Archaeofauna 10 (2001): 183-199

Archaeozoology in Greece: a Brief Historiography of the Science

KATERINA TRANTALIDOU

Ephorate for Paleoanthropology and Speleology. Ministry of Culture.
Arditou 34b, 11636, Athens. Greece.

ABSTRACT: The archaeology of classical Greece has been the main field of concentration for research programmes and excavations during the last two centuries. The abundance of literary sources and impressive archaeological discoveries from this period, all over the Aegean, provide the reason for this orientation. Scientific investigation of civilizations without writing, using all forms of archaeological data, including faunal remains, has certainly progressed in the last four decades. In Greece, studies of the Neolithic and Bronze Age have been many, while paleolithic deposits and sites have until recently received far less attention. In addition, there has been no important tradition of zoological research in Greece, as there was in Occidental Europe in the 18th century. There is only one private natural history museum, two local state museums in Crete and Macedonia, and several comparative collections in the universities. Thus, the study of archaeozoology as a source of historical information has been slow to develop.

The study of archaeological animals bones in Greece began with the occasional work of zoologists from Germany, Hungary, France and the Scandinavian countries, and was generally limited to the determination of species and anatomical part represented. Their basic studies and methodology, plus the corpus of such studies in adjacent countries and the whole of the south Mediterranean, provided a solid framework for the studies of contemporary archaeozoologists, their successors. Major topics for English and American scientists studying Greek assemblages were the economic and ethnological interpretation of faunal remains. By the 1980's Greek scientists had also begun to study and publish in archaeozoology. These more recent studies, with the growth of scientific knowledge and methods, including those of taphonomy, theories and explanations have converged on one analytical objective, how to get more information concerning the internal history of the site. Archaeozoological papers on Greek assemblages are regularly presented and published as part of special topical Conference Proceedings. Published site reports may also present the analysis of archaeozoological data. Still, there are no Greek scientific journals which regularly publish archaeozoological reports.

Today, the challenge is to distinguish archaeozoology from paleontology (in the very recent paleolithic excavations), and to reconcile the experimental techniques, the empirical approaches of traditional archaeology, the methodology of paleozoology, and the environmental, economical, dietary and ethnological interpretations of archaeological faunal remains with the rich historical resources (both literary and archaeological) of the past in Greece.

KEY WORDS: ARCHAEOZOOLOGY, GREECE, ZOOLOGY, ARCHAEOLOGY

RESUMEN: La arqueología de la Grecia clásica ha sido un foco preferente de programas de investigaciones y excavaciones durante los últimos dos siglos. La abundancia de fuentes literarias y los impresionantes hallazgos arqueológicos de este periodo, por todo el mar Egeo, proporcionan la razón de ser de tal circunstancia. La investigación científica acerca de las civilizaciones carentes de escritura, utilizando todo tipo de datos arqueológicos incluyendo los restos faunísticos, ha progresado indudablemente durante las últimas cuatro décadas. En Grecia los estudios sobre el Neolítico y la Edad del Bronce han sido numerosos, mientras que los depósitos y asentamientos paleolíticos han recibido mucha menos atención hasta hace poco. Además de ello no existió una tradición de investigación zoológica en Grecia como se produjo en Euro-

pa occidental durante el siglo XVIII. Sólo existe un museo privado de historia natural, dos museos estatales en Creta y Macedonia y algunas colecciones comparativas en las universidades. Por todo ello el estudio de la Arqueozoología como fuente de información histórica ha sido lento en su desarrollo.

Los análisis de huesos de animales arqueológicos en Grecia comenzaron con el trabajo esporádico de zoólogos procedentes de Alemania, Hungría, Francia y los paises escandinavos y quedaron circunscritos en la mayoría de los casos a la determinación de las especies y a la representación de porciones anatómicas. Los análisis básicos y la metodología por ellos proporcionada, así como el conjunto de tales estudios en países adyacentes y en la totalidad del Mediterráneo meridional, proporcionaron un marco sólido para los estudios de los arqueozoólogos contemporáneos, sus sucesores. Asuntos claves para los científicos ingleses y americanos que estudiaban los conjuntos griegos fueron la interpretación económica y etnológica de los restos faunísticos. En los años 80 los científicos griegos empezaron a estudiar y a publicar en el campo de la Arqueozoología. Estos estudios más recientes, ayudados por el desarrollo del conocimiento y los métodos científicos que incluían la tafonomía, las teorías, así como determinadas explicaciones, convergieron sobre un objetivo analítico a saber, como obtener más información relativa a la historia interna de un asentamiento. Los trabajos arqueozoológicos sobre muestras griegas se presentan y publican con regularidad como parte de las Actas de conferencias especializadas. Informes faunísticos concretos presentan también análisis de datos arqueozoológicos. A pesar de todo ello no existen revistas científicas griegas que publiquen de modo regular trabajos arqueozoológicos.

Hoy en día el reto consiste en diferenciar la Arqueozoología de la Paleontología, al menos en las excavaciones del Paleolítico más reciente, y en reconciliar las técnicas experimentales, los enfoques empíricos de la Arqueología tradicional, la metodología de la Paleozoología y las interpretaciones ambientales, económicas, dietarias y etnológicas de los restos faunísticos arqueológicos para conjuntarlos con las ricas fuentes históricas, tanto literarias como arqueológicas, del pasado en Grecia.

PALABRAS CLAVE: ARQUEOZOOLOGÍA, GRECIA, ZOOLOGÍA, ARQUEOLOGÍA

> And yet - who knows - perhaps there where someone stands firm against all hope, perhaps there does human history begin, and the beauty of man amidst rusted iron and bones of bulls and horses, amidst the ancient tripods in which a few laurel leaves still burn and the smoke rises, vanishing into the sunset like a golden fleece.
> Yannis Ritsos, *Eleni*

INTRODUCTION

Although there are countless published archaeological studies about Greece, studies of the environment which incorporate the natural and social sciences (including archaeozoology) have been, until recently, quite rare. This has been particularly true for the Classical and later periods. Of the several interrelated disciplines that contribute to the study of the environment, I give here a critical history of the course of archaeozoology as a discipline developed during recent decades (Davis, 1987; Reitz & Wing, 1999), the problems considered by researchers studying faunal materials from sites in Greece, and the importance of archaeozoology in the development of Greek archaeology itself. In so doing, the course of archaeozoology cannot be divorced from the inquiries, methodology and dominant trends in the fields of archaeology and systematic zoology. ARCHAEOLOGY in this instance, is considered with the context of anthropology, art history, social science, ethnology and a historical discipline. SYSTEMATIC ZOOLOGY is that branch of comparative biology which contributes to understanding the complexity of living and fossil organisms, the classification of species and populations, and the creation of a clearer conception of their ecology and history (Futuyma, 1991).

FIGURE 1 A

J. Boessneck (a) and S. Bokonyi (b), two individuals who contributed to the development of archaeozoology, and the analysis of osteological materials from Greece.

Two comprehensive surveys of archaeozoological work in Greece have been published. The first, compiled in the early 1980's by Sebastian Payne, of English Heritage, (Payne, 1985) includes over 100 titles, with a summary description of the basic data provided in each study (site, region, chronological period, and vertebrate NISP, MNI, etc). However, the most important contributions of Payne's survey are in the questions he poses concerning methodology and interpretation (excavation technique, sample collection, interpretation of biometric data, etc), reflecting his own thinking and considerable experience in examining palaeozoological and modern material from the Mediterranean and Western Europe.

Ten years later, a second survey by David Reese, of Yale University (Reese, 1994), consists primarily of a bibliographical compilation of archeozoological work since 1985. These, together with several articles (most in English) on literary and iconographic evidence relating to animals, plus a listing of reports of mollusc remains, and studies of bone artifacts from many prehistoric sites, amounts to 371 titles. Reese, obviously regarding the Aegean as a geographical and cultural entity, also cites analagous studies of sites on the East Aegean coast (e.g. Troy, Miletus, Ephesus), and Cyprus. He notes that there are relatively few reports on materials later than the Bronze Age, and presents a very useful table separating materials deriving from settlements, sanctuaries and cemeteries. Since 1995, Reese has continued to collect virtually all titles concerning zooarchaeological materials (vertebrate and invertebrate); as of January 2000 these numbered around 750 items (Reese, personal communication).

An additional inventory-data base had been prepared by the Institut fur Palaoanatomie, Domestikationsforschung and Geschichte der Tiermedizin, Munich, headed by Professor A. von den Driesch. Specialized inventories have also been compiled by individuals and university cen-

tres involved with archaeozoology. An example is the University of Liege (Belgium), Groupe Interuniversitaire de contact sur l'histoire des connaissances zoologiques et des relations entre l'Homme et l'animal, headed by Professor L. Bodson - emphasis here is placed on evidence from iconography and ancient literary sources, and Greek antiquity is on of their main branche of research. Since 1986, they have also had a regular colloqium "Histoire des Connaissances Zoologiques" (e.g. Bodson, 1998).

A glance at these bibliographies reveals an uneven distribution of archeozoological studies in space and time. Western Greece, the Palaeolithic Age and the post-Bronze Age periods are less favoured topics. Moreover, very few studies deal with assemblages from sacrificial or grave contexts. In part, this is because there have been fewer excavations in Western Greece than in Macedonia and Southern Greece, and in many instances, organic remains from excavations have not been collected. Indeed, in the early 20th century, many excavation directors did not consider it necessary either to retrieve osteological material or to consult natural scientists concerning it's identification. Early exceptions were Taramelli (1897), Hatzidakis (1912), Evans (1935) and Marinatos (1932), all working on Crete, Blinkenberg (1931) on Rhodes, and Heurtley (1927-28) in Central Macedonia. In these cases (with the exception of the work of the British paleontologist Boyd-Dawkins (1902) in the Diktaian Cave in Crete, faunal analysis was limited to a list of species, or a few lines in the general text. After 1950, the proliferation of excavations at prehistoric sites, especially of the Neolithic Age, prompted the sporadic collection of osteological materials, depending largely on the site excavator's personal research goals. In addition to site specific studies (as compiled by Payne and Reese) a number of synthetic studies of animal distribution, bioarchaeology and ecology have also made use of archaeological data (cf. Yannouli & Trantalidou, 1999; Trantalidou, 2000).

THE ARCHAEOLOGICAL AND ZOOLOGICAL CONTEXT OF FAUNAL STUDIES

The course of archeozoological studies in Greece was not coincidental, but reflects the epistemology, structure, history and ideology of both

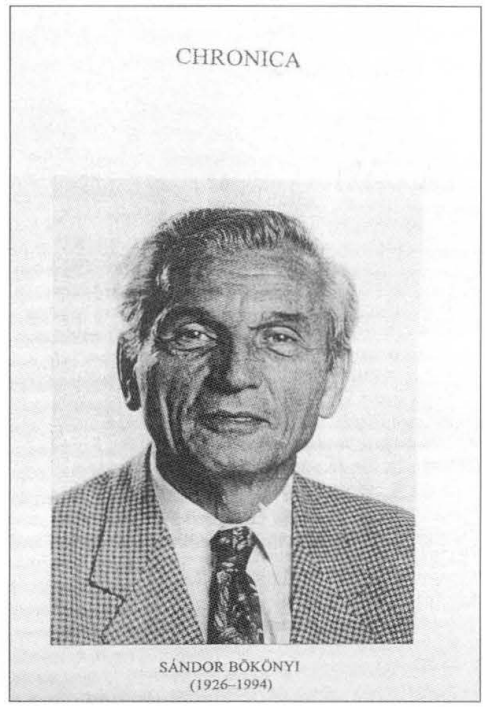

FIGURE 1 B

archaeology and zoology. ARCHAEOLOGY passed successively from the collection of rare and aesthetically outstanding objects, to the advancement of Greek antiquity as the basis of the European spirit (enlightenment, romanticism, neoclassicism) by Western dilettante, as proof of the historical population continuity and origin, and as a factor of social and national cohesion by the enslaved Greeks (Kalpaxis, 1993; Petrakos, 1998b). By the middle of the 16th century, sculptures and architectural members were removed from Greek monuments by the Ottomans to be used as building materials in various parts of their Empire, and by Europeans to grace private collections and subsequently the national museums of the West (Kalpaxis, 1990). In response, Greeks tried either individually or collectively to protect antiquities; examples of these efforts are know from as early as the 17th century. The first archaeological law was passed in 1834 (Gratsiou, 1987; Petrakos, 1998a), just four years after the protocol granting Greece independence. Concurrently, in Greece, the creation of special archaeological collections and state museums was promoted (Table 1). These now number nearly 240, not counting the collections of the foreign schools permitted to excavate in Greece, and private museums. The Greek Archaeological Society, which receives some state funding, was founded in 1837 on the initiative of

FIGURE 2

The Goulandris Natural History Museum, Athens. The new extension has been completed in collaboration with the Natural History Museum of London.

the wealthy mercant K. Belios. Because of the lack of state funding and staff for archaeology and conservation at this time, the goal of the society was to find, restore and reconstruct the antiquities of Greece.

These and other historical circumstances, plus the fact that, despite vandalism and exappropriation over the centuries, important architectural sites, and countless archaeological objects, plus literary testimonia, texts and inscriptions have survived in Greece, often relegated the collection of anthropological and environmental materials to second place. Study of the exploitation and management of the natural environment, both ancient and modern, has been at best undervalued if not dismissed completely, even to the present day. During the recent expansion of the Athens underground metro system (1993-1995), for instance, archaeological skeletal materials from historic period deposits, both animal and human, were not systematically collected and retained for analysis.

The past history of the PHYSICAL SCIENCES in Greece has been even less encouraging. During the period when modern evolutionary thought (a concept familiar to ancient Greek philosophy which, in it modern for, has it's roots in the European enlightenment (e.g. Futuyma, 1991) and the precepts of systematic biology were being established, historical circumstances precluded all scientific activity in Greece.

The first university in the modern Greek state was founded in Athens in 1837 (Table 1). Teaching of natural history and paleontology commenced in the second half of the 19th century, although excavations had been attempted earlier. The excavation at Pikermi (Attica) for instance, first started in 1835 by the British historian G. Finlay and the ornithologist Lindermayer. These excavations were extended in 1853 by the Greeks under Professor Heracles Mitsopoulos (Symeomidis & Theodorou, 1989). Until very recently, however, there was no official or legal protection for palaeontolo-

Historical Event Institution	**Date** Date of Foundation
Decree of Ioannis Kapodistrias creating the National Museum, housed in the orphanage of Egina Island	1829
Foundation of the Greek State after the War of Independence (1821-1829, 47,516 sq km)	**1830**
Royal Numismatic Treasury, later the National Numismatic Museum, Athens	1834
Archaeological Museum at Syros	1834/35
National Archaeological Museum, Athens	1836/39
Athens University	1837
Polytechnical School, Athens	1862
Annexation of the Ionian Islands (52,115 sq km)	**1864**
Archaeological Museum of Mykonos	1880
Annexation of Thessalie, Epirus in part (63,606 sq km)	**1881**
Ethnographical Museum, Athens	1883
Archaeological Museum of Olympia	1886
Archaeological Museum at Eleusis	1889/96
Greek - Turkish War (63,211 sq km)	**1897**
Archaeological Museum of Delos	1897
National Gallery, Athens	1900
Archaeological Museum of Delphi	1900
Archaeological Museum at Epidauros	1905/09
War of the Balkans (121,794 sq km)	**1913**
Byzantine Museum, Athens	1914
Greek-Turkish War of 1920 (150,833 sq km)	**1920**
Secession of Greek-Turkish War (130,199 sq km)	**1922**
Thessaloniki University	1925
Athens Academy (sections of physical sciences, political sciences, literature & art)	1926
Zoological Museum, Athens University	1850
School of Political Sciences (Panteion), Athens	1930
Local Archaeological Museums at the Acropolis, Athens; Sparta; Thebes; Volos; Herakleion; Tegea; etc	before 1930

Sources: Inglessi, 1932-1933; Haritonidou, 1978; Zapheiropoulou, 1988; Hatzidakis, 1995: 108-109; Collectif, 1998, 1999; Petrakos, 1995, 1998; National Archaeological Museum, 1999.

TABLE 1

Significant dates in Greek political history, and the founding of Public Museums, Institutions and Universities in Greece, 1830-1930.

FIGURE 3

The Institut for Mediterranean Studies, Rethymnon, Crete, which houses a small laboratory for environmental archaeology, specializing in seeds and fish.

gical sites, such as Pikermi, although its deposits of the Tertiary era which contributed specimens to a number of European Museums, including the Gallery de Paleontologie, Paris and the British Museum of Natural History, London). Instead such areas were included, through the Archaeological Laws, in protected zone as places "of outstanding natural beauty" (Journal of the Government 44, 31/01/1984). For all Greece's palaeontological wealth, no national museum of natural history was established. Rather, collection/museums were set up in the department of Geology-Paleontology and Biology-Zoology at the University of Athens, and subsequently at other universities.

The Zoological Museum of the University of Athens is 130 years old. In the middle of the 19th century, a small group of German naturalists created a Nature Society which compiled modern comparative collections of birds and minerals. These collections were brought to the central building of the University of Athens in 1850, where they became the basis for the Zoological Museum of the University. In 1868 the museum was divided into three branches, the Zoological, Mineral-Geological-Paleontological and Botanical. As was the case in archaeological museums, the Zoological Museum received frequent donations, particularly of molluscs and birds. In the beginning of the 20th century a zoological garden existed in Phaliron, but during World War I, the animals of the garden died of starvation. Some of these animals were donated to the Zoological Museum as mounted specimens. This museum was opened to the public in the 1930's, however during World War II, and the Greek Civil War it's premises were used as an army hospital. When it was able to reopen as a museum, many of the original display and study collections were found to be missing. Between 1963 and 1982, the museum was closed for restoration, opening to the public again in 1988. Also

opened to the public in 1988 was the new university buildings in Zographou (Zapheiratos, 1998). Today, with 2000 square meters of floor space, it offers research facilities in the areas of ecology, systematic biology, physical anthropology and paleoanthropology. Like many other museums and private societies (e.g. the Hellenic Zoological Society, Hellenic Ornithological Society (established 1982), etc), it maintains a publication series, archives and data bases. It has also now started a series of popular publications, under the direction of Professor A. Legakis (e.g. Adamopoulou *et al.*, 1998).

The private Goulandris Natural History Museum (Figure 2) was founded in 1964. It's collections include approximately 1300 bird specimens (95% of the avifauna of Greece), 15000 molluscs, plus collections of modern and fossil mammals (Figure 6). The Goulandris publishes an annual report (Annales Musei Goulandris) as well as books on modern Greek flora and fauna (Figure 7). Recently it has been enlarged to 13000 square meters, with new exhibition areas, an amphitheatre, library extension now housing 40000 journal volumes and over 5000 monographs, etc. The Natural History Museum of Crete, which opened in June 1998 (University of Crete, Herakleion), with 800 square meters of floor space, focuses on ecosystems of the Eastern Mediterranean and Crete, and has exhibition the Minoan environment and the everyday activities of Bronze Age Cretans. It also publishes on a small scale, exclusively for educational purposes. In all of these museums, despite their rather small size, there are also small exhibits on the evolution of man. The newly founded Museum of Natural History in Paranesti (Drama), which opened in 2001, has an exhibition space of 320 square meters, plus laboratories (Figure 9). This museum it part of a network of three facilities; the others are Stauroupoli, near Xanthi, which specializes on study of man and the environment, and Prasinada, Drama, which studyies the environment and energy sources.

The systematic collections of the "zoological museums" of the Biology Departments at the Universities of Thessaloniki and Patras, founded in the 1970's, remain small, barely covering the educational needs of their students. Moreover, none of these Universities or museums as yet have courses oriented toward the comparative study of osteological materials from archaeological assemblages. In the University of Thessaloniki, Macedonia, the Department of Biology specializes in marine biology. This university also has two museum specialities which have existed since it's foundation. One is a laboratory specializing in non vertebrate and marine avifauna, the other concentrates on the more common natural history areas of mammals, birds and mollusks (Koukouras, personal communication). The Zoological Museum in the Department of Animal Biology at Patras was founded by professor J. Ondrias in 1973, and is dedicated primarily to public school education. At present however, it has no professional or support staff, and it's functions are maintained by the volunteer time of the scientific staff. Neither of these two university museums have their own publication series (Chondropoulos, personal communication).

An additional obstacle to the creation of comparative collections is the lack of large zoological parks or gardens in Greece. Exceptions are the parks on Rhodes, where *Dama dama* are reared, the small island sanctuaries such as Theodorou off Crete which hold populations of Agrimi (*Capra aegagrus*),Youra Island in the Sporades with a population of feral goats, Delta of Evros, Nestos, Achelos, as well as a number of wetlands and lakes which are set aside as protected zones for various mammal and bird species. Attica Zoological Park near Sparta provides a natural habitat for over 300 species of birds, plus reptiles and mammals, where live observations could be made and which could supply the natural history museums with comparative osteological materials.

In the past, the need for modern comparative faunal collections was often met by either transferring the osteological materials to universities or institutions outside Greece (e.g. Cambridge, Munich, Southampton, Tennessee and the Smithsonian Institution) or by creating small local reference collections at the site of excavations (e.g. Nea Nikomedia-1960's; Akrotiri, Thera-1980's; Kavousi, Crete-1990's). In the early 1990's, thanks to the collaboration of Greek and foreign specialists, small comparative collections were set up, and are being updated, such a collection was begun in 1988 in the Fitch Laboratory (Figure 4 a, b) of the British School of Archaeology at Athens and in the Malcolm H. Wiener Laboratory (Figure 5) of the American School of Classical Studies at Athens in 1992. These collections contain osteological material from the basic suite of species common to Greece, and are meant to facilitate the study of the natural history and archaeology of Greece and neighboring regions. Newly founded archaeological units in the Institute of Mediterra-

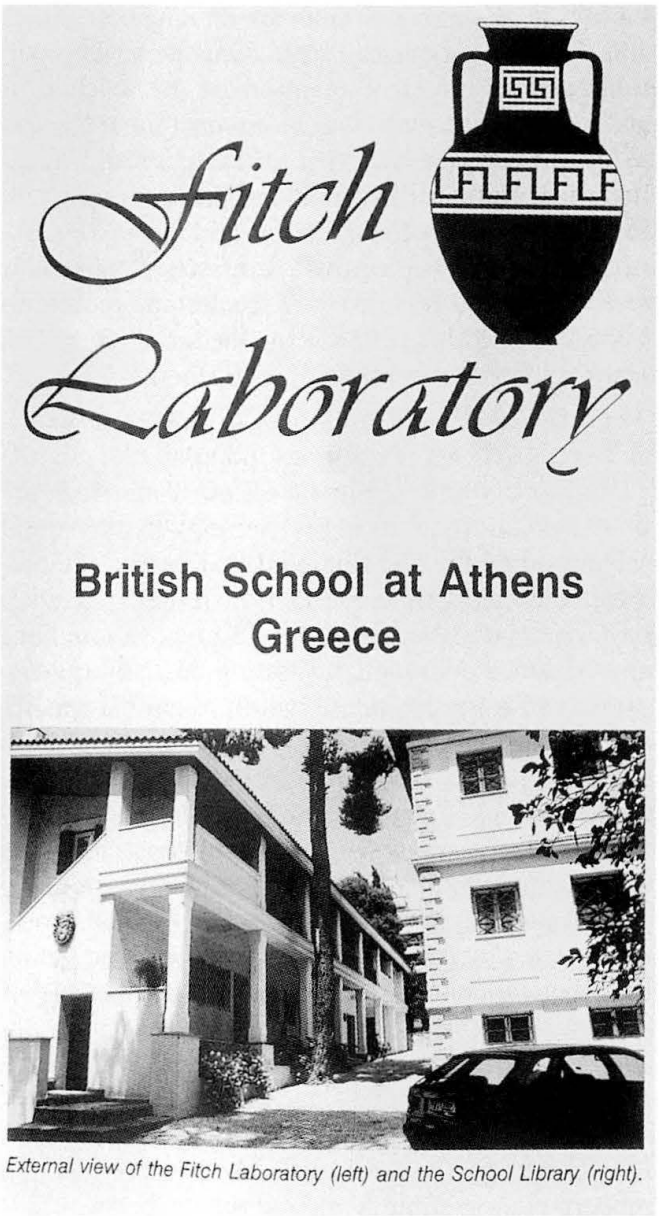

FIGURE 4 A

(a), (b) The Fitch Laboratory of the British School of Archaeology at Athens, which has a basic comparative collections of domestic mammals, fish and seeds.

nean Studies (Rethymnon, Crete) and the INSTAP (Institute for Aegean Prehistory) Study Center for East Crete (Pachia Ammos) are able to accommodate researchers and excavation materials, but do not as yet have systematic reference collections - apart from those held by individual scholars. In addition laboratories in Athens, including those at the British and American Schools, the Goulandris Museum and Democritus have facitilites for x-ray, microscopy, and trace element analysis. The Wiener Laboratory of the American School of Classical Studies also offers yearly Research Fellowships and Associateships for the study of human and vertebrate osteological materials.

FIGURE 4 B

By considering the historical processes, course and dynamic of each of the component sciences of archaeozoology in the Modern Greek State, we understand why this new synthetic science has not been amoung the options available in the university curriculum until very recently. The teaching of environmental archaeology at the University of Athens has been covered consistently by one person since the late 1980's, while the other universities, particularly Thessaloniki and Crete, now offer such classes on a rotating basis within their curriculums. The Archaeological departments of all the Greek universities are also now beginning to develop their own Environmental Units and collections.

THE EFFECTS OF EUROPEAN SCHOOLS AND METHODS ON GREEK ZOOARCHAEOLOGY

Because environmental archaeology has only recently become a course of study in the Greek

curriculum, it is natural that whatever progress was made in the study of archeozoological materials from Greek sites was affected directly by the methods and theoretical orientation of individual researchers' country of origin and scholarly background. The fact that the works of such distinguished zoologists and palaeontologists as Keller, Hilrheimer, Winge, Degerbol and Bate, who were invited to work in Greece prior to World War II, make little use of archaeologically derived materials is surely due to the limited amounts of such materials at their disposal, the descriptive manner in which the sciences treated such materials, and the routine relegation of faunal studies to appendices in archaeological publications. This holds true for Holocene as well as Pleistocene site assemblages (Trantalidou, 1996). For example, in 1936 when Bate comments on Greek fauna she makes perceptive remarks about the palaeontological material of the quarternary period of Crete, but gives minimal consideration to materials from archaeological excavations (cf. Lax, 1996 for a compilation of her works in Crete).

Detailed presentation of archaeological faunal materials began to appear in the 1950's. Trail-blazers in this respect, many of whom also worked elsewhere in the Mediterranean or Central Europe, include Boessneck, von den Driesch, Gejvall, Bokonyi, Higgs, Payne, Jarman and the French interdisciplinary team that worked on Kitsos Cave. Their studies were often published together with the other archeological materials in a single volume. For some of the larger sites, such as Lerna (Gejvall, 1969) and Kastanas (Becker, 1986) the result of faunal analysis were published in separate volumes. An important impetus for archaeozoology in Greece, and more generally Western Europe, was provided by scholars of the so-called German school studying Holocene osteological materials (e.g. Boessneck, von den Driesch, Enderle, Jordan, Amberger, Lepsikaar, Hinz, Becker). Additional scholars in this tradition include researchers from Holland (Prummel), the Scandinavian countries (Gejvall, Larje) and Central Europe (Bokonyi). A number of these researchers were able to study large faunal assemblages from sites in the Thessalian plain as well as Macedonia, Epirus and the Peloponnese (cf. Reese 1994; Payne, 1985).

In their study and publications, many of these scholars were able to draw on a background of three centuries of development in zoology and paleontology, plus the emerging theory and methodologies of population biology, comparative biology and statistical analysis of data (cf. Simpson, Roe & Lemontin, 1960). Thus they were instrumental in the systemization of the science of archaeozoology, including biometry - the measurement of bones (cf. von den Driesch, 1976), morphological criteria by which to distinguish closely related species such as sheep and goats (Boessneck *et al.*, 1964; Prummel & Frisch, 1986), their variety and sex. In sum, they created the methodological framework or "set up the grid" in which other scientists were then able to operate.

In the late 1960's, a number of collective works and monographs, sometimes popularized, on the evolution and management of environments, the potential contributions of archaeology to the natural sciences, and the identification and use of osteological material in archaeology (cf. studies by Payne) have been published in Britain. Some of these have also included drawings illustrating basic morphological criteria for the identification of animal species and their age at death. Authors of these works, who have also worked in Greece, include Watson, Higgs, Clutton-Brock, Payne, Gamble and Jarman. However, because in many instances only small amounts of faunal material were saved from Greek archaeological excavations, the many of the methods commonly used by British archaeozoologists, including hypothetical-conclusive reasoning, and the use of statistical data to reconstruct palaeoeconomy (consumption, exchange, transaction) could rarely be applied to these Greek sites. But there are exceptions, such as the literary interpretation of LBA Linear B texts (Killen, 1964) used in conjunction modern ethnographic work and the analyses of faunal materials to understand flock management and wool production in the Late Bronze Age (Halstead, 1990-91, 1992; Reese, 1994).

As in Britain, it is difficult to speak of a single school of archaeological thought in France. However, the work of a number of individuals stand at the crossroads of paleontology, zoology and the historical disciplines. These scientists developed, "in the dense shadow of Leroi-Gourhan", ethnoarchaeozoology (cf. Poplin, 1973), the ethnology of techniques in the analysis of objects of bone or tooth (cf. Poplin, 2000), and the examination of issues of zootechny, cultural anthropology, palaoclimatology, exploration of the relations between societies and the environment using an anthropological approach (Anthropozoology, sensu Poplin), the quantification of data (Ducos, 1975), osteology (Desse & Desse-Berset, 1987-1996; Helmer & Rocheteau, 1994) and the use of iconography and

FIGURE 5

The Malcolm H. Wiener Laboratory at the American School of Classical Studies at Athens, main room. The laboratory has comparative faunal, mollusk and charcoal collections, a library and databank, and publication series.

texts. The journal *Anthropozoologica*, published by the Laboratoire d'Anatomie Comparee in Paris, encourages all interdisciplinary approaches, and has published papers on Greek archaeozoology. French researchers who have worked on Greek materials include Tranier, Chaline, Julien, Mourer-Chauvire, Poplin, Desse, Helmer, Gardesein, Columeau, Taboriu/Amandry, and Chevallier.

The long tradition of non-Greeks doing archaeological research has continued to flourish, sponsored in part by the many archaeological schools and institutes established in Athens (Table 2). Since the late 1970's there has also been a marked increase in the number of zoologists, palaeontologists, natural scientists, archaeologists and historians dealing with Greek archaeozoology from North America (Day, Ducan, Foster, Klippel, Lax, Mancz, Rielly, Rucillo, Rusco, Shackleton, Sloan, Walker, Winder), Britain (Bedwin, Coote, Coy, Deith, Gamble, Halstead, Jarman, Jones, Payne, Reumer, Rowley-Conwy, Ruche, Schwartz, Wall), Germany (Becker, von den Driesch, Friedl, Lepiksaar, Nobis, Persson, Raulwing, Reisch, Schmidt, Stanzel, Thessing, Uerpmann) as well as Italy (Masseti, Sorrentino, Wilkens), Poland (Kowalski, Wojtal), Belgium (Gautier, Cordy), Holland (Prummel) and Australia (Powell).

Issues of taphonomy, the geochemical, climatological or biological events that affect the creation of archaeological deposits, have been of little concern to those studying osteological assemblages from Greece. Most studies of Greek archaeozoological materials have concentrated on the economic, ethnological or historical interpretation of site assemblages, recording the presence of cut marks, traces of burning, and the differential representation of skeletal body parts, all indicative of human use of animals for food, clothing or tool-making materials. Less attention has been paid to such issues as fracture patterns (indicating marrow extraction) or the depositional dynamic of bone after its deposition.

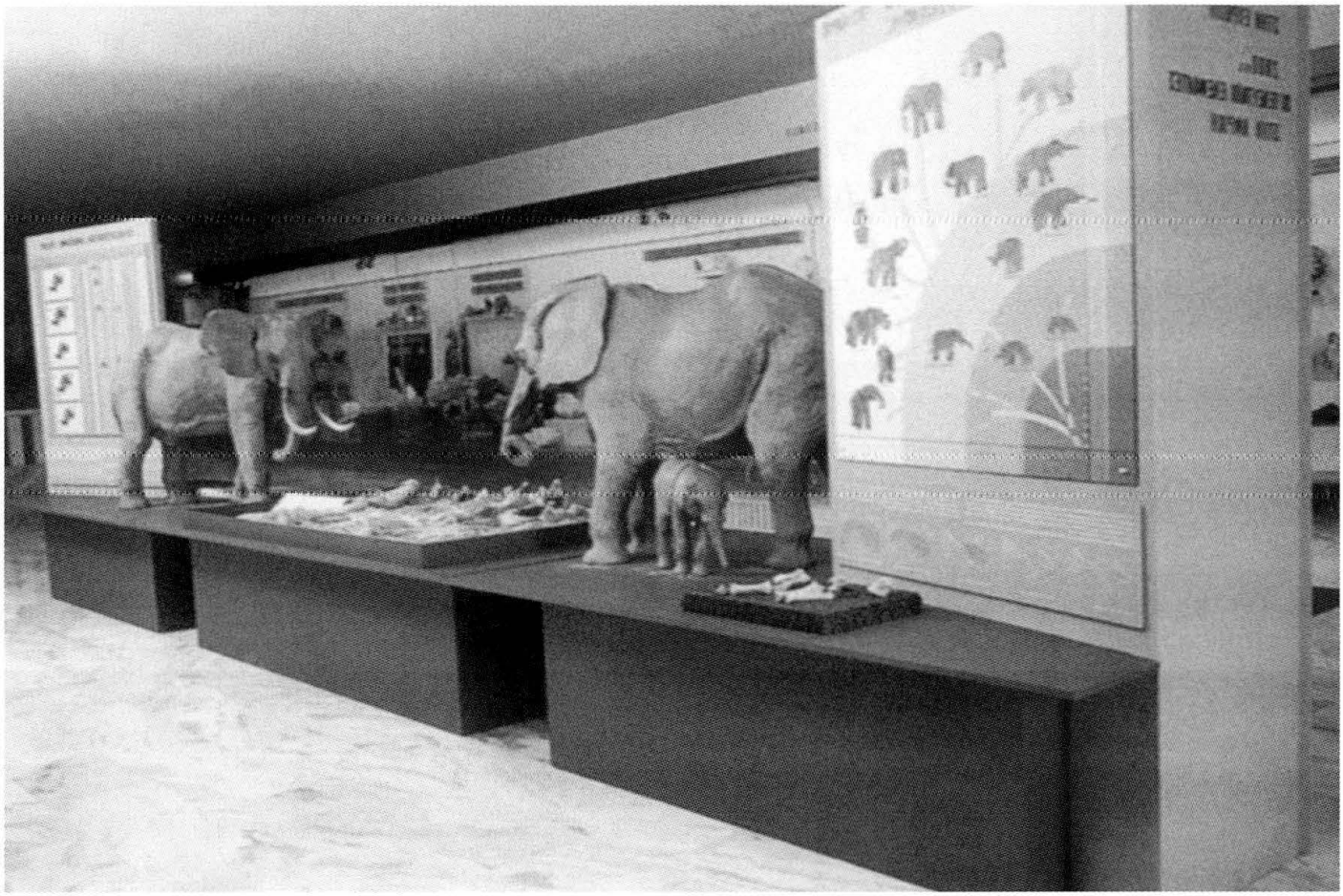

FIGURE 6

The Goulandris Natural History Museum, temporary exhibition on Telos (Dodecanese) dwarf elephants, prepared by palaeontologists, Professors N. Symeonidis and G. Theodorou.

THE CONTRIBUTIONS OF GREEK RESEARCHERS TO ARCHAEOZOOLOGY

Scholars of Greek origin began to study archaeozoological assemblages in the late 1980's. Almost of these people were trained in archaeology, with the exception of two (Koufos and Tsoukala) who are palaeontologists dealing occasionally with archaeozoological materials. All Greek archaeologists now involved with archaeozoology have higher degrees from universities in Britain (the majority) or France. At present amoung those studying Greek assemblages are Karali-Yannacopoulos, Hamilakis, Yannouli, Panayiotakopoulou, Kosmetatou and Trantalidou. Others continuing their doctoral studies (2001) include Kotzabopoulou, Myona, Isaakidou, Psathi and Kavoura, while still other students are working towards their masters degrees. Because of their varied educational and professional backgrounds, the ideological influences of each can be seen, although Greece too is experiencing the gradual globalization of the sciences.

The general lack of infrastructure in Greece results in libraries and laboratories in both the Universities and the Ephorate for Palaeoanthropology - Speleology which are still small and devoted almost exclusively to the conservation of materials. In addition, the difficulty in finding a common ground for archaeozoology between paleontology and zoology in Greek universities continues to make autonomous research and truly ground breaking experimental or analytical research difficult, and leads archaeological students to universities and research centers in Europe and the Americas. There are also, to date, in Greece no autonomous scientific journals dealing specifically with archaeozoology, as there are for the more general field of archaeology (cf. *Archaiologiki Ephimeris* [1837-], *Praktika tis Archaiologi-*

Institution	Date of Foundation
French Archaeological School	1846
German Archaeological Institute	1879
American School of Classical Studies	1881
British School of Archaeology	1886
Austrian Archaeological Institute	1908
Italian Archaeological School	1909

Source: Petrakos 1995, 1998.

TABLE 2
Foundation dates for the first foreign Archaeological Schools in Greece.

kis Etaireias [1837-], *Archaiologikon Deltion* [1915-], *To Ergon tis Archaiologikis Etaireias* [1954-], *Archaiologia* [1981-], *Archaiologikon Ergon sti Makedonia ke ti Thraki* [1987-], etc.) or paleontology (cf. *Annales Geologiques des Pays Helleniques* [1942-], Figure 8). Consequently, Greek archaeozoologists publish primarily in these Greek journals, the journals of the foreign schools in Greece, international archaeologial journals, site monographs and the proceedings of local or international archaeological conferences. Two monographs have also recently been published, one devoted to paleontology and archaeozoology in Greece (Reese, 1995), the other specifically to zooarchaeology in Greece at the end of the 20th century (Gamble *et al.*, 2001).

CONCLUSIONS ON THE HISTORY AND FUTURE OF GREEK ARCHAEOZOOLOGY

Today, in Greece and the Mediterranean, scientists are focusing their studies on the reconstruction the palaeoenvironment and past everyday life through the association and interpretation of osteological remains and archaeological context in order to understand the use of habitat and palaeoeconomy of the sites. The linking of zoological evidence with literary and iconographic sources in all aspects of archaeozoology, including assemblage species composition, cut marks and burning, flock composition and the use of animal raw materials, is increasingly gaining ground. A distinctly Greek character is gradually being developed in these studies. In a country with such a rich cultural tradition, the information to be gained from such sources cannot be ignored, nor should ethnographic parallels be invoked indiscriminately, without regard to the archaeozoologial evidence. Today, archaeologists involved with environmental studies are virtually obliged to incorporate zooarchaeological data in their historical reconstructions. Alternatively, without continued growth and recognition, this discipline will amount to no more than a long list of repeated or minimally differentiated data, without a presence in its own right.

ACKNOWLEDGMENTS

Warm thanks Lynn Snyder and Elizabeth Moore for inviting me to give a paper in their session at the ICAZ meetings in Victoria. I thank Prof. K. Zapheiratos (Ethnikon and Kapodistriakon, University of Athens, Department of Zoo-

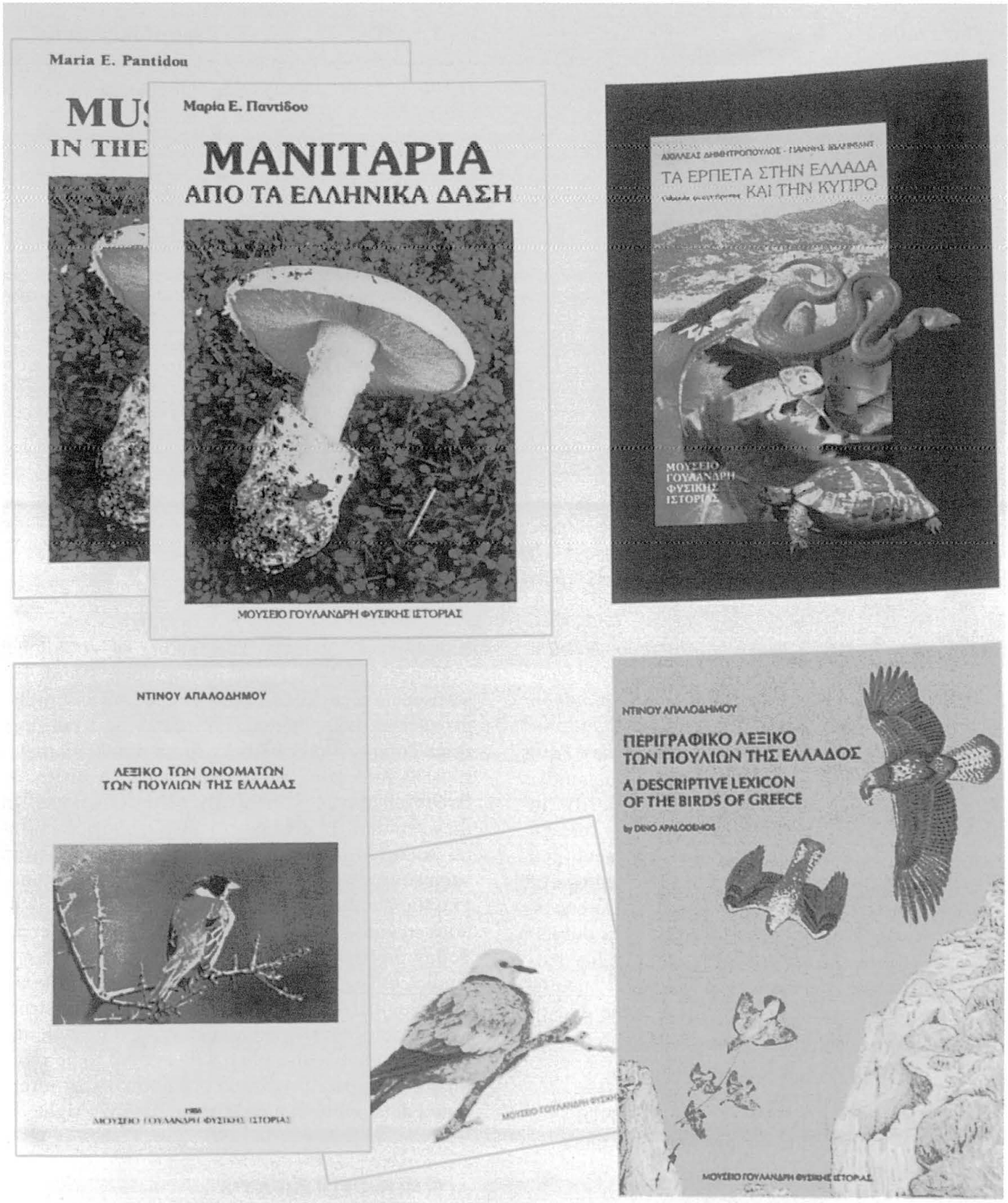

FIGURE 7
Some recent publications of the Goulandris Natural History Museum.

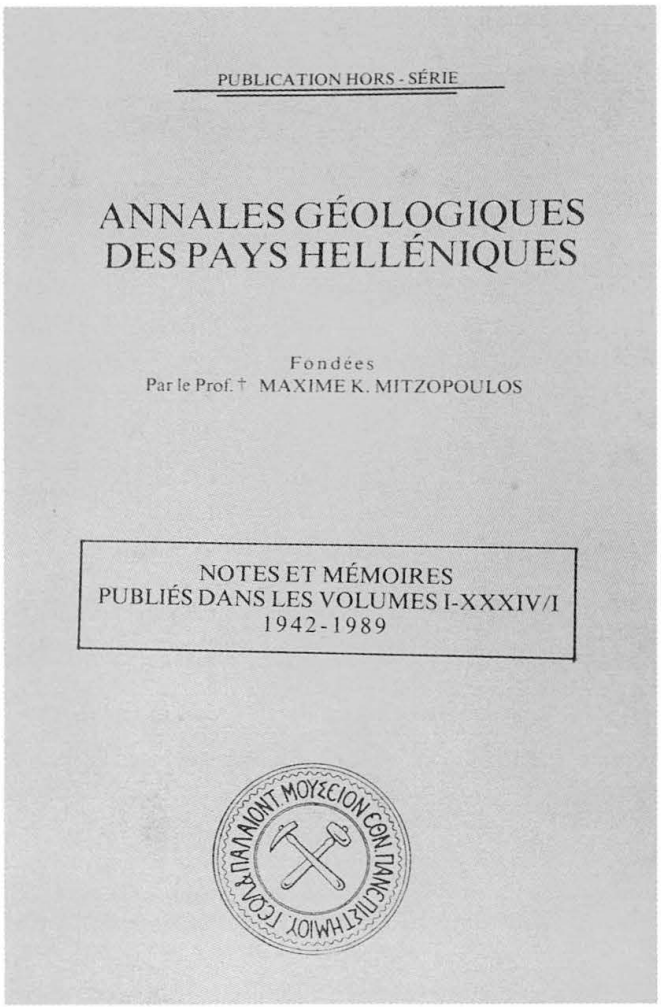

FIGURE 8

The Journal of the Geological/Paleontological Museum at Athens: *Annales Geologiques des pays Helleniques.*

logy), Prof. P.B. Chondropoulos (University of Patras, Department of Biology, Section of Animal Biology), Dr. Theodore Koukouras (Aristoleion University, School of Biology, Department of Zoology) and Dr. David Reese (Peabody Museum of Natural History, Yale University) for the information which they shared with me, and Prof. A. von den Driesch and Dr. L. Bartosiewicz for the photographs of I. Boessneck and S. Bokonyi. Thank you to A. Doumas and Lynn Snyder, respectively, for help in the translating and editing of the text of this paper. A portion of this paper was prepared while I was a Senior Research Fellow at the Malcolm H. Wiener Laboratory, American School of Classical Studies at Athens, and I thank the director, Sherry Fox, and the American School for their support. I would also like to thank all the professors and collegues, Greek and non-Greek for their work. Space limitations do not permit the listing of their hundreds of publications concerning the Greek environment and archaozoology, but I express here my deep appreciation for their work, and their contributions to our knowledge of Greek history.

REFERENCES

ADAMOPOULOU, C.; DIMAKI, M. & MARAGUOU, P. 1998: *Snails of Greece*. Zoological Museum, Athens.

BATE, D.M.A. 1936: Animal remains, fish, etc. In: Lamb, L.: *Excavations at Thermi in Lesvos*: 126. Cambridge University Press, Cambridge.

BECKER, C. 1986: *Die Tierknochenfunde Kastanas Ausgrabungen in einem siedlungshugel der Bronze-und Eisenzeit Makedoniens 1975-1979.* Prahistorische Archalogie in Sudosteuropa 5, Berlin.

BLINKENBERG, C. 1931: *Lindos, Fouilles de l'acropole 1902-1914, I. Les petits objets*: 183-184. Walter de Gruyer, Berlin.

BODSON, L. 1998: Contribution a l'etude des criteres d'appreciation de l'animl exotique dans la tradition grecque ancienne. In: Bodson, L. (ed.): *Les Animaux Exotiques dans les Relations Internationales: Especes, Fonctions, Significations*: 39-212. Universite de Liege, Liege.

BOESSNECK, J.; MULLER, H-H. & TEICHERT, M. 1964: Osteologische Unterscheidungsmerkmale zwischen Schaf (*Ovis aries* Linne) und Ziege (*Capra hircus* Linne). *Kuhn-Archiv* 78: 1-129.

BOYD-DAWKINS, W. 1902: Remains of animals found in the Dictaean cave in 1901. *Man* XXX: 113-115.

COLLECTIF 1998: *The History of the Numismatic Museum* (Greek text). Archaeological Receipts Fund, Athens.

COLLECTIF 1999: *The National Archaeological Museum.* Archaeological Receipts Fund, Athens.

DAVIS, S.J.M. 1987: *The Archaeology of Animals*. Yale University Press, New Haven.

DESSE, J. & DESSE-BERSET, N. (eds.) 1987-1996: Fiches d'osteologie animale pour l'archeologie. Juan-les-Pins: Centre de Recherches Archeologiques, CNRS, APDCA.

DRIESCH, A. von den 1976: *A Guide to the Measurement of Animal Bone from Archaeological Sites.* Peabody Museum of Archaeology and Ethnology, Bulletin 4. Harvard University. Cambridge, Mass.

DUCOS, P. 1975: Analyse statistique des collections d'ossements d'animaux. In: Clason, A.T. (ed.): *Archaeozoological Studies*: 35-44. North Holland Publishing Company.

EVANS, A. 1935: *The Palace of Minos at Knossos.* Mcmillan & Co., London.

FUTUYMA, D.J. 1991: *Evolutionary Biology* (Greek text). Crete University Press, Herakleion.

GAMBLE, C.; HALSTEAD, P.; HAMILAKIS, Y. & KOTJABOPOULOU, E. (eds.) 2001: *Zooarchaeology in Greece: Recent Advances.* British School at Athens (BSA series), London.

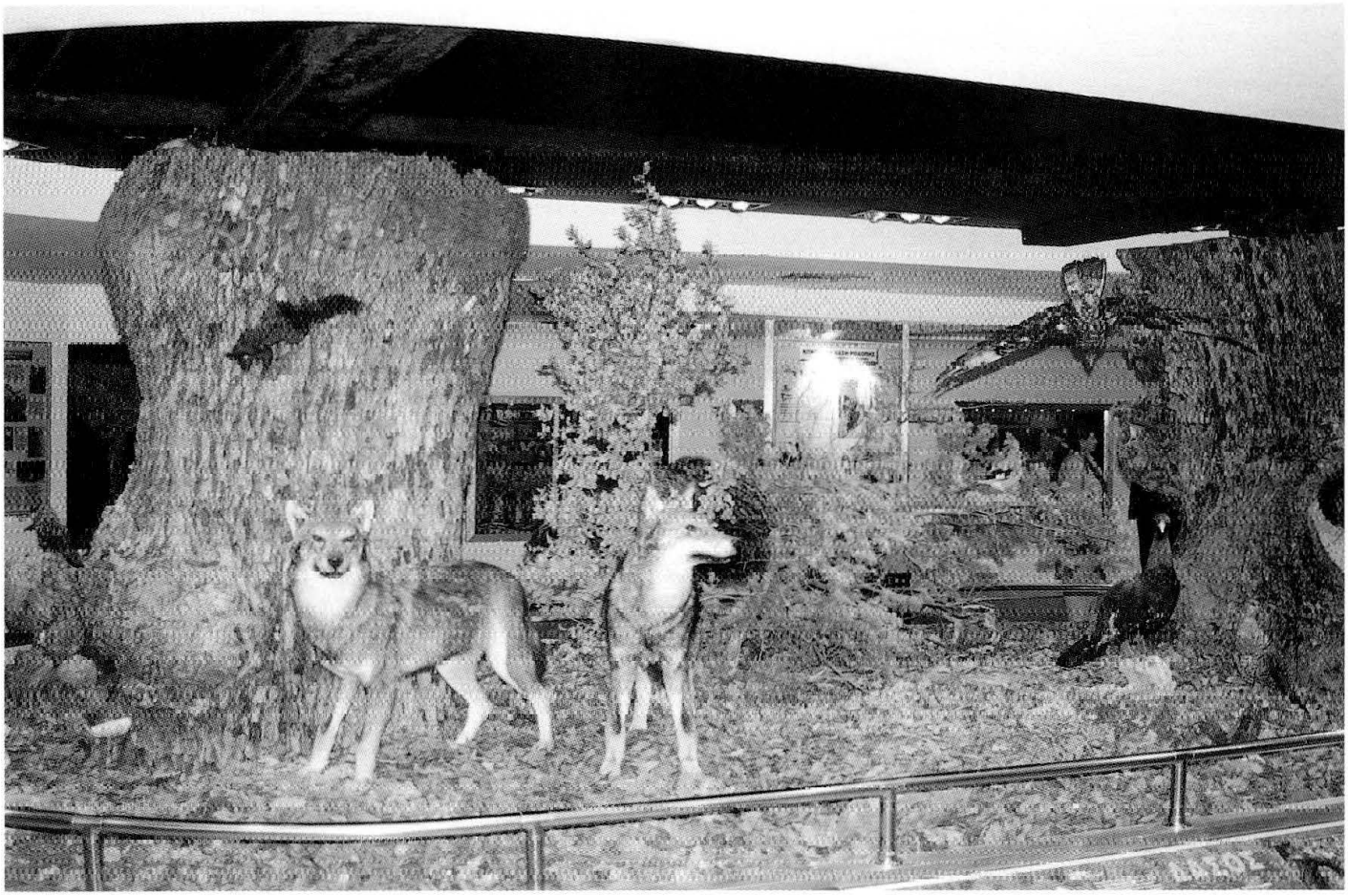

FIGURE 9
Museum of Natural History in Paranesti. View of the interior.

GEJVALL, N.G. 1969: *Lerna a Preclassical Site in the Argolid, 1. The Fauna*. American School of Classical Studies, Princeton.

GRATZIOU, O. 1987: Archaeology and protection of monuments. In: *Work and Function of a service for the Protection of Monuments Today*: 45-49. Extraordinary Congress of the Association of Greek Archaeologist, organized by the Archaeological Service (Greek text), Athens 9-13 March 1984.

HALSTEAD, P. 1990-1991: Lost sheep? On the Linear B evidence for breeding flocks at Mycenaean Knossos and Pylos. *Minos* 25-26: 346-365.

HALSTEAD, P. 1992: Agriculture in the Bronze Age Aegean: towards a model of palatial economy. In: Wells, B. (ed.): *Agriculture in Ancient Greece*: 105-117. Strifter utgiuna an Svnska Institutet I Athens.

HARTIONIDOU, A. 1978: *Epidauros, The Sanctuary of Asclepios and the Museum* (Greek text). Kleio, Athens.

HATZIDAKIS, J. 1912: Tylissos Minoiki (Minoan Tylissos). *Archaiologiki Ephemeris*: 197-233.

HATZIDAKIS, P. 1995: History of Greek archaeology; history of the Archaeological Museum of Mykonos (Greek text). *Mentor* 35: 108-122.

HELMER, D. & ROCHETEAU, M. 1994: Atlas de squelette appendiculaire des principaux genres Holocenes de petits ruminants du nord de la Mediterranee et du Proche-Orient (*Capra*, *Ovis*, *Rupicapra*, *Capreolus*, *Gazella*). *Fisches d'osteologie animale pour l'archeologie*. Serie B: Mammiferes 1. Juan-les-Pens, Centre de Recherches Archeologiques. CNRS.

HEURTLEY, W.A. 1927-1928: Human and animal remains. In: Heurtley, W.A. & Radford, C.A.R. (eds.): *Two Prehistoric Sties in Chalcidice. Annual of the British School at Athens* 29: 175.

INGLESSI, N.G. 1932-1933: *Annuaizes de Grece*. Chambre de Commerce et d'Industrie, Athens.

KALPAXIS, Th. 1990: *Archaeology and Politics I, the Archaeology of Samos, 1850-1914* (Greek text). Crete University Press, Rethymno.

KALPAXIS, Th. 1993: *Archaeology and Politics II, Excavation of the Temple of Artemis in Corfu, 1911* (Greek text). Crete University Pres, Rethymno.

KILLEN, J.T. 1964: The wool industry of Crete in the Late Bronze Age. *Annals of the British School at Athens* 59: 1-19.

LAX, E.M. 1996: A gazetteer of Cretan paleontological localities. In: Reese, D.S. (ed.): *Pleistocene and*

Holocene Fauna of Crete and It's First Settlers: 1-32. Monographs in World Archaeology no. 28.

MARINATOS, S. 1932: Protominoikos tholotos taphos para to chorion Krasi Pediados (Early Minoan vaulted tomb near the village of Krasi Pediados). *Arch Delt* 12: 102-141.

PAYNE, S. 1985: Zooarchaeology in Greece: a reader's guide. In: Wilkie, N.C. & Coulson, W.D.E. (eds.): *Contributions to Aegean Archaeology: Studies in Honor of W.A. McDonald*: 211-244. Kendall/Hunt, Dubuque.

PETRAKOS, V. 1995: The persons that have influenced Greek archaeology (Greek text). *Mentor* 34: 61-72.

PETRAKOS, V 1998a: The Greek concept of the monuments from Kuriakos S. Pittakis to the present (Greek text). *Mentor* 47: 65-73.

PETRAKOS, V 1998b: Greek archaeology during the age of Kyriakos S. Pittakis (Greek text). *Mentor* 47: 74-113.

POPLIN, F. 1973: Interpretation ethnologique des vestiges animaux. In: *L'Homme hier et aujourd'hui*: 345-354. Cujas, Paris.

POPLIN, F. 2000: Oeufs d'autruche decores grecs et etrusqus: technique et diffusi. In: *L'artisant en Grece ancienne, les productions, les diffusions*: 127-143. EFA-MON, Lyon, University Lille 3.

PRUMMEL, W. & FRISH, H. 1986: A guide for the distinction of species, sex and body size in bones of sheep and goat. *Journal of Archaeological Science* 13(6): 567-577.

REESE, D.S. 1994: Recent work in Greek zooarchaeology. In: Kardulias, P.N. (ed.): *Beyond the Site: Regional Studies in the Aegean Area*: 191-221. University Press of America, Lanham.

REESE, D.S. 1995: *Pleistocene and Holocene Fauna of Crete and It's First Settlers*. Monographs in World Archaeology no. 28.

REITZ, E.J. & WING, E. 1999: *Zooarchaeology*. Cambridge University Press, Cambridge.

SIMPSON, G.G.; ROE, A. & LEWONTIN, R.C. 1960: *Quantitative Zoology*. Harcourt Brace & Company, New York.

SYMEONIDIS, N. & THEODOROU, G. 1989: History of the fossil life at Pikermi, Attica (Greek text). *Attiko Topio kai Perivallon*: 48-57.

TARAMELLI, A. 1897: Grotte de Miamu. *American Journal of Archaeology* 1: 287-312.

TRANTALIDOU, K. 1996: O Zoikos Kosmos (The Animal World - Greek text). In: K.-Kurtessi-Philippakis: The Palaeolithic Period in Greece. *Archaiologia Kai Technes* 58: 45-53.

TRANTALIDOU, K. 2000: Animal bones and animal representations at Late Bronze Age Akrotiri. In: Sherratt, S. (ed.): *The Wall Paintings from Thera*: 709-735. Proceedings of the First International Symposium.

YANNOULI, E. & TRANTALIDOU, K. 1999: The fallow deer (*Dama dama* Linnaeus, 1758): archaeological presence and representation in Greece. In: Benecke, N. (ed.): *The Holocene History of the European Vertebrate Fauna*: 247-281. Modern Aspects of Research Workshop, Berlin.

ZAPHEIROPOULOU, P. 1988: *Syros Museum*. Archaeological Receipts Fund, Athens.

ZAPHEIRATOS, K. 1998: *Zoological Museum* (Greek text). In: *Epetirida Scholis Thetikon Epistimoy: 1997-98*: 66-68.