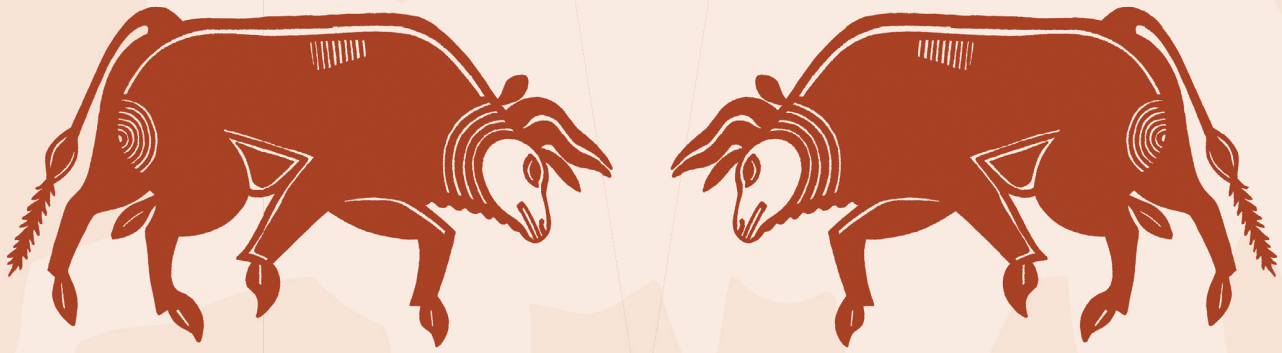
Archaeobiology 3

ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII



Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

edited by

Julie Daujat, Angelos Hadjikoumis, Rémi Berthon, Jwana Chahoud, Vasiliki Kassianidou, and Jean-Denis Vigne

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Group photo of the 13th ASWA[AA] meeting June 8th 2017
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Part 2: Subsistence Economies of Early and Late Complex Societies in Southwest Asia and Adjacent Areas

Part 3: Beyond Subsistence: Animals in the Symbolic World of Southwest Asia and Adjacent Areas

FOREWORD

The 13th ASWA conference was hosted by the University of Cyprus, one of the youngest of Europe's universities. In 2019, it was only thirty years since its foundation. Nevertheless, this is a thriving academic institution, which currently consists of eight faculties, twenty-two departments, and eleven research units.

In 1991, and just two years after the university's foundation, the Archaeological Research Unit (ARU) was founded by decree from the Government of the Republic of Cyprus, following the issuance of the dependent legislation by the House of Representatives. The decision to establish the ARU was based on the recommendation of the Interim Steering Committee of the University of Cyprus, which stated the following:

1. Cyprus is offered for primary research in the field of archaeology thanks to its distinctive cultural signature and history, as well as due to the fact that Cypriot archaeology and archaeological research on the island already has a distinguished tradition and international reputation;

2. The subsequent international recognition of the importance of archaeological research in Cyprus should comprise one of the first incentives for choosing the University of Cyprus as a center for postgraduate studies, and will pave the way for the exchange of students and academics between the University of Cyprus and academic institutions overseas.

The faculty members of the ARU, who are also part of the Department of History and Archaeology academic staff, have contributed immensely over the past 28 years to the achievement of the aforementioned objectives for the study and promotion of Cypriot cultural heritage through their research, their teaching, and the practical training they have been providing to students at undergraduate and postgraduate levels. The active study of other regions of the Mediterranean world have not been overlooked either, as members of the ARU academic staff have been carrying out excavations and research projects in Greece, Turkey, and France.

The members of the ARU are actively carrying out research in Pre- and Protohistoric Archaeology, Classical and Byzantine Archaeology but also Archaeometry and Environmental Archaeology, Maritime Archaeology, and Western Art. In the course of the past 28 years, the ARU has laid very stable foundations in all aforementioned specialisations of the archaeological discipline, none of which existed at academic level in Cyprus before the unit's establishment. Through their teaching at undergraduate and postgraduate levels, all members of the ARU academic staff have been contributing to the formation of a new generation of Cypriot archaeologists, equipped with all the necessary knowledge and practical experience needed to excel in this scientific field.

Over the years, the ARU has been very active in organizing international conferences and workshops. The ARU has organized over 50 international conferences, while members of the academic staff have published the proceedings of over 20 scientific meetings held at the ARU.

Thus, when Jean-Denis Vigne came to my office several years ago with the suggestion to co-organize the 13th Archaeozoology of Southwest Asia and Adjacent Areas conference I gladly accepted. The meeting in Nicosia brought together colleagues from all over the world and offered a venue where new results from the field or the laboratory could be presented and discussed. The publication of the conference proceedings enables colleagues who were unable to attend the conference to read about the latest developments in the archaeozoology of this culturally important region.

I would like to close by thanking all the members of the 13th ASWA organizing committee for all the work they have put into bringing so many scholars to Cyprus, many of them for the first time. I would also like to thank the co-editors of this volume for all the work they have put into the publication of the proceedings.

Professor Vasiliki Kassianidou
Director of the Archaeological Research Unit,
University of Cyprus
Nicosia, August 2019

EDITORS' PREFACE

Due to their location at the meeting point of the three Old World's continents—Africa, Asia, and Europe—Southwest Asia and its adjacent areas played a pivotal role in the history of humanity. They received successive waves of our species—*Homo sapiens*—out of Africa. Different processes in several areas of this large region brought about the transition to the Neolithic, and later on the urban revolution, the emergence of empires bringing with them important subsequent religious, cultural, social, and political consequences. Southwest Asia also played a major role in the interactions between East (Asia) and West (Europe) during the last two millennia. The unique importance of Southwest Asia in the history of humanity is strengthened by the, also related to its location, fact that this area is a hotspot of biodiversity, especially in mammals, which were—as everywhere in the world—tightly associated to the history of civilizations in a diversity of roles: game, providers of meat and milk, traded raw material, symbol of prestige and wealth, pets, etc.

Everywhere in the world, the biological and cultural interactions between humans and animals often remain under-evaluated in their heuristic value for understanding complex social and biological interactions and trajectories. This is why, almost half a century ago, archaeologists who were carrying out research and reflecting on such themes founded a very active nonprofit world organization named the International Council for Archaeozoology (ICAZ). This is also why the ICAZ working group "Archaeozoology of Southwest Asia and Adjacent Areas" (ASWA[AA]) was one of the first ones created within ICAZ, constituting one of the largest and most active of ICAZ's working groups.

The ASWA[AA] was formed during the 1990 ICAZ International Conference in Washington, D.C. Its purpose is to promote communication between researchers working on archaeological faunal remains from sites in western Asia and adjacent areas (e.g., Northeast Africa, Eastern Europe, Central Asia, and South Asia). It carries out its mandate mainly through the sponsoring of biennial international conferences. Since 1998, these meetings have alternated in being hosted in Europe or in Southwest Asia: Paris (1998), Amman (2000), London (2002), Ankara (2004), Lyon (2006), Al Ain (2008), Brussels (2011), Haifa (2013), Groningen (2015).

Ongoing armed conflicts and political tensions in several countries of Southwest Asia made it difficult to locate a safe and convenient place that would enable the organizing the 13th ASWA[AA] meeting in within that region. Although Cyprus is currently a member of the European Union, in (pre-)history Cyprus was embedded in the eastern Mediterranean "world." Because of its location, Cyprus was indeed at the confluence of African, Levantine, Anatolian, and Greek cultural streams and, as is common for islands, recombined them in different but always original ways all along its history. Archaeozoology recently provided one of the most convincing illustrations of the tight connection between Cyprus and Southwest Asia, demonstrating that the earliest domesticated mammals, especially cats, pigs, cattle, sheep, and goats, were introduced to the island very shortly after their first incipient domestication on the near continent, that is, during the ninth millennium BC. For all these reasons, Cyprus represented an ideal place to host the 13th ASWA[AA] conference.

Despite the illegal military occupation of part of its territory by a foreign country, the option of hosting the meeting in Cyprus was enthusiastically embraced by all members of the working group, especially because it is open to all nationalities and maintains good diplomatic relationships with a large majority of countries in Southwest Asia. These facts contributed towards the 13th ASWA[AA] meeting in Cyprus (June 7–9, 2017) becoming one of the best-attended ASWA[AA] meetings. It brought together 80 scientists coming from 25 different countries: from Southwest Asia (6 countries), Europe (14 countries), North America (2 countries), and Japan.

They presented their results in 36 oral and 32 poster presentations. They debated the long-term interactions between humans and biodiversity, about the beginning of animal domestication and husbandry, the strategies of animal exploitation from the Paleolithic to modern times, and the symbolic and funeral use of animals through time. They also greatly enjoyed the numerous social events organized, in-

cluding a fantastic Cypriot mezze dinner, enhanced by a local folk-music band, and a nice excursion to the archaeological sites of Amathous, Kourion, and Khirokitia, and to the museums of Nicosia and Larnaca, which provided ample opportunities for scientific exchanges in a friendly atmosphere.

The hosting of the conference at the new campus of the University of Cyprus was another major reason to the meeting's success. This campus was a convenient and pleasant venue for such a conference, and the strong support of the University of Cyprus, as well as its valuable experience for the organization of such meetings were deeply appreciated by both the scientific organizers and the delegates. Several other partners contributed to the organization: the French archaeological mission "Neolithisation—Klimonas," which is itself strongly supported by the French School at Athens, the Cyprus Department of Antiquities, the French Institute of Cyprus, the French National Center for Scientific Research (Centre National de la Recherche Scientifique [CNRS]), and the French National Museum of Natural History (Muséum national d'Histoire naturelle [MNHN]).

The present volume brings together the texts of 18 of the 68 presentations of the meeting in Nicosia. The editorial board collected the papers and organized their review and editing. We are very grateful to Sarah Kansa (and Open Context), Justin Lev Tov, and Lockwood Press for their constant support in bringing this volume to fruition.

Julie Daujat
Angelos Hadjikoumis
Rémi Berthon, Jwana Chahoud
Vasiliki Kassianidou
Jean-Denis Vigne

3.2 | The Cult of Horus and Thoth

A Study of Egyptian Animal Cults in Theban Tombs 11, 12, and –399–

Salima Ikram* and Megan Spitzer†

Abstract

Animal cults have been a feature of ancient Egyptian religion since ca. 3000 BC, enjoying intermittent popularity until the fourth century AD and the Christian dominion of Egypt. Under the direction of José Galán, the Proyecto Djehuty team has been working in Dra Abul Naga, west of Luxor, in the area of the Eighteenth Dynasty tombs of TT 11, TT 12, and –399–. Parts of these tombs, subsequent to their initial use, became the site of an animal cult dedicated to the gods Horus and Thoth. This paper explores the nature of the cult, the types of animals interred, their acquisition and mummification, and it speculates on their relationship to the different gods to whom the area was dedicated.

Keywords

socio-symbolic use of animals, past biodiversity, religion and animals, animal mummies, ancient Egypt, cult, shrews, raptors, ibis

Introduction

Ancient Egyptian deities often took theriomorphic forms, either completely, or partially. A deity's totemic animal manifested specific characteristics of the god or goddess to which it was attached. Thus, sun-colored raptors that flew high in the sky, had superb eyesight, and were fierce fighters were associated with the sun god, Re, or Horus, who was a manifestation of the divine ruler of Egypt. Shrews, with their extraordinary nocturnal vision and fierce temperaments, were considered the nocturnal manifestation of Re (Ikram 2005). Thoth, the god of wisdom and literacy, was most often shown as a Sacred Ibis (*Threskiornis aethiopicus*) or a man with an ibis head. Re, Horus, and Thoth were worshipped all over Egypt. Starting about 660 BC and continuing into the Roman era (ca. AD 340), an innovation in the worship of other gods is notable, vis à vis votive offerings. Instead of only giving statues, statuettes, and stelae to the gods in the hopes that the donors' prayers would be answered, mummies of the animal associated with the god were given as offerings. The idea that the sacrifice of a living creature would be more effective in answering the donor's prayers might have been partially responsible for this new type of votive offering (Ikram 2015a:5–15). Often, these *ex votos* were related to cults where an animal, thought to be the repository of a portion of the god/goddess's spirit, was worshipped. This cult animal would be treated like a living god, and upon its death the spirit of the god would move into another similarly marked creature that was then worshipped, much as is the cycle seen with the Dalai Lama. The dead animal was mummified and buried with great pomp in a catacomb/tomb dedicated to these Sacred Animals (Ikram 2015a:5–9; Ray 2001).

Although the Sacred Animal was a single creature at a time, the mummified votive offerings were numerous, each carrying a prayer to its associated deity and playing a significant part in the economy of Egypt (Ikram 2015b). After being consecrated to

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Figure 3.2.1. An overview of the site with TT 11, TT 366 and TT 12 (left to right) labeled. (Photograph courtesy of J. M. Galán.)

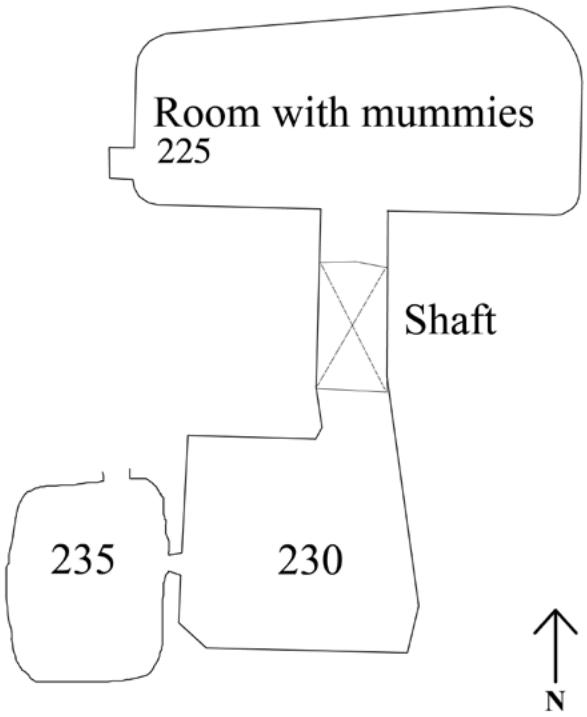

Figure 3.2.2 Schematic plan of the shaft and chambers UE230 and UE235. (Plan courtesy of N. Warner.)

the deity, the votive animals were also buried. Most commonly, a human tomb was reused and repurposed for vast numbers of animal burials.

Materials

The west bank of Luxor—ancient Thebes—is riddled with sepulchres of kings, elites, and commoners. A group of tombs clustering together in an area known as Dra Abu al-Naga has been excavated by the "Proyecto Djehuty" since 2002 under the direction of José M. Galán (Figure 3.2.1).[1] Most of these rock tombs date from the sixteenth century BC. But some of these—Theban Tomb [TT] 11, 12, and Tomb –399– in particular—have proven to have a life that extended well beyond their original owners' intentions: they were taken over and used as burial places for animal mummies. Texts found painted in red on the walls, covering the original carved decoration in some instances, explain that the area was used to inter offerings to Horus and Thoth in the third century BC, extending into the second century BC (205–130 BC), at the very least (Di Cerbo and Jasnow 2021).

1 http://www.excavacionegipto.com.

The tombs yielded several complete mummies, albeit blackened by smoke due to a—or a series of—fire(s), some of which are alluded to in the texts on the walls. Subterranean chambers accessed by shafts in TT 12 and Tomb –399– in particular (Figure 3.2.2), were filled in some cases with large linen bundles that contained fragments of burnt mummified remains as well as badly burnt bones and in other cases 13 to 25 cm thick deposits of burnt bone (Figure 3.2.3). These latter deposits, excavated in 2014 and coming from the irregularly shaped Chambers UE230 (measuring 3.1–3.25 m × 3.55–3.75 m and ca. 1.5 m high) and UE235 (measuring 2.73–2.10 m × 2.5–1.65 m × 1.25–0.8 m high) are the focus of this paper.

The burnt bone is all that remains of the many mummies placed as votive offerings in these tombs. A single or several conflagrations destroyed the textiles in which the animals were wrapped, and the oils and resins used in mummification fed the flames, causing the mummy bundles to be reduced to burnt and twisted bone, with colors ranging from black to white to blue and encompassing in-between shades.

Methods

A strategy to retrieve and record the information within the limited time frame of the season and presence of the full team was implemented. After UE230 chamber was gridded out into nine roughly 1 × 1 m squares, the material was removed from each square within the chambers, taken outside and sieved. Before the material was removed from each square, samples of four liters were taken from four of the eight squares located at different parts of the room (V, VIII, IX) in order to provide results that reflected the contents of the entire chamber. As UE235 had a largely collapsed ceiling, in the interest of safety, it was not emptied, but one four-liter sample was taken from roughly the middle of the room, where the deposit was ca. 26 cm deep. The samples were scooped up by hand and thus some anatomical elements escaped inclusion, as we did not want to dig down too violently and break the bones, many of which had a tendency to snap and/or shatter. Each sample was analyzed to obtain an overall idea of species represented, minimum number of birds placed in the room, their ages, and whether entire birds had been mummified or just specific portions. Photographs provided *comparanda*. Information recorded

Figure 3.2.3. The top level of UE230 with the burnt bones amidst the red and grey matrix. (Photograph by S. Ikram/F. Bosch.)

also included pathologies, anatomical element, and portion thereof, side, approximate age, and degree of burning. In addition, "cherry-picked" samples from the sieved remains of Chamber 230 were also analyzed with a view to gaining a better perspective on the range of animal remains present here.

Results

A total of 3,867 bones derived from the samples and "cherry picking" were examined from UE230 and UE235. The Number of Identified Specimens (NISP) to family was 2,962, to genus 1,931 (Table 3.2.1 and Figure 3.2.4). A common feature in all of the samples was the preponderance of Threskiornithidae remains. These were followed, by a considerable margin, by Falconidae. Based on the four-liter samples, the dimensions of the room, and the depth of the deposit, the Minimum Number of Individuals (MNI) in chamber UE230 would have been approximately 10,000 ibises and 2,000 birds of prey—a large amount of avifauna coming from diverse ecosystems. It should be noted that the MNI in UE230 (Table 3.2.2) indicates more raptors than ibises. However, it needs to be repeated that this sample is reflective of "cherry picking," and thus does not reflect the true proportion of ibis to raptor.

The analyses of each sampled area yielded a slightly different profile (Table 3.2.1)—note that only squares V, VIII, and IX in UE230 and one in UE235 had four-liter samples; the rest of the material was derived from "cherry picking" from the sieve, ignoring the plentiful Sacred Ibis bones. Square IX not only had the greatest number of raptors but also the greatest diversity of raptor species—as well as the greatest number of bones from the sample. Square V yielded the largest number of Sacred Ibis bones and the least number of raptors. This distribution might reflect the mode of deposition of the mummy bundles.

The age range of animals varied; a total of 756 immature/juvenile bird bones was noted, ca. 19.5% of the total assemblage. It is difficult to differentiate species in bones belonging to such young birds—including fledglings—but the general impression was that at least 600 of these bones were of ibis. Fewer identifiable immature/juvenile birds of prey remains were found. It should be noted that in the area containing the mummies, the team found a jar with ibis eggs. Thus, these birds were represented from egg to mature adult.

Of the identified birds, 57 bones showed signs of pathology. These were mainly of ibises suffering primarily from broken legs, which had healed in an

Table 3.2.1. Distribution of species across the areas of UE230, including "cherry picked" ones.

Taxa	235	230									Grand Total
		I	II	III	IV	V	VI	VII	VIII	IX	
Ardea sp.				1							1
Egretta garzetta				2			3				5
Ciconia sp.										1	1
Threskiornis aethiopicus	375	1	1	9	2	307	2	3	217	286	1,203
Plegadis falcinellus	7			5	1	1	8		2	13	37
Threskiornithidae	127	1		1		352	3		161	228	873
Pandion haliaetus			1				1		2	4	8
Pernis apivorus	1			1						1	3
Elanus caeruleus				2		3	2	1		5	13
Milvus sp.	4			12	1	2	11	1	4	16	51
Haliaeetus vocifer			2								2
Neophron percnopterus									1	1	2
Gyps fulvus	6	5	3	7	5	3	3		2	5	39
Torgos tracheliotus	1	4		5	4	5	1			4	24
Vulture	8	25	14	28	25	6	28	2	2	17	155
Circaetus gallicus				1							1
Circus sp.	1			5			2		2	9	19
Accipter brevipes				1						1	2
Accipter nisus			1	10			4		3	8	26
Accipter gentilis										1	1
Buteo sp.	4			12		3	12		6	26	63
Aquila sp.	4	2	2	6		4	3		1	7	29
Accipitridae	5	1				2	1			10	19
Small raptor		1		2		4	1		5	8	21
Medium raptor	4	1		10			9		1	13	38
Large raptor	1					1		1		5	8
Falco naumanni				2							2
Falco tinnunculus		4		4		4			3	10	25
Falco columbarius				1		2					3
Falco subbuteo				1		2					3
Falco biarmicus	3		1	6		15	12		4	26	67
Falco peregrinus										1	1
Falco sp.	1	5	2	96		10	38	2	9	116	279
Fulica atra				1							1

Table 3.2.1. (cont.) Distribution of species across the areas of UE230, including "cherry picked" ones.

Taxa	235	230									Grand Total
		I	II	III	IV	V	VI	VII	VIII	IX	
Streptopelia senegalensis										1	1
Cuculus canorus										2	2
Tyto alba				3						5	8
Athene noctua				2							2
Asio sp.				1						1	2
Strigidae				1							1
Corvus sp.										1	1
Bird	155		2	1		241	3	2	102	276	782
Small bird		4				5			4	4	17
Large bird										1	1
Sus scrofa				1							1
Capra hircus										2	2
Ovicaprid			1					1			2
Medium mammal				1				2			3
Lizard/snake									12	5	17
Grand Total	**707**	**54**	**30**	**241**	**38**	**972**	**147**	**15**	**543**	**1,120**	**3,867**

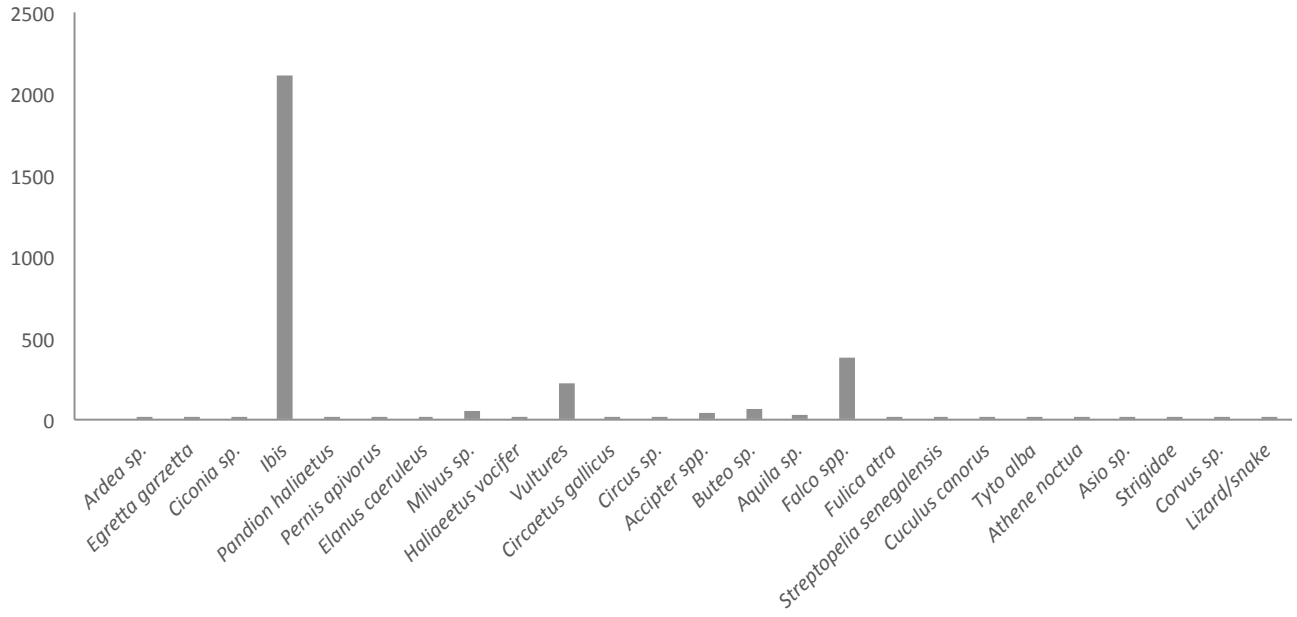

Figure 3.2.4. Chart showing NISP of different species in samples from UE230 and UE235

Table 3.2.2. Minimum Number of Individuals (MNI) in UE230.

Taxon	MNI
Ardea sp.	1
Egretta garzetta	3
Ciconia sp.	1
Threskiornis aethiopicus	57
Plegadis falcinellus	7
Pandion haliaetus	2
Pernis apivorus	2
Elanus caeruleus	5
Milvus sp.	13
Haliaeetus vocifer	1
Neophron percnopterus	1
Gyps fulvus	8
Torgos tracheliotus	5
Circaetus gallicus	1
Circus sp.	4
Accipter brevipes	2
Accipter nisus	9
Accipter gentilis	1
Buteo sp.	18
Aquila sp.	5
Falco naumanni	1
Falco tinnunculus	6
Falco columbarius	2
Falco subbuteo	2
Falco biarmicus	18
Falco peregrinus	1
Falco sp.	45
Fulica atra	1
Streptopelia senegalensis	1
Cuculus canorus	1
Tyto alba	3
Athene noctua	1
Asio sp.	1
Corvus sp.	1
Sus scrofa	1
Capra hircus	1
Lizard/snake	3

awkward fashion. They had not been treated, and thus, were not properly set. However, the birds had survived long enough for the injury to heal, indicating that they were safe from predators and that they were being fed. In addition to broken bones, some of the birds suffered from infections, reminiscent of what is found in zoo populations, based on Spitzer's personal observations and experience.

Discussion

The large number of birds present in a single chamber—about 10,000 ibises and 2,000 birds of prey in UE230—just one of several such chambers, all thought to be active between 204–130 BC at least, demonstrates the extreme piety and number of pilgrims that dedicated these votive mummies to the gods. The vast number of mummies clearly means that sourcing these creatures must have been big business and a significant part of temple activities, both in terms of labor and economics (Ikram 2015b).

The presence of eggs in the adjoining chamber to UE230, and the age range of the birds in UE230 and UE235, suggest that ibises, at least, were actively being bred or kept in a controlled environment so that they ultimately could be "harvested" and mummified. It would be relatively simple to make a resident flock of ibis somewhat tame by regular feeding and the maintenance of a salubrious wet environment, perhaps close to the Nile or a canal or indeed a pond supplied by a canal. This last option makes it feasible for an ibis breeding installation to be located near the tombs' site in which they were found. Indeed, such a system of a controlled environment with food provided is in keeping with the finds in terms of the pathologies noted on the bones, where birds, especially ibises, had problems walking, but managed to survive surprisingly well. Thus, collecting—and perhaps even incubating—eggs and maintaining a relatively stable and large supply of ibises for mummification was simple. It is also possible that large, netted enclosures were constructed to better contain the birds. Certainly there is evidence for smaller-scale enclosures of this type on farms, where captured water birds were reared for food (Épron and Daumas 1939:Plates VI–VIII).

At the site of the Sacred Animal Necropolis at Saqqara, where a temple and catacomb for ibises and raptors existed, the discovery of a pond, garden, and eggs has led excavators to identify a possible ibis

breeding area and hatchery (Davies and Smith 1997). Texts as well as archaeological remains support the idea of protected spaces for breeding and feeding ibises from Saqqara (Ray 1976:138) and other sites (Kessler and Nur el-Din 2015:120–130; Traunecker 1987; Vandorpe 1992:115). However, it should be noted that initial DNA work on a very limited sample provides some evidence against managed populations of ibis (Wassef et al. 2019). Edda Bresciani has suggested some sort of egg-hatchery and nursery for crocodiles that were to be mummified (Bresciani 2015:203–205), and it is possible that puppy farms served canine cults (Charron 2015; Ikram et al. 2013), all of which provide further evidence for the farming of certain species in order to supply the animal cults.

Fewer identifiable immature/juvenile birds-of-prey remains were found than of ibises. Although raptors are more difficult to capture and maintain, this can be successfully achieved, particularly for some *Falco* species. In fact, more bones of the smaller falcons were identified than of any other bird of prey. These birds are more plentiful in Egypt than many other raptors, are possibly easier to catch, and certainly easier to control and to breed. Indeed, other examples of kestrel (*Falco tinnunculus*) mummies that were force-fed suggest that they were kept in captivity (Ikram et al. 2015), and this might even have been the case with a harrier (Ikram 2017). This supports the idea of an active breeding program specifically created and maintained to supply the mummy industry. Of course, an alternative explanation for the young birds is possible: they might have been captured/collected from their nests as has been done by falconers through time (see Frederick II of Hohenstaufen 1943 [1241]:128–129). It is easier to capture nestlings and fledglings than adult raptors, so these "captures" might be the source for the immature/juvenile birds of prey.

Were the bones not so badly burned, it might have been possible to carry out DNA studies on a selection in order to see if the birds were related (Spigelman et al. 2008), which might have provided evidence for a breeding program. Perhaps in the future, other areas of the site will yield material that can be thus tested.

If the animals were not bred, but captured wild, this might indicate a slightly different environment to what is found in the area today. Sacred Ibis, regular members of Egypt's avifauna from the Predynastic era (4500 BC), if not before, have been largely extinct in Egypt since the mid- to late nineteenth century (Meinertzhagen 1930:438; *contra* Miles 1998:31 who claims that they occasionally appear as summer visitors, which possibly might be a new development). The decrease and eventual demise of Egypt's ibis population might have started due to the expansion of population and changes in the environment brought about by new crops, such as sugarcane, starting in the seventh but increasing during the ninth and tenth centuries AD (Bodenstein 2014; Hassan and Nasr 2008), and rice, particularly from the ninth/tenth centuries AD (Nesbitt et al. 2010). Old crops like papyrus were eradicated and all this would have changed the topography and ecosystems of the Delta and the areas abutting the Nile. Papyrus served as nesting places for ibises, such that its substitution with the latter crops would have affected the birds' available habitat. Certainly, the eventual eradication of the papyrus thickets that lined the Nile, a process that started in the tenth century AD when these plants were no longer used for paper, boats, rope, or food, must have been a major factor in the ibis's extirpation. It is unclear exactly when papyrus vanished from Egypt; it was present but no longer cultivated at the end of the sixteenth century (Alpin 1980 [1581–1584]:158–159; 2007 [1581–1584]:152). The papyrus that is found in Egypt today (*Cyperus papyrus*) was reintroduced in 1872 from botanical gardens in Paris, with some perhaps indigenous survivors noted in the Wadi Natrun, northwest of Cairo, in 1968 (Parkinson and Quirke 1995:9–10). As rice and sugar, which are intensively cultivated in the area around Luxor, radically altered the ecology of the area, this development was exacerbated by the introduction of cotton at the end of the eighteenth and the start of the nineteenth century (Richards 1982:8–25; Sayyid-Marsot 1984:155), the large-scale cultivation of which irrevocably changed the face of the Delta.

Such changes in the environment would have had less effect on the raptors, some of which flourish with the increase of agriculture, for example the Black-shouldered kite (Miles 1998:130). However, the range of raptors attests to a more varied avifauna than is present today (Goodman et al. 1989; Houlihan and Goodman 1986; Meinertzhagen 1930; Miles 1998). It is useful to note that their representation in the assemblage follows the pattern of their inhabitation of Egypt: the ones that even now are migrants/rare winter visitors, such as most of the eagles, are less well represented in the assemblage

than those that breed in Egypt and spend longer periods here, such as many of the falcon species, which might have been bred intensively as well—for example, *F. tinnunculus* (Ikram et al. 2015). Possibly, some breeding raptors that were transiting through Egypt might have been forcibly kept in Egypt, yearlong, while others would have been wild-caught on a seasonal basis. Certainly, throughout Egypt there are many more ibis mummies than those of raptors, attesting to the relative ease with which the former can be bred and managed as opposed to the latter. This disproportion, however, should not reflect on the relative popularity of the two gods in Egypt; both Horus and Thoth were revered by the ancient Egyptians, who importuned them through the medium of bird mummies, in the hopes that their prayers would be answered.

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