A Musical Nature: Pre-Columbian Ceramic Flutes of Northeast Honduras

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ZUSAMMENFASSUNG

Archäologen sind gerade damit befasst, eine vorkolumbische Kulturgeschichte für den nordöstlichen Teil von Honduras zu schreiben. Forschungen in dieser isolierten, fernen Region Zentralamerikas haben bereits zu einem begrenzten Verstehen materieller Hinterlassenschaften und der lokalen kulturellen Prozesse geführt. Fest steht, dass hier eine große kulturelle Grenzregion begann bzw. endete, die während der Zeit des ersten europäischen Kontakts in der ersten Hälfte des 16. Jhds. dünn von indigenen Gruppen bewohnt, über mehrere Jahrhunderte zuvor aber in unterschiedlich intensivem Austausch mit den in nordöstlicher Richtung florierenden Maya-Gesellschaften Guatemalas und den in südöstlicher Richtung gelegenen Isthmo-Kolumbischen Kulturen stand. Die örtliche Bevölkerung, die möglicherweise mit den Payasprachigen Pech in Verbindung gebracht werden kann, stellte während der letzten beiden vorkolumbischen Phasen von Nordost-Honduras (Transitional Selin und Cocal, ca. 800–1530 n. Chr.) handmodellierte Flöten aus Keramik her, die bislang von der Forschung unberücksichtigt sind. In diesem Beitrag behandeln wir eine kleine Auswahl dieser Instrumente, die von den Bay Islands vor der Honduranischen Küste stammen.

1 INTRODUCTION

Northeast Honduras is situated on the frontier between the Mesoamerican and Intermediate (or Isthmo-Colombian) culture areas of Central America defined by anthropologists (Fig. 1)[1]. In antiquity, the northeast Honduras region[2] showed cultural affiliations with its Mesoamerican neighbours to the northwest prior to 300 B.C., while in later times the social affiliation seems to have been closer to its Chibchan neighbours to the southeast (Fig. 2)[3].

Knowledge of the earliest indigenous inhabitants of northeast Honduras derives from ethnohistoric accounts and archaeology. Regarding the former, several noteworthy accounts about the region were recorded in the early decades of the 16th century. The first expedition, led by Christopher Columbus himself in 1502, resulted in a description of a face-to-face encounter between the Europeans and a native trading canoe in the Bay Islands, just off the coast of northeast Honduras. The event was described by Columbus, and others traveling with him, in diaries and letters to Spain[4]. About two decades later, in 1525, following the conquest of the Aztecs in Central Mexico, Hernando Cortes[5] travelled to northeast Honduras, established the community of Trujillo (now the capital of the department of Colon), and described some of the native inhabitants and their lifestyle. Collectively, these ethnohistoric accounts provide some of our only insights to the aboriginal population of Honduras in the early 1500s. Despite these early European explorations, the region became an economic backwater with little colonization or development until the early decades of the 20th century.

Given the remoteness of the region, and considerable difficulties of travel and communication, artifact collecting and the first archaeological excavations on the islands and adjacent mainland of northeast Honduras began only in the 1920s and 1930s and were very sporadic[6]. One set of collect-

1 Healy 1976, 1984a, 1984b; Hoopes/Fonseca 2003; Kirchhoff 1943; Willey 1959, 1966.

2 The northeast Honduras region is composed of the modern political departments of Bay Islands and adjacent Colon in their entirety, as well as the northern portion of the department of Olancho and the western portion of the department of Gracias a Dios (Dennett 2007, 14–15, figs. 1.3-1.4).

3 Dennett 2007, 14; Dennett *et al*. 2008; Healy 1974, 1976; Healy/Dennett 2006; Holt 2000, 44; Stone 1941.

4 More details about this remarkable first cross-cultural meeting were published years later by the historians Herrera (1726–1730), Las Casas (1875–1876), and Martyr (1812).

5 Cortes 1908.

6 Spinden 1925; Stone 1941; Strong 1935, 1948.

ing expeditions of this early era in the Bay Islands, conducted by two British investigators, is of particular interest to us due to their recovery of a number of ceramic musical instruments. A sample of these artifacts is examined by us in some detail below.

The first attempts to establish a chronology by relative cross-dating of ceramics with the better-studied Maya subarea began only in the late 1950s[7]. However, it was not until the mid-1970s that modern archaeological investigations were undertaken[8]. These revealed an incomplete three-period ceramic chronology, anchored by the first radiocarbon dates for the region[9]. More recently, archaeologists have again returned to northeast Honduras and begun to reconstruct the lifestyle and socio-political organization of the archaeological cultures there[10].

The Transitional Selin Period (A.D. 800–1000) marked the cultural shift into the final Pre-Columbian era of the region, the Cocal Period (A.D. 1000–1530). A number of archaeological sites of northeast Honduras have been dated to this time span, including Dixon Site and Indian Hill (on the Bay Islands); Selin Farm, Rio Claro, Piedra Blanca, and Peroles Calientes (near the North Coast); and La Cooperativa, Marañones, Limoncito (in the interior of Honduras)[11]. Based on the archaeological data and limited ethnohistoric descriptions, we suspect that these late groups were organized as chiefly societies. In antiquity, Central American chiefdoms were typically marked by: at least two levels of site hierarchy with a distinct central place; differences in size and quality of residential architecture reflecting status differences; communal labour projects; food surpluses and food storage facilities; specialized craft production (such as musical instruments); rank ordered burials with clear status levels; importation of valuables from outside the region; and warfare (sometimes intense conflict)[12].

Although the debate continues, recent research suggests that the Cocal culture, in particular, was most likely composed of Chibchan speakers (derived ultimately from Lower Central America and South America) who lived in a stratified society with sites marked by large earth-and-stone platforms and perishable wood-and-thatch buildings. They were farmers (e.g., maize and sweet manioc), skilled potters, and imported exotic materials from afar (e.g., obsidian, copper bells, Tohil Plumbate pottery, chalcedony bifaces, etc.). Today, the modern Pech, who speak Paya (a Chibchan-family language), are the most likely descendants of the Cocal peoples of 500 years ago[13].

Given the tardiness and spottiness of the archaeological research, it is not surprising that almost no information about ancient music or sound-producing instruments has been previously reported. Here we provide some of the first detailed evidence regarding prehistoric aerophones from this remote and poorly understood part of Central America.

2 PRE-COLUMBIAN CERAMIC FLUTES OF NORTHEAST HONDURAS

Among the archaeological finds of northeast Honduras are some tubular flutes and a large group of globular vessel flutes (or ocarinas)[14] (Figs. 3–16). In the archaeological literature for Central America, these instruments have often been incorrectly described as whistles (or *silbatos*, in Spanish). By definition, these are flutes without stops, producing one tone which can be modified only by changing the air pressure and other playing techniques, such as tongue and throat modulation[15]. Indeed, as will be discussed, the Pre-Columbian ceramic aerophones from northeast Honduras are single-chamber vessel or tubular flutes with exterior ducts and four stops, and they possess a considerable tonal range. The instruments are flutes in anthropomorphic or zoomorphic shape and have a mouthpiece with a narrow air duct to channel the player's breath; an aperture (or windway) of different shapes (circular, semicircular, rectangular, and mixed forms); tubular or globular (both hemispherical and oval) resonators; and stops (or finger holes) in the top wall which served to manipulate the airflows within the resonating chambers and, thus, the production of melodies composed of dif-

7 Epstein 1957.

8 Healy 1974, 1976, 1978a, 1978b, 1984a, 1984b; Veliz 1978; Veliz *et al.* 1977.

9 The periods (and sub-periods) of northeast Honduras are: Cuyamel Period (1200–300 B.C.); Selin Period (Early Selin: A.D. 300–600, Basic Selin: A.D. 600–800, Transitional Selin: A.D. 800–1000); Cocal Period (Early Cocal: A.D. 1000–1400, Late Cocal: A.D. 1400–1530), after Healy (1978a, 61) and Dennett (2007, Fig. 2.1).

10 Begley 1999; Clark *et al.* 1985; Cuddy 2007; Dennett 2007; Healy/Dennett 2006.

11 Begley 1999, 192; Cuddy 2007: Dennett 2007, 89, Fig. 5.13; Healy 1978a, 1978b; Veliz 1978.

12 Creamer/Haas 1985, tab. 1.

13 Dennett 2007, 13–14; Sapper 2000; Stone 1941, 9–10.

14 Italian in origin, the term ocarina dates to the 19th century and translates literally as "little goose". There is still debate about whether it is appropriate to apply this term to Pre-Columbian ceramic wind instruments, as it is the name which the instrument maker Giuseppe Donati gave to his particular ceramic wind instrument, a stopped flute with a transverse conical resonator and different sized stops. However, the term is commonly applied today to all kind of ceramic vessel flutes of the prehistoric Americas, Europe, and China.

15 E.g., Boggs 1974, 63; Olsen 1986, 114; Both 2005a, 30.

ferent pitches. While the northeast Honduran ocarinas are stopped (i.e., the resonators show no exit or sound hole), the tubular flutes are open at the distal end of the tubes. As demonstrated through our testing, these exit holes could have served as additional stops when playing the instruments.

Studies of early vessel flutes from Colombia indicate that such instruments could be fine-tuned to allow a group of these instruments to play "in harmony"[16]. However, such general claims often ignore or simply overlook the possibility that Pre-Columbian instruments were most likely the subject of quite different, indigenous aesthetics. Suggestions like this (e.g., playing "in harmony") derive from a Western concept based on the socialized musical aesthetics of perceiving certain intervals to be pleasant or not. Even if Pre-Columbian flutes could be played "in harmony" for the Western ear, this was probably not the original intention. Thus, as in most Pre-Columbian ceramic wind instruments of the Americas, there was probably not much attention paid to positioning the finger holes at exactly the same places. Also, there were few attempts to match equal volumes of the resonating chambers. Indeed, it seems more likely that the ancient instrument makers placed the finger holes and other organological features wherever suitable, although within a specific, conventionalized framework. Even if skilful indigenous flutists could play these instruments "in harmony", or even in unison by applying different air pressures, it is much more likely that the music produced in antiquity followed rules of still unknown indigenous aesthetics which may not have matched Western rules at all.

The individual complexity of Pre-Columbian duct flutes, such as those of northeast Honduras, is important to note because it implies a significant degree of crafting skill and musical knowledge to hand-produce many of these instruments. Indeed, it is not unreasonable to suggest that a high degree of ceramic craft specialization existed, perhaps at the chiefdom level, in order to create such aerophones in antiquity. As will be discussed below, these instruments were not simply toys, but were probably regarded as important ritual objects. It should also be noted that while our focus herein is on fired clay (ceramic) flutes, similar and other instruments may also have been made of organic materials (e.g., bone, wood, etc.), which are far less likely to be recovered due to problems of poor preservation[17]. Unfortunately, ethnographic studies of flute use in northeast Honduras are lacking because, by the 1900s terracotta wind instruments were no longer being produced in the region[18].

One of the first descriptions of Pre-Columbian wind instruments from northeast Honduras was made by Strong[19]. Four ceramic ocarinas were recovered from the Indian Hill site on Barburata Island, although only one was complete. All appear to have originally had four stops on the top surface, with a more or less tubular mouthpiece at one end. In each of these instruments, the aperture was located on the undecorated lower underside, near to where the mouthpiece joins the body. Strong[20] was of the opinion that three of these ocarinas were modelled to resemble sea cows, the West Indian Manatee (*Trichechus manatus*). The lateral flippers of the sea cow ocarinas were perforated, presumably for threading a cord to suspend the instrument around the neck. This is a feature common to virtually all flutes from this region. The upper surface of each Indian Hill specimen was decorated with incised lines and punctations, a decorative style which we know to be representative of the Transitional Selin to Cocal Periods (ca. A.D. 800–1530). The fourth specimen was broken, but "represents a stocky conventionalized human figure"[21]. According to accounts, the local Bay Island inhabitants had many ocarinas of this latter (anthropomorphic) form in their private collections of artifacts in the 1930s, suggesting that they may have been as common as ocarinas with animal (zoomorphic) representations[22].

Archaeological investigations four decades later at the sites of Selin Farm and Río Claro in the department of Colon have produced the first securely dated remains of prehistoric wind instruments from northeast Honduras[23]. A single, broken specimen from Selin Farm, dating to the Transitional Selin Period (A.D. 800–1000), consists of a human head with an air duct which served as mouthpiece (Fig. 3). Unfortunately, the body of the figure is missing, making it difficult to reconstruct its entire original form.

The second excavated specimen is complete, and comes from the site of Río Claro. It is a well-made, ceramic ocarina in the form of a small anthropomorphic figure (almost 4 cm long, 2.8 cm wide, and about 2.3 cm thick), with four circular stops on the top surface (Fig. 4). The figure's arms, reaching to the head, create loops (openings) on each side of the head, again presumably for suspending the instrument. The belly has an oversized, protruding naval, and the globular body is decorated with an incised and jabbed collar/neck

16 Dessy/Dessy 2001, 12.
17 Boggs 1974, 63.
18 Conzemius 1932, 112.
19 Strong 1935, 105 pl. 27, 2a–c, g.
20 Strong 1935, 105 pl. 27, 2a–c.
21 Strong 1935 pl. 27, 2g.
22 Strong 1935, 105.
23 Healy 1976, 1978a, 1978b.

decoration. Finger-pinched feet are depicted as fin-like appendages with incised lines. This artifact was a surface find, recovered atop the remains of what was most likely a domestic structure at Río Claro. Decorated, associated ceramics, as well as the incised-punctate decorative style on the aerophone itself, indicate that this Río Claro ocarina dates to the Early Cocal Period (A.D. 1000–1400)[24]. The specimen was fully functional, but not tested for its acoustics[25].

3 SOME FLUTES OF THE FEACHEM-MOYNE COLLECTION

In 2006, Healy examined the Feachem-Moyne Collection of archaeological material collected in 1937 and 1939 from the Bay Islands of what is today northeast Honduras, followed by acoustical tests of the aerophones made by Both in 2008[26]. Most of these artifacts are now housed at the Museum of Archaeology and Anthropology at the University of Cambridge in England[27]. The collection, consisting of over 3000 specimens, is in deep storage, and contains an array of ceramic, lithic, shell, bone, and metal artifacts collected by Lord Moyne in 1937 while traveling by vessel along the Caribbean coast of Central America[28]. Two years later, in 1939, Richard W. Feachem, a student at Cambridge, visited the Bay Islands and collected additional archaeological material. Most of it was added to the holdings at Cambridge. Unfortunately, notes from both expeditions fail to provide the requisite detailed contextual information expected today. Comments rarely go beyond linking certain artifacts to one of the various islets composing the Bay Islands.

Following World War II, Feachem completed a master's thesis at the University of Cambridge reporting on the entire collection. At the time of writing, Feachem had no clear idea of the dating of the specimens, nor their cultural affiliation. Secure chronology for the region only became available with the advent of radiocarbon dating, with the first absolute dates for northeast Honduras produced only in the 1970s[29].

The Feachem/Moyne collection today contains over 40 whole or fragmentary flutes. Here we examine and illustrate only a very small sample of these complete sound-producing artifacts. A detailed paper discussing other flutes types from this remarkable collection will be prepared in future.

Anthropomorphic Tubular Duct Flute

UC Museum Catalogue #1947.411 A

A straight tubular flute of 10.6 cm (length) x 6 cm (width) x 2.6 cm (depth) with three vertically aligned stops of 0.6–0.7 cm in diameter and a sound hole at the distal end which could serve as an additional stop while playing (Figs. 5, 14). The tubular mouthpiece protrudes slightly and shows a flat air duct. The aperture presents a semicircular edge (labium) and is located on the reverse (dorsal) side of the instrument.

The flute is in the form of a standing human figure. It has elaborate decoration, with appliquéd lumps or strips of clay added to the tube to create (top to bottom) a headdress (hat?), the face, two ear ornaments (spools?), a necklace composed of individual elements, two (mostly free) arms "akimbo" with bracelets, and legs with lateral adornments. Incised lines and punctuations indicate the face and the adornments. The hands and feet are indicated only roughly. Either the ear ornaments, which have central open bores, or the arms, which create loops at the figure's side, likely served as suspension holes. The mouthpiece is attached as part of the headdress of the figure.

Playing the instrument, melodies composed of a note range of a bit more than a sixth between G5 $^{-40}$ (1532 Hz) and A#6 $^{-20}$ (1843 Hz) can be produced when the sound hole is used as an additional finger hole. This playing technique is quite reasonable, not only because it was sometimes applied in Pre-Columbian tubular flutes[30], but also because it is highly functional when using both hands (the exit hole at the distal end is operated with one finger of the other hand). Moreover, the exit hole has the same diameter as the stops on top of the tube, another strong argument for the application of this fingering technique. The individual tones which can be played when using all 16 possible finger combinations and the derivation tones which are produced when different air pressure is

24 Healy 1978, fig. 11.

25 The complete Río Claro ocarina was submitted to authorities of the *Instituto Hondureño de Antropología e Historia* (Tegucigalpa, Honduras) in 1976 for permanent curation. The Selin Farm ocarina fragment is housed at Trent University, Canada.

26 The recordings were made with a portable DAT recorder (SONY DTR-80P) and two Rode M3 microphones. Note ranges were tested with a chromatic tuner set to A = 440 Hz and the freeware Spectrogram 16.0.

27 A small subset of the Bay Islands archaeological materials collected in 1939 by R.W. Feachem is now curated at the Museum of Winchester College, Winchester (England). Of particular interest is a single, four-stop ocarina listed as artifact #50 in an unpublished catalogue (John Falconer, personal communication, 2008). It was played, and the tonal range of some fingering positions was recorded: two finger holes stopped = A / Bb; three finger holes stopped = F / F# / G; four finger holes stopped = C (John Falconer, personal communication 2008).

28 Feachem/Braunholtz 1938; Moyne 1938.

29 Healy 1978a, 21–22, tab. 1.

30 Both 2005a, 90–96.

applied are given in table 1. This instrument can also be overblown. Three gradually different pitches per finger combination can be obtained. Microtones in between are playable, giving a great range of melodic possibilities (Tracks 1–3). In some finger combinations, especially in the higher register, a "windy" sound is produced, characterized by a background noise around the fundamental tone. The reason for this effect is possibly more related to the pressure levels of the air within the resonator, which interfere with the incoming air directed towards the edge of the aperture, than to the mouthpiece/air duct – aperture/edge assemblage. In this case it cannot be excluded that the effect was intentional. However, deformations of the assemblage during firing, or tiny damages at the edge due to the conditions of conservation over time, could also be reasons for the effect. The sound of a few of the finger combinations (# 9 and 13) is weak.

Regarding the possible date and spatial distribution of the instrument type beyond the Bay Islands, it is important to note that the specimen appears almost identical to a tubular duct flute described in detail (but not illustrated) from recent Culmi Valley (department of Olancho) investigations in the Honduran interior. This tubular, ceramic flute, in the possession of a landowner at the archaeological site of Limoncito, is dated by associated ceramics to the Transitional Selin and Early Cocal Periods (A.D. 800–1400)[31].

Anthropomorphic Globular Duct Flute

UC Museum Catalogue #1946.101 F

A four-stop anthropomorphic ocarina with clearly defined head, arms and legs of 7.2 cm (length) x 6.5 cm (width) x 2.8 cm (depth) (Figs. 6, 15). The blowing hole is placed on top of the figure's head. The air duct is directed towards a circular aperture 0.8 cm in diameter on the back (dorsal) side of the instrument. The aperture has a semicircular extension, which seems to be part of the original manufacture and was most probably designed to change the character of the sound. The resonator is not fully globular (oval) and extends partly into the two legs of the figure, where the two lower stops are placed. In comparable anthropomorphic duct flutes of the collection, this organological feature is even more pronounced, representing a rare transition form between a globular and a multichambered (double) tubular flute (Figs. 7–8). The stops are 0.5–0.6 cm in diameter.

This ocarina has a clear human form, with a well modelled face (eyes, nose, nostrils, mouth), wearing a rounded incised/punctuate headdress, and a raised, punctuate chest ornament (a pectoral?) located between the two upper stops. The nostrils, toes, and fingers are all indicated by simple punctuations. The flute was most likely worn, as it is not free-standing. Perforations are made in the shoulder for suspension. The back side of the instrument is undecorated.

Playing the instrument, it was observed that more air pressure was needed to produce a sound than in the case of the other instruments. This is most probably related to the semicircular extension of the aperture, which requires the air exiting the duct to travel much further before hitting the edge than in most of the other instruments. There is also a little damage on the top left side of the edge of the aperture, but it is doubtful that this had much acoustical effect. The somewhat imprecise hit of the airflow of this instrument is characterized by a band of background noise around the fundamentals, producing a soft, windy sound.

Melodies composed of a note range of slightly more than a full octave between A#5 $^{-20}$ (922 Hz) and B6 $^{-20}$ (1953 Hz) can be produced. The individual tones which can be played when using all 16 possible finger combinations and the derivation tones which are produced when a different air pressure is applied are given in table 2. In this instrument, four different pitches per finger combination can be obtained. Microtones in between are playable, giving a great range of possible melodic possibilities (Tracks 4–6). Nevertheless, it could be that melodies of not more than five or six tones were produced when applying more or less constant air pressure levels. The flute cannot be overblown.

Zoomorphic Globular Duct Flute

UC Museum Catalogue #1946.101 S

A four-stop zoomorphic ocarina with bird-like features of 7.5 cm (length) x 5.5 cm (width) x 4.0 cm (depth) (Figs. 9–10). The blowing hole is located on top of the central bird-like head, which is accompanied by two similar heads without organological functions to the left and right. The air duct is directed towards a semicircular-rectangular aperture placed on the back (dorsal) side of the instrument. The resonator is fully globular, showing the stops on the top side. The distance between the two upper stops is considerably greater than that between the lower ones. Two holes for suspension are located in what appear to be two outstretched (short) wings placed laterally. The instrument is not free-standing.

[31] Begley 1999, 155. 159.

This beautiful ocarina was identified by Feachem[32] as representing a bird. Indeed, the three heads placed on top of the instrument have large and sharply protruding beak-like projections and ringed eyes, giving the impression that pelicans (either the American White Pelican *Pelecanus erythrorhynchos* or the Brown Pelican *Pelecanus occidentalis*) may be represented. Like the previously discussed human figure ocarina #1946.101, the tri-headed bird also has some type of raised, incised chest ornament, possibly representing a pectoral. Two little legs are attached at the lower lateral side. The reverse side of the instrument is undecorated.

Playing the instrument, melodies composed of a note range of more than an octave between E5 $^{+15}$ (665 Hz) and F6 $^{+45}$ (1434 Hz) can be produced. The sound is overall clear, with not much accompanying background noise around the fundamentals, due to the fact that the mouthpiece/air duct – aperture/edge assemblage is well aligned. The individual tones which can be played when using all 16 possible finger combinations and the derivation tones produced when a different air pressure is applied are given in table 3. As in the other ocarinas of the collection, four different pitches per finger combination can be obtained, as well as the microtones in between, giving a great range of possible melodic possibilities (Tracks 7–9). This flute also cannot be overblown.

Zoomorphic Globular Duct Flute

UC Museum Catalogue #Z.35926 C

A four-stop zoomorphic ocarina with turtle features and measuring 6.5 cm (length) x 5.1 cm (width) x 3.5 cm (depth) (Fig. 11). The mouthpiece is in the form of a turtle head, with the blowing hole located where the beak of the turtle should be. The air duct is directed towards a rectangular aperture with an irregular edge, placed on the reverse (dorsal) side of the instrument. The resonator is not fully globular (oval), with the stops on the top side. The distance between the two upper stops is considerably greater than that between the two lower ones. A hole is located in one of the splayed, rear feet, for suspension. The foot on the other side of the instrument, in which most probably the other hole for suspension was located, is broken off. The instrument is free-standing when placed with the reverse side on the ground.

The turtle carapace is encircled by punctuation dots and an incised line ringing the shell. The head and the tail end have grooved tab-like protrusions. The stubby, protruding feet are represented with notched scalloping. The back side of the instrument is undecorated. This specimen is similar to a series of other ocarinas from the collection and to a four-stop ocarina from another collection of artifacts from northeast Honduras (Bay Islands), now curated at the Winchester College Museum, England; it was also collected by F.W. Feachem[33].

Playing the instrument, melodies composed of a note range of a bit less than an octave between A#5 $^{-20}$ (922 Hz) and A6 $^{-40}$ (1720 Hz) can be produced. The individual tones which can be played when using all 16 possible finger combinations and the derivation tones produced when a different air pressure is applied are given in table 4. Four different pitches per finger combination can be obtained, as well as the microtones in between, giving a great range of possible melodic possibilities. The sound of this ocarina is characterized by a considerable amount of accompanying background noise around the fundamentals, due to the irregular edge and the poor alignment of the mouthpiece/air duct – aperture/edge assemblage (Tracks 10–13). This makes the instrument sound extremely "windy", especially in the higher frequency ranges. It is unclear whether the irregular form of the edge was intended or simply the result of damage. Consequently, it remains unclear whether this sound effect was originally intended or not. The flute cannot be overblown.

Zoomorphic Globular Duct Flute

UC Museum Catalogue #1947.411 B

A four-stop zoomorphic ocarina in the form of a fish measures 6 cm (length) x 5.3 cm (width) x 3.3 cm (depth) (Figs. 12, 16). The mouthpiece is placed at the head of the fish. The air duct is directed towards a semicircular-rectangular aperture with an irregular edge, placed on the reverse (dorsal) side of the instrument. The resonator is fully globular, with the stops on the top side. As in the other ocarinas, the distance between the two upper stops is considerably greater than that between the two lower ones. Two suspension holes are located adjacent to the head, in the ventral and dorsal fins of the fish. The instrument is not free-standing.

The fish is represented in side-view with an extended dorsal fin, elaborate tail fin, and a ventral fin. The gills are crudely shown, as are the fish mouth and ringed eye. The reverse side of the ocarina is undecorated, so it was clearly meant to be viewed (worn) with the decorated side visible.

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32 Feachem 1947, 119.

33 The find is listed as artifact #50 in an unpublished catalogue of the Honduran Collection from the Bay Islands, Winchester College Museum, UK (John Falconer, personal communication, 2008). See footnote 27.

On this instrument melodies composed of a note range of an exact octave between G#5 $^{+35}$ (848 Hz) and G#6 $^{+35}$ (1695 Hz) can be produced. The individual tones which can be played when using all 16 possible finger combinations and the derivation tones produced when a different air pressure is applied are given in table 5. Four different pitches can be obtained, as well as the microtones in between, giving a great range of possible melodic possibilities. The sound is very clear and sharp without any background noise, although the edge of the aperture is irregular (Tracks 14–19). The flute cannot be overblown.

Zoomorphic Globular Duct Flute

UC Museum Catalogue #1946.101 O

A four-stop zoomorphic ocarina with features of a sea cow features measures 8.6 cm (length) x 6.9 cm (width) x 5 cm (depth) (Figs. 13, 17). The mouthpiece is placed on top of the head of the sea cow (the West Indian Manatee *Trichechus manatus*). The air duct is directed towards a rectangular aperture measuring 0.8 x 0.7 cm with irregular edge, placed on the undecorated reverse (dorsal) side of the instrument. The resonator is fully globular, with the stops on the top side. The distance between the two upper stops is considerably greater than that between the two lower ones. Two suspension holes are located adjacent to the head, in the lateral flippers of the sea cow. Unfortunately, one of the flippers is partly broken off. The instrument is not free-standing.

The sea cow is represented with two eyes, a snout, two lateral flippers and a tail flipper. Similar instruments from the Indian Hill site on Barburata Island were described by Strong.[34] and identified as representing sea cows, while Feachem[35] identified #1946.101 O and comparable instruments of his collection as representing birds. However, similar looking Selin period vessel lugs from northeast Honduras have been identified elsewhere by archaeologists as representing a sea cow[36]. What Feachem identified as a bird beak appears more like the pronounced snout of a manatee.

Playing the instrument, melodies composed of a note range of a little bit more than an octave between F5 $^{+45}$ (717 Hz) and F#6 $^{-30}$ (1455 Hz) can be produced. The individual tones which can be played when using all 16 possible finger combinations and the derivation tones produced when a different air pressure is applied are given in table 6. Four different pitches can be obtained, as well as the microtones in between, giving a great range of melodic possibilities (Tracks 20–23). The sound of this ocarina is characterized by much accompanying background noise around all fundamentals, due to the irregular edge and the poor alignment of the mouthpiece/air duct – aperture/edge assemblage. This makes the instrument sound extremely "soft" and "windy". As in the other instruments of the collection with such sound effects, it is unclear whether this was intended or not. The flute cannot be overblown.

4 COMPARISONS, FUNCTIONS, AND MEANINGS OF PRE-COLUMBIAN FLUTES IN NORTHEAST HONDURAS

The flutes of northeast Honduras are a significant artifact category. They are found in some abundance (over 40 examples are curated in the Feachem/Moyne collection alone), and apparently were modelled by the resident indigenous population (on both the offshore Bay Islands and on the mainland) to represent humans as well as some types of local (tropical) fauna. The tubular specimens typically represent humans, while the globular vessel flutes depict both humans and animals, with the latter clearly representing avifauna and marine life. Collectively, we see standardized views portrayed. Humans and birds are, without exception, portrayed frontally, with marine animals such as turtles depicted from a top-down perspective, and fish shown laterally (in profile). The sound characteristics of these instruments extend from very windy tones with much background noise to clear and sharp fundamentals. However, it is difficult to verify whether the windy sound effects were intended or mainly the result of minimal deformations of the mouthpiece-aperture assemblage (e.g., due to imperfect shaping or firing). Minimal damage at the edge of the apertures may also affect the sound.

Ceramic wind instruments have a very long and geographically extensive history of use in the Americas. However, with the exception of flutes from the Nicoya region in northwest Costa Rica, dating to Zoned Bichrome sites, at about 800–500 B.C.[37], and to subsequent periods[38], the Intermediate Area of Lower Central America and Colombia appears to lack such instruments before A.D. 800[39]. Neighbouring cultural centers to the north

[34] Strong 1935, 105, pl. 27, 2a–c.
[35] Feachem 1947, 119–120.
[36] Healy 1993, 202–203.
[37] Snarskis 1981, 178, Exhibit #3, 61, 63.
[38] Bischof 1982, 5. 26–27.
[39] Finds dating A.D. 800 and later are reported from central Honduras (Stone/Turnbull 1941), eastern El Salvador (Boggs 1974, 87–91), western Nicaragua (Larry Steinbrenner, personal communication 2007), northwestern Costa Rica (Hickmann 2008, 65), and northern Colombia (Bruhns 1994; Hickmann 2008, 50; Olsen 1986).

and southeast produced sophisticated ceramic flutes long before 1000 B.C., such as in Pre-Classic period Maya sites in the highlands of southern Guatemala and in coastal sites in Ecuador[40]. As stated earlier, the northeast Honduras region showed cultural affiliations with its Mesoamerican neighbours prior to 300 B.C., while in later times the social affiliation seems to have been closer to its Isthmo-Columbian (Chibchan) neighbours to the southeast.

On the basis of this cultural panorama, it appears that the individual features of the discussed wind instruments have more in common with South American cultures, although this does not exclude the presence of some Mesoamerican features inspired by the flutes of earlier cultural centers, such as from the Maya subarea. Indeed, while the circular apertures and the side-view of some of the instruments point more to southern influences, the rectangular apertures may link some other instruments more to cultures of the northwest. The individual features are also mingled, while the individual constructive principles, such as mouthpieces in the form of the heads of anthropomorphic or zoomorphic creatures, and the characteristic morphological features of the flutes, follow a local tradition which existed for hundreds of years in northeast Honduras between A.D. 800 and 1530.

There continues to be debate about the function of these instruments. Played singly or in groups, ceramic flutes might have served in a range of different activities in Pre-Columbian societies. First, and foremost, they functioned as sound-producing devices with a very specific musical aesthetic. However, it is difficult to reconstruct today exactly who played them, and for what reasons. Certainly, the instruments would not have been regarded as children's toys. This is an assumption sometimes made, probably due to the function of comparable European ceramic vessel flutes, which date back to medieval ages[41]. The time and effort estimated to produce these hand-modelled Pre-Columbian flutes makes this a highly questionable proposition.

Alternatively, a number of writers have suggested that Pre-Columbian aerophones were used to produce animal sounds, as devices which could be made to imitate animal calls, and especially bird calls, for hunting purposes. Others suggest that they were used for signals between humans[42]. Signalling, however, was probably never their main function, as the sounds of the instruments were not far reaching; they were neither high-pitched nor loud enough to have been practical for this task. Another form of communication is, however, possible, namely, between humans and the spiritual world. In this context, one can easily imagine that the instruments were played by shamanic practitioners in fertility rites, for curing, divination, and other ritualistic acts[43]. This interpretation is supported also by ethnographic comparisons and analogies. It has been suggested, for example, that some South American ocarinas were effigy figurines used to "conjure supernatural powers or to provide protection from physical or spiritual dangers"[44]. However, ethnographic research from South America, dating to Colonial times, also suggests that flutes were employed for amorous courting[45], among many other possible functions.

Most probably, the instruments represented status symbols and were highly regarded objects, playing an important role chiefly in ceremonies and/or religious activities. Some of the animals represented, as in the case of the manatee flutes and the tri-headed pelican flute, appear to be wearing the same necklace or pectoral that the human figures (anthropomorphic flutes) wear. If the pectoral was a sign of special status, it could be argued that the flutes represent not just animals, but possibly some form of supernatural entity with, so far, unclear meaning.

Pottery, in and of itself, is a static cultural element. Although the fired clay musical instruments of northeast Honduras are part of the basic ceramic repertoire, they do allow us a glimpse into the ideo-social realm of early Central American peoples. So far, there is no evidence for a well-defined "pantheon of gods" in northeast Honduras, of the type seen among the ancient Maya or Aztec cultures of Mesoamerica[46]. Instead, all available evidence points to the existence of an animistic belief system among native groups there. In this world, human beings are portrayed (in ceramics) as one component of the environment, with little or no evidence (so far) for a hierarchical distinction between humans and other animals. Among the flutes identified, we find miniature anthropomorphic (humanoid) figures, as well as representations of forest or sea creatures such as birds, turtles, fish, and possibly manatees. An animistic ideological principle – wherein the soul, or essence, exists in all things of nature[47] – seems to have been at play in the production of aerophones in northeast Honduras. In this context, it is notable that the air ducts of the flutes are placed in the heads of humans and animals, with the player of the instrument blowing into the vertex, giving life and vitality to the creature represented. The underlying concepts of

40 Dessy/Dessy 2001; Lathrap 1975, 104, Exhibit #484, 485.
41 Tamboer 1999, 23–25.
42 Boggs 1974, 108; Both 2006, 319; Healy 1988, 27.
43 Both 2005b; Willey 1978:7; Hickmann 2008, 14–15.
44 Olsen 1986.
45 Boggs 1974, 108.
46 Houston 1993; Miller/Taube 1993.
47 Bird-David 1999, 67.

breath, life, and sound are still not fully understood for this early era.

Although groups like the Maya, for example, may have deified some creatures, such as the jaguar (*Felis onca*), the crocodile (*Crocodylus acutus*), and the quetzal bird (*Pharomachrus mocinno*), this type of animal worship was only one element of a much broader and far more complex belief system which included an array of powerful transformative gods. There is no evidence for this level of spiritual complexity in northeast Honduras. Instead, there seems to be a more general appreciation, perhaps even worship, of all elements of nature. In such an indigenous worldview, human beings appear to have been simply one component of nature, one of many equally important elements.

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TRACKLIST

Track 1 0:27 min.
Track 2 1:05 min.
Track 3 1:41 min.
Anthropomorphic tubular duct flute, UC Museum Catalogue #1947.411 A, free improvisations. Played and recorded by A. A. Both.

Track 4 0:31 min.
Track 5 2:42 min.
Track 6 0:44 min.
Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 F, free improvisations. Played and recorded by A. A. Both.

Track 7 0:18 min.
Track 8 0:47 min.
Track 9 0:41 min.
Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 S, free improvisations. Played and recorded by A. A. Both.

Track 10 1:19 min.
Track 11 0:42 min.
Track 12 0:25 min.
Track 13 1:39 min.
Zoomorphic globular duct flute, UC Museum Catalogue #Z.35926 C, free improvisations. Played and recorded by A. A. Both.

Track 14 0:57 min.
Track 15 1:37 min.
Track 16 0:32 min.
Track 17 1:23 min.
Track 18 1:06 min.
Track 19 0:32 min.
Zoomorphic globular duct flute, UC Museum Catalogue #1947.411 B, free improvisations. Played and recorded by A. A. Both.

Track 20 0:45 min.
Track 21 1:37 min.
Track 22 1:10 min.
Track 23 0:45 min.
Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 O, free improvisations. Played and recorded by A. A. Both.

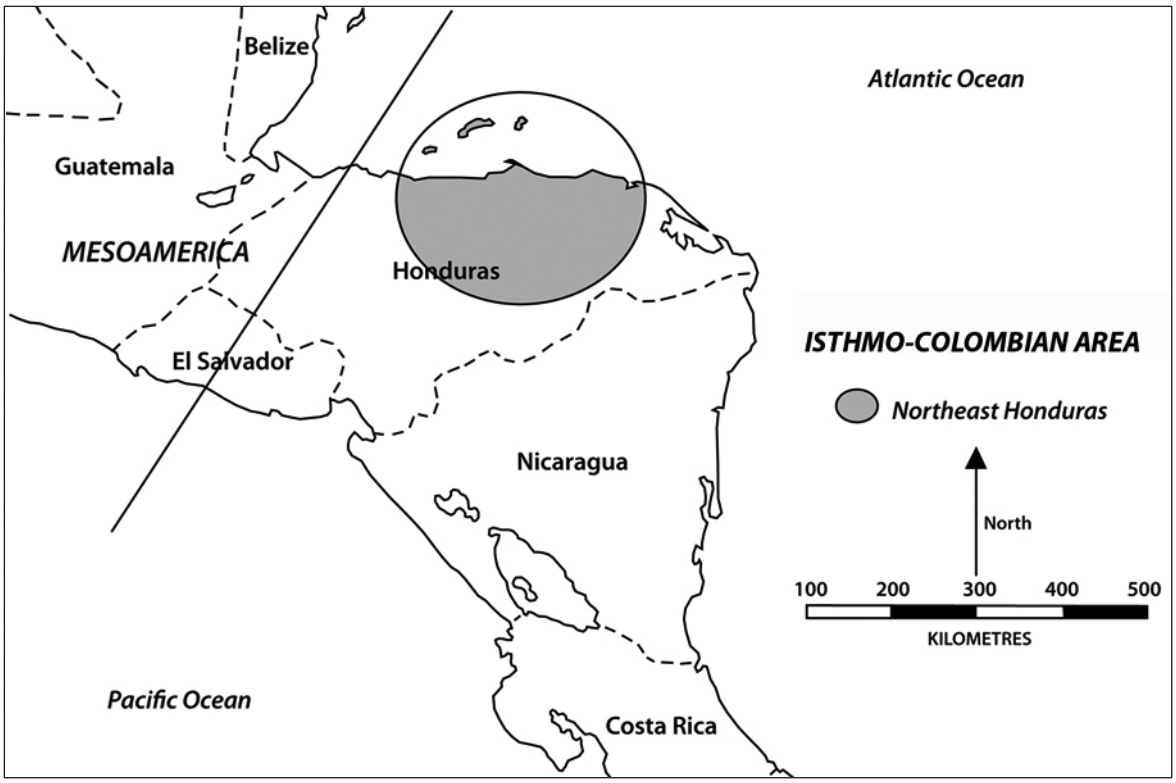

Fig. 1 Map of Mesoamerica and the Isthmo-Colombian areas (after Dennett 2007).

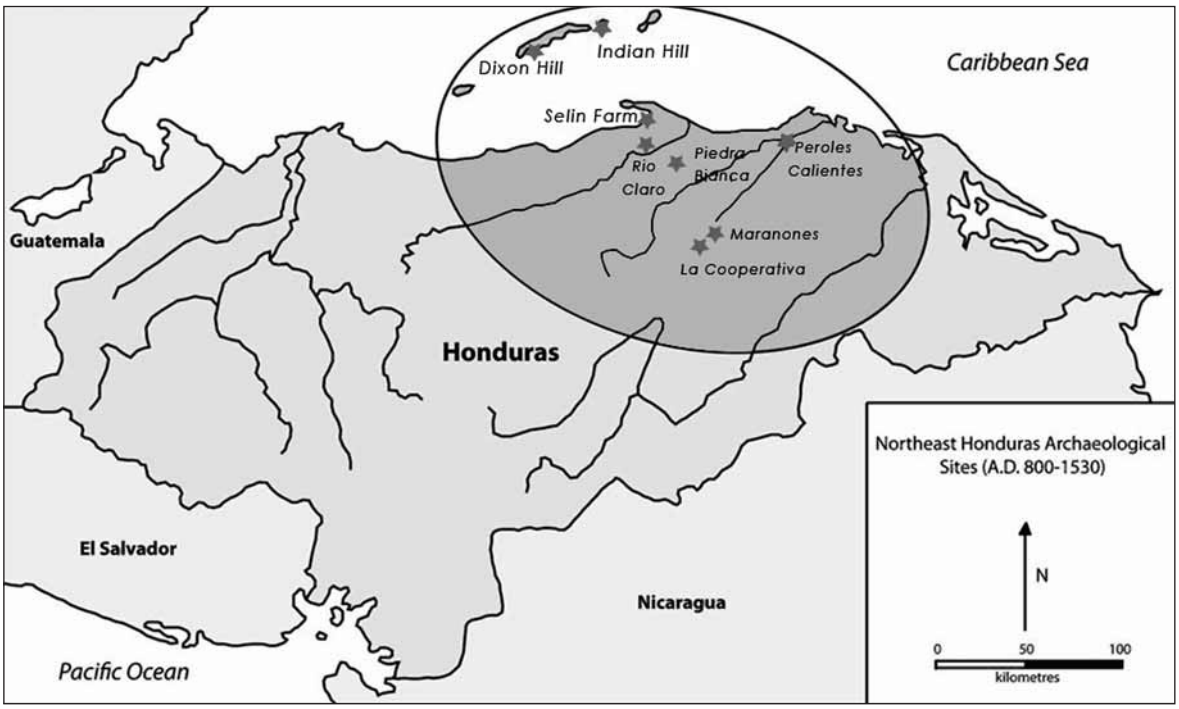

Fig. 2 Map of Honduras with sites mentioned in the text (after Dennett 2007).

Fig. 3 Anthropomorphic globular duct flute fragment from the Selin Farm site (H-CN-5), northeast Honduras (photographed by P. F. Healy).

Fig. 4 Zoomorphic globular duct flute from the Río Claro site (H-CN-12), northeast Honduras (photographed by P. F. Healy).

Fig. 5 Anthropomorphic tubular duct flute, UC Museum Catalogue #1947.411 A (photographed by A. A. Both).

Fig. 6 Anthropomorphic globular duct flute, UC Museum Catalogue #1946.101 F (photographed by A. A. Both).

Fig. 7 Anthropomorphic globular duct flute, UC Museum Catalogue #1946.101 H (photographed by A. A. Both).

Fig. 8 Anthropomorphic globular duct flute, UC Museum Catalogue #1946.101 E (photographed by A. A. Both).

Fig. 9 Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 S (photographed by A. A. Both).

Fig. 10 Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 S (photographed by A. A. Both).

Fig. 11 Zoomorphic globular duct flute, UC Museum Catalogue #Z.35926 C (photographed by A. A. Both).

Fig. 12 Zoomorphic globular duct flute, UC Museum Catalogue #1947.411 B (photographed by A. Both).

Fig. 13 Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 O (photographed by A. A. Both).

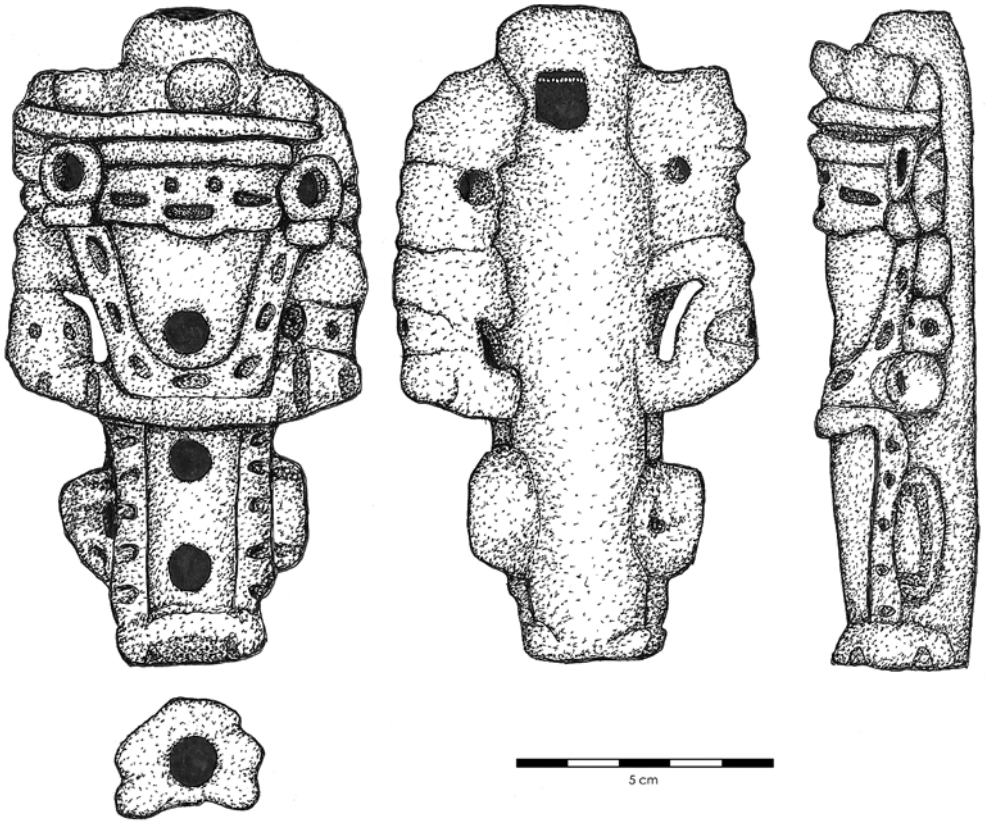

Fig. 14 Anthropomorphic tubular duct flute, UC Museum Catalogue #1947.411 A (drawing by Erika Range, adapted from Feachem 1947).

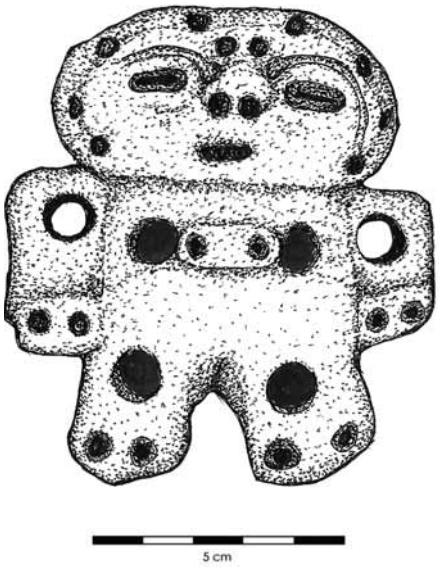

Fig. 15 Anthropomorphic globular duct flute, UC Museum Catalogue #1946.101 F (drawing by Erika Range, adapted from Feachem 1947).

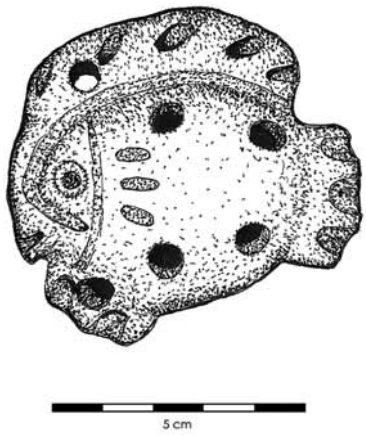

Fig. 16 Zoomorphic globular duct flute, UC Museum Catalogue #1947.411 B (drawing by Erika Range, adapted from Feachem 1947).

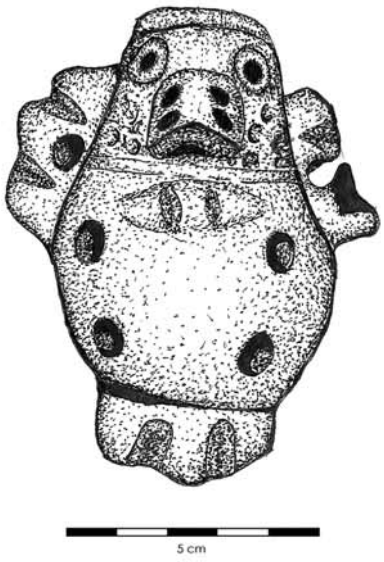

Fig. 17 Zoomorphic globular duct flute, UC Museum Catalogue #1946.101 O (drawing by Erika Range, adapted from Feachem 1947).

4-Stop Tubular Flute (anthropomorph), Honduras Moyne/Feachem collection 1947.411 A, Cambridge							
right: air pressure below: fingerings					**soft**	**normal**	**strong**
16 >	O	O	O	O	A	A +35	A#6 -20 1843 Hz
15 >	O	O	O	●	G#	G# +35	G# +40
14 >	O	O	●	O	G# -25	G#	G# +20
13 >	O	●	O	O	[G +40]	G#	G +10
12 >	●	O	O	O	G -25	G	G +30
11 >	O	●	O	●	F# -30	F# +10	F# +30
10 >	●	O	O	●	F +20	F# -20	F# +5
9 >	O	●	●	O	F +20	F# -40	[-]
8 >	●	O	●	O	F -10	F +35	F# -30
7 >	O	O	●	●	F -30	F	F +20
6 >	●	O	●	●	D -30	D -10	D +20
5 >	O	●	●	●	C +30	C# -20	C# -10
4 >	●	●	O	O	F -40	E +40	F
3 >	●	●	O	●	D +30	D# -45	D#
2 >	●	●	●	O	D -40	D	D +25
1 >	●	●	●	●	G6 -40 1532 Hz	G +40	G#
> = blowing direction (left first stop, right last stop/exit hole) grey background: positions when flute is played without using the exit hole							

Table 1 Tonal range of anthropomorphic tubular duct flute, UC Museum Catalogue #1947.411A.

4-Stop Globular Flute (anthropomorph), Honduras Moyne/Feachem collection 1946.101 F, Cambridge					
air pressure fingerings		**soft**	**normal**	**strong**	**very strong**
16	○ ○ ○ ○ ^	A -40	A# +20	A# +35	B6 -20 1953 Hz
15	○ ○ ○ ● ^	G# -40	G# +20	A -40	A +20
14	○ ○ ● ○ ^	G#	G# +35	A -10	A +20
13	○ ● ○ ○ ^	G# -10	G# +35	A -15	A +30
12	● ○ ○ ○ ^	G# -15	G#	A -35	A +15
11	○ ○ ● ● ^	F# -20	F#	G -40	G +30
10	○ ● ● ○ ^	F# -35	F# +10	G -20	G +30
9	● ○ ○ ● ^	F +20	F# -30	F#	G -40
8	● ○ ● ○ ^	[F# -40]	F# -15	F# +25	G -10
7	○ ● ○ ● ^	[F -20]	F +25	F#	F# +35
6	● ● ○ ○ ^	F#-40	F#	F# +30	G -30
5	○ ● ● ● ^	D +35	D# +15	D# +35	E
4	● ○ ● ● ^	D# -45	D#	D# +45	E +20
3	● ● ○ ● ^	D -35	D +40	D# +10	E -40
2	● ● ● ○ ^	D# -40	D# +40	E	F -25
1	● ● ● ● ^	A#5 -20 922 Hz	B -35	B +30	D
^ = blowing direction (below the two front stops, above the two rear stops)					

Table 2 Tonal range of zoomorphic globular duct flute, UC Museum Catalogue #1946.101 F.

4-Stop Globular Flute (zoomorph), Honduras Moyne/Feachem collection 1946.101 O, Cambridge					
air pressure below: fingerings		**soft**	**normal**	**strong**	**very strong**
16	○ ○ ○ ○ ^	E +20	F -25	F +5	F#6 -30 1455 Hz
15	○ ○ ○ ● ^	D# -45	D# +20	E -30	E +5
14	○ ○ ● ○ ^	D -10	D# -20	D# +10	D# +45
13	○ ● ○ ○ ^	D# -45	D# +20	D# +45	E +20
12	● ○ ○ ○ ^	D# -30	D# +35	E -45	E +10
11	○ ○ ● ● ^	C -20	C# -20	C# +20	D +10
10	○ ● ● ○ ^	C +30	C# -20	C# +20	D
9	● ○ ○ ● ^	C# -20	C# +30	D -30	D +20
8	● ○ ● ○ ^	C +45	C#	C# +35	D +5
7	○ ● ○ ● ^	C +45	C# +20	D -35	D +25
6	● ● ○ ○ ^	C# -25	C# +25	D -35	D +25
5	○ ● ● ● ^	A# -45	A# +20	B -30	B +25
4	● ○ ● ● ^	A# -35	A# +40	B +15	C -10
3	● ● ○ ● ^	A# +10	B -20	C -45	C +40
2	● ● ● ○ ^	A +35	A# +10	B -30	C +20
1	● ● ● ● ^	F5 +35 717 Hz	F# +25	G	A +15
^ = blowing direction (below the two front stops, above the two rear stops)					

Table 3 Tonal range of zoomorphic globular duct flute, UC Museum Catalogue #1946.101 S.

4-Stop Globular Flute (zoomorph), Honduras Moyne/Feachem collection 1946.101 S, Cambridge					
air pressure fingerings		soft	normal	strong	very strong
16	○ ○ ○ ○ ^	E -15	F -35	F +5	F6 +45 1434 Hz
15	○ ○ ○ ● ^	D -20	D# +15	D# +45	E +15
14	○ ○ ● ○ ^	C# -5	D +15	D# -35	D# +35
13	○ ● ○ ○ ^	D -15	E -20	E +15	F -20
12	● ○ ○ ○ ^	D	D#	E -15	F -20
11	○ ○ ● ● ^	C	C# -20	C# +15	D -35
10	○ ● ● ○ ^	C	C# +35	D +20	D#
9	● ○ ○ ● ^	C	D -45	D +30	D# +35
8	● ○ ● ○ ^	C -25	C# -20	C# +35	D
7	○ ● ○ ● ^	C +20	C# +20	D -20	D# -25
6	● ● ○ ○ ^	C +30	C# +30	D -15	D#
5	○ ● ● ● ^	A +35	B -15	B +25	C +20
4	● ○ ● ● ^	A -15	A# -15	B	C +25
3	● ● ○ ● ^	A# -20	B	C -30	C#
2	● ● ● ○ ^	A	A# +20	B -25	C -30
1	● ● ● ● ^	E5 +15 665 Hz	F# +20	G -15	G#
^ = blowing direction (below the two front stops, above the two rear stops)					

Table 4 Tonal range of zoomorphic globular duct flute, UC Museum Catalogue #Z.35926 C.

4-Stop Globular Flute (zoomorph), Honduras Moyne/Feachem collection Z 35.926 C, Cambridge					
air pressure below: fingerings		soft	normal	strong	very strong
16	○ ○ ○ ○ ^	G +45	G#	G# +30	A6 -40 1720 Hz
15	○ ○ ○ ● ^	F# -35	F# +20	G -40	G +20
14	○ ○ ● ○ ^	F# -15	G -40	G	G +30
13	○ ● ○ ○ ^	F# -30	F# +30	G -45	G +10
12	● ○ ○ ○ ^	F# -45	F# +25	F# +40	G
11	○ ○ ● ● ^	E	F -20	F +15	F# -45
10	○ ● ● ○ ^	E -20	E +35	F -15	F +40
9	● ○ ○ ● ^	E -40	F -25	F -5	F +35
8	● ○ ● ○ ^	E -25	F -30	F +10	F +45
7	○ ● ○ ● ^	E -40	E +35	F -20	F +35
6	● ● ○ ○ ^	D# +30	E	E +30	F -5
5	○ ● ● ● ^	C# +20	D +20	D# -25	D# +20
4	● ○ ● ● ^	C# +30	D +10	D# -30	D# +30
3	● ● ○ ● ^	C# -30	C# +40	D -15	D# -10
2	● ● ● ○ ^	C#	D -40	D -15	D# -45
1	● ● ● ● ^	A#5 -20 922 Hz	A# +40	B -5	C -40
^ = blowing direction (below the two front stops, above the two rear stops)					

Table 5 Tonal range of zoomorphic globular duct flute, UC Museum Catalogue #1947.411 B.

4-Stop Globular Flute (zoomorph), Honduras Moyne/Feachem collection 1947.411 B, Cambridge					
air pressure fingerings		**soft**	**normal**	**strong**	**very strong**
16	o o o o	F# +35	G +45	G#	G#6 +35 1695 Hz
15	o o o ●	F	F# +25	G -20	G +35
14	o o ● o	F -10	F# +10	G -30	G +25
13	o ● o o	F -10	F# -20	F# +40	G
12	● o o o	F +30	F# +30	G +15	G# -20
11	o o ● ●	D# +30	E +40	F +20	F# -20
10	o ● ● o	D# +45	E +30	F -10	F# +5
9	● o o ●	D# +35	E +15	F -30	F# -30
8	● o ● o	D# +30	E	E +45	F -5
7	o ● o ●	D# +5	E +45	F	F# -30
6	● ● o o	E -35	E +30	F +15	F# -5
5	o ● ● ●	C -20	D-20	D#-45	E -5
4	● o ● ●	C# -35	D -15	D +45	E -45
3	● ● o ●	C# -35	D -25	D +30	D# +35
2	● ● ● o	C# -25	D -10	D +45	E -25
1	● ● ● ●	G#5 +35 848 Hz	A# +20	B +25	C# -15
^ = blowing direction (below the two front stops, above the two rear stops)					

Table 6 Tonal range of zoomorphic globular duct flute, UC Museum Catalogue #1946.101 O.