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of Cyprus**

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***Faunal Extinction
in an Island Society***

**Pygmy Hippopotamus Hunters
of Cyprus**

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Introductory Note

The prehistory of Cyprus has held a particular fascination for scholars ever since the Swedish Cyprus Expedition discovered, some sixty years ago, the first evidence for a Neolithic settlement at Petra tou *Limniti* near the north coast. Subsequent research by P. Dikaios, A. Le Brun, and I. Todd on the Neolithic culture of the island has increased our knowledge of this early phase of Cypriot prehistory, but at the same time, it has raised the question whether the Neolithic was preceded by an earlier phase or not. Already in 1968, a suggestion was made by E. Stockton for the existence of a pre-Neolithic culture, but this suggestion was poorly documented and was not pursued as a viable proposition. Early in 1981, S. Swiny asked me to consider an investigation of what appeared to be a pre-Neolithic site at Akrotiri *Aetokrernnos*, but I expressed certain reservation, and I was even more doubtful after visiting the site a few months later. My advice was that we should be extremely cautious, though I was favorably disposed to allowing a limited excavation if an experienced prehistorian could be found to undertake it. Alan Simmons accepted the challenge and over three years (1987, 1988, 1990), he and his collaborators excavated nearly the entire site, which is less than 40 sq m in extent. I have been “critical” throughout the excavation, not of the methods used but of the results of the stratigraphic study and of their interpretation. This criticism did not stem from a negative attitude, but I thought that an investigation of this kind—the results of which were to add at least 1,500 years to Cypriot prehistory—should be handled with extreme caution. Such an approach seemed even more imperative in view of the limited area of the excavation.

The excavation results are impressive and Simmons and his team are to be congratulated for not only publishing preliminary reports, but also for the prompt publication of the final report. An excavation in such a limited area of a period never before encountered on the island has surely not solved all the problems; indeed, it has raised a good number of questions. One cannot deny, however, that Akrotiri *Aetokrernnos* is a cultural site, that the faunal and cultural material found there is of vital importance, and that the dating of the deposits to 1,500–2,000 years earlier than the previously known first occupation of Cyprus has opened new horizons for further investigations. The questions raised by the excavations should be considered together with the skepticism and criticism already expressed by

certain scholars about the interpretation of Akrotiri *Aetokremnos* (and no doubt there will be further questions to address after this publication) as a positive phenomenon. For over fifty years, archaeologists have been excavating Late Bronze Age sites in Cyprus in order to attain a better understanding of merely some two to three centuries of the island's past, yet "the more we learn the less we know" about this period. An impressive start has been made at Akrotiri *Aetokremnos*, which should encourage systematic archaeological and paleontological surveys of the island. Even if this circa tenth millennium B.C. habitation were seasonal, surely it would not be the only one on Cyprus. The geographical location of Akrotiri *Aetokremnos*, together with its suggested seasonal occupation, gives it a uniqueness that can only be substantiated by careful documentation of comparable sites, for presumably the attraction (hippopotamus meat) was not confined only to this rather inhospitable spot. Despite the discovery of hippopotamus bone beds elsewhere, none seems to show an association with human activity. Fortunately, the island is exceptionally situated for research on the early prehistory of the Mediterranean.

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Foreword

The multidisciplinary research program at Akrotiri *Aetokremnos* is important, in my opinion, for three reasons: two empirical and one conceptual. Quite apart from the archaeology, work at the site is a major contribution to island biogeography, in that the *Phanourios* sample—certainly the best from Cyprus and probably the best anywhere in the world—has already provided, and will continue to provide, important ecological and behavioral data on these intriguing creatures. Dwarfed island faunas are important to our understanding of the complex factors that shape natural selection in ecologically closed environments over the evolutionary long term. At *Aetokremnos*, we seem to have the “end” of a long sequence of hippo evolution on the island. With comparative studies of other Cypriot hippo faunas, we should be able to pin down the interval of initial colonization by what were, presumably, normal-sized hippos, and—if the other sites can be dated—document the dwarfing process in considerable detail. *Aetokremnos* would still be a significant paleontological locality, even in the absence of evidence of a human presence there.

While reading the text of the monograph, a number of questions strictly related to the paleontology occurred to me. One was how to model the colonization process. There seems to be little question that the large mammals colonized the island by swimming to it (because, I gather, Cyprus has not been connected to the mainland for roughly 5–6 million years). Moreover, the distance to the nearest land would have been at least 60–65 km, even during episodes of maximum sea-level regression, and considerably less than the 80–120 km that separates Cyprus from the Anatolian coast today. It might be possible to identify the source of the colonizing population and predict the colonization interval, given current, relatively refined knowledge of marine paleotemperature cores.

The dwarfing process itself is also interesting and remains very poorly understood. One might imagine that systematic relationships would obtain among (1) island surface area (or, more accurately, the area corresponding to hippo habitat); (2) the size of the initial, colonizing population (it must have been large enough to sustain a mating network); and (3) the time elapsed since initial colonization. Through Reese’s (and other’s) analyses, we already know something about diet preferences and the kinds of terrain to which the Cypriot pygmies were adapted. Extrapolating from modern research, we may also be able to say something about

local group size and composition, because it appears that there are systematic differences between extant pygmy hippos and their larger relatives. Assuming that we can establish at least some of these parameters and make educated guesses about others, this becomes a classic simulation problem, the empirical credibility of which can be evaluated with the various hippo faunal samples found on the island. An island biogeographer could, no doubt, come up with many more intriguing questions that would maximize the research potential of the large and well-preserved *Aetokremnos* faunas.

The second major empirical contribution of the work is, of course, the archaeology. In my opinion, Simmons and his colleagues make an extremely strong case for contemporaneity of humans with *Phanourios*, even if the role of human agency in the extirpation of the species is not well understood. Moreover, the site is extremely well dated with 31 determinations from six laboratories establishing the period of use/occupation of the rock-shelter in the tenth millennium B.C. (Simmons & Wigand 1994; anyone familiar with radiocarbon dating will recognize that it is practically a miracle to get so many coherent determinations on eight different kinds of samples from six different laboratories!). Simmons and his coworkers have conducted an exemplary excavation and analysis of *Aetokremnos* and have documented beyond a reasonable doubt the association of a large number of unequivocal artifacts with the faunas, the presence of informal hearths, and a high incidence of burnt bone. Even if we are not in a position to know the details of the archaeotaphonomic record at the site (and the question arises as to whether we know the detailed archaeotaphonomy of *any* site), it seems clear to me that humans were involved in the accumulation of the hippo, elephant, malacological, and avifaunas, and that alternative scenarios that seek to eliminate human agency stretch credulity to the breaking point. Interpretation of the *meaning* of this association will no doubt remain controversial (at least until we have a better understanding of the processes involved in ancient bone accumulations), but the association itself is beyond question.

The work at *Aetokremnos* also raises a number of conceptual issues, probably the most important one being the implications that the research has for the notion of a Neolithic colonization of the island by people already practicing domestication economies. These models are founded on work at the important site of Khirokitia, excavated over the years first by Porphylos Dikaio, and then by a French team headed by Alain LeBrun. Central tenets of these models are that there was no pre-Neolithic human presence on the island, and that Neolithic colonists brought with them not only domesticated ovicaprines and cereal grasses, but also wild species of potential economic importance (i.e., deer). It seems pretty clear that, whatever else it might mean, the *Aetokremnos* research documents a human presence on the island some 1.5–2 millennia earlier than Khirokitia, and with no indications (at least at *Aetokremnos* itself) of domestication economies. This situation fits a pattern of relatively late human colonization of the Mediterranean Islands (Sardinia—only technically an island—excepted) and raises the question of why humans began to occupy island niches when they did.

Being something of a demographic determinist, I think the answer to that question probably had a great deal to do with population-resource imbalances in the littoral regions of the eastern Mediterranean mainland, where the domestication process had already been underway for millennia, and where there is considerable evidence for dietary diversification and intensification prior to the appearance of domestication economies (see, e.g., Neeley and Clark 1994). When humans began to encounter dietary stress due to increased local

population density as a consequence of sedentism (e.g., the Natufian), they initially responded to that stress by diversifying their diet to include more high-cost, low-yield resources (e.g., shellfish) and by intensifying the procurement of traditional dietary staples (e.g., gazelle, cereal grasses) (Cohen 1975, 1977; Redding 1988). When they began to “run out of options” for diversification and intensification, if they could emigrate, some did so.

Although humans probably reached the Mediterranean Islands from time to time throughout the Pleistocene, a sustained human presence on them is documented only around the Pleistocene/Holocene boundary. This is a significant piece of evidence that calls for an explanation. Domestication is a “process” not an “event” and, as a number of workers have clearly shown, it has roots deep in the Late Pleistocene (e.g., Clark 1987; Cohen 1977; Jarman *et al.* 1982). The *Aetokremnos* research must be seen in this broader intellectual context. It has profound implications for how we think about domestication, and how we weight the various causal factors (demographic, climatic, behavioral etc.) invoked to explain it.

Finally, it is worth remarking that any “interesting” results obtained from multidisciplinary research efforts at a site like *Aetokremnos* are bound to be controversial. It is naive to expect definitive resolution in the face of competing claims about evidence and competing views about the credibility of preferred approaches. Ultimately, these are epistemological issues, bound up in the different “packages” of biases and preconceptions that archaeologists bring to the research enterprise (see, e.g., Simmons 1991b). Given the lack of evidence accepted as decisive by all, different epistemologies result in conclusions that are fully warranted only within the boundaries of a particular conceptual framework. All conclusions are, therefore, conditional on the unstated assumptions that underlie a particular research protocol.

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Preface

The small size of Akrotiri *Aetokremnos* belies its significance. This has been a far more complex project than I imagined when we first started excavations, and when we concluded our field studies, I realized that *Aetokremnos* would not be easy to write up. I find it somewhat amusing—as well as ironic—that I have become an advocate for a human role in Pleistocene extinctions because I have never been overly convinced that in most parts of the world this was the case. In Cyprus, it appears that it was.

Aetokremnos is a controversial site, presenting many challenges. Our research there has resulted in a broadening of my understanding of what it really means to conduct true interdisciplinary archaeology. It is not easy, but it is rewarding. I should note that although this volume is the major report on our investigations, a second volume is planned by David Reese. This volume will provide much more detail on the faunal remains, especially those strange little animals, the extinct Cypriot pygmy hippopotamus (or the “pygmos” as they affectionately came to be called), that we all became so attached to in one way or another.

In a work such as this, there are numerous individuals who need to be thanked, even after all of my cajoling for timely submissions of individual authors’ contributions. The research reported on here goes far beyond the contributors whose words and thoughts make up much of this volume. Many others contributed, knowingly or unknowingly, to what is reported here, and I can only list some of them. I must first thank the field staff of the project, all of whom were unpaid professionals, students, or amateurs. Without their untiring devotion, this project would never have happened. Even the occasional complaints about the same red wine offered at dinner are overlooked in light of their enthusiasm and skill. These individuals (not counting those who volunteered for only a day or so) include Gwynn Alcock, Bonnie Bazemore, Geoffrey Clark, Susan Dolezal, Steve Durand, William Farrand, Gerald Hennings, Susan Horne, Lena Kassianides, Elliot Lax, Rolfe Mandel, Françoise Martin, Gavin Muir, Michael Neeley, Sandra Olsen, Deborah Olszewski, Catherine Perlès, Kathy Roler, Phil Simkin, Shelly Smith, Thomas Strasser, Alessandra Swiny, Helena Swiny, Philip Swiny, Stuart Swiny, and Weihong Zhao. In addition, David Reese was with us for all three excavation seasons, as was Steve Held, who served as field director. I benefited immensely from their knowledge of Cyprus.

Aside from contributors, other individuals who gave of their time and wisdom, even if I might not have listened to the latter, include Olivier Aurenche, Ofer Bar-Yosef, Reuban Bullard, David Burney, John Cherry, Christopher Chippendale, Paul Croft, George Frison, Donald Grayson, Herbert Haas, Julie Hansen, Gary Haynes, Ellen Hersher, Alice Kingsnorth, Bernard Knapp, Alain and Odile LeBrun, Stephanie Livingston, Lee Lyman, Paul Martin (who I guess was right, at least for Cyprus!), Eric Meyers, Fred Nials, David Pearlman, Gary Rollefson, Avraham Ronen, David Rupp, Pat Shipman, Paul Sondaar, Joanna Smith, Alison South, Nicholas Stanley-Price, Mary Stiner, Ian Todd, Claudio Vita-Finzi, Alan Walker, and Fred Wendorf.

I also owe a great debt to the Department of Antiquities of the Republic of Cyprus. When initiated, Vassos Karageorghis was director, and his critical but fair assessment of the site is a tribute to the professionalism of the department. His successors (Athanasios Papa-georghiou, Michael Louloupis, Demos Christou, and Sophocles Hadjisavvas, the present director) have been equally supportive. The former curator of the Kourion Museum, Socrates Savvas, made our stay there more pleasant than any field project has a right to expect. Members of the Western Sovereign Base Area Archaeological Society contributed to the project in many ways. Several Royal Air Force personnel, including Stewart Chapman, Frank Haggerty, Brian Hoskins, Brian Pile, and Julian Whitehead, also greatly facilitated the research. In particular, I must single out Gavin Muir and Phil Simkin who were “assigned to us and probably did not know what they were getting into; they deserve enormous credit for their support and knowledge of “the system.”

There are many others without whom this project would never have been started and completed, and I owe them a particular debt of gratitude. From the Cyprus American Archaeological Research Institute (CAARI), Vathoulla Moustouki was always a source of great assistance. Stuart Swiny, former director of CAARI, and his talented family was an inspiration for the project; and in those days when we did not even know if *Aetokremnos* was cultural, he put his professional reputation on the line with characteristic good humor. I hope the results of this work justify his confidence in the site. The wonderful hospitality of all of the Cypriot people we encountered made this a delightful introduction to Cyprus for me. I only hope that the future brings a lasting peace to this often troubled island.

In the United States, various individuals formerly with the Desert Research Institute (DRI) supported the project in many ways. Mona Reno aided considerably with early reports on the site. I must single out Susan Sawatsky for her untiring effort in producing the computer-generated profiles in Chapter 4 and other figures in Chapter 5, which were made using *Interleaf*. The late Cynthia Irwin-Williams, former director of the Quaternary Sciences Center at DRI, was an enthusiastic supporter. The project would not have been completed without the great support of Dale Ritter, Cythnia’s successor at DRI until his retirement in 1995. Various individuals at the University of Nevada, Las Vegas, have also helped with the project, and I especially thank Margaret Lyneis and Claude Warren for their insights. The figures were drawn by Geoffrey Clark (chipped stone), Renee Corona-Kolvet (chipped stone, maps), Michael Neeley (chipped stone), Deborah Olszewski (chipped stone), Janie Ravenhurst (ground stone), and Russell Hapke (Fig. 13.1). Some of the final photos in Chapter 7 are reproduced by courtesy of the Field Museum of Natural History. Eliot Werner of Plenum Press has been more than patient throughout the process of publishing this volume. Finally, my wife Renee Corona-Kolvet has been a constant source of inspiration for dealing with the “pygmos.” I’m sure that she, as am I, is now happy that they may finally rest in peace.

No modern archaeological project can be undertaken without adequate funding. *Aetokremnos* was no exception, and involved “creative financing” on several levels. The National Geographic Society provided the bulk of the funding. Other agencies that also supported the project included the Desert Research Institute, the Institute for Aegean Prehistory, the Leakey Foundation, the Lindley Foundation, the National Endowment for the Humanities, and the National Science Foundation.

A brief word on site names as used in this volume: As is customary in Cyprus, archaeological sites normally have two names, the first after the nearest village and the second referring to the nearest toponym. The second word should be italicized. In most cases, a site is known by its second name alone; thus *Aetokremnos*. Sometimes, however, particularly well-known sites (such as the Aceramic Neolithic village of Khirokitia *Vounoi*) are frequently referred to by their village name, that is, Khirokitia in this example. This scheme can often be confusing to non-Cypriot specialists, and I have tried to be consistent throughout this volume.

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