University of Oklahoma Press, Norman, OK.

Saunders, N.J.

1994 "Tezcatlipoca: jaguar metaphors and the Aztec mirror of nature." In *Signifying Animals: Human Meaning in the Natural World*, edited by R. Willis, pp. 159-177. One World Archaeology #16. Routledge Press, London.

Sharer, R.J.

2000 ["Early Copán Acropolis Program 2000 Field Season."](#) Research Report Presented to FAMSI. The University of Pennsylvania Museum.

Sharer, R.J., J.C. Miller and L.P. Traxler

1992 "Evolution of Classic Period Architecture in the Eastern Acropolis, Copán." In *Ancient Mesoamerica* 3:145-159.

Sharer, R.J., L.P. Traxler, D.W. Sedat, E.E. Bell, M.A. Canuto and C. Powell

1999 "Early Classic Architecture Beneath the Copán Acropolis." In *Ancient Mesoamerica* 10:3-23.

Tozzer, A.M.

1941 *Landa's Relacion de las Cosas de Yucatán*. Papers of the Peabody Museum of American Archaeology and Ethnology, vol. 18. Harvard University, Cambridge MA.

Wing, E.S. and S.J. Scudder

1991 "The Exploitation of Animals." In *Cuello: An Early Maya Community*, edited by N. Hammond, pp. 84-97. Cambridge University Press, Cambridge.