A ZOOARCHAEOLOGICAL PERSPECTIVE ON THE AMBANGAN SITE, A PREHISTORIC SETTLEMENT IN BUTUAN, AGUSAN DEL NORTE, SOUTHERN PHILIPPINES

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INTRODUCTION

The purpose of this report is to present the results of the identification and preliminary analysis of zooarchaeological materials excavated from December 10, 1981 to March 26, 1990 in the Ambangan site, Libertad, Butuan City, Agusan del Norte. These materials were recovered from the midden layer associated with large quantities of low- and high-fired ceramic sherds, metal implements and ornaments, net weights, spindle whorls and decorated potsherds dating from the 9th to 12th centuries AD. The zooarchaeological materials were analyzed in order to give insights into the past environment and to give a glimpse of the human and animal relationships in the past.

THE STUDY AREA

The province of Agusan del Norte (3752 km^2) is divided into ten municipalities and one city - Butuan. Butuan City is situated in the southwestern part of Agusan del Norte and comprises 91 Barangays. One of these is Libertad, located five kilometers west of the city proper. About 250 meters east of the Libertad River is Ambangan, a semi-marsh area (Fig. 1). In Ambangan's riverine area, pot hunting activities brought forth the discovery of *Balangay* 1, an ancient boat (Peralta 1980; Ronquillo 1987). This discovery eventually gave rise to the Butuan Archaeology Project. So far, 8 boats have been discovered. Wood samples taken from three of the boats have given radiocarbon dates of 1630±110 BP, 700±90 BP and 960±70 BP.

The area where the boats were discovered is a low-lying tidal flat where five habitats can be observed, namely grasslands, coconut groves, mangroves, nipah groves and cultivations. Archaeological researches by ASEAN (1986), Bautista (1983a, 1983b, 1987, 1989a, 1989b), Bautista and Orogo (1990), Cembrano (1988), Peralta (1980) and Ronquillo (1987) indicate the presence of habitation and workshop sites associated with tradewares dating from the 9th to 12th centuries AD.

Indo-Pacific Prehistory Assn. Bulletin 10, 1991:161-170 (P. Bellwood ed., *Indo-Pacific Prehistory 1990,* Vol 1)
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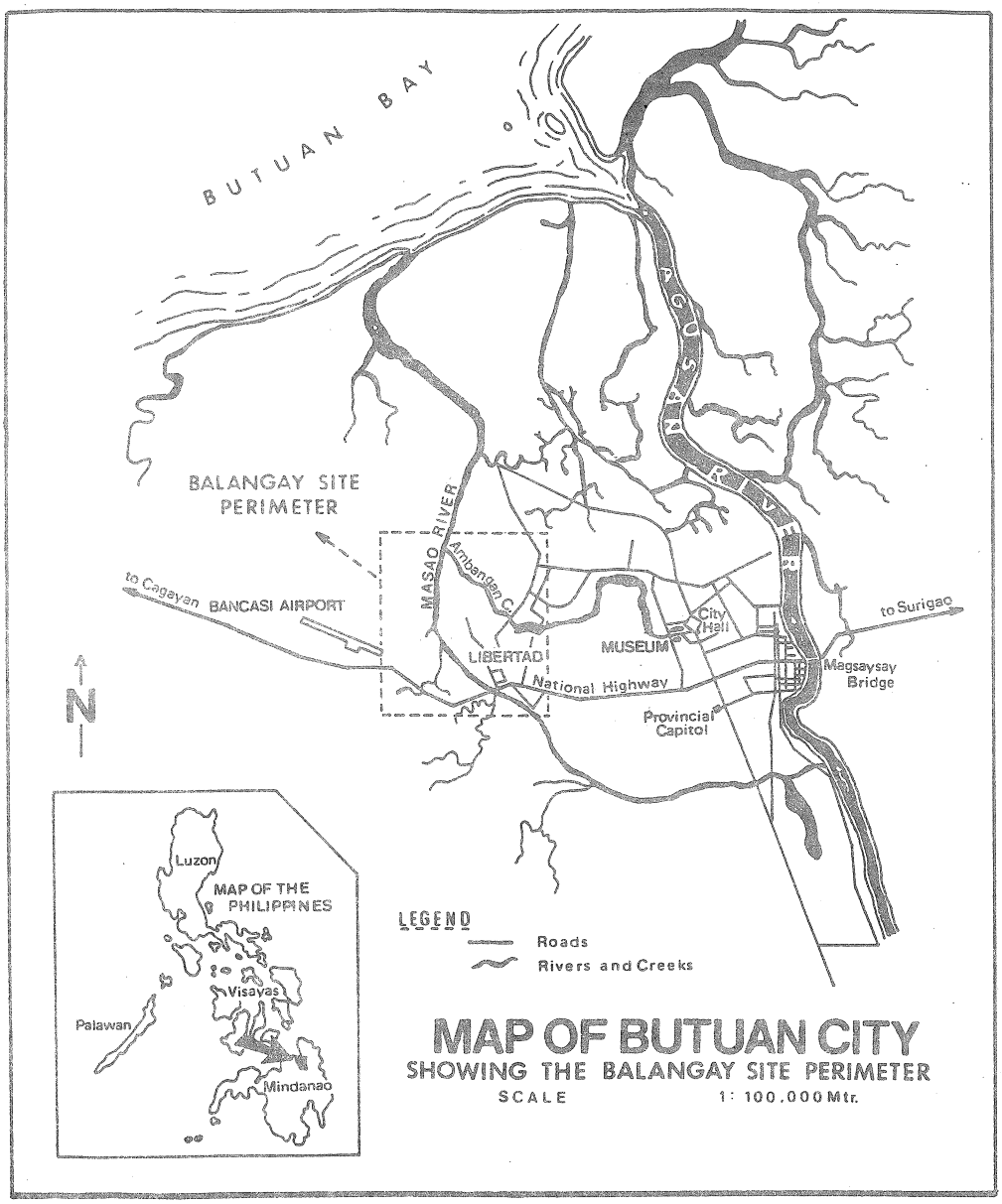

FIGURE 1: MAP OF BUTUAN CITY

FLORA AND FAUNA

The vegetation in the higher elevation of the province is predominantly dipterocarp forest. The dipterocarp species are important sources of lumber. However, the expansions of slash-and-burn agriculture and logging have resulted in the destruction of

this forest, so that wild animals such as bearded pig, deer, wild cats (*Paradoxurus philippinensis, Viverra tangalunga)* and macaque monkeys (*Macaca philippinensis*) are now observed only on the mountain slopes. At lower elevations, grasslands are converted into agricultural areas planted with rice and maize. Coconuts dominate the riverine and swampy areas while mangrove and nipah (*Nipa fruticans*) groves are abundant in the tidal flats at the mouths of streams and sheltered bays.

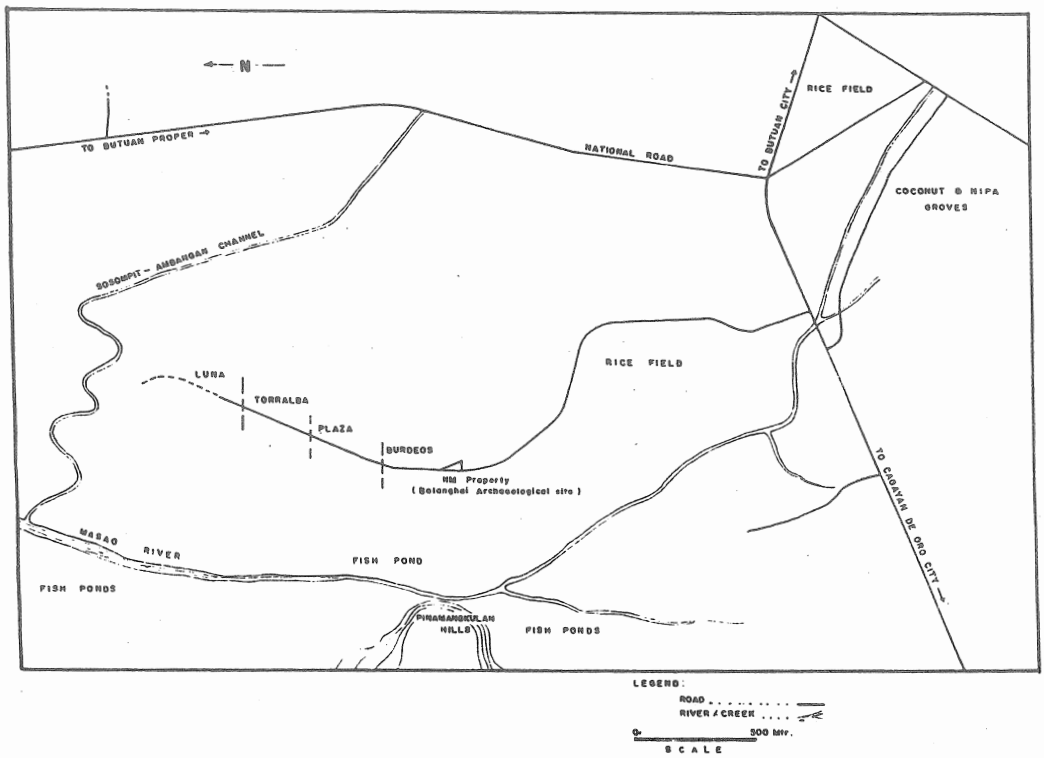

FIGURE 2: THE AMBANGAN ARCHAEOLOGICAL SITES

Birds are represented by white-collared kingfisher (*Halcyon chloris*), coucal (*Centropus* sp.), Philippine mallard (*Anas luzonica*), green-winged pigeon (*Chalcophaps indica*) and fantails (*Rhipidura* sp.). Several species of snakes, lizards, frogs and rats (*Rattus* sp.) are also observed in the area. In the riverine and swampy grounds, several species of crustaceans such as *Pachygrapus* sp., *Sesarma* sp. and *Thalassina anomala* abound.

In the mangrove and freshwater tributaries, crabs of the species *Uca (Deltuca) coarcta*, *Metapograpsus latifrons, Varuna litterata* and *Neoepisesarma lafondi* occur. Shellfish include nerite shells (*Neritina [Vittina] waigiensis*), horn shells (*Telescopium telescopium*) and mangrove clams (*Geloina coaxans*). The distribution of these invertebrates in some areas is now restricted because several square kilometers of mangrove forests and swamps have been converted into prawn and fish ponds.

Land Snails
- *Helicostyla* spp. (2 species)
- *Ellobium aurisjudae* (Linn., 1758)

Freshwater Snails
- *Pila ampullacea* (Linn., 1758)
- *Thiara* spp. (2 species)
- *Faunus ater* (Linn., 1758)
- *Vivipara* sp.
- *Bellamya sumatrensis* (Dunker, 1852)
- *Thiara scabra* (Muller, 1774)
- *Brotia costula* (Rafinesque, 1883)
- *Melanoides tuberculata* (Muller, 1774)
- *Melanoides punctata* (Lamarck, 1822)
- *Melanoides torulosa* (Bruguiere, 1789)

Freshwater Bivalves
- *Cycladicama cumingi* (Hanley, 1844)
- *Anodonta (Sinanodonta) woodiana* (Lea, 1834)

Brackish Univalves
- *Telescopium telescopium* (Linn., 1758)
- *Terebralia sulcata* (Born, 1778)
- *Terebralia palustris* (Linn., 1758)
- *Neritina variegata* (Lesson, 1831)
- *Neritina (Vittina) waigiensis* (Lesson, 1831)
- *Cerithidea cingulata* (Gmelin, 1791)
- *Neritina (Provittoida) coromandeliana* (Sowerby, 1832)

Brackish Bivalves
- *Geloina coaxans* (Gmelin, 1791)
- *Azorinus abbreviatus* (Gould, 1861)

Marine Univalves
- *Cellana testudinaria* (Linn., 1758)
- *Trochus niloticus* (Linn., 1758)
- *Turbo marmoratus* (Linn., 1758)
- *Turbo bruneus* (Röding, 1798)
- *Turbo (Marmarostoma) crassus* (Wood, 1828)
- *Turbo* sp.
- *Nerita albicilla* (Linn., 1758)
- *Nerita undata* (Linn., 1758)
- *Natica lineata* (Röding, 1798)
- *Lambis lambis* (Linn., 1758)
- *Strombus luhuanus* (Linn., 1758)
- *Strombus canarium* (Linn., 1758)
- *Cypraea annulus* (Linn., 1758)
- *Mauritia arabica* (Linn., 1758)
- *Chicoreus capucinus* (Lamarck, 1822)
- *Chicoreus* sp.
- *Murex* sp.
- *Nassarius (Zeuxis) olivaceus* (Bruguière, 1789)
- *Latirus* sp.
- *Conus (Lithoconus) litteratus* (Linn., 1758)

Marine Bivalves
- *Anadara scapha maculosa* (Reeve, 1844)
- *Tegillarca granosa* (Linn., 1758)
- *Spinearca fausta* (Habe, 1953)
- *Ostrea* sp.
- *Isognomon isognomon* (Linn., 1758)
- *Malleus malleus* (Linn., 1758)
- *Spondylus* sp.
- *Hippopus hippopus* (Linn., 1758)
- *Asaphis dichotoma* (Anton, 1838)
- *Gafrarium tumidum* (Röding, 1798)
- *Gonimyrtea (Alucinoma) soyoae* (Habe, 1958)
- *Pillucina (P.) pisidium* (Dunker, 1860)
- Family Limidae
- *Placuna* sp.
- *Tapes (Amyglada) japonica* (Deshayes, 1853)
- *Anodontia edentula* (Linn., 1758)
- *Dendostrasea folium* (Linn., 1758)
- *Vulsella vulsella* (Linn., 1758)
- *Hawaiarca uwaensis* (Yokoyama, 1928)
- *Trapezium (Neotrapezium) liratum* (Reeve, 1843)

TABLE 1: SPECIES OF MOLLUSCS REPRESENTED IN THE AMBANGAN MIDDENS

METHODOLOGY

The animal remains included in this study were recovered from the midden layer discovered in 1981-1990 in five archaeological sites within the Ambangan area (Fig.2). These were Balangay 1, Burdeos, Plaza, Torralba and Luna. Significant animal remains recovered by gold panners are also included in the study.

The identification of shells was based on Burch 1981, Dance 1974 and Abbott 1948, while the identification of bones was based on Bautista 1982. Information on MNI (minimum number of individuals) for bivalves was gathered and cut marks were also recorded on both shells and bones. With regard to bones, observations were based on

Binford 1981 and on comparison with traces of cut marks on bones in the osteological reference collection of the National Museum in Manila.

With regard to domestication, osteometric data on wild and indigenous domesticated chickens of the Philippines (Bautista 1988a) were used to classify the archaeological chicken bones. Animal remains utilized as implements and ornaments are also described.

RESULTS

Molluscan remains represented in the excavated collections are listed in Table 1. Crustacean remains were also recovered from the archaeological excavations. The most commonly encountered parts were claws or pincers. With regard to bone remains, shark, sting ray, varieties of bony fishes, sea turtle, box pond turtle, crocodile, python, chicken, rat, macaque, large carnivore, dog, goat, pig, dugong, deer and rhinoceros were all recovered. Major observations will now be listed.

CHONDRICHTHYES (sharks and sting rays): vertebral centra of various sizes were recovered from the excavation sites. The majority represented the trunk and caudal vertebrae of sharks. Spines of sting ray were also recovered.

OSTEICHTHYES (Teleost fish): vertebral centra, neural spines, scales, cranial bones such as dentaries and premaxillae of bony fishes were recovered. The diameters of vertebral centra varied in different specimens, the greatest being 21 mm, the smallest 6 mm. In species recognition, a fragmented dentary with row of knob-like and pebble-like crushing teeth was identified as Family Sparidae (breams) while the other type of fragmented dentary with tooth buds that fused into a beak belonged to Family Scaridae (parrot fish).

CHELONIDAE (Sea turtle: *Chelonia mydas*): fragments of bony carapace, pelvic and pectoral girdles and limb bones were recovered. A fragmented carapace and plastron of *Cuora amboinensis* (box turtle) were also found in the midden layer.

Python reticulatus (python): several pieces of vertebrae of python were identified.

Crocodylus sp. (crocodile): teeth of crocodile were recovered by a gold panner.

Gallus gallus (chicken): remains of chicken were exhumed from all sites in Ambangan. The recovered bones were the humerus, scapula, vertebra, pelvic girdle, femur, tibiotarsus and tarsometatarsus.

Macaca philippinensis (macaque): a portion of mandible with dentition and limb bones was recovered.

Rattus sp. (rat): tibia and incisors of rat were also identified.

Dugong dugong (dugong): ribs of dugong were recovered.

Canis familiaris (dog): the recovered bones of dog were the cranium, femur, ulna, and fragmented maxilla. Premolar and molar teeth were also recovered from the midden layer.

Large Carnivora: one piece of lower canine of large carnivore was found associated with the midden by a gold panner.

Sus sp.: amost all skeletal parts of pig were recovered from the excavation sites, ranging from immature to adult individuals.

Capra hircus: bones of goat were also recovered from the excavation sites. The bones included metacarpals and metatarsals.

Cervus sp.: almost all bones of deer were recovered from the excavation sites, of both young and adult individuals.

Rhinoceros sp.: two superior teeth (right PM4, left M3) were recovered in the midden layer by a gold panner. A worn PM4 (length 44 mm, anterior width 54.9 mm, posterior width 44 mm) has a parastyle fold, weak crochet, anterior fossette, small deep post fossette and a cingulum cusp on the medial surface. An M3 (length 44.2 mm [outer surface], anterior width 42.8 mm, posterior width 35.5 mm) has a parastyle fold, a well developed crochet, anterior fossette and deep post fossette.

Shellfish: it was observed that greatest number of molluscan remains recovered from the excavation belonged to the freshwater bivalve *Anodonta (Sinanodonta) woodiana*. The greatest MNI (minimum number of individuals) recorded in a 2 x 1 meter pit was 209. Another very common mollusc was *Tegillarca granosa*. Most of the gastropods exhibited broken apices and outer lips, perhaps resulting from extraction of meat.

DOMESTICATION

Osteometric data on bone structures collected by Bautista (1988a) were used to determine whether chicken bones were from wild or domesticated birds. Various dimensions of humeri, tarsometatarsi, femora and tibiotarsi were measured and the results plotted on scattergrams. Scattergrams for all bones measured revealed that the chicken remains belonged to a domesticated form. Figure 3 shows a scattergram for femur proximal widths and breadths, showing that some differentiation in size does occur. The excavated chickens are believed mainly to have been domesticated.

ANIMAL PARTS UTILIZED AS IMPLEMENTS AND ORNAMENTS

Valves of *Tegillarca granosa* with well defined holes on the umbo were presumably used as net sinkers. Shrimp-like objects of carved bone used as squid lures, averaging 65 mm in length, were also recovered from the midden layer. Bone awls manufactured from long bones (fibulae, metatarsals and metacarpals) of medium sized mammals were found in the midden, ranging in length from 79.9 to 160 mm. A probable part of a handle of a dagger made of compact bone was also encountered by a gold panner. This artifact measured 81.6 mm in length and 25.9 mm in width.

Some animal parts were also utilized as ornaments. Shell bracelets were manufactured from the shells of *Conus litteratus* and *Cellana testudinaria*, with average diameters being

83 mm for *Conus* and 77 mm for *Cellana*. Modified antler, bone and teeth of mammals with evidence of drilling include a tine of *Cervus* antler with a basal hole, a pig canine, crocodile teeth and the rhinoceros molar and premolar (described above). Rings were manufactured from shark vertebrae, up to 152 mm in diameter and 17.1 mm in thickness. One ring was carved with 4 linear groove encircling the outer portion of the vertebral body. An ivory stamp seal with an inscription reading *tbad* or *twan* was also recovered by a gold panner. This had a diameter of 32.8 mm. Another worked piece of bone had a mushroom-like appearance with a large stalk and unexpanded cap, measuring 40 mm in length.

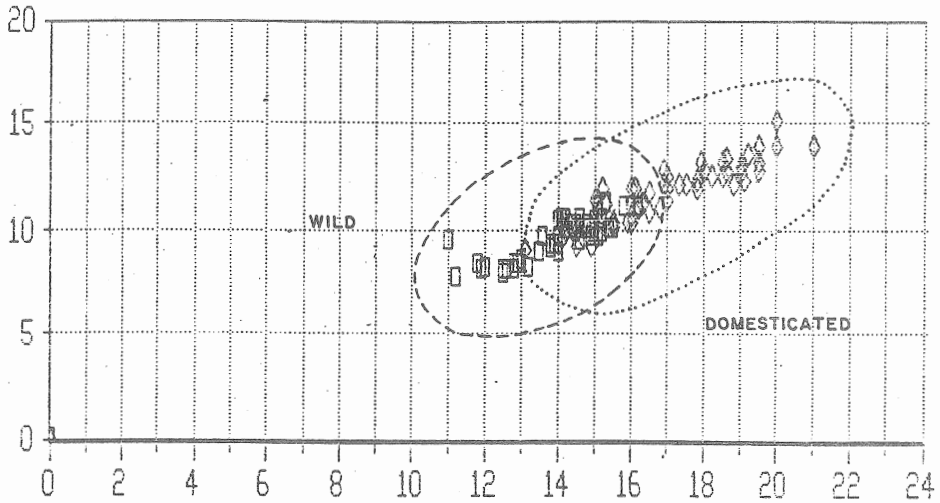

FIGURE 3: DIMENSIONS OF FEMUR PROXIMAL ENDS FOR AMBANGAN FOWL
Vertical axis = depth; horizontal axis = breadth (in mm)

Three pieces of wooden animal figures were also recovered, one being of a pig which lacked features of the wild form; there was no protruding canine and the limbs were short. The second carving represented a parrot fish with a protruding head and a beak-like mouth. The third figure was carved in a stylized form of a lizard.

DISCUSSION

Systematic excavation in the Ambangan site has revealed that a prehistoric settlement of stilt houses was established in the riverine area between the 9th and 12th centuries AD. The discovery of a midden layer with considerable animal remains has provided evidence for the prehistoric environment as well as for the exploitation of animals in the past. Preliminary interpretation of the zooarchaeological materials reveals that some of the animal species represented in the midden layer are now locally extinct, such as the shellfish *Anodonta (Sinadonta) woodiana* and the marine mammal *Dugong dugong*. The dugong is now included in a list of endangered species of Philippine fauna.

One of the most significant finds was the recovery of a rhinoceros premolar and molar with evidence of drilling through their roots. According to Bautista (1988b), the anterior width of the PM4 is within the limits for recent *Rhinoceros sondaicus* (Javan rhinoceros) but the posterior width is shorter by 3 mm than the outer lower limit for this species. The anterior width of the M3 is shorter by only 0.2 mm than the lowest value for recent Javan rhinoceros, while the length of the outer surface is within the limits for the Javan species. Comparison with the metric characters of Philippine rhinoceroses from the Pleistocene reveal that they are smaller than the Ambangan specimen. The morphological description of the teeth also resembles closely that of *Rhinoceros sondaicus* (Bautista 1988b). These specimens were recovered by a gold panner in the midden layer associated with trade materials from Southeast Asia and China and probably were brought to the Philippines from the south. The canine of a large carnivore found associated with tradewares was also probably brought to the site from another country.

In the midden layer, the majority of the zooarchaeological materials were food debris and small freshwater snails of the Thiaridae family which represented a natural death assemblage. Molluscs utilized as sources of food were of freshwater, brackish and marine species. These materials had broken apices and outer lips which provided evidence as to how the meat was extracted from the shell. The greatest number of molluscan remains represented in the midden layer belonged to the freshwater species *Anodonta (Sinanodonta) woodiana*. The recovery of this species is significant because it no longer exists locally. Today, the most commonly exploited shellfish in Ambangan is the brackish mangrove clam *Geloina coaxans*. This species was also recovered in the excavation but only in small quantities.

These differences are probably due to change in the local environment. Based on the geological study by ASEAN (1986), it appears that freshwater tributaries existed locally in the 10th century which were probably the sources of *Anodonta*. Brackish environments also existed in the area but not extensively. The successive accumulation of sediments brought about by frequent flooding resulted in the formation of an expanded delta, transforming the area into a plain with extensive swamps, marshes and estuaries, eventually leading to the gradual shrinkage of the Masao River in the west. This led to the loss of the natural habitat for *Anodonta*.

The recovery of sea animals such as shark, large bony fish and sea turtle as well as dugong revealed that different methods of fishing/hunting were used by the early settlers. Sharks are ocean dwellers, while large bony fish inhabit outer reefs and the open sea. Sharks were probably caught by the use of bait and spears with the aid of a well-structured boat. With regard to teleost fish, Sparidae (breams) and Scaridae (parrot fish) were probably caught by the use of spears. Many net weights were also recovered from the excavation (Cembrano 1988). Fragments of the bony carapace of green sea turtle (*Chelonia mydas*) were recovered in all sites studied. This sea turtle is also an ocean dweller but it lays eggs on the sandy shore. In present communities of the coastal area sea turtles are being butchered for their unlaid eggs, which are considered a delicacy. Rural folk use marine turtle eggs, fresh blood and liver as cures for asthma (Fontanilla 1980:13).

Terrestrial hunting was probably one of the activities of early settlers of Ambangan. The recovery of bone remains of deer, macaque and python suggested a range of hunting activities. Deer inhabit tracts of primary forest but can also be seen in clearings, cultivated areas and even in mangrove type forest. Most of the bones of mammals and sea turtle possessed cut marks. Butchery techniques can be inferred from repetition in observed cuts at exactly the same structural points. Anatomical reasons for specific cuts can also be inferred. Cut marks on bone were almost hairline in size, probably caused by the use of metal knives.

Butchery techniques observed include the following. Several pieces of vertebral centra of bony fish had cutmarks as a result of dismemberment and processing. Cut marks on the proximal parts of chicken femora were observed, probably inflicted as a result of food processing. Ribs of dugong exhibited cut marks which were probably the result of cutting off the distal end of the rib during the separation of the sternum from the ribs.

Cut marks observed on the ascending ramus of pig mandibles may be related to the cutting of the muscle that connects the mandible to the cranium. Cut marks were also observed on the medial sides of pig mandibles which might be related to the cutting of the mylohyoid muscle during removal of the tongue. Filleting marks were also observed on the lateral surfaces of pig mandibles, probably related to the removal of the meat. Other cut marks on parts of pig skeletons occurred on atlases and cervical vertebrae, on the transverse processes of lumbar vertebrae, on the distal ends of ribs, on scapulae, pelvic girdles, on the distal ends of humeri and the proximal ends of tibiae, and on metatarsals.

Cut marks on deer bones occurred on cervical vertebrae, on the distal ends of humeri, on radii, on the proximal ends of tibiae and on tibia shafts, and on acetabula and metatarsals. Cut marks also occurred on many other unidentified mammal bones. Based on the overall observations of cut marks the activities generally involved were primary butchering, disarticulation or dismemberment and secondary butchering such as filleting and processing of parts for cooking and consumption.

Aside from the utilization of animals as food items, there was evidence that shell and bone materials were used as implements and ornaments. The recovery of shell sinkers and squid lures provided additional evidence that sea food hunting was practiced by the early settlers.

This report is preliminary and there is still a need to conduct a systematic excavation in the Ambangan area in order to gather reliable data. The data presented provide a glimpse of the environment and economy of a people who sailed in plank-built boats and settled in the coastal area of Ambangan.

ACKNOWLEDGEMENTS

I would like to express thanks for the assistance rendered by the following individuals: Mr Ricardo de Guzman, Mr Miguel Accion Jr., Ms Nora Rosales, Mrs Agustina Tamayo, Ms Lolita Illana, Mr Teodoro Armero, Mr Ismael Acosta, Mr Marcelo Bayambago, Mr Bernandinito Galpo, Ms Hazel Bautista, Mrs Margarita Cembrano, Mr Jaime Cabrera

and Dr Postma. I would also like to thank Mr Wilfredo P. Ronquillo and Dr Eusebio Z. Dizon for their support on the Butuan Archaeology Project.

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