AEGIS

Essays in Mediterranean Archaeology

Presented to Matti Egon

by the scholars of the Greek Archaeological Committee UK

edited by

Zetta Theodoropoulou Polychroniadis
and Doniert Evely

Archaeopress Publishing Ltd
Gordon House
276 Banbury Road
Oxford OX2 7ED

www.archaeopress.com

ISBN 978 1 78491 200 0
ISBN 978 1 78491 201 7 (e-Pdf)

Printed in England by Oxuniprint, Oxford
This book is available direct from Archaeopress or from our website www.archaeopress.com

The Founder of GACUK Matti Egon with the 'unusual bouquet' offered by the scholars.

The scholars of GACUK and its Founder Matti Egon, the Chair Zetta Theodoropoulou and the Treasurer Panos Arvanitakis in the garden of the BSA, September 2014.

Contents

List of Figures

Piraeus: beyond ‘known unknowns’

The casting technique of the bronze Antikythera ephebe

Cylindrical altars and post-funerary ritual in the south-eastern Aegean during the Hellenistic period: 3rd to 2nd centuries BC

In search of the garden-peristyle in Hellenistic palaces: a reappraisal of the evidence

Entering the monastic cell in the Byzantine world: archaeology and texts

Discovering the Byzantine countryside: the evidence from archaeological field survey in the Peloponnese

On a Fāṭimid *Kursī* in the Monastery of Saint Catherine at Mount Sinai

Showcasing new Trojan wars: archaeological exhibitions and the politics of appropriation of ancient Troy

Foreword

This volume is dedicated to Matti Egon-Xylas by past scholars of the Greek Archaeological Committee UK. Its publication was announced during a celebration in her honour which took place at the British School at Athens on Friday 19 September 2014. The celebration and the proposal for a *Festschrift* had been a long-term goal of mine and I am delighted to see it finally materialise. The scholars responded enthusiastically to the call for the compilation of this *Festschrift* as a symbolic token of gratitude for the material and moral support that they received over the years. Regrettably, not every scholar was able to contribute due to ongoing professional obligations and the tight time constraints. The contributors were invited to write on a subject of their choice related to their expertise. As the topics range from the Neolithic period to the 19th century AD, it seemed appropriate to present them in chronological order.

I would like to take this opportunity to thank all our past and current scholars for their contributions and their participation in the special celebration in honour of GACUK's founder, Matti Egon. I also wish to express my sincere appreciation to Dr Doniert Evely for his collaboration and substantial assistance with the editing of this volume.

Matti Egon was born into a shipping family from Chios. She spent her early years in Athens and at a young age moved with her parents to the British capital. Following the footsteps of her mother, Stamatia Xylas, who was one of the first women in Greece to receive a literature degree from a Greek university, Matti read Classics at University College, London. This was the beginning of a genuine passion for archaeology, which she considers a fundamental component of culture. This belief has informed and inspired her multifarious activities for decades. She has generously supported major museums in England as well as the British School at Athens. With her husband, Nicholas Egon, Matti established the 'Annual Runciman Lecture', hosted by the Centre of Hellenic Studies, King's College, London. She undertook voluntary work for fifteen years for the Archbishopric of Thyateira and Great Britain in schools, hospitals and benevolent organisations, which include the Greek Centre, the Anglo-Hellenic League, the London Hellenic Society and the National Trust for Greece. Matti and Nicholas Egon have been benefactors of The Prince of Wales International Centre for SANE Research at Oxford. Because of her continued involvement in Greek shipping, she established, in memory of her father, the Michael M. Xylas Scholarship for MSc students in Shipping, Trade and Finance at the Cass Business School, City University, London.

Over the years, Matti has established and supported links between the scholarly community and the general public in the UK and also the work of Greek archaeologists. It was during the 1986 celebration of the 150th anniversary of the Archaeological Society at Athens, with which she had already been involved for many years, that Matti agreed to bring together leading members of the London Greek community and seek their support for the Society. This led to the founding of the Greek Archaeological Committee UK as an associate body of the Archaeological Society at Athens. The Committee received charitable status in 1992. Matti served as chair of the Committee during two terms for a total of sixteen years (1986-1993, 2004-2013).

The aims of the Committee are twofold. By organising two lectures annually at King's College, London and at the Hellenic Centre, it presents to academics and the learned public of the UK the latest archaeological work carried out in Greece. By November 2015, fifty lectures will have been given by eminent archaeologists, mainly Greek. Furthermore, the Committee has to date offered the opportunity to pursue postgraduate research degrees in Greek archaeology at leading UK universities to nearly fifty talented Greek and Cypriot-Greek graduates with first-class honours degrees. Their high academic standard is reflected in Professor R.R.R. Smith's words "Thank you for sending us the brightest minds." All this has been achieved thanks to Matti's commitment and generosity. Not only is she involved with every aspect of the Committee's work, but she has attracted new members and donations and has, since 1993, personally contributed very substantial funds for two annual scholarships.

In Greece, Matti has followed in the footsteps of the Great Benefactors who, since the 19th century, have founded and supported with munificence Greek institutions of education and culture. She continued the family tradition which bestowed upon her native island of Chios the Homerion Cultural Centre in Kardamyla by supporting the Koraes Central Public and Historical Library of Chios. She has also underwritten the publication of Adamantios Koraes' *Atakta* in several volumes, as well as many other research projects, book publications and conferences. Her love and appreciation of music has resulted in several music studies scholarships and sponsorship for concerts at various venues, including the Megaron in Athens. She has also supported the 'Mantzaros Philharmonic' of Corfu. Many causes, institutions and individuals have benefitted from Matti's generosity and one would struggle even to begin to list them, as she is always discreet about her philanthropy.

Even if we were somehow to pass over all these achievements in her productive life, she would still stand out for her abiding love for her homeland and its people, her grace, good manners and generosity, tenderness and strength, stamina and positive outlook, optimism and personal involvement with her extended family of scholars, with whom she keeps in touch even after the completion of their studies. Matti makes her imprint on the world through her work, deep knowledge and dedication, which set a remarkable example. She focuses on the essentials and always strives towards personal betterment, general progress and the common good.

Matti Egon-Xylas, a Grande Dame of Greek culture, was awarded the Gold Cross of the Order of Beneficence (2008) by the Hellenic Republic "for her outstanding services to Greece, the Greek community and the Orthodox Church and for her contribution to the advancement of Greek culture in the United Kingdom."

Zetta Theodoropoulou Polychroniadis, PhD
Chair, Greek Archaeological Committee UK

The value of digital recordings and reconstructions for the understanding of three-dimensional archaeological features

Constantinos Papadopoulos

Post-doctoral Researcher in Digital Humanities, An Foras Feasa – The Institute for Research in Irish Historical and Cultural Traditions, Maynooth University, Ireland

Introduction

The application of computer methodologies in archaeology and cultural heritage is not so recent a trend as is often argued. In 1973 at Birmingham, UK, a group of computer scientists and archaeologists gathered to present their work on the implementation of computer methodologies in archaeology. Buckland,[1] for example, presented a site information retrieval scheme, using the BASIC language to enhance on-site recording of finds. Since then, on-site recording has developed to involve advanced desktop- and web-based databases, three-dimensional Geographic Information Systems (GIS) databases[2] and modern equipment, such as satellite-based navigation systems (GPS) and tablets. The rapid technological advancement, especially in the last two decades, has led to the development of new fields, innovative methodologies and novel approaches at both a theoretical and practical level. This paper will focus on the use of three-dimensional recording methods and digital reconstructions as tools for understanding and interpreting archaeological evidence and enhancing knowledge production in the archaeological process. First, it will highlight the paradox that dominates archaeological practice and limits the boundaries of understanding and interpretation only in two dimensions. Then, it will present a brief introduction to three-dimensional recording in archaeology, emphasising the use of laser scanning, photogrammetry and reflectance transformation imaging (RTI). By using as a case-study Koutroulou Magoula, a Greek Neolithic site in central Greece, this paper will discuss how digital recording methods and digital reconstructions can help archaeologists and the people involved in knowledge production during the archaeological process, to augment understandings and interpretations. It will conclude by arguing that three-dimensional visualisations in a reflexive and multi-vocal context should be considered an inseparable element of archaeological fieldwork and an indispensable tool in the hands of archaeologists.

A two-dimensional three-dimensionality

The archaeological process is dominated by a paradox. Although we excavate and research a three-dimensional world, our interpretations rely on two-dimensional depictions of past reality. For example, in an attempt to create a sustainable record, which can act as a reference back to the process of excavation, the remains of a building are translated into a few photographs, conventionalised drawings and textual descriptions. All these representations lack aspects of the three-dimensional world, since their capabilities are limited to the presentation of their information in only two-dimensions.[3] Therefore, the material world is flattened by the aforementioned methodologies, though we have to return to the original three-dimensional information in order to form understandings and produce interpretations. However, this process of transforming the evidence from one form to another is problematical: some information is lost, and indeed other matters that might have not existed enter the records.

Photographs were adopted in archaeological procedure as early as their invention in 1839. Since photographs provide the only 'real-life' evidence of the process and the products of excavation, they create a narrative about the work of archaeologists[4] that not only accompanies texts and drawings, but has its own individual existence. The accuracy and precision, and consequently perceived objectivity that photography could provide, led to its wide acceptance in archaeology. The accuracy was also supported by scales and measuring equipment,[5] while unrelated objects, people and shadows were also removed from the frame, thus producing decontextualized archaeological depictions. The capabilities of the equipment used, combined with the photographers' and archaeologists' choices regarding what to capture and how, also remove certain qualities from the photographic depiction of three-dimensionality. For example, cameras cannot capture the whole breadth of information regarding colour, while the depiction of textures depends on the light and the viewpoint.

Drawing as a means for the recording of archaeological evidence can be traced back even before the establishment of archaeology as a discipline. It was probably the analogue means used in the production of these records, i.e. paper and pencil, which gave the idea of objectivity. In addition, the fact that the draughtsman is not visible in the record

[1] Buckland 1973.
[2] Katsianis 2012.
[3] Papadopoulos 2014.
[4] Bateman 2005, 193; Bateman 2006, 68.
[5] Lucas 2001, 208.

amplifies this pseudo-objectivity. As with photography, drawings also employ a series of conventions in order to capture on paper a flat and usually colourless version of the three-dimensional world[6] and ensure that the final product is intelligible to every person with that specialised knowledge, regardless of language or excavated context.[7] However, drawing conventions cannot be applied universally, since the depiction of evidence largely depends on individual choices as well as skills. In addition, the conventions used produce themselves problems in the depiction of three-dimensional elements, which are so very integral in the understanding of archaeological features. Characteristic examples are colour and texture, which are both missing from drawings, while the geometric features of finds are only limited to scaled measurements.

Texts and written reports have been handled in different ways through time, depending on the aims of the recording process and the people that these were addressed to.[8] Textual records, in the same way as photographs and drawings, also employ a specialist language, either allowing authors to describe information in free narrative or restricting them to fit their observations into predefined fields in an attempt to separate evidence from the people who produced that evidence,[9] and thereby ensure a seemingly objective and homogenous record. This superficial objectivity is strengthened by the other methods of recording and presentation used, such as photographs, charts, references to others' work etc.[10] However, text can only provide an interpretation of the evidence based on individual choices and understandings, translating them from one form to another.[11] By no means can this translation be considered passive and objective, but rather it is a subjective and socially determined process. The documentation of three-dimensional information depends on individuals' perceptual abilities and skills, as well as choices in regard to the breadth of information to be included and the kind of information to be omitted. As a result, most textual descriptions lack essential information about the colour and texture of architectural features, while the colour of the soil is documented either in free description or by using a Munsell Color Chart,[12] which in turn is dependant on several spatiotemporal variables.[13]

From the above, it becomes apparent that the archaeological process is dominated by a theoretical, practical and methodological problem. The excavated three-dimensionality is understood and recorded only in two dimensions, thus leaving behind certain properties of the real world. It is therefore crucial to intensively employ recording techniques, such as laser scanning and photogrammetry that capture three-dimensional information, and also to abandon the traditional ways of thinking and translating reality into two dimensions. The key factor in advancing our understanding of archaeological sites is to have access to three-dimensional recording during all stages of a fieldwork project. This paper argues that this is possible only when three-dimensional recording methods and digital reconstructions are an integral component of fieldwork, and all the information gathered is directed through a three-dimensional process. Of course, this does not mean that it is futile to record the evidence in traditional ways. This remains a necessary and preliminary step that will provide the basis for the process of digital reconstruction and allows a certain level of flexibility, given that traditional recording methods continue to be extensively employed. However, the emphasis should be put on understanding the three-dimensional character of the evidence through a multi-vocal process that will enable the sharing and testing of hypotheses and ideas, while engaging all people involved in a project's production of knowledge.

Three-dimensional recording in archaeology

Archaeology has enthusiastically employed digital methods in order to capture the three-dimensionality of excavated features. In this section, laser scanning, photogrammetry and Reflectance Transformation Imaging will be mentioned, which have already proved to be valuable tools in the pursuit of three-dimensionality in both the field and the lab.

Non-contact 3D digitisers, known as laser scanners, are devices that capture three-dimensional information of given surfaces, objects and structures, collecting points at a high rate and producing results in real time.[14] Laser scanners generally operate on one of three principles: triangulation, time of flight and phase comparison. They generate a 'point cloud', which is a collection of three-dimensional (XYZ) co-ordinates that portrays to the viewer an understanding of the spatial distribution of a subject. Post-processing, which can be quite time consuming, is needed to turn the 'point cloud' into useful information, most often as a meshed model.[15] Depending on the quality of the device used and the amount of post-processing, the results can range from accurate to extremely accurate, with respect to the acquisition of measurements and the morphology of the scanned objects. For example, the density of the 'point cloud' depends greatly both on the amount of scans of the subject-matter, as well as the time spent registering the results with the highest possible accuracy. The replication of texture and colour also depends on several factors, such as the detail that the device can capture, the number of scans obtained, as well as the amount of post-processing. Laser scanners have been used for different scales of datasets, i.e. landscapes,[16] buildings, artefacts[17] and human remains,[18] while the high-resolution 3D models have

6 Piggott 1965, 165.
7 Hope-Taylor 1967, 181.
8 Hodder 1989.
9 Edgeworth 2006, 27.
10 Shanks 1997, 82.
11 Hodder 1991, 15; Shanks 1992, 104; Lucas 2012, 237–243.
12 Munsell Color Chart 1994.
13 Frankel 1980.
14 Böhler and Marbs 2002, 696.
15 Jones 2007, 12.
16 Lasaponara *et al.* 2011.
17 Esquivel *et al.* 2007.
18 Kuzminsky and Gardiner 2012.

often been combined with photogrammetry[19] to produce surface models and eliminate the practical issues that laser scanners pose.[20] Further, a few cases exist where laser scanners have been used to capture contexts in archaeological excavations.[21]

Photogrammetry is a technique that relies on photographs: it is used for deriving accurate three dimensional measurements. The simplest application of photogrammetry is to determine the distance between two points that lie on a plane parallel to the photographic image plane by measuring their distance on the image, if the scale of the image is known. More advanced applications of photogrammetry, called stereophotogrammetry, involve the estimation of the three-dimensional coordinates of points on an object, which are determined by measurements made in a series of overlapping photographs taken from different positions. The XYZ coordinates of a given point on an object or surface are measured by the method of triangulation, according to which, rays are projected from the camera location to the point on the object, and where these rays meet the 3D location of the point is determined. In recent years, several applications have been developed which link the accuracy of photogrammetry with the detail of object recognition and modelling that computer vision produces.[22] These methods produce three-dimensional photorealistic models which correspond to the properties of the real objects, and can also be used to derive accurate measurements.[23] Three-dimensional photogrammetric techniques in archaeological projects have been extensively used in excavation recording, employing different theoretical and methodological approaches to capture finished contexts, intermediate excavation stages and completely revealed features.[24] Similar techniques have also been used for modelling artefacts,[25] as well as profile estimation for digitised sherds and vessel reconstruction by fragment matching.[26]

Reflectance Transformation Imaging (RTI) uses digital cameras and lights to capture and enhance subtle surface details and so generate detailed-surface models of objects.[27] This method uses a camera in a fixed position and a series of lights at known positions, either because they are also fixed, or because this information can be derived from the photographs by using shiny spheres during capturing the image. The photographs are then combined in a software package, enabling the virtual relighting of the objects by calculating the values for each pixel in the photograph under any incident light direction. Users can use a software viewer to virtually move the light across the surface of the captured object. By combining the results of raking light with image processing and computer graphics algorithms,[28] details of the objects' surfaces can be enhanced, providing an augmented perception of colour, texture and form, in a way that is impossible otherwise. RTI was quickly adopted by cultural heritage research and conservation studies: it was realised that by using simple and relatively low-cost equipment, it is possible to extract information which otherwise would have been lost if using conventional photography.[29] Some of the first applications of this technique were on written records, such as epigraphy, while other fields, such as rock art, numismatics and lithics have also benefited from its capabilities. Moreover, RTI has been used in conservation to detect details and surface anomalies that would have been impossible to identify by the naked eye.[30] It is worth mentioning that although RTI techniques to derive three-dimensional properties are gradually developing,[31] RTI can at the moment only capture and interactively visualise two-dimensional information. However, the way that this visualisation is implemented, by moving light and surface enhancements, the perception of three-dimensionality is far more accurate and closer to reality than conventional photographic approaches, both in terms of geometric properties and surface details.

In this section, I have referred to three of the methods widely used in the field of archaeological documentation that capture buildings' and objects' geometry, colour and texture with a greater level of detail and accuracy than conventional recording methods do. It is beyond doubt that these techniques are more efficient in recording the three-dimensionality of the evidence and making sites more easily retrievable for future research and interpretation. Also, this three-dimensionality can provide more information for producing a digital reconstruction of a site. For example, the details depicted in conventional hand-made drawings, cannot be compared to the fidelity of texture derived from RTI or geometry from photogrammetry. This means that by using this enhanced information, digital reconstructions can become detailed and accurate representations of the past. However, when computer graphic simulations in archaeology are seen only as products, i.e. images, which attempt to replicate reality and produce pristine representations of the past, they can neither augment the process of knowledge production significantly nor improve the understandings about the spatial characteristics of the past. The weight of utilization of such work should rather be focussed on the different stages of the process of digital reconstruction, which, if critically thought, can significantly augment understanding. Therefore, it is the process of questioning how the records are formed and how they are implemented in digital reconstructions — and not the computational methods themselves — that can significantly improve comprehension about present and past practices: the why rather than the how.

[19] See for example Lerma *et al.* 2010; Cabrelles *et al.* 2009; Remondino 2011.
[20] Campana and Remondino 2007, 41.
[21] Doneus and Neubauer 2005.
[22] Mundy 1993.
[23] Pollefeys and Van Gool 2002; Remondino and El-Hakim 2006.
[24] See for example Doneus *et al.* 2011; Lo Bruto and Meli 2012; Dellepiane *et al.* 2012; Forte *et al.* 2012, 366–370.
[25] Kersten and Lindstaedt 2012.
[26] Willis 2011, 323–352.
[27] Mudge *et al.* 2005, 2008; Malzbender *et al.* 2000, 2001.
[28] Earl *et al.* 2010.
[29] Earl *et al.* 2011; Mudge *et al.* 2010.
[30] Kotoula and Kyranoudi 2013.
[31] See for example MacDonald 2011; Drew *et al.* 2012.