POCA 2007

POCA 2007:
Postgraduate Cypriot Archaeology Conference

Edited by

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PREFACE

The idea to hold a conference for postgraduate students and young scholars conducting research on Cypriot Archaeology was inspired in 2001 by Dr Kirsi Lorenz, at the time a PhD student at the University of Cambridge and now currently Research Coordinator at the Cyprus Institute. At the early stages of the Postgraduate Cypriot Archaeology (POCA) Conference, the meetings were largely informal in character and were addressed to postgraduate students mostly from the United Kingdom. The turning point in the history of POCA was the conference held at Trinity College in Dublin, in 2005, which served to transform the idea of POCA and established it as an international gathering of postgraduate students and young researchers working on Cypriot Archaeology. The main organiser in Dublin, Dr Giorgos Papantoniou, at the time a PhD student at Trinity College, was responsible for the first publication of the proceedings of that year's POCA meeting. The volume was completed and published in 2008 with ten important contributions on Cypriot Archaeology by graduate students and young scholars.

The University of Cyprus has been supporting the institution of POCA from its earliest stages. Professors Demetrios Michaelides and Maria Iacovou were the key speakers in 2002 and 2005 respectively. Furthermore, Cypriot students studying at the University of Cyprus and other European and American Universities have regularly participated in the POCA annual conferences since 2004. In 2006, during a productive meeting at the University of Edinburgh, the postgraduate students of the University of Cyprus decided for the first time to undertake the organisation of this major event. Our motive at the time was to promote Cypriot archaeology at an international level and also to provide the opportunity to Cypriot students of the University of Cyprus to present their work and thus contribute to the better understanding of Cypriot archaeology. It was a great pleasure that we realised that we have fulfilled our goal.

POCA 2007 would not have taken place without the generous financial support of the Department of History and Archaeology of the University of Cyprus. We would especially like to thank the then President of the Department, Professor Theodoros Mavrogiannis, and the Director of the Archaeological Research Unit, Professor Demetrios Michaelides, for their

valuable contribution towards securing the necessary funds to meet the financial needs of this conference and also for their valuable guidance throughout the preparation and organisation of POCA 2007.

The conference took place in Nicosia between the 18th to 21st October 2007. The keynote lecture was delivered by Professor James D. Muhly entitled *"Ten kings of the land of Iadnana in the midst of the sea": Greeks and 'Ionians' in Early Iron Age Cyprus*. Professor Muhly's lecture was very successful and well attended. We extend to Professor Muhly our warmest thanks and gratitude for kindly accepting our invitation. During his inspiring lecture, Professor Muhly expressed the wish for the return of the Stele of Sargon, presently at the Staatlichen Museen of Berlin, back to Cyprus. This request took the form of a petition, which was signed by the editors, authors and professors of the Department of History and Archaeology of the University of Cyprus and it is included in the volume. A copy of the petition has been sent to the Staatlichen Museen.

The conference encompassed 24 presentations by postgraduate students and young researchers from a number of Institutions and Universities in the United Kingdom, France, Italy, Belgium, Germany and the United States. The papers, which were organised chronologically in eight sessions, extended over millennia of Cyprus' history, from the earliest prehistory to the medieval period. They comprised archaeological, anthropological and palaeopathological approaches to the material culture of ancient Cyprus. A lively discussion followed each paper.

Our truly international meeting was further enhanced by the significant and active presence of the professors of the Department of History and Archaeology. They also provided us with ideas and guidance during the entire year of preparation. Special thanks is also owed to the chairpersons of each session who not only adapted themselves impeccably to the subject of speakers but entered into the spirit of the conference and contributed in their own way to making it constructive and beneficial. Archaeologists of the Department of Antiquities, directors of field projects on Cyprus, other leading experts and a number of undergraduate students also attended the meetings. Many thanks are also due to Dr Sabine Rogge, who kindly accepted to address the concluding remarks.

The success of the conference owed a great deal to the generosity of the Cyprus Tourism Organisation. We were able to provide dinner for our guests after the end of the conference in addition to an excursion to Kourion and the Troodos mountains (Omodos region) the following day.

Given that many of the papers made original and new contributions to their subject areas as they were based on the ongoing PhD research of the authors, the decision to publish the proceedings was therefore taken during

the conference. The papers were all subject to peer-review. We would also like to express our gratitude to the 19 anonymous referees, leading experts in their fields, for providing constructive reviews and valuable comments on every paper that was submitted for publishing. We would also like to thank Dr Andrew Philip Souter for correcting and proof-reading the papers and Professor Demetrios Michaelides for providing the necessary financial support. The volume was edited by us in order to produce a coherent and significant work that provides unique views into the island's history.

The first paper (Nathan K. Harper) deals with the study of biodistance in archaeology and provides case studies from Cypriot sites. The second paper (Sandra Rosendahl and Carole McCartney) explores the earliest colonisation of Cyprus and stresses the need to acknowledge small, limited-activity sites in order to understand the complexity of the earliest man-created landscapes on the island. The third paper (Carole McCartney and Marianna Ktori) discusses the formation processes of lithic material in a new site, currently excavated at Ayia Varvara. The following two papers discuss two frequent but often neglected classes of ceramic material. Ariane Jacobs presents part of her ongoing PhD research on the Late Cypriot Plain Wares and introduces preliminary results of her study of the material originating from the excavations at the Late Cypriot urban settlement at Alassa. Federica Spagnoli argues that the study of cooking pots can be used as an indicator of cultural and social changes in Cyprus and the Levant between the Late Bronze and the Iron Age. The discussion on the prehistory of the island closes with a paper (Angelos Papadopoulos) on Cypriot Bronze Age iconography especially in relation to warfare.

Kathrin Kleibl discusses the evidence concerning the Cypriot Ram God and introduces new approaches to iconography and foreign influence. Anna Cannavò presents the Near Eastern textual sources (Neo-Assyrian, Biblical, Hebrew) that reveal Near Eastern perceptions of the island's identity in the Archaic period. The next two papers deal with the political configuration of the Cypriot kingdoms. Anna Satraki explores the means through which the Cypriot *Basileis* manifested their power in the form of royal inscriptions, coinage and royal sculpture. Sidonie Lejeune examines three inscriptions dealing with citizen body and tries to identify the distinctive characteristics of the Cypriot political structures during the era of the kingdoms. Peter Cosyns and Karin Nys review the research on core-formed glass vessels in Cyprus and present some preliminary results of their study of the Cypriot material. Dimitris Vitas examines old theories concerning the existence and the location of Nea Paphos' lighthouse and suggests new interpretations and ideas. Skevi Christodoulou presents the epigraphic evidence on baths and water supply in Hellenistic and Roman

Cyprus. Issues concerning the Latin and Ottoman periods are touched upon by two authors. Mia Gaia Trentin presents a research project that catalogues the graffiti in the churches of Cyprus and some preliminary results from her study of the graffiti. Iosif Hadjikyriakos studies the ceramic decoration in the interior of the churches of Cyprus, a unique phenomenon in the Mediterranean and explores its social connotations. Finally, Niki Savvides closes the volume with some results on a preliminary condition survey concerning the Paphos mosaics.

We feel that the Proceedings of POCA 2007 combine to form a homogeneous volume that comprises a modern and comprehensive approach to the various fields of study of Cypriot history and archaeology. We would like to thank all the participants for their patience and cooperation. They enthusiastically attended all events scheduled by the Organising Committee and contributed to the success of the Conference. We are grateful to all the people and institutions involved with the first international Conference organised by postgraduate students of the Department of History and Archaeology and the publication of this first volume. With the continuous support of the University of Cyprus and our professors we anticipate that this achievement will make a valuable contribution for understanding and appreciating the archaeology of Cyprus and stimulate further discussion.

—Anna Satraki and Skevi Christodoulou

PETITION

In the year 707 BC seven Cypriot leaders offered voluntarily their submission to the Assyrian king Sargon II. Sargon then ordered that a stele be erected at the port town of Kition. The stele depicted the profile of his majestic image and was inscribed with his magnificent deeds in the Near East:

> *"I caused to inscribe upon a stele the victory and the conquests of my hands which, by the strength of the great gods, I achieved over all my enemies,* ***and left it for the future in the land of Ia, a district of the land of Yadnana****".*

The stele, which must have stood at Kition for centuries, is the only Neo-Assyrian document ever to have been found in Cyprus and the only Neo-Assyrian monument that has ever crossed the western frontiers of the continent. It was removed from Cyprus in AD 1845 and was soon afterwards (1846) purchased by the National Museums in Berlin, where it is since displayed in solitude, away from its cultural context, which is the *land of Ia*.

Because this unique monument remains to this day the earliest and foremost evidence regarding the Iron Age kingdoms (*βασίλεια*) of Cyprus,

we, the undersigned, organizers and contributors of the POCA 2007 Conference, request the return of the Stele of Sargon to *the land of Ia*. We thereby most strongly appeal to you, the National Museums in Berlin, for a gesture of goodwill and scholarly comradeship:

Please, return this unique historical monument to the Republic of Cyprus.

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University of Pennsylvania
Dr Polymnia Muhly
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Director of the Archaeological Research Unit, University of Cyprus

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PhD Candidate, Aix en Provence
Rania Michael
PhD Candidate, Pontificio Instituto di Archeologia Cristiana

LIST OF ABBREVIATIONS

AA	*Archäologischer Anzeiger*
AASOR	Annual of the American Schools of Oriental Research
Aegeum	Aegaeum: Annales d'archéologie égéenne de l'Université de Liège
AfO	Archiv für Orientforschung
AJA	American Journal of Archaeology
AmerAnt	American Antiquity
Annales ESC	Annales. Économies, Sociétés, Civilisations
ANRW	H. Temporini (ed.), *Aufstieg und Niedergang der römischen Welt*, Berlin 1972–
ARDAC	Annual Report of the Director of the Department of Antiquities, Cyprus
BAR Int. Ser.	British Archaeological Reports, International Series
BASOR	Bulletin of the American Schools of Oriental Research
BCH	Bulletin de Correspondance Hellénique
BÉFAR	Bibliothèque des Écoles françaises d'Athènes et de Rome
BICS	Bulletin of the Institute of Classical Studies of the University of London
BSA	Annual of the British School at Athens
BSFE	Bulletin de la Société Française d'Egyptologie
CCEC	Cahier du Centre d'Études Chypriotes
CMS	Corpus der minoischen und mykenischen Siegel
CRAI	Comptes rendus des séances de l'Académie des inscriptions et belles-lettres [Paris]
FGrHist	F. Jacoby, *Fragmente der griechischen Historiker* (Berlin 1923-)
IEJ	Israel Exploration Journal
IJNA	International Journal of Nautical Archaeology and Underwater Exploration
JHS	Journal of Hellenic Studies
JMA	Journal of Mediterranean Archaeology
JNES	Journal of Near Eastern Studies
MÉFRA	Mélanges de l'École française de Rome, Antiquité
MHR	Mediterranean Historical Review
OGIS	Orientis Graeci inscriptiones selectae

OpAth	Opuscula Atheniensia
OpArch	Opuscula Archaeologica
Qedem	Qedem. Monographs of the Institute of Archaeology, Hebrew University of Jerusalem
RAss	Revue d'Assyriologie
RB	Revue Biblique
RDAC	Report of the Department of Antiquities, Cyprus
RN	Revue numismatique
RSF	Rivista di Studi Fenici
SEG	Supplementum Epigraphicum Graecum
SIMA	Studies in Mediterranean Archaeology
WO	Die Welt des Orients
ZA	Zeitschrift für Assyriologie und vorderasiatische Archäologie
ZÄS	Zeitschrift für ägyptische Sprache und Altertumskunde

FROM TYPOLOGY TO POPULATION GENETICS: BIODISTANCE IN CYPRUS

NATHAN K. HARPER

Introduction

Studies in biological anthropology in Cyprus and the wider eastern Mediterranean are often overlooked. For one, studies of material culture through an art historical, economic or functional approach have maintained preeminence as a means of investigating cultural development and change. Human skeletal remains themselves are often very fragmentary and the recording and excavation of these remains is very time consuming and can be seen as a hindrance slowing the archaeological work[1]. When skeletal remains are analysed and reported it is often in an appendix without wider synthesis and dissemination. Since 2000, there have been very few publications concerning human skeletal material from Cyprus in prominent biological anthropology journals[2].

The current theoretical stance of bioarchaeological[3] research states that the human body and its remains can be used to reconstruct many biological and social processes within past populations[4]. In her seminal 1977 work outlining American bioarchaeological theory, Buikstra provides five research goals on which biological anthropologists and archaeologists

[1] Bush and Zvelebil 1991.

[2] F. Le Mort's analysis of the demographic profile of the subadults from Khirokitia is an exception. American Journal of Physical Anthropology, International Journal of Osteoarchaeology, Human Biology, and Human Evolution are major English language outlets for biological anthropology research. European anthropological journals include Anthropologie, Anthropologischer Anzeiger and Bulletins et Mémoires de la Société d'Anthropologie de Paris.

[3] In North America the term "bioarchaeology" refers to the study of human rather than faunal or botanical remains

[4] Buikstra and Beck 2006; Larsen 1997.

can collaborate[5]. The list of topics highlighted by Buikstra includes, but is not limited to, burial programmes and social organisation, daily activities and division of labour, paleodemography including past population size and population density, population movement and genetic relationships and finally diet and disease. Buikstra also suggests that these topics should be addressed in a sequence to insure that the differences or similarities seen in cemetery populations are not the cause of a selective burial programme or genetic predisposition to disease[6].

Due to the relatively insignificant part that biological anthropology studies have played in the development of theory within Cypriot archaeology, there are many facets of the biology of ancient Cypriots that are poorly developed or entirely unknown. Basic questions concerning growth and development, diet and health and paleodemography are little understood. How these groups are adapted to their environment and the process and origins of genetic diseases, specifically thalassemia are, as of yet, unresolved[7]. One aspect that has received more attention than others is the relationship of ancient Cypriot groups to others in the eastern Mediterranean. The current paper describes the history, methods and conclusions within the study of biodistance in Cyprus. The first section will discuss the history of biodistance studies from cranial typological analyses to model-free statistical biodistance studies to more recent model-bound quantitative statistical genetic studies. The history of these studies will then be discussed for Cyprus and case studies will be presented.

Biodistance

From its earliest days anthropology has been concerned with examining the relationships and kinship among and between the groups under study. Understanding how and why groups of people are related provides one of the clearest frameworks for understanding cultural difference and change. Biological distance or *biodistance* is the measurement and interpretation of relatedness or divergence between populations or subgroups of populations based on polygenic skeletal and dental traits[8]. The most basic assumption of all biodistance studies is that populations sharing attributes are more closely related than populations showing great differences in the same attributes[9].

[5] Buikstra 1977, 67.
[6] Buikstra 1977, 70.
[7] See Angel 1972a.
[8] Buikstra *et al*. 1990, 1.
[9] Larsen 1997.

The attributes under analysis for the bioarchaeologist are derived from the skeleton and the dentition. These variables can either be metric, derived from linear measurements of bone or tooth, or non-metric, discrete skeletal or dental traits that vary in presence or degree of expression. Biodistance studies are heavy in mathematical theory and statistics and the statistical methods used for metric and non-metric traits vary. For this paper only metric traits will be discussed[10].

The stated goal of biodistance studies is to describe the genetic variation between and among groups and the role this variation plays in population structure and history. The metric variables derived from the skeleton are measures of the *phenotype*, the total physical appearance (in this case size and shape) of an organism which is determined in part by both underlying genetic and environmental components. This differs from the *genotype* which is the presence of particular alleles at specified loci in an organism.

Linear measurements between clearly identified landmarks on the cranium or dentition have been the historically preferred method for quantifying the phenotype. The identified landmarks are determined largely based on ease of identification and replicability rather than any functional or developmental reason. Despite this, traditional measures of cranial size and shape suggest genetically neutral traits rather than those influenced by selective evolutionary pressures. There is a level of *plastic* change that can be seen in some groups that have recently transitioned from hunting and gathering to an agricultural lifestyle that is not related to adaptive genetic response[11]. Despite the historical research suggesting that cranial size and shape can change in as little as one generation, recent statistical studies indicate that the major component controlling cranial shape is genetic[12].

Cranial Typology

For historical and archaeological sampling reasons the cranium has been the main focus of biodistance studies. The first typologists investigated cranial shape and size as a means to taxonomically classify "racial" groups. This was based on the earliest taxonomies derived from the *Scala Naturae* or Great Chain of Being which ranked all things from

[10] For a review of skeletal and dental non-metric traits, see Berry and Berry 1967; Finnegan 1978; Hauser and De Stefano 1989; Turner *et al.* 1997.
[11] Carlson and Van Gerven 1977; Gonzáles-José *et al*. 2006; Gravlee *et al*. 2003.
[12] Boas 1910; Sparks and Jantz 2003; Relethford 2004; Roseman 2004.

God (the highest) to rocks (the lowest). Carolus Linnaeus the great taxonomist of the 18th century recognised four human races based on skin colour (white, red, yellow, and black) and physiognomy, including facial prognathism (projection). Cranial typologists saw western Europeans as the standard against which to judge all other groups. Studies of the cranium became quantified mostly as a means of judging cranial capacity as a proxy for intelligence. These biometricians thought that difference between types and intelligence could be quantified statistically, using one or two variables. Once again, western European groups were considered superior. This White-Black or more accurately, White-Other dichotomy generally remained the standard until the mid-20th century[13].

While typological analyses were preeminent, anthropology and specifically biodistance played a central role in the development of statistical methods. Karl Pearson developed statistical tests such as the Chi-Square Test, Pearson's *r* for correlation of variables (product moment coefficient) and his Coefficient of Racial Likeness (a distance measure) were based on anthropometric and skeletal datasets[14]. Pearson's journal, *Biometrika*, started in 1901, became the major voice for statistical analyses of human variation and inheritance.

Even with the advent of 'biometrical' analyses the typological bent was still apparent. This was most visible in the use of indices.

> "…crude dimensions are not often racially significant in the individual, and their value for this purpose is somewhat questionable even when the means of groups and the variabilities are calculated. For this reason it has long been customary for anthropologists to calculate indices which express the relation of one dimension to another as a percentage"[15].

Indices were calculated for most measurements of the craniofacial skeleton providing a tri-partite system for classifying size and shape. The most common index used was the cranial index, a ratio of the breadth of skull to its length. The range and the terms given to the tri-partite classification were dolichocrany (narrow or long headed) for an index up to 74.99, mesocrany (average or medium) between 75 to 79.99 and brachycrany (broad or round head) from 80[16]. This was repeated for the nose (nasal breadth to height, leptorrhiny, mesorrhiny, and platyrrhiny), the eye orbit (orbit height to breadth, chamaechonchy, mesochonchy,

[13] Cook 2006.
[14] Howells 1969.
[15] Hooton 1926, 77.
[16] Bass 1987.

hypsiconchy) and many other characteristics of the cranium. The racial types developed during these years were largely arbitrary, based on traits the researcher saw as important for differentiating between types and the reasoning was largely circular.

For the typologist the individual was the unit of analysis, variability was unaccounted for and individuals showing multiple typological traits were shoehorned into a group. This was born of the essentialist idea that racial groups with a "pure racial strain" or core region interacted with other core races on the edges of their ranges and formed many hybrids between races. For archaeological populations, differences in types were explained as the intrusion of groups from other "racial centres". Migrations of groups were the only explanatory model for those following typological methods. This fitted well within the diffusionist, culture area school in anthropology of the time.

Multivariate Craniometric Studies

The last major anthropological biodistance studies utilising typology were found in the mid-1950s and early 1970s at the same time as statistical biodistance studies based in anthropological statistics and genetics were being developed. There was a paradigmatic shift in human skeletal studies at the beginning of the 1950s as a response to the "New Archaeology". The "New Physical Anthropology", sought to answer questions concerning biological processes in human populations rather than the description of individuals or racial types[17]. One of the major driving forces behind a change from typological to populational thinking was the new evolutionary synthesis focusing on genotypes, phenotypes and populational level analysis. The works of biologists Sewell Wright[18], J.B.S. Haldane[19], R.A. Fisher[20] and Theodosius Dobzhansky[21] provided the foundation on which quantitative population genetics was built.

W.W. Howells was one of the first anthropologists to apply multivariate statistics to biodistance studies of populations. He saw the transition from univariate to multivariate statistics as a "transition from Pearsonian to Fisherian statistics"[22]. Univariate statistics could only address differences in variation of one or two variables or measurements

[17] Washburn 1951.
[18] Wright 1969.
[19] Haldane 1932.
[20] Fisher 1930.
[21] Dobzhansky 1937.
[22] Howells 1969.

of a cranium or tooth. What were being tested were the measurements and not the cranium or tooth as a biological unit within a collection of units that can be considered a population.

Though sampling methods, transformation of raw variables and pooling of groups and sexes has been treated differently by many investigators the most common multivariate statistics utilised in biodistance studies are principal component analysis (PCA)[23] and canonical discriminant analysis (CDA)[24]. Both statistical analyses seek to reduce many variables into a new set of variables that explains the majority of the variation seen in and between the groups under analysis. PCA does not require any *a priori* grouping of the samples. For PCA the total sample under analysis is grouped and a variable accounting for a maximum of variation is derived as a linear function of the original variables. The new set of variables in a PCA maximises the proportion of variation for the variables within the total sample for each new principal component. The first component explains the majority of the variation. With each successive component less and less variation is explained.

In canonical discriminant analysis the main goal is to test which variables distinguish between two or more *a priori* groups. The first canonical discriminant function gives each individual a score based on the function of the new transformed variables. The mean score for all of the individuals within an *a priori* group represents the sample centroid. Groups are placed along a line that accounts for all of the variability contained in the function and a sectioning point is given that best separates the groups. For three or more groups the dimensions are expanded and can include two or three lines of orientation and allowing for a visual estimation of distance between swarms of individuals within populations. With both PCA and CVA, graphical plotting in multidimensional space is important to understanding the differences between individuals and population centroids in space.

The main statistical method of measuring the biodistance between populations is the D^2 or Mahalanobis' generalised distance. Mahalanobis was an Indian statistician that worked in Pearson's laboratory in England and critiqued the Coefficient of Racial Likeness, stating that the magnitude of divergence between populations was affected by sample sizes[25]. Mahalanobis' distance measure is a weighted Euclidean distance measure

[23] For a more detailed discussion of principal components analysis in anthropology, see Corruccini 1975; Andrews and Williams 1973.
[24] For discussions of canonical discriminant analysis, see Giles and Elliot 1965; Howells 1966; Crichton 1966.
[25] Ghosh and Majumder 1995.