SAPIENZA UNIVERSITÀ DI ROMA
DIPARTIMENTO DI SCIENZE DELL'ANTICHITÀ

ARID ZONE ARCHAEOLOGY

8 2019

MONOGRAPHS

Papers from the 1st Workshop

Archaeology in Africa

Potentials and perspectives on laboratory & fieldwork research

Edited by
Savino di Lernia and Marina Gallinaro

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with contributions by
M. I. Ahmed, F. Altamura, B. E. Barich, A. Barili, J. Ben Nasr, J. Bogdani, Y. Bokbot, G. Boschian, C.A. Buccellato, P. Buzi, E. Cancellieri, M. Cherin, A. Colonna, A. Dekayir, S. di Lernia, E.B. Ichumbaki, D. A. Iurino, M. Gallinaro, M. Guirguis, E. Janulardo, L.-I. Manfredi, G. Manzi, F. T. Masao, A. Mastino, S. Menconero, A.M. Mercuri, P. Mitchell, J. Moggi Cecchi, S. Ribichini, I. Rossetti, C. Rossi, N. Santopuoli, S. Sarmati, S. Tusa†

with foreword by S. di Lernia

All'Insegna del Giglio

This book is dedicated to Sebastiano Tusa,
colleague and friend

Contents

List of Figures and Tables

Foreword

Approximately one year after the last monograph, devoted to the Holocene pastoral archaeology of Egypt's Western Desert (Gallinaro 2018), I am pleased to present the eighth volume of our series. It collects a selection of contributions presented at the 1st Workshop on "*Archaeology in Africa*" held in Rome in December 2017, whose theme was "*Potentials and perspectives on laboratory & fieldwork research*" and it is edited by Marina Gallinaro and myself: for this reason, I shall not detail here what the reader will find in the introducing chapter. As Series Editor, however, I have to mention a previous monograph devoted to the proceedings of a conference, held in Rome in June 2001 and edited by Mario Liverani (2003), focussed on arid lands in Roman times. I am confident that also other initiatives could consider for publication our series. This book is also fully 'open access', in order to facilitate its diffusion. As Series Editor, I am glad to underline how AZA is in the forefront of dissemination of scientific research supported by public funds, following the guidelines of the European Union. Also for this book I have followed the tradition to ask several colleagues to join our "Advisory Board", that is a panel of researchers that provide comments and suggestions on the submitted chapters: it is a rigorous, yet not-blind, peer-review process that aims to provide constructive and transparent criticism. I take then the opportunity to thank here, in alphabetical order, Piero Bartoloni, Matthew R. Bennett, Alberto Cazzella, Paola Davoli, Hédi Dridi, Mhamed Hassine Fantar, Enrico Giorgi, Alessandro M. Jaia, Damiano Marchi, Lucia Mori, Oscar Mei, Lorenzo Nigro, Marc Mayer Olivé and Gaëlle Tallet, who have greatly contributed to the quality of this volume.

Opening of the 1st Workshop on "Archaeology in Africa": from the left, the late Prof. Enzo Lippolis, former Director of the Dipartimento di Scienze dell'Antichità, Prof. Savino di Lernia, organizer of the workshop with Dr. Marina Gallinaro, and Prof. Eugenio Gaudio, Rector of Sapienza Università di Roma (Photo by A. Zerboni).

The publication of this book has been possible thanks to the financial support of the "*Dipartimento di Scienze dell'Antichità – Sezione Archeologia*", Sapienza Università di Roma and of the "*Scuola Archaeologica Italiana di Cartagine – SAIC*": I wish to thank Andrea Cardarelli, Coordinator of our archaeology section, and Attilio Mastino, President of the SAIC, for their help and support.

I am also pleased to welcome a new colleague joining our Editorial Board: Mario Santana Quintero (University of Carleton, Canada), ICOMOS Vice-President and expert on ethics in the domain of digital heritage.

On a more general level, as times passes, we see how the outcomes of the 'Arab Spring' still shake much of the *arid zones* to which this series is devoted. In Northern Africa, research in Algeria is still limited for foreign researchers; Libya is dramatically still; Egypt, but for some localities along the Nile Valley, also has restrictions, with much part of the desert off-limits for security reasons. Tunisia and Morocco are probably the only countries where, albeit with difficulties, fieldwork is, to some extent, still possible. If we move south, much of the Saharo-Sahelian region is still heavily affected by turmoil, ethnic clashes, and social instability. Despite this is tragic especially for our African young colleagues who cannot access the field, and for the local community involved, it is also important to see things in a different perspective. As Peter Mitchell has hinted in his key-note speech during the workshop (published in this volume), we should acknowledge "*that both in those countries where security conditions currently preclude access to the field and more generally, fieldwork is not the only means of producing archaeological knowledge. Indeed, the inability to undertake it may even be a blessing in disguise if this encourages us to publish the results of fieldwork already undertaken. African and non-African institutions alike house vast quantities of material that has been excavated, but not yet fully studied.*"

Arid Zone Archaeology Series is open to welcome any contributions that could go in the direction of keeping African archaeology, and especially that from 'conflict zones', alive and visible.

Finally, this book has been sent to the publisher a few weeks after the tragic death of Sebastiano Tusa in the airplane crash near Addis Abeba, Ethiopia in March 2019. Dear friend, tireless researcher and passionate scientist, Sebastiano has extensively worked in Africa – Tunisia, Libya, Kenya, to name a few – trying to overtake the traditional barriers between disciplines: we wish to dedicate this book to his memory.

Savino di Lernia
Series Editor
Arid Zone Archaeology

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Arid **Z**one **A**rchaeology
Monographs **8**, 2019
pp. 1-5

1. Introducing the 1st Workshop on "Archaeology in Africa"

Savino di Lernia, Marina Gallinaro

Abstract. This chapter introduces the workshop "Archaeology in Africa", providing a synthesis of the contributions and placing the event in the international scenario.
Key Words. Africa; conflict & turmoil; resources; fund raising.

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Acknowledgements. The workshop has been possible thanks to the efforts of many people and institutions. We wish to thank Eugenio Gaudio, Rector of Sapienza Università di Roma, the late Enzo Lippolis and Giorgio Piras, former and present Director of the Dipartimento di Scienze dell'Antichità, and Marcello Barbanera, Director of the Museo dell'Arte Classica, Sapienza Università di Roma. During the two-day workshop, several young colleagues helped in the organization and logistics: we thank Marco Carpentieri, Martina Di Matteo, Erika Palmeri, Rocco Rotunno, Claudia Sabbini, Olivier Scancarello, Priscilla Zanutel, Sara Zecchinato. The workshop has been funded by the "Archaeological Mission in the Sahara", Sapienza Università di Roma.

1. Background

With the increasing number of conferences, congresses and workshops devoted to African archaeology, one wonders if there is room for another one. More so if with the explicit hope, or unconscious admission, that this workshop would have been the first of a (long) series. And finally, in Italy, where in the past other attempts to create a flexible but permanent structure did not last for long (see Barich, this volume).

This workshop comes after a long theoretical gestation, mainly due to the essential questioning – do we really need it? – and many perplexities (in particular of one of us, SdL). One of the main factors driving our decision to organize this meeting was the awareness of the lack of a network in Italy (both for Italians and Italy-based researchers) for those who work in Africa.

This is particularly surprising, given the very long tradition of Italian research in Africa, particularly active in Northern and Eastern Africa since the 1930s (e.g. Di Caporiacco and Graziosi 1934; Graziosi 1942; Mori 1965). Although this geographical focus could be in some way related to our colonialist past, the expansion of Italy-based research to several other African countries that not suffered the Italian occupation likely reflects a genuine scientific, cultural and ultimately political choice. Notwithstanding scientific research should be borderless, and cultural heritage should not be considered property of a country, we should regrettably admit that all of us belong to places and we all are strongly influenced by traditions, political institutions and legislations of (our) respective countries. This hugely affects the way we do research, raise funds and the ways we work in other places, including teaching, publications and dissemination. Since these topics have not been discussed in Italy over the last 25 years (if ever), we thought that a meeting calling for contributions to consider these aspects, regardless of place of fieldwork, cultural, chronological and historical time frame, and methodological approaches, would have represented a 'novelty' in our scientific panorama. We thought that Africa was the key-word to be used to keep all these contributions together, convinced that doing scientific research in Africa has a distinctive value, as recalled several times (e.g. di Lernia 2017; Mitchell and Lane 2013; Stahl 2005).

Another trigger for this meeting was (and it is) related to the so-called 'Arab Spring'. The outcome has been particularly effective for those who work in the Mediterranean basin, and, in Africa, for those working in the northern regions. Turmoil, social and political instability, terroristic threats, however, had a severe impact also in several other African countries. The death in February 2017 of two Nigerian colleagues, Anas Ibrahim and Adamu Abdulrahim, who tried to abort the kidnapping of Peter Breunig and Johannes Behringer, from Germany, is probably one of the most dramatic events. As we write these notes, after nearly two decades the Algerian president Abdelaziz Bouteflika will not stand for re-candidacy in the next elections. In Sudan, after 30 years, Omar Hasan Ahmad al-Bashīr Bashir Al Assad has been deposed, following protests that have long inflamed the country. In Libya, more than eight years after the death of Gheddafi, Khalīfa Haftar, military leader of the so-called Libyan National Army (LNA), is attacking Tripoli, home of the UN-backed government of Fāyez al-

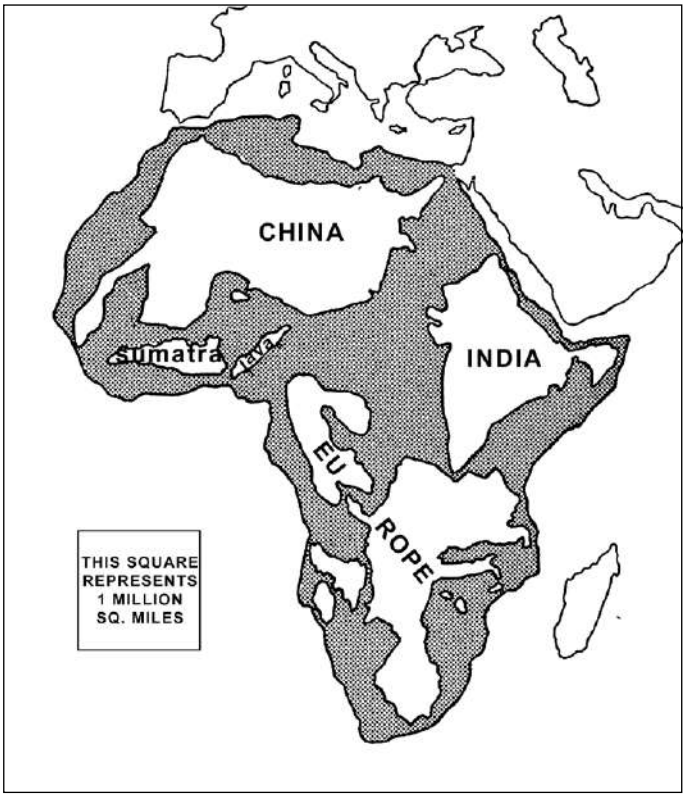


Fig. 1.1 – Map of Africa (modified, after Clark 1975).

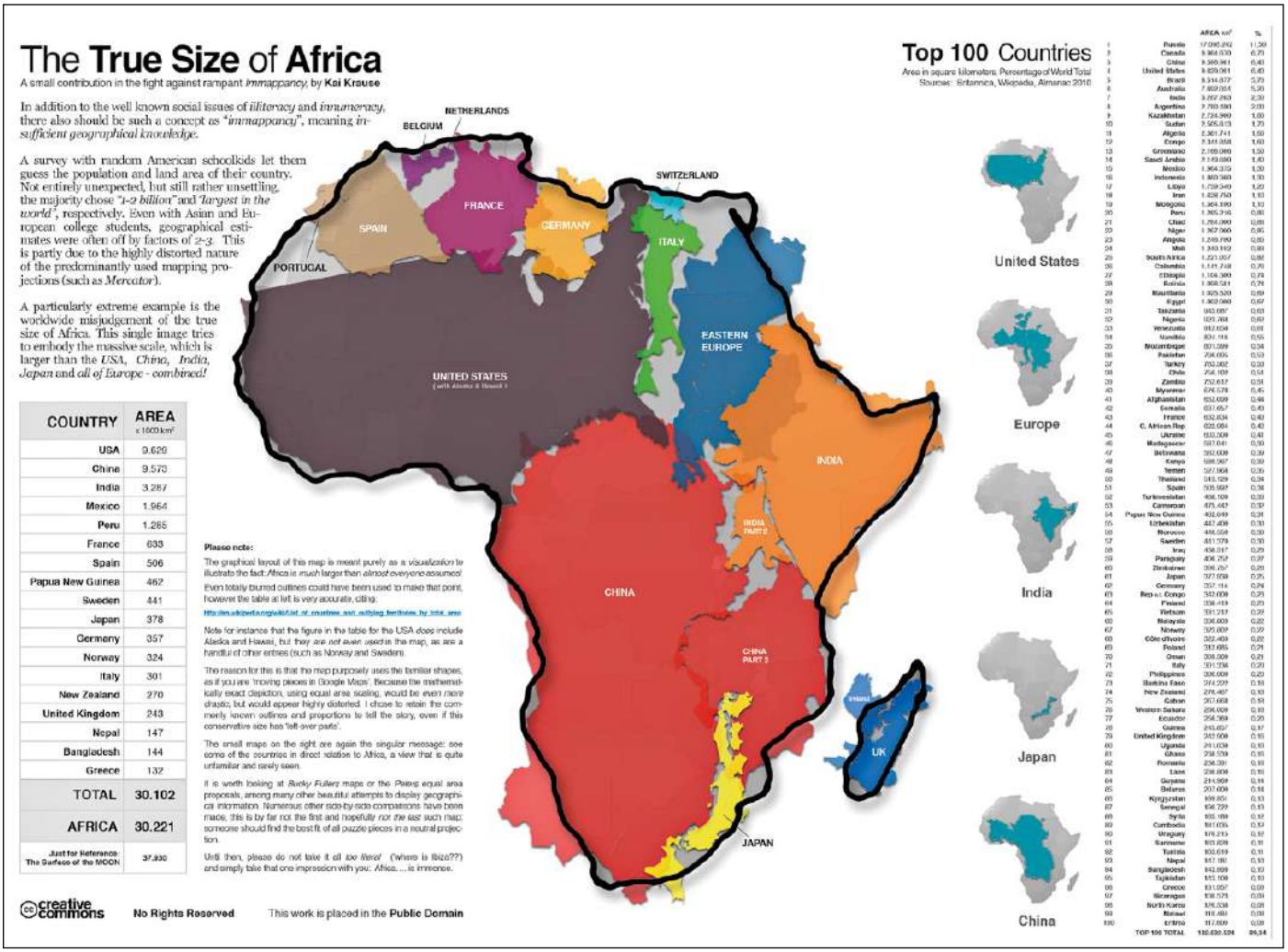
Sarrāj: at the United Nations, Russia, and in the European Union, France, blocked any motion of condemnation.

The list of anguishing problems affecting Africa's local populations, travellers, businesspeople, tourists, as well as scientists is long. In our specific and quite narrow field, we undoubtedly entered a post-colonial phase of archaeology, where aims and methods are no longer driven by the need of the 'global north' but by several other factors, starting from the specific requests of local institutions (e.g. di Lernia 2015). After 2011, the scarce (if any) activity in the field in Egypt, Libya, Chad, Mauritania, Niger and to some extent Tunisia and Algeria had a positive counterpart in a strong resumption of publications, but it is hard to believe that this could last for long. In the fundraising process, fieldwork still plays an important role, although more voices urge for a different use of money and the ways we practice archaeology (Mitchell, this volume).

The aims of the workshop and the ways we look at the African continent are brightly evident in the choice of the two images we used in the website and workshop leaflets (https://archaeoinafrica.wordpress.com). The first illustration (Fig. 1.1) is from the seminal article published by John Desmond Clark more than forty years ago (1975): in a sense, the question "*Africa in prehistory: peripheral or paramount*?" is still valid, although needs, problems and perspectives are dramatically changed since then. The second image is dated to 2010 and realized by Kai Krause, a German graphic artist for an exhibition organized by the Royal Geographic Society in London (Fig. 1.2). Both convey the same, basic meaning: Africa is a vast landmass and could include many countries of the planet. At the same time, the problems and potentials of the African continent are relevant to the planet, and we believe that this has emblematic value also for archaeology. In a sense, Africa's territorial vastness is a metaphor of the greatness of this continent in the archaeological domain, and the ways this greatness could potentially contribute to theoretical, methodological and interpretative issues. An important objective of the meeting was also to stimulate the confrontation between different perspectives and to set the platform to create a synergy between research groups and to intensify national and international cooperation.

2. Structure and contributions to the workshop

This volume collects 14 contributions, out of 21 talks presented at the workshop that engaged ~45 researchers from 8 countries, with a strong focus on Italy-based researches (Fig. 1.3). Its structure is basically geographic, with chapters organized from north to south and from west to east, following a chronological order for each area. Peter Mitchell, who generously addressed the workshop's keynote, provides here a manifesto of archaeological practices in Africa, strongly recalling the need to engage local communities since the preliminary phases of any project. Anna Maria Mercuri provides a supra-regional view of archaeobotanical research in North Africa, placing ethnobotany at the centre of any current and future agendas. The need to combine archaeological practice with the safeguard and valorisation of cultural (and natural) heritage is put forth by Barbara Barich's contribution, which focussed on different case studies in Egypt. Emanuele Cancellieri and Jâafar Ben Nasr summarize the limits, and the potentials, of archaeological research in southern Tunisia, one of the regions greatly affected by the 'Arab Spring'. With particular sadness we report of the contribution by Sebastiano Tusa and Cecilia Buccellato: Sebastiano, tragically died in March 2019 air crash near Addis Abeba, was one of the leading Italian archaeologists. In this chapter, he and Buccellato synthesize the numerous projects carried out in Libya, indicating the severe



COUNTRY	AREA x 1000 km²
USA	9.629
China	9.573
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221
Just for Reference: The Surface of the MOON	37.930

Fig. 1.2 – The artwork "The true size of Africa" (http://kai.sub.blue/en/africa.html)

risks for coastal archaeological sites, not only for the problems related to global warming but also because threatened by illicit excavations and indiscriminate building expansion. Lorenza-Ilia Manfredi, Abdelilah Dekayir and Yousef Bokbot present here an innovative project focused on the ancient mining activity in the Maghreb, combining fieldwork in different countries and with a strong attention towards the training of young African colleagues. The issue of preservation of archaeological contexts in Egypt is one of the topics tackled by Paola Buzi, Julian Bogdani, Angelo Colonna and Ilaria Rossetti in their chapter. They diligently list a series of archaeological sites – of different cultural phase – that "*are now in danger of being either swallowed or heavily damaged by the expansion of the modern agricultural installations*", calling for more reports of this kind that could help to preserve Egypt's cultural heritage. The oasis of Kharga in Egypt's Western Desert is the geographic focus of the chapter presented by Corinna Rossi and Mohamed Ibrahim Ahmed, who also focus on the risks connected to the expansion of modern agriculture. Ettore Janulardo gives a suggestive commentary on ancient Egypt's view through the eyes of influential artists in the mid-19th century. An interesting 'African connection' is the focus of the chapter by Michele Guirguis that reports the relations between Tunisia and Sardinia in the context of the diffusion of Phoenician culture between the 9th and 8th centuries BC. In particular, this

Fig. 1.3 – Map of Africa with location of the contexts presented and discussed during the workshop (empty circle) and those published in this volume (solid dot).

paper urges to reconsider with a fresh approach the nature and mechanisms of the cultural contacts in the central Mediterranean in the first millennium BC, a particularly timely theme. Flavio Altamura – who summarizes the importance of faunal ichnology and the need to (re)organize our field methods in order to be able *to find* and record these evidences – and Marco Cherin *et alii*, with the updates on Laetoli footprints in Tanzania, move to East Africa the pendulum of the contributions to the book.

The last contribution, by Attilio Mastino and Sergio Ribichini, elegantly outlines the remarkable results of the SAIC, Italian Archaeological School of Carthage, born in 2016. In a way, this experience represents an ideal epilogue of our first workshop, and of this volume. It is hoped that this type of association, with solid relations in African countries, will be able to develop a better practice of archaeological research with the instruments of cultural diplomacy and with the increase of the connections and bi- and multilateral mobility, ultimately favouring the protection and safeguarding of a particularly fragile cultural heritage.

3. Future perspectives

Since 1947, the congresses of the Pan African Archaeological Association gather, usually every four years and in different coun-

tries in the continent, the Africanist community at large. Similar audience characterizes the Biennial Conference of the Society of Africanist Archaeologists that has been alternating since 1996 between Europe and North America. Since 2002, yearly international conferences on African archaeology are run in the UK (African Archaeological Research Days: AARD). Many other conferences punctuate our calendar, also driven by the recent tremendous advances in the field of molecular biology, that now have in Africa a relevant 'battlefield' (Skoglund *et al.* 2017; Vai *et al.* 2019; van de Loosdrecht *et al.* 2018). Although the 'genetic revolution' is today pivotal in the scientific debate (also for its intrinsic potential to operate on museum collections thus mitigating the lack of fieldwork), we believe that cultural cooperation and bilateral and multilateral mobility centred on fieldwork is still an essential part of the process. The idea that a new generation of African (and Africanists) archaeologists does not have access to the field in many regions of the continent is serious and potentially dramatic on the middle- to long-term: it is, therefore, necessary to reorganize our schedule and, if necessary, to re-interpret our 'archaeologies'.

The organization of this workshop and the ensuing discussions, including this volume, will hopefully go in this direction.

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Arid **Z**one **A**rchaeology
Monographs **8**, 2019
pp. 7-15

2. *Carpe Diem*: building African archaeology in the twenty-first century

Peter Mitchell

Abstract. Africa has the oldest, and in many ways one of the richest, archaeological records of any continent, but it is also the continent that ranks lowest in terms of human development. How do these facts relate to each other and to our own responsibilities as archaeologists and as citizens? This paper addresses these questions across several areas: communicating more effectively what archaeologists do; engaging with development projects; working to conserve Africa's cultural heritage; finding ways of pursuing archaeological research even in the face of breakdowns in governance and security; and conducting fieldwork in an ethically responsible fashion. It ends by discussing some of the ways in which archaeologists may be able help to avert the impacts of global climate change, the greatest single challenge confronting African populations in the twenty-first century.
Key Words. Africa; archaeology; twenty-first century; challenges; communication; development; security; ethics; climate change.

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Acknowledgements. This paper is an expanded version of a lecture given at the outset of the 1st Workshop "Archaeology in Africa" on 6 December 2017. I should like to thank Savino di Lernia and Marina Gallinaro for inviting me to deliver that lecture and participate in the Workshop, as well as everyone else who spoke at and contributed to what I trust will be the first of many such meetings.

1. Introduction

From a human standpoint Africa is both the world's oldest inhabited continent and its poorest. As archaeologists we celebrate the fact that it is where the hominin lineage first evolved and also where our own species did so – and this in a time frame that in just a few months in the course of 2017 increased by some 50% courtesy of the redating of Morocco's Jebel Irhoud fossils (Hublin *et al.* 2017) and the analysis of ancient DNA from a 2000 year-old burial at Ballito Bay, South Africa (Schlebusch *et al.* 2017). And yet as human beings we bemoan the fact that Africa ranks lowest of all the continents in terms of overall human development, suffers the highest rates of HIV infection, child mortality, and population growth, has by far the smallest GDP *per capita*, and shows the poorest levels of educational attainment and opportunity (AVERT 2016; IMF 2016; UNDP 2016; WHO 2016). It is also arguably the land mass most exposed to the twenty-first century's principal challenges: biodiversity loss, climate change, environmental degradation, and good governance. How do these facts relate to each other? How should our professional responsibilities as archaeologists and scholars intersect with our duties as citizens and human beings?

In this brief contribution I can tackle only some of the possibilities that these questions pose. My selection is necessarily a personal one, based on things that strike me as particularly important and illustrated by examples of which I happen to have specific knowledge. However, I hope that it nevertheless succeeds in adding further notes to the score recently developed at greater length and with greater fluency by Kusimba (2017), Ogundiran (2017), Giblin *et al.* (2014), and others.

2. Communicating what we do and why we do it

Those of us from Europe, North America, or other parts of the global North who work in Africa inevitably do so as outsiders, albeit in collaboration with African colleagues and with the consent of relevant national institutions and structures. Coming to Africa from the West, however, it is impossible to ignore the historical context in which African-European relations have long been framed, a context of deep-rooted disparities in wealth and education coloured everywhere by the experience of colonisation. This history not only affects how we – as archaeologists – may be perceived and treated, but also influences the understandings that local communities have of archaeology as a discipline (Lane 2011). Writing from his own experience of practising archaeology in West Africa, Ibrahima Thiaw (2003), for example, has discussed how archaeologists are, to many of his compatriots, no more than treasure-hunters concerned only with a distant and 'primitive' past that holds no connection to people today. Indeed, paying attention to broken bits of material culture, animal bones, and human remains may even signal an unwelcome interest in potentially malevolent forces (Thiaw 2003: 217). Such (mis)understandings are by no means confined to Senegal, and

there remains a widespread perception (not entirely limited to Africa, it must be said) that archaeology is "*an elitist subject… far removed from people's struggle for livelihood*", one reserved for the participation and gratification of foreigners and the educated few (Segobye 2005: 34).

The lessons to draw from this are obvious: we cannot just communicate among ourselves, with colleagues in other disciplines, and with those who give us grants. Rather, we have to redouble our efforts to explain and justify what we do to the communities among whom we work. This is, of course, by no means just a moral imperative, although it is undeniably that. It is also a necessity if we are to ensure future fieldwork possibilities *and* support the building of effective archaeological capacity where, as in some countries, this still does not exist or, as in virtually all, it remains fragile. Exhibitions (including those able to travel into areas far removed from major population centres (e.g. Metz 1994; Jansen 2016), press articles, and appearances on television and radio are among the obvious strategies that come to mind for conveying as widely as possible what archaeologists do and why they do it. So, too, is ensuring that museums, in particular, can be foci for attracting the wider community via a broader range of outreach activities, not purely those that are didactic. Kusimba and Klehm (2013: 231), for example, note how the Khama III Museum in Serowe, Botswana, was explicitly designed as a communally functional space available, among other things, for traditional music and dance performances, as well as more formal kinds of education.

In addition to these well-established avenues, my guess is that there is also still enormous untapped potential in more novel methods that exploit today's many social media outlets. These methods have already been trialled as a tool for archaeological fieldwork by Davies *et al.* (2014) when asking community members to map the social and physical landscapes of Marakwet, Kenya, but growing access to the Internet across Africa offers scope for engaging a much wider public with the contents of museums and the activities of archaeologists alike (e.g. Walker 2016; van Vollenhoven *et al.* 2017). Moving along a parallel – but sometimes overlapping – path, archaeologists should also lobby for archaeological evidence and methods to be incorporated into the classroom as another means of teaching basic skills like numeracy or an awareness of science. This has been tried, with some success, in post-apartheid South Africa (Esterhuysen and Lane 2013), and has also recently been canvassed in Nigeria (Agbelusi 2015). Where it has been attempted with wildlife conservation (e.g. African Wildlife Foundation 2017), experience suggests that this kind of approach can be remarkably effective in sensitising adults as well as children, providing another motive for undertaking it were one needed.

3. Archaeology and development: public engagement and sustainability

Given the accelerating pace of dam, road, pipeline, and urban construction in much of the continent, contract archaeology inevitably forms an increasingly large share of the archaeology now being undertaken in Africa (Arazi 2009; Arazi and Thiaw 2013). Sadly, however, even where robust legislation exists, a lack of state commitment, insufficient resources (or an unwillingness/inability effectively to apply those that do exist), and the constraints imposed by having to work to small budgets and developer-set agendas often significantly limit what can be done to monitor and mitigate the impacts of such projects (Arazi and Thiaw 2013: 217-218). As a result, opportunities for constructive, creative, and informative engagement with local communities may be particularly limited. Sadly, precisely the same constraints and challenges frequently apply to the ongoing management and conservation of supposedly protected archaeological sites, even those accorded World Heritage status, as Ichumbaki and Mapunda's (2017) recent damning analysis of successive failed initiatives at Kilwa Kisiwani and Songo Mnara, Tanzania, powerfully illustrates.

Although this last example testifies only too well how foreign funding is of little value if it does not adequately engage local populations, enhance national heritage infrastructures, or provide for the long-term persistence of what is set up with outside investment, archaeology is still likely to benefit where major development projects are funded by international organisations like the European Union or the World Bank, rather than by countries such as China or the Gulf states that show no interest in mitigating the archaeological and broader environmental impacts of the schemes they finance (Verhoeven 2016; Lane *et al.* 2017; Mahlakeng 2017). Moreover, although ample scope remains for conflicting agendas and the miscomprehension of archaeological needs and ambitions (MacEachern 2010), similar possibilities may be found where development projects involve major international corporations keen to burnish their public image by funding at least some degree of heritage mitigation (such as Exxon in the case of the Chad-Cameroon pipeline; Lavachery *et al.* 2010).

Building on projects like this one, there is now a growing body of case studies to illustrate and disseminate good practice in un-

dertaking effective community-based and community-engaged fieldwork in Africa (e.g. Schmidt and Pikirayi 2016; Humphris and Bradshaw 2017, who usefully point out that we also need to take into account that 'communities' are far from homogenous groups). Personal experience of working with World Bank funds at Metolong in Lesotho exemplifies some of the ways of doing this. Led on the ground by my colleague Charlie Arthur, we first made sure to build in a series of activities aimed at presenting and explaining our work to local communities via open days, school visits, village meetings, and Sesotho-language newsletters. However, Charlie and his colleagues also explicitly set out to train people from those communities so that they could undertake and record the excavation process itself. In sharp contrast with how most archaeological projects have typically used local labour, especially in southern Africa, we sought to break down traditional black/white, junior/senior, employer/labourer hierarchies and instead directly engage local people in the process of interpreting the archaeological sites on their doorstep (Arthur *et al.* 2011; King and Arthur 2014). We *hope* that this contributed something to the more general process of archaeological transformation within the southern African region, providing an example for what could and should be done more widely in South Africa, where the make-up of the archaeological profession is still heavily influenced by the racial dynamics of the apartheid era (Smith 2009). But we *know* that it led directly to the creation of Lesotho's first ever community of heritage practitioners (https://lesothoheritage.wordpress.com) and equipped them with skills that they have since used in several other archaeological projects in both Lesotho and South Africa, even if in the end the Metolong project was not, on its own, able to bring about the establishment of effective heritage management, monitoring, and mitigation structures at a national level (King and Arthur 2014: 171).

The question of community involvement in archaeological projects exemplified by our work at Metolong spills over into that of how heritage resources should be managed, including those that are a focus of tourist interest. To my mind, it is an absolute *sine qua non* of sustainable management that it involves and be acceptable to local communities, a theme recently explored on a pan-African scale by the contributors to Ndoro *et al.* (2017). While conflicts of interest may exist and traditional management practices are unlikely to extend to below-ground evidence or to heritage that is perceived as unconnected to living communities, those practices *can* provide an effective, low-cost, and enduring means of protecting many archaeological resources. There is an obvious analogy here with how best to conserve Africa's biodiversity, as it is now widely understood that this is impossible *without* the participation of local people in ways that bring them some kind of tangible return (Adams 2004; Brooks *et al.* 2013). Although we must guard against any suggestion that African populations have remained unchanging over time or that they have necessarily always lived in harmony with nature, opportunities surely exist to manage and market wildlife and cultural heritage together to the joint benefit of both, a point Audax Mabulla (1996, 1998) made many years ago with respect to Tanzania's Serengeti region, home to such iconic sites as Laetoli and Olduvai Gorge.

But heritage is not just about monuments, rock art, and objects. Nor is it static, even if we have often failed to recognise this in the past and still sometimes struggle to do so today. How, for example, do we reconcile the archaeologist's wish to preserve rock art as it has survived from the past with the desires of local communities in Kondoa, Tanzania, or South Africa's uKhahlamba-Drakensberg Mountains to paint over existing images or undertake ceremonies in (archaeologically) sacred sites (Ndlovu 2009; Prins 2009; Bwasiri 2011)? The fact that heritage is living, not dead, can also readily go unrecognised by those who fund our fieldwork. At Metolong, for example, it took considerable effort to convince the World Bank that it should find funds to record how the local landscape was being used by its *contemporary*, rather than just its prehistoric, inhabitants (see Nic Eoin and King 2013; King and Nic Eoin 2014). Intangible forms of cultural heritage of the kind that we went on to investigate there necessarily exist within a specific spatial and environmental context that can only be properly documented before that context – and thus the nexus of connections between landscape and the recurrent practice of everyday activities – is destroyed. Indeed, they may be lost forever once that destruction happens (cf. Rowan 2017: 184). Engaging strongly and respectfully with local communities, archaeologists are well equipped to record their intangible and living heritages using a wide variety of media (Nic Eoin *et al.* 2013), providing an important service to those who host us, but also building connections that can simultaneously strengthen our interpretations of the past, frame future research, and facilitate further fieldwork. Connections of this kind – and living heritage studies in general – will, I think, be an important growth area in the years to come, and one that may perhaps provide the most effective means of integrating African perspectives on the past into how archaeologists structure their research and their analyses (cf. Segobye 2009: 171; Mire 2011; Clack *et al.* 2017).

Growth does, however, need to be funded, and one may doubt whether sufficient money will ever come from the state. While

governments may pay their salaries, we all know that many colleagues do not have the resources to undertake research, manage sites, or maintain museum collections as they would wish. If tackled cleverly, however, might contract archaeology be of help here, perhaps by requiring developers not only to pay for archaeological work to be undertaken (and analysed and published), but also to sustain research teams between projects? The idea may seem Utopian, but the principle that "*the polluter pays*" is well established elsewhere, even in our own field (Arthur *et al.* 2011: 245), and at the end of the day the amounts currently spent on archaeology on big development projects, in particular, are trivial, less than 0.2% of total costs at Metolong, for example. While it would be naive to expect that those who finance development projects will always comply with Christ's exhortation in the Sermon on the Mount "*Ask, and it shall be given you*" (Matthew 7: 7), it is surely true that if we do not ask we will not receive.

4. Maximising opportunity in the face of adversity

Lesotho, where the Metolong Dam was built, has witnessed several *coups d'état*, two military takeovers, and an invasion since independence in 1966 (Bradford 2017), and it continues to experience political turmoil (e.g. News24 2017). However, its governance problems are trivial compared to those of many countries. Colleagues living or working in other parts of the continent know much better than me the disruption to years of planning and investment that arises in conditions of civil war, governmental breakdown, and terrorism. Whether in the Sahara, Somalia, or Congo such problems will not be speedily resolved, so what do we do? Several things spring to mind, all of them universal in their relevance, all things that we should do anyway, but all potential responses to political crises.

First, archaeologists in the global North must continue to support those individuals and institutions striving to maintain the integrity of museums, monuments, and archaeological landscapes within Africa. Offering training and equipment is one way of doing this, building on the example of initiatives such as that between the Musée National de Lubumbashi in Congo and Belgium's Royal Museum for Central Africa (Kusimba and Klehm 2013: 233-234) or the longstanding partnership between Sweden (especially Uppsala University) and universities and museums across eastern and southern Africa (Sinclair 1984; Trotzig 1995). For those countries and regions experiencing long-term political turmoil and violence it may not always be possible to undertake this kind of work *in situ*. However, as di Lernia (2015) has recently argued in the case of Libya, this still leaves open the provision of opportunities for archaeologists and other heritage practitioners to gain relevant skills abroad, as well as the securing of funding for facilities and research that those individuals can then deploy at home: training in archaeological science and conservation, digitisation of museum collections, analysis of satellite imagery, creation of online archives etc.

Another contribution that can be made where working on the ground is difficult involves monitoring endangered sites in order to share information, limit damage, and raise general awareness, something exemplified by the EAMENA initiative, which seeks to combat threats to archaeological resources in the Middle East and North Africa (http://eamena.arch.ox.ac.uk; Rayne *et al.* 2017). Since many of those resources are both highly portable and eminently marketable, databases that can be used to help curtail the sale and acquisition of stolen antiquities or ensure their return are equally vital (Mugnai *et al.* 2017), although looting – and even the selling off of accessioned museum objects (Smith 2014: 140-141) – is far from new or a problem confined to countries at war (Schmidt and McIntosh 1996).

Third, we need to acknowledge (with due respect to the Indiana Jones stereotype that our profession retains in the popular imagination) that, both in those countries where security conditions currently preclude access to the field and more generally, fieldwork is not the only means of producing archaeological knowledge. Indeed, the inability to undertake it may even be a blessing in disguise if this encourages us to publish the results of fieldwork already undertaken. African and non-African institutions alike house vast quantities of material that has been excavated, but not yet fully studied. As just one suggestion of the form that such research could take, consider that the kinds of residue analyses that have successfully identified dairying and plant processing in the prehistoric Sahara (Dunne *et al.* 2012, 2016) have so far been applied just twice in eastern and southern Africa, and on both occasions only in the form of small-scale student dissertations (Fewlass 2015; Keute 2016). Many more and much larger projects of this kind are clearly possible. Redating older excavations using state-of-the-art accelerator radiocarbon technology is another comparatively easy, but potentially high pay-off, goal that does not require new excavations. In southern Africa, for example, almost all the dates available for understanding the transition from Middle Stone Age to Later Stone Age technologies are based on bulk charcoal or bone samples, some run as long ago as the 1960s. Several groups are now engaged in either re-excavating

key sites or redating charcoal from previous excavations to produce a much more precise chronology for Marine Isotope Stages 2 and 3 (e.g. Loftus *et al.* 2016; Tribolo *et al.* 2016; Pargeter *et al.* 2017, 2018). Refining other regional chronologies, like that of East Africa's Pastoral Neolithic, through similar programmes of chronometric housecleaning and redating should also be considered.

At a much larger scale, celebrating Africa's archaeological heritage offers a powerful means of enhancing the continent's current standing within a (Western) world that still too often characterises it as the home of poverty, violence, and despair. Thinking back to the *Ancestors* exhibition at the American Museum of Natural History that explored what was known about hominin origins over 30 years ago (Delson 1985), is it not perhaps time for African institutions to unite with those of the global North to create a travelling exhibition that instead of showcasing our common physical ancestors highlights our shared cultural inheritance, in other words the profound contributions that African societies have made to world history and culture? Would this indeed not be a worthwhile initiative for the Pan-African Archaeological Association and similar organisations (such as AFRICOM) to bring to the attention of a global audience? And does not the success over the past couple of decades of single-city exhibitions celebrating the African past and its connectivity with other parts of the world (e.g. Phillips 1995; Giblin and Spring 2016; Coquery-Vidrovitch 2017) testify to the appetite that would exist for such an encounter?

Of course, Africa's cultural heritage, including its archaeology, also offers multiple opportunities for reinforcing the identity and self-understanding of individuals and communities in ways that can promote a wider sense of belonging and social cohesion *within* the continent. Our research as archaeologists can and should contribute actively to this goal as well, not least in post-conflict situations where our data may be able sensitively to question assumptions about the fixed nature of group identities and the relationships between them (e.g. Giblin 2014 with respect to Rwanda). While undertaking fieldwork in collaboration with local communities *in situ* is again the ideal, where this is not possible it does not follow that nothing at all can be done. Consider, for example, the current Durham-based research network for studying, contextualising, and publicising the South Sudanese collections that are scattered in museums across Europe (https://southsudanmuseumnetwork.com). Fully involving civic societies and colleagues on the ground in South Sudan, one of this network's key aims is to develop more nuanced understandings of South Sudanese history and inter-ethnic relations that may be able to inform future reconciliation and peace-making.

A further principle to bear in mind is the need to maintain a high degree of intellectual and practical flexibility, focusing on questions of general rather than overly parochial interest. In part, this is because such topics are those that can – where necessary – be more readily translated from a location that becomes too insecure to another that remains amenable for fieldwork, something exemplified by the recent research of Anne Haour and colleagues on the *Crossroads of Empire in West Africa*. Originally intended for Niger, when terrorist activity made that impossible the project was successfully relocated to Bénin, creating new collaborative links there (Haour *et al.* 2016). But the importance of framing projects with regard to the general rather than the particular (however much that may better enable engagement with local community histories and heritages on the ground) is also that it is the general – or rather the general illuminated by the specific – that will best capture the global imagination, feeding into that raising of the profile of Africa's cultural heritage that I mentioned earlier. This is absolutely essential if we are to build on the progress that has been made in recent years by publishing ever more African material in journals with an international (rather than a purely Africanist) readership and if Africa, especially its sub-Saharan majority, is to be given due attention in general synthetic works, works that even now massively over-privilege the Holocene records of the West, its putative cultural 'ancestors' in Egypt and the Near East, and its current Chinese competitor for global influence. While it may be true that publishers' sales are likely to be greatest in North America and Britain, one has to ask if it is still defensible – in the second decade of the twenty-first century – for the *whole* of sub-Saharan Africa to receive just 34 out of 515 pages devoted to specific world regions 'after the ice' in what is perhaps the leading English summary of the human past (Scarre 2013)? And for that 6.6% of text and illustrations to equal the amount of space given to the Late Preclassic, Classic, and Post-Classic periods of Mesoamerica, an area that is itself roughly 6.6% the size of Africa south of the Sahara?

Finally, wherever we work and wherever we are based we must be willing to speak out on those issues where our responsibilities as scholars and human beings should resonate with the interests of the communities among whom we work. That, after all, is why organisations like the Society of Africanist Archaeologists require their members to subscribe to and uphold explicit codes of ethical conduct (https://safa.rice.edu/SAfA_Info/SAfA_Code_of_Ethics/). The silence of some colleagues in the face of the human rights abuses perpetrated against those displaced by Sudan's Merowe Dam was, to the contrary, a cause for shame, the accu-

sation that those protecting against such abuses "*set a very unfortunate precedent*" and "*engaged in vandalism of the highest order*" (Welsby 2008: 13, 14) when they sought, as part of their struggle, to prevent further archaeological work one that was unhelpful at best. In this instance, looking the other way did not, in the end, prevent the permanent loss of important elements of Sudan's cultural heritage and instead probably made it more, rather than less, difficult to campaign against the damage wrought by further projects of this kind (Hafsaas-Tsakos 2011; Kleinitz and Näser 2011, 2013). With renewed efforts now underway to build more dams in Sudan, as well as in many other parts of the continent from Ethiopia (Nasir and Ndoro 2017) to Lesotho (Mitchell 2017), the responsibilities shirked on the Middle Nile a decade ago are bound to resurface, albeit we may hope with a better outcome than in the past. But for such an outcome to be realised demands that archaeologists are not seen – and do not see themselves – as being blindly beholden to those who commission their work or who fund the development projects that they attempt to mitigate. While our research focuses on the past, we do not work in a moral vacuum where our actions exist independently of the political, economic, and cultural desires and rights of people in the present. Indeed, if there is not that connection how does what we do as archaeologists differ from the object collecting activities of Europe's eighteenth-century *dilettanti* (cf. Daniel 1978: 24)? To the contrary, there will always be times at which we will need to speak truth to power, to take a stand, and to refuse to be complicit in what we know to be ethically wrong (Esterhuysen 2012: 11; di Lernia 2017: 267).

5. Archaeology and climate change

I want to end by turning to a theme that links more closely to my own research on late Pleistocene and Holocene hunter-gatherers. Yet when working in Lesotho, a country ranked 216th in the world for life expectancy (CIA 2016) where 60% of people live below the *national* poverty line (World Bank 2015: 8), I have to ask myself how I can defend this intellectual preoccupation with something seemingly so remote from the everyday concerns of its current inhabitants. One response might return us to where I began, emphasising that since we *all* descend from Pleistocene Africans and since southern African hunter-gatherers are as much a part of the total human experience as anyone else, the continent's cultural heritage *as a whole* is worth investigating precisely because of its universal relevance. But that is not, I think, enough.

Like the rest of the continent, Lesotho is exposed to global warming. Because of Africa's widespread aridity, the fragility of its ecosystems, its exposure to natural disasters, its escalating population, and its limited infrastructure, the impacts of the unfolding climatic catastrophe on agricultural output, water resources, human migration, public health, biodiversity, and political stability are likely to be particularly grave. Indeed, they are almost certainly already underway, as the endless movement of people across the Sahara and the Mediterranean attests (Missirian and Schlenker 2017) and the recent crisis in the supply of water to the greater Cape Town area of South Africa underlines (Wolski *et al.* 2017). And yet our understanding of what drives African climates remains limited, our knowledge of how global climatic and environmental processes produce local consequences poor, our ability to predict change at the regional and sub-regional levels weak, even though, to remain in southern Africa, that region's pasturelands are likely to undergo severe degradation (Meadows and Hoffman 2003), its production of key staple and cash crops (maize, wheat, sugar) will likely fall by 10-20% (Turpie *et al.* 2002), over 80% of its species are likely to undergo severe contractions in range (Erasmus *et al.* 2002), its river basin run-offs are likely to decline substantially (by as much as 40% in the case of the Zambezi River; Arnell 1999), and its current biome boundaries will undergo massive shifts (Hannah *et al.* 2002). The self-serving denials of some politicians to the contrary (see, for example, Schulman 2016), no reasonable person can any longer doubt that "*global* [climatic] *change is a major threat to the survival of…communities, human and otherwise*" (Meadows 2006: 143). I have argued elsewhere (Mitchell 2008) that as a consequence archaeologists have a professional responsibility to treat this issue seriously since, along with our colleagues in the natural sciences, we are uniquely placed to retrieve data that can identify past episodes of change, assess models for the future, and contribute to identifying sustainable land-use practices.

Exploring the historical ecology of the relatively recent past and the means by which present-day African populations have managed the landscapes and resources around them is one way of doing this, exemplified in East Africa by the work of Paul Lane (2010, 2016; Marchant and Lane 2014), Matt Davies (Davies and Moore 2016, Davies *et al.* 2017), Daryl Stump (2010), and others. Projects focused on the late Quaternary are also well placed to do this since this period combines relatively well-resolved chronologies with good preservation of palaeoenvironmental proxy data over times of intense change like the Pleistocene/Holocene transition or even the shift out of the Last Interglacial over 100,000

years ago. Researching the impacts of climate change on past populations and ecologies over time frames such as these may be able to contribute to minimising similar impacts in the future, for example by tracking the distribution and co-occurrence of large mammal taxa over time (e.g. Plug and Badenhorst 2001). To my mind, this kind of 'usable past' (*sensu* Lane 2011: 14) can and should constitute a core theme of African archaeology in the twenty-first century, one that draws together our distinctive ability as archaeologists to track change and processes over the long-term with our growing wish to engage in research that is both socially relevant and enriched by distinctively African ways of knowing the world.

Summing up, I am confident that we can use archaeological data and practice as a means of building a sound and sustainable future not just for our own discipline, but also for the benefit of the continent on which we are privileged to work. Intra-African initiatives such as the African Archaeology Network (Chami *et al.* 2001) are particularly vital here. Stepping outside our national, regional, and sub-disciplinary comfort zones to develop ways of sharing knowledge and building research capacity between the different regions of Africa and between the different components of its long history, encouraging work that transcends political, ethnic, and linguistic borders, enhancing the strength and diversity of African heritage management and heritage research infrastructures, and speaking plainly to those in positions of political and economic power must also all play their part. Far from serving as a recommendation to drown our sorrows in the face of the problems that we face, the admonition of the Roman poet Horace "*Carpe diem!*" should instead remind us of what we stand to gain from embracing these challenges, from confronting them with confidence, and from using the opportunities they present to advance the goals and ambitions represented by the papers in this volume.

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3. Holocene archaeobotany in Africa: not only 'food and fuel'

Anna Maria Mercuri

Abstract. This contribution deals with some recent archaeobotanical studies carried out in African contexts. Basic methodological approaches are different depending on the type of record (microscopical or macroscopical plant remains), and the interdisciplinary interpretative framework. The largest set of remains is studied, the main details on environmental and cultural reconstructions from one context can be acknowledged. Examples of case studies from integrated archaeological and botanical researches are reported. They represent a reconstruction of environments influencing subsistence strategies in the Sai Island (North Sudan), the evidence that cultural uses of plants for offerings in the Gobero necropolis was based on the regional environments (Niger) and the intermingled climate, hydrological and cultural variables which influenced human economy and movements in the Tadrart Acacus (Libya). All the sites are in Sahara, next to rivers or lakes and crossed climate oscillations of the early, middle and late Holocene.
Key Words. Palynology; Sahara; plant cover; plant uses; interdisciplinary.

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1. Introduction

The archaeobotany of Africa is developing researches on a wide range of themes based on the role that plants have had, and still continue to have, in human life. Besides 'food and fuel', the archaeobotanical research of the current century is showing more and more that plants have triggered discovery and innovation, technology and wellness, and that therefore the many different plant species have been pervasive for the cultures which developed in this continent, as well as in almost every part of the world. In the past, plants were matter of fuel and tools, beliefs and feasts, agriculture and economy: these are the basis of any cultural development and should have a central role in current, interdisciplinary, archaeological research.

The study of plant remains, however, implies that both macroscopical and microscopical biological records are analysed and different topics, at the borders between archaeology and biology, are investigated to obtain integrated interpretation. Archaeobotany deals with plant remains of different size, shape, each part having a different biological and physiological role in plant life (Faegri *et al.* 1989; Zohary and Hopf 1993; Pearsall 2000; Cappers and Neef 2012; Zohary *et al.* 2012; Mercuri *et al*. 2018a). The large seeds, fruits and pieces of wood/charcoal, visible to the naked eye on excavation layers, have been early recognized by archaeologists as exceptional records of past economies and plant-related cultural choices (e.g. van Zeist *et al*. 1991). The basic taxonomical identification produces a list of species, or taxa, giving direct information on vegetation and ecology, and can show some plant uses in a certain site. Floristic lists often are completed by quantitative data, i.e. relative (percentage) and absolute (concentration) values: they are not 'precise' measurements and must be described considering the biological features of the different species, vegetation and ecosystems. Botanical and environmental data are the immediate biological outputs while cultural implications may be inferred thanks to the archaeological and ethnobotanical integration modulated by the stratigraphic, taphonomic, structural and chronological variables of each archaeological site.

2. Different plant records, similar inferences

Both macroscopical and microscopical plant remains must be studied to obtain a complete set of information for palaeoenvironmental reconstructions. Any evidence gives a part of information and altogether different records help to depict the general frame of plant cover, flora composition, vegetation, ecology and plant uses in a given site and during a given time. Besides the interdisciplinary (archaeo-geo-bio) research, an intra-botany in-

terdisciplinary research is of key importance to fully exploit the potentiality of this scientific tool in reconstructing past environments and human behaviours (Mercuri 2008a).

Palaeoecology and archaeology classically investigate complementary aspects of the research on environment and humans in a diachronical perspective (Cappers and Neef 2012; Mercuri *et al*. 2018b). The off-site palaeobiological records from marine, lake or peat cores often study pollen focusing on plant cover at a regional level, and on plant cover at a regional scale, and vegetation history basically depends on climate changes (e.g. Hely *et al*. 2014). Extended effects of land-use are evident in off-site terrestrial cores but archaeological sites seem to be the most appropriate deposits to record human activities (Mediterranean: Mercuri 2014; Sahara: Mercuri 2008b). Sampling strategy including off-sites (lake cores) and on-sites (archaeological sites) is the most complete strategy but may be not always applicable in archaeobotany of African contexts. In tropical regions and the Sahara desert, in fact, low pH, erosion and high oxidative contexts prevent the preservation of plant remains out of the archaeological deposits (Dimbleby 1985). In these contexts, archaeological stratigraphy may be the only remnant of subsequent past environmental events and archaeological sites may be the key sites for palaeoenvironmental studies. The archaeological sites offer a high set of macro- and micro-botanical data.

2.1 Plant macroremains

These include quite large plant parts, which are objectifiable and can be sorted and observed at a stereomicroscope (from 10x to 80x magnification). We can distinguish five main categories of plant macroremains: i) Seeds, the dissemination product of Spermatophytes, i.e. Gymnosperms and Angiosperms, that can be very small and transported by wind or water, or may be large and used as food in the case they belong to protein-sugar rich species; ii) Fruits, the seed container produced by Angiosperms; together with seeds, they can be evidence of the ripening season and plants harvested next to the site or transported from another place; they can include as well small and large species, and dry or flesh types that may have elicited variable interest in humans, especially for food. The caryopsis of cereals/grasses, for example, is an uncommon case of dry indehiscent fruit with the seed coat fused with the fruit coat, exclusive of the Poaceae family; iii) Woods are the result of the secondary growth of woody plants, i.e. Gymnosperms and eudicots dicotyledons; iv) Charcoals are produced by water removal and transformation of wood; v) Other parts like leaves and stem fragments, part of flowers, thorns and small branches can be occasionally found, as mixed plant accumulation in very different contexts.

The large part of macroremains in archaeological contexts consists of seeds and fruits, which usually mark plant accumulation for food (but also for fodder and bedding), with important implications for plant processing and the history of domesticated species. Accurate species descriptions (Wasylikowa 1992, 1998), spatial analysis and ratio waste/fruit accumulations (Van der Veen 1992), morphological changes and implications for cereal domestication and relationships between African and Asian crops (Fuller 2007) are among the main topics. A special case of record of food plants is the negative evidence from clay impressions (e.g. Paniceae in Magid 1999; Stemler 1990). In African contexts, archaeological sites have often preserved charcoals useful to follow vegetation composition based on climate oscillations (Neumann 1989; Ballouche and Neumann 1995) and the development of cultural landscapes (Höhn and Neumann 2012; Carrión *et al.* 2018). They are often used to infer tree/shrub exploitation for fuel or timber (e.g. Amrani 2018; Castelletti *et al.* 1998; Zerboni *et al.* 2017), despite the possible taphonomic issues at some sites (Höhn *et al.* 2018). Well-preserved wood and fibres have been also found associated with burials and plant offerings (e.g. in Egypt, Moustafa *et al.* 2018; in Niger, Mercuri *et al.* 2013), or woven as basketry and cordage (di Lernia *et al.* 2012). Symbolism and decorative purposes are exemplary described by the desiccated leaves, flowers and seeds/fruits of garlands and collars in coffins of the Ancient Egypt (e.g. 16th-13th century BC in Hamdy and Fahmy 2018). Trade history was inferred from food plants, i.e. seeds and fruits from Roman Egypt (Caracuta *et al.* 2018; and see also examples from Berenike in Cappers 2006, and Quseir al-Qadim in Van der Veen 2011). Later, agricultural diversification, including the exploitation of both wet habitats for rice and dry environments for millets and sorghum, promoted urbanization and state formation in western Africa (from the 4th to around the 15th century AD; Champion and Fuller 2018).

2.2 Plant microremains

These include features that are part of the previous macroremain records but are isolated and not visible at naked eye. They need therefore complex procedures of chemical-physical concentration before they can be observed with a light microscope, from 250x to 1000x magnification. We distinguish five main categories of microremains: Pollen is the aploid (n) generation of plants (2n, and more in polyploids), produced from spores in pollen sacs of Spermatophytes; very different amount of pollen grains are

Fig. 3.1. Map with the research areas

produced by plants depending on the nature of anemophilous (high amount spread in the air) or zoo/entomophilous (low amount transported by insects or animals, including humans); pollen is evidence of blooming period, presence of flowering plants living in the site/area, transport of plant parts to the site; ii) Microcharcoals, often counted in the pollen slides, are small residues of combustion of wood and charcoal fragmentation, and mark natural or anthropogenic fires; iii) Phytoliths are cellular inclusions of leaf, stem, flower and fruit tissues of some species that, e.g. formed from the absorption of monosilicic acid from the ground water; iv) Starch remains largely comes from plastids of roots and seeds; v) Tissues such as epidermid fragments can occasionally be observed when undecomposed organic matter is preserved.

The pollen discovered in the rock shelters and caves of Wadi Teshuinat, Libyan Sahara, allowed us to infer palaeoenvironmental and climate changes, besides palaeoethnobotanical data, at a regional scale (see below; Mercuri 2008a, 2008b). In general, the pollen discovered from archaeological sites like these has two key features: firstly, it is 'disturbed' and, therefore, mainly accumulated by human transport that is a positive evidence for archaeology; secondly, it is 'local', like the macroremains, and therefore the landscape reconstruction is closer to the site than that resulting from regional off-site deposits (Mercuri *et al.* 2015, 2019). Besides pollen, microcharcoals can be observed in the same slide that are very useful to identify the presence of fires. In the dry lake sediments of the Jefara Plain, in Northern Libya, a combination of pollen (synanthropic herbs: *Plantago* + *Urtica*) and microcharcoals confirmed the presence of humans at the site (Giraudi *et al.* 2013a). In the case of off-site lake stratigraphies, the presence of microcharcoals is especially interesting to reconstruct palaeoenvironmental changes and regional fire dynamics (Lake Tanganyika: Palacios-Fest *et al.* 2005; Kiathipes 2018; Szymanski 2018). Phytoliths have been fruitfully studied to obtain data on food from dental calculus in Sudan (Madella *et al.* 2014).

2.3 Non-Pollen-Palynomorphs

These are a number of non-Spermatophytes records (also called NPPs) not included in the plant-derived microscopical remains mentioned above. They are more and more considered and counted in pollen slides, and give special contribution to the knowledge of palaeoecological characteristics of past environments. They prevalently include: i) Algae, in the form of cysts or cellular remains, indicating some soil erosion or water habitats. ii) Fungi, preserved as hyphas or spores, and looking dark due to the chitin composition of the cell wall; their significance ranges from markers of soil erosion to saprophytes living on dung. iii) Animal fragments consisting of very variable parts, like eggs, mandibles, or other fragments from invertebrates can be also found in case of good preservation of the organic matter.

In the Jefara Plain, many fragments of plant tissues and algae (*Cymatosphera*) were considered as index of shallow and brackish water locally (Giraudi *et al.* 2013a). The study of fungi in samples from African contexts is still poor but some interesting examples already exist. For example, the combined results of fungal and pollen analyses suggested that animal browsing had increased between ca. 6200 and 4000 years BP in the East African Coast (Szymanski 2018).

2.4 Molecular analyses

These studies, including nucleic acids, lipids, other organic molecules, preserved from seeds and plant parts, with some inorganic compound may be added to the list of not visible plant parts often preserved in archaeological contexts. In plant cells, the plastidial ancient DNA can be extracted besides nuclear and mithocondrial DNA. Environmental conditions such as humidity,

temperature, salinity and pH have strong effects on molecules preservation. Molecular studies on archaeological remains have been especially useful to deepen the history of African crops, such as *Sorghum bicolor* (Rowley-Conwy *et al.* 1998, 1999), and *Panicum laetum* and *Echinochloa colona* (Olmi *et al.* 2012), even joined to morphometrical analyses (Fornaciari *et al.* 2018a, 2018b). The use of pigments from plants was inferred from the analyses of textiles that coupled records of dye plants (*Punica granatum*) with specific chemical components, dated to Garamantian period (Bruni *et al.* 2011). Lipids in pottery revealed extraordinary traces of ancient boiling practices involving grasses and aquatics among which *Potamogeton* was the most unexpected herb, probably boiled in a soup consumed for food and its medicinal properties by hunter-gatherers (Dunne *et al.* 2016). All the previous examples refer to Saharan regions and this confirms that the current dry environments are especially preservatives for organic molecules. As for inorganic compounds, the combined evidence of a high concentration of gypsum and spherulites from animal coprolites in thin sections, together with dung and abundant charcoal in the macroremain record, was useful to infer that *Tamarix* wood was the main source for fuel in the ancient Fewet, a Garamantian settlement in a oasis (Zerboni *et al.* 2017).

3. *Archaeo* and *ethno* botany: intermingled approaches

Archaeobotany and ethnobotany are both related to the relationships between humans and plants, investigated at a different time-scale. Minnis (2000) defines archaeobotany as the 'ethnobiology of the ancient past' and a sub-field of ethnobotany. In past contexts, as 'Nature and Culture' were intermingled, economic choices are likely to have been primarily based on local natural habitats and resource availability (Diamond 2002). Archaeobotany is centred on plant remains preserved in ancient deposits while ethnobotany observes living people and their knowledge on plants. Archaeological records permit the inference of the cultural value from nature, quantity and frequency of plants preserved in sites (e.g. Pearsall 2000; Van der Veen 2007; Cappers *et al.* 2009). Ethnobotanical observations allow us to collect data on present-day plant processing and traditions (e.g. Martin 1995). Arguments supporting the links between archaeo- and ethnobotany may be twofold (Florenzano *et al.* 2016b):

a) *From archaeo to ethno* – archaeobotany/archaeology can help to understand current uses, and can represent a good guide for future practices. The economic, or simply useful, plants were known, looked after and transported into settlements for millennia, and the plants collected in the past are abundant remains in archaeological sites discovered today. This suggests that modern uses of plants have deep roots in ancient uses and common needs.

b) *From ethno to archaeo* – ethnobotany reveals the significance of some plant records in archaeological sites. Human/plant relationships seem to follow, both now as in the past, the same basic rules the world over (Zohary and Hopf 2000). In many cases ethnobotany may provide good reference to interpret the cultural significance of archaeobotanical evidence using the modern analogue approach. This has especially evident examples in African traditional uses like those of wood procurement in Libyan Sahara by Tuareg people who burnt dead trees in place to produce charcoal in other ways (Zerboni *et al.* 2013). The culinary practices in northern Ethiopia were studied looking at modern grinding stone surfaces and cooking habit to provide an interpretive context for archaeological starch and grinding stones found in the Pre-Aksumite archaeological site of Mezber (1600 BC-AD 1). Moreover, it was suggested that some heating damages observed on archaeological starch grains identified as cf. Triticeae may have been caused by plant processing; probably Mezber inhabitants roasted cereal flour which is a widespread culinary practice today (D'Andrea *et al.* 2018). Processing of plants is usually interlaced with the selection and manipulation of wild plants for food and medicine (e.g. *Sorghum bicolor* and *Pennisetum glaucum* in Beldados *et al.* 2018). Even when ethnological observations were carried out of Africa, excellent interpretative reference for African archaeology were observed in current plant harvesting modalities in the Near East (Kislev *et al.* 2004; Weiss *et al.* 2006) or plant processing of millets in the Iberian peninsula (Moreno-Larrazabal *et al.* 2015) or China (Song *et al*. 2013).

4. Examples of archaeobotanical research from Saharan contexts

In the Sahara desert, mountains and plains preserved the traces of past plant cover and water places that have been more extended and diversified than today during past climate conditions. Archaeobotany, based on ethnobotanical evidence and interdisciplinary studies, has been among the research tools used in palaeoenvironmental and palaeoethnobotanical reconstructions. Pollen and archaeobotanical remains cannot surely give 'all

the answers' we expect but can give unexpected information of very different aspects of past environmental conditions.

In the three case-studies reported below there are examples of a prevalently environmental reconstruction with cultural implications (Sai Island), the cultural uses of plants strongly based on the local environment (Gobero necropolis) and the intermingled climate, hydrological and cultural variables in mountains of the desert (Tadrart Acacus sites) (Fig. 3.1). All the sites have been discovered in Sahara, next to rivers or lakes and under the climate oscillations of the early, middle and late Holocene.

4.1 Sai Island, in Sudan

The Sai Island is a very interesting case-study of palaeoenvironmental reconstruction from pollen analyses giving information on subsistence strategies. Since the early Holocene, the Upper Nubian area has been characterised by a mosaic of habitats with fairly treeless vegetation, swamps with hygrophilous trees and savannahs next to the river, but also desert and gravel habitats in the region (Garcea 2013; Hildebrand *et al.* 2018). Palynological analyses allowed reconstructing local wetland environment but interestingly the best information comes from the preservation state of pollen and algae remains (Florenzano *et al.* 2016a). The combined evidence of low pollen concentration and thinned-diaphanous exine suggests a dilution of pollen content in alluvial layers and the presence of repeated hydration-dehydration cycles linked to floods, respectively (Florenzano *et al.* 2016a, 2018). The most interesting record, however, is that of the freshwater amphibious alga *Fritschiella*, which preferably lives on moist soils rather than in water, tolerates very high temperatures but survive in soils with less than 20% moisture content probably because of the high evaporation rates of arid regions. Today, *Fritschiella tuberosa* is observed southern the Sai Island, near Karthoum, giving a green tinge to the drying silt surfaces on the banks of the Blue Nile as the river recedes after the summer floods, between August and October. This alga points to dry conditions that may have been similar to the current ones, at least on a seasonal basis (Brook 1952). *Fritschiella* was exclusively found in the archaeological sites located on the west bank of the Sai Island. This strongly suggests that the two sides of the Island had different habitats, reasonably resulting in a variable availability of resources. In the eastern side, where this alga was absent, there were rapid water flow, with flooding and inundation risks but more water fish and shellfish availability. In the western side, indeed, there were more trees and permanent woody vegetation, with higher plant diversity offering more resources for terrestrial plants as food and other uses, but there were seasonal periods of drought and low water with land erosion risks. The mobility between the two sides of the island was probably adopted as an easy strategy to face the lack of resources that may have been lack of soils in the east, and low water in the west.

4.2 The necropolis of Gobero, in Niger

The recovery of plant remains from settlements, villages or necropolis occurs rarely, and their bad preservation and taphonomical issues usually prevents such analyses in open-air sites. The pollen record from the Necropolis of Gobero is an important exception.

Approximately 200 burials, encompassing over five millennia, constitute what is the earliest and largest Holocene cemetery in the Sahara, with distinctive skeletal anatomy of prehistoric hunter-fisher-gatherers (Garcea 2013). Together with geostratigraphical, faunal, anthropological and archaeological records, these sites provide evidence of episodic human occupation of the Sahara under early and middle Holocene climatic oscillations (Sereno *et al.* 2008; Giraudi and Mercuri 2013). Palynological analyses from a short sequence of a desiccated lake, and from twenty-three burials attributed to Pre-Pastoral and Pastoral cultural phases were carried out with the aim of reconstructing the main features of past environments (for detailed analyses of all pollen samples, see Mercuri *et al.* 2013). Burials have specific features that make their archaeobotany fairly different from that of settlements and residential sites. Sometimes, distinctive pollen assemblages witness floral depositions and rituals (e.g. Tipping 1994), but these contexts are particularly hard to interpret since samples can include pollen and plant remains from different sources (floor or objects lain on the floor, stomachs or other parts of the human body). The samples from Gobero burials showed often low pollen concentration that did not permit them to be considered unequivocal indicators of plant accumulation in place. Among the elements concurring to the interpretation, the point of sampling and the state of preservation of microscopical remains were of key importance. Besides the palaeoenvironmental reconstructions, it was possible to infer some particular forms of plant uses and relevant funerary behaviour from samples taken from four Pastoral burials, two of which were radiocarbon dated (Garcea 2013; Sereno *et al.* 2008).

The pollen sample BT-P3 was collected between the arms of burials B8 and B9: This contained most *Celosia trigyna*-type pollen, found in large clusters as pieces of anthers (flowers) that suggested flowers were collected and transported to the burial. The

plant is known to have some medicinal principles and produces coloured flowers. Also in the case of burial B6, pollen of caper-*Capparis* and of myrtle-*Myrtus* were deposited near the hands and the head, respectively. Both evidence suggest that there was an intentional deposition of flowers – not a simple plant bed – near the bodies of dead persons. Pollen shows that some funerary practices involving plants with beautiful flowers or fruits, or plants with smell and medicinal principles, were performed about 6000-4000 years ago in this area (Florenzano *et al.* 2016b). These are the features usually loved in plants used for decoration and rituals even today.

4.3 South-West Libyan Sahara

Impressive amounts of well preserved plant remains have been discovered in rock shelters and caves commonly scattered in the Tadrart Acacus mountain highlands. Multidisciplinary researches focused on archaeological issues and palaeoenvironmental reconstructions. Stratigraphical studies often revealed that, under changing environmental conditions, subsequent cultures inhabited the same site with different subsistence strategies. Thus, the Wadi Teshuinat sites and Takarkori rock shelter were inhabited by hunter-gatherers in the early Holocene while pastoralists lived in the same sites during middle and late Holocene phases (e.g. Cremaschi and di Lernia 1998; di Lernia 1999, 2001; Garcea 2001). The link between climate oscillations, water regimes and vegetation cover are among the main causes of adaptive behaviours by people, and often cultural changes in desert regions (Mercuri 2008b; Cremaschi and Zerboni 2009, 2011; Mercuri *et al.* 2011; Cremaschi *et al.* 2014).

Pollen presence depended on past plant cover, sediments and human presence (Mercuri 2008a). High pollen concentration reflecting accumulation of flowers/plants is visible in organic-rich samples, such as dung layers. The absence of pollen grains, though not interpretable, can be evidence of fires made in hearths or trampling in open-air floors causing oxidation: the two processes are known to destroy pollen (Faegri *et al.* 1989). High pollen concentration and the presence of a dominant type were taken as the best examples of human 'actions by pollen' (Mercuri 2008a). In Wadi Teshuinat, the high presence of *Typha* and of *Echium* pollen grains reflected human actions which occurred at the early Holocene Late Acacus phase: the use for thatch and food in the case of cattails, and the fodder harvesting of toxic plants testifying for a prolonged and continuous feeding of the animals penned in a cave, in the case of the borage plant.

During environmental crises, like at the end of the 9th and the 6th millennium BP, people had to face dryness and reduced availability of plant resources that caused adaptive economy changes or famine and land abandonment (Mercuri *et al.* 2011). The most impressive archaeobotanical record consists of a huge amount of grasses which are often dominant in archaeological layers as fruits and pollen, and stems woven as basketry or used in bundles to stop the fire in fireplaces (Mercuri 2008b; di Lernia *et al.* 2012). Most of these uses and evidence are common in the region and in the connected mountains of Tassili n'jjer (Amrani 2018). As Poaceae are the main component of arid land plant associations (White 1983; Ozenda 2000), their high presence in archaeological layers can be expected and obvious; they were so common that were easily harvested for different uses or browsed by animals in great quantity. Despite climate oscillations (Cremaschi and Zerboni 2011), plants survived to drought, and hunter-gatherers influenced plant cover through harvesting, selection and sometimes cultivation over the last 10,000 years (Mercuri *et al*. 2018c). For example, some plant records, belonging to food and fodder plants, are so recurrent in Saharan archaeological sites that they testify to a continuative selection of the same plant species for millennia. The history of plant harvesting and cultivation in Takarkori shows that the millets found at the rockshelter include grass species that are wild (weed) and cultivated (crop) today. The archaeobotanical record shows that the tendency of these weeds to evolve as crops is rooted in the very long history of manipulation and management in the Sahara, and that "*The same behaviour that allowed these plants to survive in a changing environment in a remote past makes them some of the most likely possible candidates as staple resources in a coming future of global warming*" (Mercuri *et al.* 2018c: 78). At the middle Holocene, grasslands or savannahs shifted southwards and locally a more xerophilous vegetation spread changing the type of plant resources and becoming more suitable for pastoralists.

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Arid **Z**one **A**rchaeology
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4. Cultural Heritage in Africa – Worldwide perspective and a focus on the Sahara

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Abstract. Modern archaeology is a very complex science in which the study of past societies must address and take into account the needs of today's societies and, indeed, Africa is a privileged field for the application of this model. Over the years in all African countries the efforts aimed at the protection and revaluation of "cultural heritage" gained greater prominence, while its role in society was changing, in parallel with the approach to its management, as required by the new concept of historical landscape. The article draws a long scientific path going back to the 1990s and starting from theoretical statements on the role of archaeology and claims of originality of the historical and archaeological studies in Africa. It therefore focuses on the various objectives achieved, from the tendencies of public archaeology, developing their action in the field of education, training and knowledge dissemination, to the most up-to-date forms of enhancing the archaeological heritage and the environment as a single macro-system. An example of this strategy is offered by the creation of National Archaeological Parks in various Saharan countries, mainly as a protection strategy towards tourism and development plans.
Key Words. Cultural Heritage safeguard; Sahara; public archaeology; training; protection; National Archaeological Parks.

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1. Introduction

Modern archaeology, almost a 'two-faced Janus', shows two faces to us. Archaeological projects cannot only deal with the reconstruction and explanation of specific issues as requested by the scientific statute of the discipline, but must also include other objectives such as the protection, enhancement and dissemination of the 'Cultural Heritage'. As a matter of fact, our goal as archaeologists should be to merge these two aspects together. From the beginning we should think of a 'discourse' of discovery, reconstruction, dissemination. A discourse that must be shared with the public, all of whom need to be involved in the archaeologists' historical reconstruction, and not just a select audience such as that of the academic world (Hassan 1999: 396).

We are all well aware of how the expression 'Cultural Heritage' has a broad and comprehensive meaning referring at the same time to aspects of living cultures and to geoarchaeological landscapes and their transformations over millennia, to sites, to monuments, to old and modern craft techniques, all of which are strategic components for the sustainable development of any region. Each component of the 'Cultural Heritage' system is in fact intimately linked to a specific physical-social space. Both environment and historical landscapes exist around us and are seen by everyone: villages, towns, fortresses, physio-geographic features, all built and transformed by human activity, level by level, over thousands of years. As a consequence, archaeology is increasingly interested in exploring and understanding the relationships between the physical evidence of the past and its social context, combining the study of any component of the material culture with an articulated ecological approach of the physical environment containing it (Loubser 2001; AA.VV. 2007; Ensoli 2012).

In Africa the need to protect and raise awareness of its cultural heritage has acquired notable importance and is destined to be increasingly strengthened in the future. The importance that tourism has for many African countries, with all its many repercussions, makes protecting sites and monuments and training technicians a critical issue. International research programs have increased the level of commitment and involvement in the field operations. Research contracts agreed with the Antiquities Organizations along with safeguarding and training also foresee the increasing level of involvement by numerous scholars of the host country in the archaeological programs taking place locally. These therefore present themselves as joint enterprises for training purposes in the fieldwork, study, interpretation and publication of archaeological sites. Therefore, archaeology has acquired a growing educational role, which is not only that of professional training, but is also aimed at the rediscovery of past values and the strengthening of identities. With regard to the latter point, all the moments in the history of the Continent must be sought, in that the identity is not only that of a single historical period but instead is cumulative.

2. African Archaeology: the challenges of the 1990s

In the second half of the twentieth century a tension started being perceived in the studies on Africa between the archaeology

Fig. 4.1 – Forum for African Archaeology and Cultural Heritage: a session of the Seminar "*State of the Pre-protohistoric research in Africa*", Rome 1992 (Photo by B.E. Barich).

of Europeans and that of Africans. The main argument was that the colonialist matrix of the early studies had led to the suggestion that African cultures were inferior with respect to European ones. Very little creativity was assigned to African cultures, which were described as an example of cultural stagnation. Grahame Clark (1977) stated that since the late Pleistocene most of the Continent has remained a sort of cultural museum. Even the interpretations made of some African cultural aspects such as Great Zimbabwe, the Ife culture and Ancient Egypt included elements of this 'cultural stagnation' misconception. In this climate the diffusionist hypotheses which, refusing a more articulated explanation of phenomena, reaffirmed the supremacy of privileged groups or seats, found fertile ground.

Since the mid-twentieth century the main cultural phases of African prehistory had been named with a terminology deliberately separated from the European one[1], but in the 1990s several authors, strongly committed to a cultural policy whose contents went beyond the usual chronological and interpretative objectives (Sinclair *et al.* 1993; McIntosh 1996; Shaw 1997; Vogel 1997), began to emphasize how Eurocentric views played a role in shaping much of the interpretation of Africa's past. The subsequent revisionism tended to enhance the independence of events occurring in the African continent with respect to Europe and the Near East. It also came to deny the possibility of talking about an African Neolithic:

"*Rejection of the term 'Neolithic' for African studies would remove at least one reminder of a term with an outmoded Eurocentric bias*…" (Sinclair *et al.* cit: 8).

This attitude, in contrast with the diffusionist trends, was above all aimed at claiming the autonomy of Africa in terms of its major development processes, including the production of food until then seen essentially as an emanation from the Near East. However, in the long run, all of this has had a negative outcome producing the isolation of Africa and its supposed discordance compared to the main phases of cultural development. In addition, placing the African 'Neolithic' in contrast to the classical definition molded on the Near East, has certainly contributed to the current gap in the studies between Northern Africa and the Near East.

As a matter of fact, for some time there has been a rethinking of this position, especially for North Africa where new research programs have been recently launched. Focusing mainly on the transmission dynamics and on the reactivity of the recipient groups, the contributions from the Near East are being reconsid-

1. The 6th resolution of the Panafrican Congress of Prehistory and Related Studies held at Livingstone in 1955 had for the first time sanctioned the sequence of the African Stone Age: Early Stone Age, Middle Stone Age and Later Stone Age.

ered taking into account both the timing and the modalities of diffusion, and the extent to which they have been integrated into the new geographical contexts. In Africa the adoption of south-western Levantine cultigens takes place primarily along the Nile and in Ethiopia-Eritrea, therefore in the areas more in direct contact with those affected by early urbanization phenomena such as Mesopotamia and the Levant. Just in these same African areas the first mixed agricultural economy and the first states emerged (Mitchell 2005: 230). But this – for the same author cited – is just one example of the wide network within which Africa has come to find itself during its history. On the other hand, Islam gave a strong impulse to reconnect Africa to other parts of the Old World (Mitchell 2005 cit.: 233).

3. A new consciousness

The beginning and taking root of the cultural heritage consciousness is part of these claims and has also been nurtured by an ever-increasing awareness of the importance of the past and the desire to regain possession of it. The creation of the *Forum for African Archeology and Cultural Heritage* came about as a result of this scenario. At the beginning of the 1990s I worked on the Forum's foundation together with a large group of scholars representing various historical-anthropological and related disciplines in African studies primarily J. Desmond Clark and Fred Wendorf[2]. The project was inspired by the Pan-African Congress on Prehistory (currently named *Pan-African Archaeological Association for Prehistory and Related Studies*) which, created in 1947 in Nairobi (Kenya), for many years had represented the unitary moment of meeting and discussion in the African pre-protohistory studies. However, after the last congress held in Jos (Nigeria) in 1983, the worsening of the political situation with continuous moments of conflict and tension in various African countries had prevented the normal running of the congresses. In 1992 the Forum was proposed as an area of discussion while waiting for the Pan-African Congress to return to operate and also with the aim of encouraging its resuming (Fig. 4.1). This latter occurred with the Congress held in Harare in Zimbabwe in 1995 (Pwiti and Sopper 1996).

The main purpose of the Forum was to promote the exchange and circulation of knowledge on archaeological, anthropological and environmental issues related to the African Continent (FORUM 1994). An important point was to emphasize the need to protect the African cultural heritage through a wide range of activities. Several commissions were foreseen in the statute of the Forum, all dealing with the social aspects of archaeology (cultural heritage; archaeology and development); the relationship between archaeology and present times (demography and urbanization; religion and society); and, finally, the didactic approach to African archaeology (FORUM 1998). A common feeling was expressed about the necessity to enhance the training in field research, in museums' organization and management, and in projects of cultural property conservation and protection offered to African students and young scholars. A new standard of research activity was conceived, recommending full awareness of the duties expected from whomever approaches archaeological and anthropological studies. A relevant problem for the African Sub-Saharan countries was the looting of archaeological sites and the illegal traffic of art objects. Both moral and ethical problems were involved in this matter. The illegal sale of the stolen loot could be prevented by providing means of support to locals. Involving and educating the local residents could become a new starting point. Finally, it was stated that the research programs in Africa had to give priority to the endangered areas, and, in any case, foresee the protection of sites and their use by the public, especially locally.

The second 1995 workshop – *Dynamics of populations, movements and responses to climatic change in Africa* – urged us to examine more closely the influence exerted by the environment on the social sphere, promoting displacement and movements of peoples. On this point the positions expressed agreed in affirming that it is not so much the environment that determines the cultural event by itself, as the modalities, and the degree, in which the event is perceived by people (e.g. Hassan 1995). More specifically, Pwiti asserted that there is no one-to-one correlation between culture and environment, since a host of various factors contribute to produce the cultures that are met not only in the archaeological field but also in the present times (Pwiti 1997: 33).

2. FORUM's foundation Seminar ("State of the Pre-Protohistoric research in Africa") was held in Rome, September 19-20, 1992, under the patronage of the Ministry of the University and Research granted by the Minister Antonio Ruberti. The Forum was made up of two interrelated parts. The permanent structure consisted in the Office of the Permanent Secretary and the Executive Committee, while the periodic structure was represented by the international meetings/workshops held at regular intervals. B.E. Barich was elected as Permanent Secretary, while the Executive Committee was composed by K. Bergashaw, M. Casini, B. Chiarelli, P. de Maret, R. Fattovich, F.A. Hassan, A. Holl, N. Petit-Maire, G. Pwiti, F. Wendorf. President of the Forum was initially J. Desmond Clark, followed later by J. Alexander. Following the first, foundation Seminar, two other workshops were organized at the Sapienza: "Dynamics of Population Movements and Responses to climatic changes in Africa" 19-21 April 1995 and "Cultural Resource Management and Fieldwork Methods in Africa", 3-5 December 1998.

Fig. 4.2 – Farafra Oasis, Western Desert. View of the internal arrangement in the Visitor Centre, Qasr Farafra (© Archaeological Mission in the Farafra Oasis).

It is all the more wrong, according to the same author, to argue that the environment forms the identity of a people by inducing them to a particular economic option (e.g. pastoral or agricultural). Economic practices are never influenced by the environment in a deterministic way for which it is dangerous assuming a simplistic relation between ethnicity and economic practice.
"*Ethnic identity is not necessarily tied to particular economies, but a function of differentiated responses to specific social and environmental situations*" (Pwiti 1997: 34).
On the whole, the Forum has contributed to formulate a new concept of cultural heritage as an ongoing process, which allows us to go beyond a too narrow concept of 'cultural identity', potentially risky for its nationalistic implications. In various countries that have gone through different phases of historical development, the cultural heritage should be considered in its multifaceted form, that is combining its various formative and historical periods. A meaningful example is Egypt, in which its prehistoric, pharaonic and Coptic pasts equally contribute to the substance of its 'cultural heritage'.

4. Strategies on the territory – Teaching and dissemination

These are public archaeology topics that even today find particularly fertile ground in Africa and represent the main focus for symposia and cultural organizations. Also the last Pan-African Congress held in September 2018 in Rabat (Morocco) was entitled *Valorization of African Cultural Heritage and Sustainable Development*. A common consensus has been formed that the plans for site safeguarding and enhancing can themselves become channels of economic development. Obviously here we deal with the delicate problem of a reconciliation between development and conservation plans which is at the basis of the concept of sustainable development:
"*… The concept of sustainable development … means much more than when it was first coined, limited to the management of biophysical exchanges between society and the natural environment. …Defending the identity of small urban centers and human settlements in the rural areas can do as much as infrastructure and services and utilities to curb the exodus towards the metropolises and the valleys, particularly in the developing countries. This makes a contribution to keeping in place the human resources that are needed for local development. This is based, inter-alia, on handicrafts or agriculture which are traditionally viewed as an obstacle to the modernization of the economy, but which are being reappraised as essential ingredients of sustainable development*" (Tortorella *et al.* 1999).

4.1 Interactions with local communities: education and safeguarding

Strengthening the local communities involving them as key stakeholders is often considered a strategy that can lead to con-

crete results. Receiving input and feedback on current or future projects directly from people living in the tourist areas could also serve to enhance local peoples. These interactions allow in fact to highlight the opportunities for local enterprises, possibly reconciling their particular needs with the long-term sustainable development of the concerned territory.

A public archaeology program should include:

a) meetings with the principal local stakeholders including local government; visits to the local schools and meeting with children, teachers and managers;

b) knowing the local classroom courses to understand how children learn and select the most appropriate tools; emphasizing how important it is to establish collaborative relations locally with teachers (history teachers in particular). Teachers should be directly involved in the field investigation so that they can transmit a first-hand representation of it to their students. The use of educational CD-ROMs in the classroom is also important;

c) planning appropriate cycles of introductory lessons on the principal features of the local landscape, environment and archaeology. Making children aware of the wealth of the local natural resources and of the characteristics of the climate. Designing an inventory of the different local soils, topography and hydrography;

d) organizing school camping trips to areas of naturalistic and cultural interest;

e) showing the complexity of the entire landscape by means of territorial readings and interpretations. Disseminating the already available data (natural, historical, ethnographic, archaeological) by means of both the existing museum structure, which will gradually be expanded, and thematic tours, education workshops on the landscape, 3D reconstructions of landscapes and sites, educational and documentary DVDs, web sites, etc.

4.2 Tourism management

A fundamental commitment is to manage tourism and the growth of tourism in a responsible way, i.e. not to cause environmental damage, pollution, respecting monuments and keeping the consumption of resources at sustainable levels. Visitors' behavior can be addressed positively through *in situ* 'training moments', as can be done through well-planned visitor centers (Fig. 4.2): small museum structures that present in a synthetic form the environmental, demographic and archaeological framework of a territory. Often perceived as a threat to the conservation of cultural and natural sites, the presence of tourists can, on the contrary, be directed to protect a site. One can take inspiration from the monitoring program put in place in Australia to preserve the great coral reef off the coast. Not only did it increase awareness of coral reef protection, but also allowed tourists to report on coral reef health.

It is essential to be aware of how many people can host a site without risking damage to its structures. In this case, managing visitors means managing the flow or even limiting access to the site for certain periods. In some cases, realistic copies have been made of monumental sites that face serious threats of deterioration. The full replica of the Lascaux cave in France, for example, was created to allow the public to enjoy the cave paintings, preserving the original ones.

5. Archaeology and safeguarding policy: the strategy of archaeological parks

Historic African sites are threatened not only by tourism but also by road and dam construction and by the plans of agricultural development that involve the extension of cultivations. A significant risk factor is also represented by the extraction of fuel. The Saharan territories have been particularly affected by problems of this kind. The interventions that took place in the 1990s in the Messak (Libya), promoted by the British company LASMO representing a consortium for hydrocarbon exploration, are a dramatic example of this phenomenon (Kröpelin 2002: 411-412). Faced with problems of this type, various countries have launched safeguarding programs such as archaeological parks, protected areas like global, naturalistic-ethnographic-archaeological systems. In Libya, the archaeological area of the Tadrart Acacus became a UNESCO World Heritage Site many years ago (di Lernia and Zampetti 2008).

Since 1980, programs have been implemented in Egypt to preserve significant parts of the natural habitat. Five protected areas have been created: Cairo, Red Sea, Sinai, Western Desert and Upper Egypt, that have allowed the preservation of bio-diversity and cultural resources. Among these two are the projects carried out in the Western Desert that have interacted with the research I have directed. The '*White Desert National Park*' involves at least in part the territory of the research concession in the Farafra Oasis; while in the other project, the '*Gilf Kebir National Park*', I was directly involved as a representative of the Sapienza Università di Roma.

5.1 The White Desert National Park

The White Desert area represents a unique example of the karst phenomenon. It is an open air museum where one can meet

Fig. 4.3 – A panoramic view of the White Desert, Western Desert (© Archaeological Mission in the Farafra Oasis).

desert environments, natural phenomena of different types, wild fauna and fossil features. The landscape returns an evocative scenery for its geological formations of soft white limestone rocks in the shape of columns, arcs and mushrooms shaped by the aeolian erosion. The protected area comprises more than 3000 sq. kilometres and stretches as far as the road that runs from Bahariya to Farafra. The Farafra Maastrichtian chalk is almost completely exposed here, the soft rock has been eroded so that it forms inselbergs, the last stage of substrate erosion, which have taken on strange animal-like shapes. These are like desert sculptures with white surfaces that create an incredible contrast to the pinkish-yellow sand (Fig. 4.3).

The geological and natural values of this desert prompted the Egyptian Government to establish the '*White Desert National Park*' within the context of an Italian-Egyptian environmental cooperation program. Within the park there are also various mini-oases and around their water sources certain types of vegetation have grown: they are characterized by small palms such as at Ain Kadra and Ain el Wadi, where a clump of palm trees and a spring have provided a rest stop since the Roman period. The creation of the park as well as establishing a control on the picturesque landscape and its natural structures, promises to also keep what remains of a once abundant vegetation and even rare specimens of fauna that still survive.

5.2 The buffer zone. The Farafra Cave

In the area immediately in contact with the protected area of the park, referred to as 'buffer zone', there is the Wadi el Obeiyid Cave 1, usually named 'The Farafra Cave'. This is one of only a few caves known not only in the depression of Farafra, but in the entire West-

ern Desert. It was discovered in 1995 by the Italian Archaeological Mission in the Farafra Oasis on the side of the Northern Plateau overlooking the high course of Wadi el Obeiyid, not far from the important Neolithic Hidden Valley site. The cave opens about 50 meters from the wadi floor and has a rather narrow opening (2×2 m) which is probably not entirely natural (Hamdan *et al.* 2014). The cave is important from a geomorphological point of view since it offers an interesting example of karst formation dating back to the middle Pleistocene; it also contains an outstanding rock art complex with very well preserved engravings and paintings (Barich 1998, 2014). The lithostratigraphic units exposed in the escarpment near the cave comprises, from top: 1) Lower Eocene Farafra limestones, comparable to the Thebes Formation of the Nile Valley; 2) it overlies the Esna Shale which in turn overlies 3) the Tarawan Chalk in which the cave is excavated (Hamdan *et al*. 2014: 377-378). The cave not only contains rock art works, but also sequences of speleothems and wind-blown sand deposited during the middle Holocene. Hamdan *et al*. report that the limestone deposits are of Cretaceous age while the karstic solution occurred during several subsequent periods. Using U/Th, two speleothems samples from Cave 1 were dated to 45 ± 2 and 287 ± 67 ka in relation to flowstone and dripstone samples, respectively (Hamdan *et al.* 2014: Tab. 3). The U and Th isotopic data suggest that there have been at least two periods of U mobilization and deposition. One would be the time of the initial formation of speleothems, probably somewhat less than 300,000 years ago; and the other would be the time of the last carbonate deposition (45,000 years ago) (Hamdan *et al*. cit.).

The particular position of the cave (Fig. 4.4) and its limited opening, which protected it against an accentuated wind action, have also ensured the preservation of the precious examples of rock art through time. Along the walls, and on the vaults of the three chambers (named 'galleries') inside the cave, there is a rich series of mostly animal engraved and painted figures. The 'Front Gallery' of the cave is the only one that has a secondary filling consisting of wind sands and organic deposits (formed by plant accumulation and caprine dung). The analysis and study of the samples offered important indications on the paleoclimate, vegetation and chronology of the cave's frequentations which extend to the most recent Holocene phase, before the definitive establishment of the desert (Barich 1998, 2014).

At the time of its first discovery the cave was very well preserved and only a small part of the Front Gallery deposit was removed to allow further investigation. Unfortunately, in recent years both the geological structure and some of the paintings inside the cave have been damaged. All this, already reported to the Egyptian Ministry of Antiquities, makes an effective intervention ever more urgent. For all these reasons as representative of the Archaeological Mission in Farafra I am urging authorities to put in place a 'musealization' program of the archaeological complex that will ensure the preservation of both the art and the structural integrity of the cave itself, without preventing people from visiting the site, especially the local inhabitants of the oasis.

5.3 The Gilf El Kebir National Park

Within the framework of the Egyptian Italian Environmental Cooperation Program, since 2007 the Italian Cooperation in agreement with the Ministry of State for Environmental Affairs (The Egyptian Environmental Affairs Agency /EEAA) is implementing a series of activities for the recently created *Gilf Kebir National Park*. In this context the program '*Italian Gilf Kebir Conservation Project*' is set, curated directly by the present author for the protection, restoration and conservation of the three main sites of Wadi Sura, on the western side of the Gilf el Kebir (Barich 2010)[3].

The Gilf el Kebir (the Great Barrier) is a plateau in the remote southwest corner of Egypt, close to the Libyan border. This 7770 sq. kilometers limestone and sandstone plateau rises 300 meters from the desert floor (1075 meters above sea level), forming one of the most formidable barriers in Africa. The geological structures include meteorite impact craters, Palaeozoic glaciations imprints, soils formed during the Mesozoic humid, tertiary volcanic deposits and Holocene playas (Kröpelin 1996: 36). In addition to the repertoire of prehistoric art, concentrated above all in Wadi Sura, there are numerous Neolithic sites rich in ceramics and lithic artefacts. The investigation and preservation of these features is essential to understand what links these western territories to the peoples of the Nile (about 720 kilometers to the east) whose identity these regions helped to shape. In the upper Wadi Abd el Malik, a variety of flora is concentrated, attracting what remains of a highly endangered wildlife (Barbary sheep, gazelles) (Kröpelin cit.).

3. The following researchers took part in the Programme: Mohamed A. Hamdan, Department of Geology, Cairo University in charge for the geological study, while lithology, fabric and painting pigments were analysed in situ by Mona Fouad, Cairo University; the archaeological investigation was carried out by Giulio Lucarini, Deputy Director of the Project and Giuseppina Mutri, both at that time Sapienza Università di Roma and currently University of Naples "L'Orientale" and Sapienza Università di Roma, respectively; conservation activities were performed by the team of the Italian restorers Cristina Caldi and Federico Ratti with the leading guide of Maria Cristina Tomassetti. A 3D model of the caves was processed by Alberico Sonnessa, Department of Geomatics, Sapienza Università di Roma; photographic documentation was made by Carlos de la Fuente. Massimo Foggini joined the team as a Gilf Kebir expert. Tamer Ramadan Zayed was the official ranger of the Gilf Kebir National Park and Eslam Reda Mubarak, officer of the Egyptian Army, was in charge to accompany the team for security purpose.

Fig. 4.4 – Farafra Oasis, Western Desert. The Wadi el Obeiyid Cave 1 seen from the wadi bottom (© Archaeological Mission in the Farafra Oasis).

Fig. 4.5 – Wadi Sura, Gilf el Kebir. Panoramic view of Cave of the Swimmers (to left) and Cave of Archers (to right) (© Gilf Kebir Conservation Project).

In the years 2010-2013 three missions of the '*Italian Gilf Kebir Conservation Project*' were directed to the main caves with paintings that open in the Palaeozoic sandstone of the Wadi Sura: the Cave of the Swimmers, the Cave of the Archers and the magnificent Foggini/Mistekawi Cave, discovered only in 2002. The results of the three missions have been entirely published in recent articles (Tomassetti *et al.* 2016; Barich *et al*. 2018; Lucarini and Barich in press). This rock art complex is located in the pictorial cycle attributed to the shepherd peoples between the 6th and the 5th millennia cal. BC (Riemer and Kuper 2012). Therefore, they are very old art works that allow us to further enrich our reconstructions by introducing references to the symbolic-ritual sphere of the Saharan peoples.

The preliminary mission (*Assessment Mission*) aimed to formulate an initial diagnosis of the current state of the caves, necessary to elaborate the analytical plan of the interventions for protection, conservation and restoration. It is said that the name Wadi Sura ('valley of images') was given by Lazlo Almásy to this wide valley that opens up in the Silurian sandstone of the Umm Ras formation (Rhotert 1952). The three shelters under study are located a few tens of kilometers from each other. The Cave of the Swimmers, the first to have been discovered together with the smaller Cave of Archers, located a few tens of meters further to the east, opens into a large cupoliform formation modeled in the Silurian sandstone (Fig. 4.5). The block extends like a promontory with respect to the front of the cliff and is surrounded by a small river, currently dry but presumably active in the humid phase of the Holocene. Then the rocky promontory where the two caves are open had to appear almost surrounded by water, from which it emerged with an undoubted effect of great suggestion for those coming from the main wadi.

The Cave of Swimmers was the one which required the most urgent intervention. The natural fractures and the parallel layer exfoliation process caused a loss of large parts of the painted surfaces and sandstone blocks. Some parts are clearly at risk of collapsing with the consequent high risk also for the painted areas in their vicinity. The most important group of images is clustered on the northern section of the wall, it comprises a large figure of a man in the classic style of Wadi Sura, accompanied by another person in bandages, while below are some of the famous 'swimmers' that gave the cave its name. The scenes are still visible in the south-central and southern area of the wall, which has also been heavily vandalised by modern graffiti.

The smaller Cave of Archers, located just 40 meters away from the former cave, shows a 10-meter wide W-SW-oriented entrance. As in the Cave of the Swimmers, you enter the cavity, 5 meters high, directly from the wadi bottom. Only a small portion of the original paintings is currently visible and extends over an area of 2.5 by 1 m. In the scene we can recognize some long-limbed figures faced with arches. They have fine limbs, while the head, due to the breaking of the rock, is no longer visible.

The third complex, the Foggini/Mistekawi Cave, is located a few kilometers to the west, on one of the buttresses that descend from the northern Gilf towards Wadi Sura. Currently the cave's front is partially covered by a thick sand deposit that formed against a large portion of the rock wall and that, in its visible part, measures about 18 meters in width and 6 meters in height. At the foot of the cave, at the level of the wadi bottom, the remains of a playa that was active during the Holocene are still in place. The still visible rock wall of the cave is entirely covered with paintings and engravings (Kuper 2013). This is a truly exceptional site, decorated by generations of artists before its abandonment when the climate began to deteriorate. We can say that this shelter has handed down to us the testimony, quite exceptional, of the symbolic and ritual behavior of the populations that in ancient times have inhabited the region. For this reason it represents an extraordinary document of the interaction of social groups with the changing Saharan environment.

The most urgent work, a 'pilot intervention', was performed against the Cave of Swimmers. The delicate work of restoration and conservation of this complex is an example of an interdisciplinary project between geomorphology, archaeology and conservative intervention for which the types of consolidants considered to be most suitable for the type of substrate were tested (Tab. 4.1). The conservation work was designed and directed by M.C. Tomassetti who, based on the preliminary survey, carried out in-depth studies in Italy to identify products that would allow the best penetrability for the substrate's consolidation[4].

The conservation work conducted so far in the Gilf Kebir has met the principles that must drive the projects carried out in Africa and which I mentioned in the first part of this work. The interdisciplinary group (geomorphologists, archaeologists, computer engineers for 3D surveying, chemists and restorers for the selection of the most suitable products) was able to count on the collaboration of a broad representation of local experts both from the University of Cairo and from the Inspectorate of Dakhla who shared all the phases of planning and execution of the intervention (see note 3).

Tab. 4.1 – Different phases of the Gilf Kebir conservation project (from: Barich *et al.* 2018).

1. Environmental monitoring;
2. Reconstruction of the geoarchaeological context and study of rock substrate;
3. Documentation and study of the archaeological context of the caves of Wadi Sura;
4. 3D mapping using Laser Scanner (graphic model for thematic mapping simulating the impact on the rock surfaces);
5. Test of materials for conservation of rock and paintings;
6. Performing a complete test of conservation (on a sample of 1×1 m) based on a preliminary analysis;
7. Training on the job

During the 2013 mission, the last one that was held in the area that then became inaccessible to research, we could verify the effectiveness of the restoration carried out on a sample area (1×1 m) of the Cave of Swimmers where the so-called sanding phenomenon resulted more evident. This process begins with the formation of a crust caused by the deposition of iron, together with other salts, on the rock surface and starts a process of alteration and disintegration of the bedrock. In fact the subsequent alteration and reduction of the crust opens the way to the disintegration of the wall substrate. The same phenomenon concerns the fractures that are formed in relation to the junctions and the folds of the rock. Since the iron deposit that makes up the crust preferably occurs in presence of a humid climate, it can be said that the process of crust formation began in prehistoric times and, more precisely, during the humid phases of the Holocene. The crust, in fact, is present both below and above the paintings. All these processes, which have played a fundamental role in the deterioration of the bedrock, must be carefully observed and studied with non-destructive methods that allow to determine the physical structure of the rock, its porosity, the presence of salts, the composition of the pigments, and the trend of fractures in relation to climatic variations.

6. Conclusion

African archaeology can offer a valid model for modern archaeology as a whole: there cannot be an archaeology as a study separate from the current reality. The role of 'Cultural Heritage' in society is changing, in parallel with the approaches to its management required by the new concept of historical landscape. The

4. The applied protocol is minutely described in the cited texts: Tomassetti *et al.* 2016; Barich *et al.* 2018.

latter is seen as a complex entity, which can contribute to the development of political ideas, to economic prosperity, to social cohesion and to reinforce the positive values of cultural diversity. Even the nature of the professional skills involved in the research, protection and management of 'Cultural Heritage' are changing. If in the past architects, archaeologists, landscape architects, worked in separate structures, or even on separate projects based on different approaches, today the integrated research / conservation / management model requires that different sectors to work together on joint projects or on a single project, in which 'Cultural Heritage' is only a component of a broader system. Even the traditional, academic way of presenting archaeological information and the forms of public dissemination have changed. In this regard the positive effort to make the museum experience genuinely educational (Moore 1994), while trying to involve more and more the local population, should also be emphasized.

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5. Archaeological research in northern Sahara. Thoughts on the experience of a Tunisian-Italian research program (2014-2017) in post-revolutionary Tunisia

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Abstract. Following the 2011 'Arab spring', archaeological research in large parts of the Sahara is still at a halt, except for a few areas where it is possible to foresee the possibility of resuming field research at a full capacity in the near future. Nevertheless, the complex and dynamic post-revolutionary socio-political evolution of the countries involved in the 'Arab Spring' makes us believe that the design and carrying out of the field research must undergo a reconsideration and should be inspired by the criteria of flexibility and modularity. In the present paper, we discuss these aspects by reporting the experience of a Tunisian-Italian research project (2014-2017) engaged in the fields of environmental studies and prehistory of central-southern Tunisia.
Key Words. Maghreb; Chott el Jerid; collaborative research programs; archaeological field research; prehistory and palaeoenvironment; anthropology.

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1. Introduction

In the present work, we discuss the experience of a Tunisian-Italian research project (2014-2017) that have seen members of the *Institut National du Patrimoine* (TN), the University of Kairouan (TN) and the Sapienza University of Rome (IT) jointly engaged in the fields of environmental studies and prehistory of central-southern Tunisia.

The premises for the start of the collaborative research activity rooted in a series of preconditions, one of which was the will of the 'Archaeological Mission in the Sahara' of the Sapienza University of Rome to establish a research transect with high scientific potential that could ideally connect the North African Mediterranean belt with the central Sahara. At the time of the beginning of collaboration, security conditions in Tunisia were good enough to allow international teams to work in relatively remote areas of the country, like the northern expanses of the Sahara Desert and the steppe region immediately north of it. The country was, in fact, experiencing a period of enhanced stability after the events that characterized the advent of revolutionary instances, the start of the turmoil and its immediate aftermath. Contrary to the dramatic outcomes of the post-revolutionary process in Libya where the Mission had proficiently worked for more than half a century (e.g. Mori 1965; Cremaschi and di Lernia 1998; di Lernia 1999; Garcea 2001; di Lernia and Manzi 2002; Liverani 2005; Anag *et al.* 2007; di Lernia and Zampetti 2008; Dunne *et al.* 2012; Biagetti *et al.* 2013; di Lernia *et al.* 2013; Mori 2013; Cancellieri *et al.* 2016; Mercuri *et al.* 2018), which made the country definitively inaccessible to foreigners and put its heritage at risk, when not irremediably lost (di Lernia 2015; di Lernia and Gallinaro 2014).

The will of the colleagues from the University of Kairouan, in particular the members of the Department of Archaeology, to establish a contact and to launch a collaboration in the field of prehistoric archaeology of southern Tunisia eventually led to the signing of an agreement for the period 2014-2017, ruling a joint research project titled "*Climats, cultures et sociétés pré-et protohistoriques en Tunisie. Recherches environnementales, archéologiques et ethno-anthropologiques*" (Pre- and protohistoric climates, cultures and societies in Tunisia. Environmental, archaeological and ethno-anthropological research). The institutional partners were

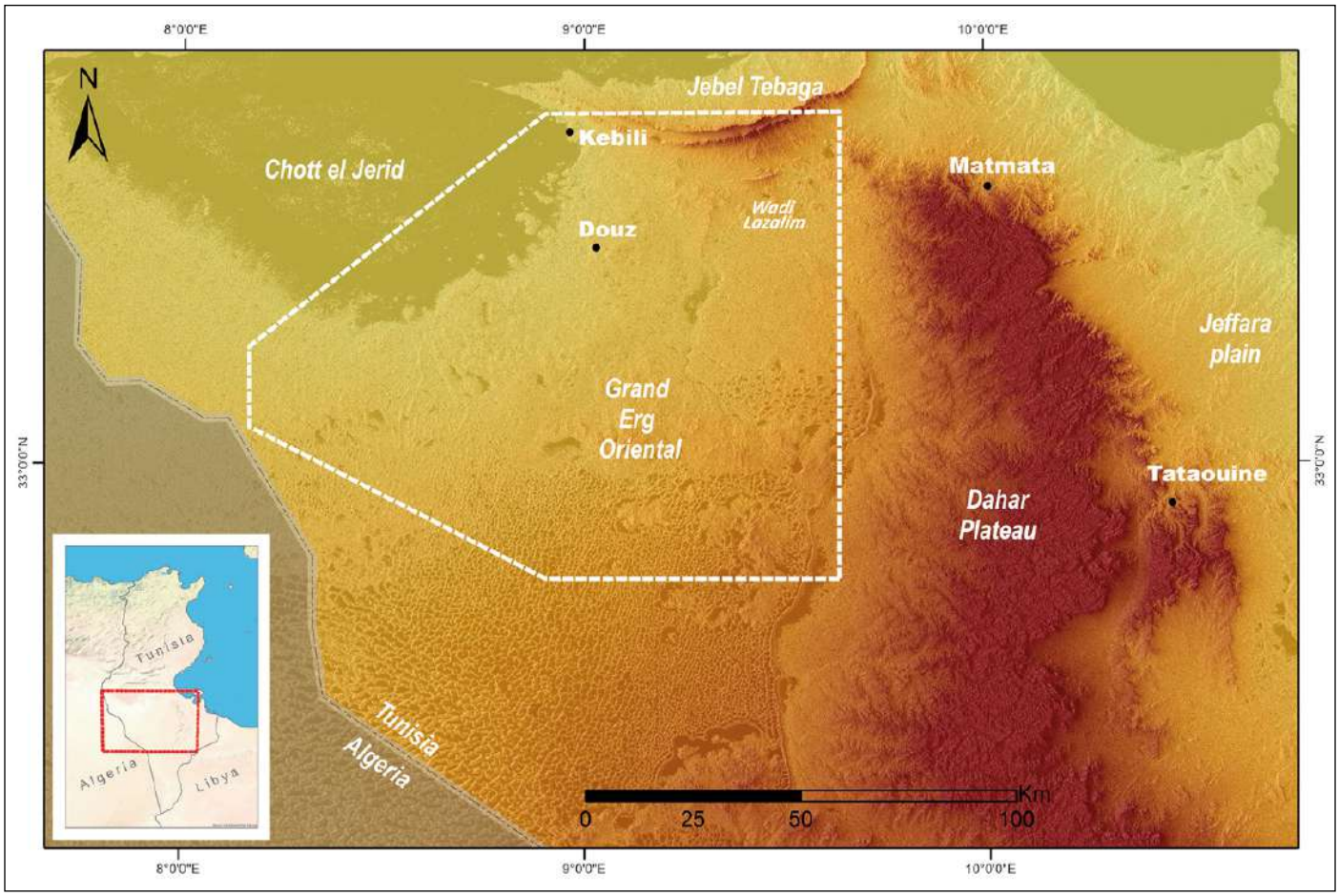

Fig. 5.1 – Map of the research area. Dashed polygon represents the approximate extent of the field researches carried out between 2015 and 2017 (© The Archaeological Mission in the Sahara, Sapienza Università di Roma).

the *Institut National du Patrimoine*, the *Faculté des Lettres et des Sciences Humaines de Kairouan* and the *Dipartimento di Scienze dell'Antichità* of Sapienza University of Rome. The scientific responsibility of the research project was allocated to Ridha Boussoffara (INP), Jaâfar Ben Nasr (University of Kairouan) and Savino di Lernia (Sapienza Università di Roma).

Field activity in the three years of the project was mainly concentrated in the Chott el Jerid and Jebel Tebaga areas (Kebili) because of the unfavourable security conditions that still affect the more southern regions. The research, conducted notwithstanding the serious internal situation dramatically hit by the terror attacks of 2015, allowed an assessment of the scientific potential of the area by means of geoarchaeological research, surveys and excavations, together with palaeoenvironmental samplings, radiocarbon determinations and genetic analysis of populations of the region (Ben Nasr *et al.* 2016; di Lernia *et al.* 2017), which provided a basis for reconstructing the cultural developments of the late Quaternary in this part of North Africa.

2. Geographic setting

Located between the Mediterranean and the Sahara, the study region (Fig. 5.1) is a pivotal area between the coast, the steppes and the desert. We have mostly studied one major transect intercepting the south of Chott el Jerid, the northern part of the Grand Erg Oriental and the steppe region of the Jebel Tebaga.

The Chott el Jerid is a vast dried natural depression located at the edge of the Sahara between the oases of Tozeur, to the north, and Douz, to the south, covering an area of over 5,000 sq. kilome-

tres. It is the largest salt lake in the region, and its underground fossil water feeds the oases around it. During the wet phases of the Pleistocene and the Holocene, the Chott el Jerid was a vast area of freshwater (Causse *et al.* 2003) and was an integral part of a hydrographic system fed by rivers that originated in the central Sahara mountains (Drake *et al.* 2011). A vast network of interconnected mega-lakes has repeatedly created favourable conditions for the formation of resource-rich environments, which has been a strong attraction for human groups and a very important catalyst for human migration. The Chott el Jerid was included in the UNESCO 'Tentative List' in 2008 for its environmental characteristics (http://whc.unesco.org/en/tentativelists/5385/) and is classified as a wetland of international importance under the Ramsar Convention (http://www.ramsar.org/sites/default/files/documents/library/sitelist.pdf).

3. Research objectives

Our research is a part of the general framework of studies on the prehistory of Tunisia which, in recent years, have produced significant results after the work of several Tunisian and international teams (e.g. Aouadi-Abdeljaouad and Belhouchet 2012; Ben Fraj 2012; Mulazzani 2013; Ben Nasr and Boukhchim 2015; Jaouadi *et al.* 2016). However, several regions and contexts, especially in the mountains and the Sahara, remain outside of this research and require systematic investigation programs to fill multiple geographical and chronological gaps and to better reconstruct human settlement during prehistoric periods in this part of the Maghreb.

The Tunisian-Italian research program thus focused on thematically linked research localities between the Chott el Jerid and the Dahar Plateau to further develop this research, to study previously unknown or poorly explored contexts, and to address Pleistocene and Holocene human settlement in the broadest spatial sense that goes beyond the intrinsic boundaries of a site. The main research targets were related to the pre-protohistory of southern Tunisia and classifiable into distinct macro-phases of human occupation (Middle Stone Age, Epipalaeolithic, Neolithic), including the ethnographic and genetic signature of the living communities.

The research objectives focused around the following main axes: i) the geographic meaning of northern Sahara in relation to crucial phases of expansion and cultural diversification of early *H. sapiens* in the Late Quaternary; ii) the human population dynamics in North Africa and the repopulation of the Green Sahara at the onset of the early Holocene; iii) the funerary practices and social dimensions of late prehistoric and protohistoric societies; iv) the genetic makeup of sedentary and nomadic people in Saharan and peri-Saharan areas.

4. Field activity

The joint research project had a rather complicated beginning. The first planned field mission was cancelled only a few days before the departure because of the tragic outcome of the kidnapping of a French hiker in September 2014 in Algeria. Although the dramatic event occurred in a region rather distant from our research area, it nevertheless prompted the Italian diplomatic authorities to take precautionary measures for our mission and suggested to postpone it.

The following year (2015) has been difficult as well. We have been able to conduct only short field activities and laboratory analyses. The objectives of these missions were to check, in the field, the structures identified by remote sensing analysis; to identify archaeological sites to be investigated and sampled; and to start the samplings for genetic analyses.

The terrorist attack on March 18 on the Bardo museum, in Tunis, occurred while we were in the field in the surroundings of the town of Douz. Also in this case, for a precautionary principle, we interrupted the fieldwork and the activities in course. We have nevertheless been able to visit two main sectors: the flat rocky zone to the east of Douz, and the sandy dune area to the south. The geoarchaeological research has been fast, the sampling reduced to the minimum and focussed on datable materials. In the dune area we recognized several surface sites with a high density of lithic artefacts, mostly early Holocene in age (Fig. 5.2). In the flat rocky area, east of Douz, we discovered some stratified Pleistocene sites along the Wadi Lazalim, where lithic artefacts are stratified within sedimentary successions.

The short field mission conducted in November 2015 was focussed on the investigation of sites in the dune area south of Douz and the sampling of biological material for genetic analysis of nomadic herders. The fieldwork was followed by a study-stay conducted at the *Institut National du Patrimoine* in Tunis and was directed to the analysis of archaeological materials collected in the field.

Security conditions in the research area between autumn 2015 and spring 2016, the privileged period for field activities in the

Fig. 5.2 – General view of early Holocene site 15/6, Grand Erg Oriental (© The Archaeological Mission in the Sahara, Sapienza Università di Roma).

Fig. 5.3 – Tumuli of necropolis 15/11, Grand Erg Oriental (© The Archaeological Mission in the Sahara, Sapienza Università di Roma).

Fig. 5.4 – A view of Wadi Lazalim. In the background, the Middle Stone Age site 15/1 (© The Archaeological Mission in the Sahara, Sapienza Università di Roma).

Sahara, have been repeatedly weakened by episodes of social instability and terrorist acts. The country experienced forms of violent clashes lasting several days, in particular during the revolts burst in January 2016 in several cities – Kasserine, Le Kef, Sidi Bouzid, Kairouan, Kebili, Douz – including the capital Tunis. March 2016 witnessed an assault by members of Daesh on the city of Ben Guerdene, on the border with Libya, not far from our study area. All this has had negative repercussions on the planning of field activities, which has seen numerous reformulations of both scheduling and objectives, as well as on the effectiveness in pursuing the research targets within the foreseen time frames.

In September-October 2016 we have been able to conduct a long and intensive field mission, and we had the possibility to explore several sites and sequences distributed over a large area in the region of Kebili. Research activities focused on 1) palynological, geochemical and sedimentological samplings; 2) intensive surveys, surface collections and excavation of test trenches in the area of Wadi Lazalim; 3) the archaeological investigation through intensive surveys, mapping and excavations in the necropolis located in the Ben Chroud area (Fig. 5.3); 4) the biological sampling of different ethnic groups.

Finally, in September-October 2017 it was possible to carry out a longer field mission, which saw the participation of a large

number of people. The Mission has seen the continuation of the research already initiated and benefited from a substantial enlargement of the territory covered by territorial surveys. The areas studied were the south-eastern limit of the Chott el Jerid, the northern part of the Grand Erg Oriental, the mountainous area of the Jebel Tebaga and the rocky area directly south of it.

Research on the MSA was concentrated along the Wadi Lazalim (Fig. 5.4), with the reprise of the excavation of the trenches studied in 2016, the excavation of a new trench on a newly discovered site, and systematic surface collections.

Research on the early Holocene phases was mainly conducted through surveys in the Grand Erg Oriental. The systematic sampling of archaeological material was accompanied by the sampling of materials for palaeoenvironmental and chronological determinations. Activities in the field of funerary archaeology first consisted in the identification of monuments within a transect that included the entire Wadi Lazalim catchment area. Subsequently, the research lied in excavating funerary monuments, chosen according to their physiographic location and architectural typology. The DNA sampling campaign focused exclusively on nomadic herders and was carried out in Douz, in the area of the Jbil National Park and in the area of the Ksar Ghilane oasis.

5. An overview of the main achievements

Our research in Southern Tunisia contributed to increasing the knowledge about Saharan MSA, still fragmentary and clustered in a few areas (Wendorf *et al.* 1993; Cremaschi and di Lernia 1998; Garcea 2001; Clark and Gifford-Gonzalez 2008; Hawkins 2012; Foley *et al.* 2013), by identifying several contexts of the relevant time period in the area of Wadi Lazalim, where deposits containing MSA stone artefacts have been first identified (Ben Nasr *et al.* 2016). The rather fresh and sharp margins suggesting little to medium transport and their inclusion into sediments potentially datable by luminescence techniques made the area a good choice to make intensive research (di Lernia *et al.* 2017). This has been conducted through the excavation of test trenches along the profiles of the wadi and surface collections of artefacts in the surroundings. Stratigraphic distribution and state of preservation of the lithic material suggest that the archaeological content has been eroded and transported from a short distance. Notwithstanding the limits posed by the state of preservation and the nature of the deposits investigated, we believe that the evidence collected represents the first step towards a better understanding of the MSA occupation of this region.

The northern Saharan region in Tunisia offered also a key to understand who were the 'pioneers' that repopulated the desert in the early Holocene. Human occupation of the relevant time period has been so far recognized in the dune area south of Douz (Ben Nasr *et al.* 2016; di Lernia *et al.* 2017). In these surface palimpsests, the archaeological materials are dispersed on the surface and are generally characterized by high density. Surface lithic scatters are very rich, diversified, and apparently include all the products of flaking activities. Armatures, like geometrics and backed bladelets, are very abundant, so are tools like endscrapers and retouched blades. The materials from sites 15/6 and 15/7 were intensively investigated by means of a technotypological analysis in order to obtain quantitative and qualitative data.

Chronology, based on AMS radiocarbon dates on fragments of ostrich eggshell (di Lernia *et al.* 2017), is almost coincident with the beginning of the Holocene, thus supporting the hypothesis of a rapid population event by small bands of hunter-gatherers from northern refuge areas taking place as environmental conditions permitted it (Cancellieri and di Lernia 2014).

As far as the research on the funerary world is concerned, the data record from the Tunisian Sahara is far less rich respect to the northern parts of the country (e.g. Miniaoui 2013). Our research, carried out by desk-based studies and field work, added information to the knowledge already established, e.g. after the systematic field investigation of funerary monuments undertaken in the region of Douz and in the Jeffara by F. Paris and M. Gaki (2010).

Our research first consisted in using geo-referenced 1/100.000 topographic maps to extrapolate points already classed for the presence of monuments. Then, the data has been processed in a GIS environment to test the associations between sites and landforms, as well as to identify major concentrations by means of density analyses. In the field, we have verified the remote data, carried out intensive surveys, and selected a series of monuments, be they isolated or clustered into necropolises, for intensive investigation. This is the case, for example, of site 15/11 (di Lernia *et al.* 2017), which is located on an elevated area some 30 km south of Douz and counting 15 tumuli (Fig. 5.3). The GPS mapping of the necropolis was followed by the acquisition of pictures for 3D photogrammetric models (Lucci *et al*. 2019). Two monuments have then been excavated. Both resulted to be looted, and only small fragments of bones and few elements of grave goods were found.

Finally, we should also underline that our project contributed to the transfer of knowledge and skills sharing, that were achieved by training Tunisian and Italian PhD/MA students in archaeological field research methodology. More specifically, this consisted in improving skills in the elaboration and design of ad-hoc field research interventions; in the fields of GIS elaboration of territorial data, be they gathered by remotely sensed datasets, surveys or excavations; in the investigation and documentation of surface sites or the excavation and sampling of stratified contexts typical of arid environments; in the digital recording and treatment of archaeological contexts, also by photogrammetric techniques and 3D modelling.

6. Some thoughts from our experience

This brief account serves as a pretext for some reflections about the constraints, but also the opportunities, presented by the reprise of international collaborative research within the complex scenarios of some north African countries, especially those that were involved in the 'Arab Spring'.

Security conditions in North Africa severely changed in the last few years, and it has become thus mandatory to approach the fieldwork with a different perspective. One point to consider is, for example, the need for some armed protection: while working side by side with armed guards is routine for many archaeological missions working in different parts of Africa, for others, used to spend entire months in remote corners of the desert without any need for it, this has been an absolute novelty.

As far as the planning and carrying out of field activities is concerned, we have learned that these should be first inspired, more than ever, by criteria of modularity and flexibility, by identifying, for example, several research areas representing an array of possible alternatives within an integrated trans-regional research project, with the aim of quickly reprogramming the intervention areas after circumstantial evaluation of risks and constraints. Tunisia sees the alternation of diversified morpho-sedimentary contexts in a few hundred kilometres. For this, it fully offers the possibility to build research transects across diverse regions and environments, allowing this way to investigate the cultural responses to the environmental changes of the late Quaternary within an integrated regional program.

In close connection with the aforementioned aspects, flexibility is thus expected also from the institutions of the countries where research is conducted, in particular, those in charge of managing international cooperation contracts and issuing research permits. Very understandably, the will of foreign missions to work on several areas risks to be perceived as a means to expand as much as possible 'their own' territories of pertinence. Nevertheless, a shift is required. It is sufficient to imagine, for example, the not remote possibility of a fund assigned for researches in a certain area where suddenly it is no longer possible to work, for whatever reason. If the parties involved – including funding bodies – have previewed the possibility of shifting research target, in the frame of an integrated and organic research project, then a readjustment, for everyone sake, is likely feasible. Otherwise, the risk of getting to a long stalemate is continuously around the corner. We could certainly stress that in a dynamic socio-political situation like that of post-revolutionary Tunisia, the frequent change of institutional managers and local administrators make the process of building and maintaining durable relationships and a shared research path somewhat complicated, but this is certainly a matter of time.

Fluctuating security conditions make the organization of field missions too early on the start date rather difficult, which has profound repercussions on several aspects. One of these is related to budgetary constraints and the time allocated to expend research funds, for which funding bodies could preview measures to counter some unpredictability of using funds by that date in that specific place, an example by adopting 'budget freezing' measures or allowing the changing of research target from one site (or region) to another, or even allowing the changing of the research target from an excavation to the study of a museum collection. Thus, when supporting research in 'difficult' regions, funding agencies should be aware of the degree of risk and are hopefully expected to adopt flexible measures to manage expenditures reports. While this is not always possible, it is observed that a degree of flexibility is generally granted by private funding agencies because of less tight administrative and bureaucratic constraints, when compared to public institutions.

In any case, actual feasibility of doing fieldwork certainly still represents a privileged prerequisite for researches to be funded. Demonstrating to have the possibility in hand to reprogram and redefine the areas of intervention – or at least being able to provide one 'plan B' as risk mitigation measure – is a reassuring element, often mandatory, for most funding agencies.

In recent years, also for security reasons, the time allotted to field missions has been much reduced. Moreover, it is not always possible to involve many people in field activities. While it is always preferable to perform as much as possible numerous and diver-

sified activities within the time and space of the same field mission, it could happen that work packages must be unpacked into smaller – modular – ones to be performed at different times and in different places. This is an option that has in some cases to be taken into consideration, even if relocating and postponing activities (e.g. analysis of materials), or splitting field research itself into autonomous segments to be done at different times (e.g. survey, excavation, sampling) means that some fixed expenses (like travel) are going to double or triple.

As regards field missions themselves, these are expensive, and to some extent risky. It is thus necessary to postpone and relocate all the activities that need not necessarily be done on the field and it is mandatory to design fieldwork programs focussed on the investigation of well preserved, possibly multi-evidence contexts. Remote techniques and desktop studies can help focusing and circumscribing the research areas to be investigated by fieldwork. In the field, it should be adopted an expeditious approach to research activity. Photogrammetric techniques of survey and documentation, and other means of fast data acquisition achievable with digital tools, allow postponing complex and time demanding necessary operations to subsequent desktop phases.

7. Concluding remarks

This brief and not exhaustive account of our 2014-2017 research experience, and the thoughts unevenly presented here raise some points that can be relevant for the design of new research projects, or the prosecution of already started ones, and have mostly to do with flexibility, viewed as the possibility of diversification of research activities in space and time. A certain degree of flexibility is certainly and primary required from archaeological missions, which are asked to be plastic enough to change programs in due course or even cancel them. But it should also be expected from funding bodies and public institutions.

We then would like to reaffirm the urgency of informing local communities of the aims of the researches that are being conducted within their territories and involving them in cultural initiatives. As a matter of fact, the area we investigated is a renowned tourist location which was largely visited by people also attracted by its environmental and cultural heritage. The numerous local museums of the region are exemplary of the attention that the communities deserve to the traditional heritage, which should be taken into consideration when designing collaborative programs in heritage investigation, preservation and valorisation. When desert tourism will get to a hopefully soon and full reprise, the local economy could surely benefit also from the progress and activities made by research on cultural heritage, archaeology and environment.

We would like to conclude by recalling that the project passed through difficult times, and the efforts spent in keeping the research alive required strong will and patience. Nevertheless, the relevance of the project and the will to pursue the proposed aims made it so that the engagements by all parties involved were honoured, and the objectives overall attained.

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6. Coastal archaeology of East Cyrenaica between sea and land

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Abstract. Over the years from 2008 to 2013 the archaeological mission "Ancient ports of Cyrenaica" has documented several archaeological sites on the coast of Cyrenaica. A brief description is given in the present work. This documentation is essential because some sites such as Hanyeh are environmentally degrading due to deep erosion. In other sites they are in danger because they are going to be destroyed by new buildings, or because the ancient remains are used in new buildings.
Key Words. Cyrenaica; coast; shipwreck.

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1. Introduction

Over the years, the sites identified along the coast have been studied (Tusa 2010, 2012) and they are summarized by the following descriptions (Fig. 6.1). The sites have been grouped into cities, villages, settlements, necropolises and wrecks. Cities are sites where many remains of buildings are visible, in the villages the remains of buildings are marginal, in the settlements only remains of artefacts are visible.

1.1 Cities

Ougla

The site of Ougla, a settlement of considerable size judging from the structural remains emerging from the sand and existing in the sea and on the nearby islets, is located in the coastal area of Hamama. Located on the beach is the corner of a thick and imposing masonry structure (probably a tower) with a functionally oblique base likely due to its being impacted by strong wave action. In the vicinity there are two circular basins lined with *opus signinum* likely used for processing fish for the production of garum or similar products. An analysis of the materials found on the surface shows that the site was occupied between the 3rd and 4th centuries A.D. This site is provisionally identified as Semeros in the Antonine Itinerary (Purcaro Pagano 1976: 295, 327).
Of the three islets just off the beach, the centre and the easternmost exhibit traces of quarries contemporaneous with the settlement. An abundance of amphora fragments and squared blocks of various dimensions are found in the area between the central islet and the mainland shore. It would seem that the middle, and probably the eastern, islet that were once attached to one another and were connected to the mainland by a natural causeway, underwent significant erosion. A wall was erected on this central islet either at the same time as, or after, the sea level rose and/or the land subsided.
However, the westernmost islet, which is about 700 m from its central neighbour, appears completely modified by excavations in the rock. These cuts are of various types, dimensions, and what seem to be different purposes. This islet, probably once connected to the mainland, was used for fish farming, for processing fishing catches, and for quarrying building stones. The fishing catches were processed in several rectangular basins lined with *opus signinum* and reverse funnel wells. Large rectangular basins are located on the shorelines nearest the sea were probably used

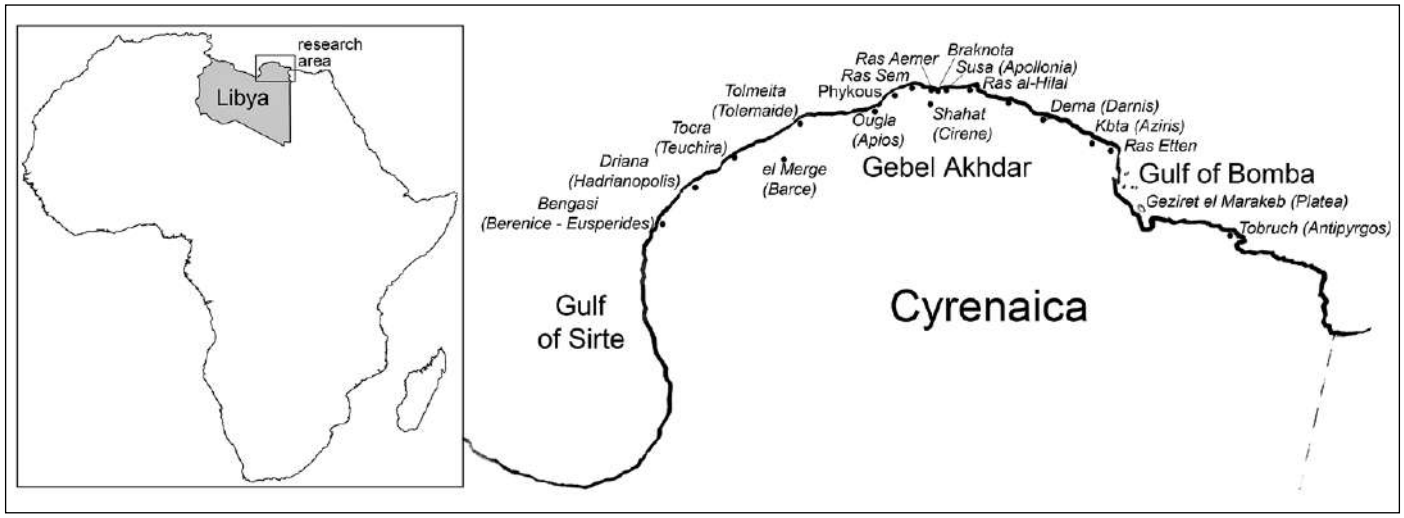

Fig. 6.1 – Map of Cyrenaica with some sites identified (Elaboration by C.A. Buccellato).

for fish farming. Small channels and holes present suggest such a function as do their dimensions and morphology. Near the westernmost basins on the shore facing the mainland, there is an artificial grotto separated into two parts and equipped with *opus signinum*-lined silos used for storing foodstuffs and liquids, and providing for shelter. Cut cavities in the rock throughout the islet indicate extraction of stone blocks with dimensions of 0.60×0.30×0.30 m. Significantly, there is a large space partially covered by the collapse of its structures at the centre of the islet, which has become concreted due to the carbonating action of seawater. Bricks, stones, and abundant mortar are found in this concreted deposit. On the eastern side of the islet, besides the usual basins, there are two spaces carved into the rock, which can be accessed by means of doors with, in one case, a lateral niche. A large, nearly rectangular basin is located on the northern side of the islet, running along almost its entire length (approx. 80 m). It was certainly produced by quarrying, but subsequently could have been used as a fishpond. Exploration of the seabed around the western islet to a depth of approx. 7 m yielded no appreciable archaeological results.

Wadi Trebbi

This site is located approx. 2.9 km south-east from the coast on the left side of Wadi Trebi. Situated on an elevated position enclosed by a partially preserved boundary wall, this locale is surrounded by land with flourishing vegetation. Various millstones and oil presses are present, while many of the rectangular structures' doorjambs are still preserved in position. One structure with staircases and a corridor covered by a collapse could be identified as a chamber tomb. A cistern that has been used in recent times, covered by a modern metal hatch, has an arcosolium; therefore, it also could be a chamber tomb. On the other side of the wadi, there are two blocks sunk into the ground that appear to be jambs, indicating a probable larger extension of the settlement. Various types of Roman pottery are present on the surface, which include decorated African *terra sigillata* (ARS). This site is identified as the site of Nausida mentioned in the Stadiasmus.

Hanyeh

Located on the eastern side of the Bay of Hanyeh is a vast settlement with stratigraphy that can be read easily from the long, eroded wall nearest the coast (Fig. 6.2). From this section it can be seen that the earliest phase with various types of black glazed and black figure pottery fragments present dates to the archaic period. Many rooms with ashlar and well-plastered walls that are preserved to substantial heights are attributed to this period. Above this phase lies those of the Roman period that include engraved comb pattern pottery and the frequent presence of various types of marble from different origins. This site is provisionally identified as the ancient Apios (Jones and Little 1971) mentioned in the Periplus of Pseudo-Scylax (Purcaro Pagano 1976: 295, 327).
It is probable that the Bay of Hanyeh's morphology was considerably different when the city was inhabited. The middle islet must have been connected to the western rocky point thus forming

Fig. 6.2 – Hanyeh, section of the remain of the structures (Photo by C.A. Buccellato).

an almost closed harbour that was open to the sea on the east side; this entry would have been protected by the bay's eastern point. The protected area must have been particularly well suited and functional for landing and sheltering vessels up to those of large sizes. Moreover, it is probable that there were small docks on the side of the islet and in front of the current beach based on the presence of a large number of squared blocks haphazardly spread over the seabed. It is also possible that the piles of stones on the southern side of the islet are the remains of ship ballast.

On the vast rocky esplanade that forms the eastern edge of the gulf, and partially closes it, there are the remains of a large quadrangular structure that likely functioned to control the area and possibly featured a lighthouse. Here as well were a considerable number of cuts resulting from the removal of blocks of various sizes. To the west of the quadrangular structure are numerous five-lobed cisterns with walls lined with *opus signinum* on a mortar bed. Also to the west of this structure, at the sea's edge, is a small bath structure carved into the rock that is comprised of a rectangular pool parallel to the coast from which could be accessed three internal quadrangular spaces separated by stone partitions.

At the centre of the gulf, near the beach, there is a reef where it is possible to identify nine circular funnel-shaped cavities carved into the rock and lined with *opus signinum*. These could be water cisterns bearing in mind that the sea level has risen almost 1 m from the Roman period to the present. Further out, on the seabed near the southern shore of the islet that closes the gulf, almost in the centre, are found a considerable number of squared blocks, millstones, and the drum of a column about 1 m in length and with a diameter of ca. 0.50 m.

The rocky esplanade at the edge of the water on the western side of the bay appears to be crossed by a channel carved into the rock that is approx. 50 m long and 3-4 m wide. Laying ca. 30 m to the north is another similar channel parallel to the previous one. These channels were excavated to prevent the silting up of the bay, which provides excellent shelter even under adverse sea conditions due to the width of its entry and the protection from the two rocky sides to the east and west. Outside, on the prom-

ontory to the west of the Gulf of Hanyeh, are four presumably Late Roman tombs.

Phykous

The site of Phykous is located on the northernmost coast of Cyrenaica, below Al-Beida, about 35 km from Cyrene in the Hamama area to the west of Apollonia (Muller 1891: 447; Stucchi 1975: 577-579). This site was identified decades ago as a port in connection with Cyrene yet has never been carefully investigated. It has been identified with the same place name over time due to being mentioned in primary sources, particularly in the Periplus of Pseudo-Scylax (Purcaro Pagano 1976: 295, 297, 300, 301, 344), the *Stadiasmus*, by Strabo, Pliny, and Ptolemy. An analytical and systematic investigation of the site was conducted not only through on foot survey, but also employing laser scanning in order to thoroughly highlight its topography. Given the surface details and the outcropping of remains of walls throughout the site, this last operation allowed us to produce a preliminary overview of the port settlement's town planning.

Some of the most significant structures were identified at the eastern end of the site at the coast, which were probably a lighthouse or port service structure. A large rectangular building (probably of a military nature) was also identified in the southern sector, and a concavity in the northernmost zone may indicate the presence of a small theatre or a bouleuterion. In addition to the numerous traces of quarrying in the northernmost sector, on the reef, there are the remains of a stone structure in a grotto that was probably used as a church. Also located here was another stone structure used as a synagogue based on the presence of an engraved seven-branched candelabrum. Underwater archaeological exploration identified a structure located at a depth of approx. 4-6 m, which can be interpreted as the base of a mole that must have been located near the small promontory on which was constructed the building interpreted as a lighthouse or port tower and extended eastward into the sea. This mole is estimated to have been about 150 m long.

A survey of the heights opposite the site clearly revealed a considerable number of monumental chamber tombs carved into the rock, at times with additional chambers along the dromos and niches. In the same hills there are numerous locations where stone was quarried, and at the highest points are the remains of imposing structures for monitoring the area. These structures are spread out over the heights to the east and west of the Bay of Phykous.

An analysis of pottery finds and masonry structures suggests that the port of Phykous was founded around the 4th century BC judging from the Attic and Campana black glazed pottery fragments found in the easternmost area of the site. However, it was frequented most intensely between the 3rd and 4th centuries AD. The relevant materials used for dating included a bronze coin from the time of Constantine.

Ras Aàmer

Around 5 km west of Braknota, on the left side of a wadi that ends near a small stony beach, is a vast settlement that we have named Ras Aàmer after the holy man buried in the adjacent marabout. This vast settlement extends over a large esplanade that descends gently toward the sea. It is possible to estimate the size of the settlement at about 6 hectares; this estimate is based on the presence of large piles of rubble resulting from the collapse of stone structures, the visible fragments of walls with double lateral walls, and the widely dispersed and abundant pottery fragments. The settlement's building structures are also present at the bed on the edge of the wadi. Presumably there are structures on the entire slope judging by the presence of wall remains. Pottery finds included sherds with horizontal and wavy engraved comb pattern decorations, and Bucchero-like grey and black glazed pottery.

Striking is a large structure located at the settlement's northern end, which extends inland for more than 800 m towards the south; it is here the structure emerges at the edge of the sea at a point where the steep coastal cliff begins. This large structure that overlooks the sea has a perfectly square perimeter, each side measuring 30.5 m, comprised of blocks measuring 0.8×0.45×0.27-1.1×0.5 m. Its 0.5 m wide walls are perfectly oriented north-south and east-west. The southernmost portion of the structure's base consists of an oblique foundation with a convex profile constructed of small stones; this portion seems to be a later addition. However, this hypothesis is in conflict with the structure's unitary nature. In the portion facing the sea its structure is more regular and no oblique base is present. The structure's interior layout is now indefinable due to the numerous collapses.

The presence of a structure to the northeast of the large square structure is also interesting. It is a large quadrangular basin carved into the rock at sea level, on the steep cliff that descends toward the sea, which can be interpreted as a fishpond. This basin is connected by means of a short, narrow corridor to an area deeply excavated into the cliff until reaching sea level. This space is divided into two parts, internal and external. It is likely that the external fishpond was connected to the internal space by means of the corridor, which could be closed if necessary, in connection

with the fish farming requirements. The external basin could be accessed from the cliff by means of a narrow staircase carved into the rock. A short distance away, to the north of the northern face of the large square structure, there is a hypogeal structure, cut into the rock, composed by multiple quadrangular connected chambers with two external entrances.

Kbta 1

At the end of the terrace overlooking the western entry (to the left when entering) of Wadi Chelba/Calig, are the remains of a fortified settlement dating from the archaic period to the Roman period (1st century AD); the latter occupation based on the presence of various finds attributable to that period. The settlement, which covers an area of about one hectare and a half, has an almost quadrangular boundary and is located on the strip of terrace near the cliff that connects it to the reef below toward the north and the left mouth of the fjord toward the east. The settlement area was fortified by a wall of squared blocks about 2 m in thickness; these blocks were observed emerging from the collapse at its highest part and in particular along the wall facing south. At apparently irregular intervals are attached and protruding circular semi-towers on the outer face of the boundary wall, with their supporting bases to this wall probably being at least 6 m in width.

The existence of this site is almost assuredly attributable to the Greek presence along these coasts in that period. An identification of this location may be the Aziris mentioned by Herodotus as the place where Batto, the oikistes of Cyrene, who spent a full six years between his previous stay of two years on the island of Plataea (Geziret el Marakeb) and the founding of his city in 631 BC. Additionally, the settlement corresponds to the sites mentioned as Azaris / Aziris in the Stadiasmus, and as Azilis / Azikis by Ptolemy (Purcaro Pagano 1976: 294, 296, 301, 330). It is well known that the Greek presence in Cyrenaica can be traced back to about half a century before the date on which Cyrene was founded (631 BC). Such an identification based on the historical sources is in broad agreement with what can be noted in the diagnostic material collected, which included proto-Corinthian, Rhodian, Cretan, and black glazed Attic pottery fragments. Another surface find was a bronze coin with a bearded head with thick hair from the Ptolemaic period. These finds clearly demonstrate the site was frequented beginning at least from the beginning of the 7th century BC.

This site is located in the easternmost zone of the area between the western side of the Gulf of Bomba and the gulf itself. The choice of these lands and the final decision to found a city like Cyrene in this region can be understood, as Stucchi pointed out (1984), in the context of the crisis of the connecting route between the Mediterranean Sea, Sudan, and the Red Sea through the Nile Valley in the 7th century BC as a result of the Assyrian invasions of Egypt. The area between Cyrene and the Gulf of Bomba became the arrival and departure base for the caravan routes toward the south, to the west of the Nile (Stucchi 1984; Stucchi 1989: 73-74; Bacchielli 1979; White 1990; White 1994,). However, it is possible that the site was occupied also before the Greek arrival (Boardman 1966; Goodchild 1976). In fact, some pottery fragments were collected with surfaces of various colours (from grey to red and black) that cannot be matched with any known production and that could compare with the pottery generally dated between 2500 and 500 BC by McBurney: these were identified by him in levels IV and III of Haua Fteah (McBurney 1967: 310-312). This is the same pottery identified also in Cyrene in the area of the pre-Greek settlement to the west of the agora (Baldassarre 1987; Tinè 1987).

Ras Etteen 1

Ras Etteen is the westernmost point of the large Gulf of Bomba (Fig. 6.3). Two lines of reefs extend from its cape location towards the sea; they are the remains of a rocky protuberance that in the past must have comprised the natural protection of the bay where this ancient settlement stood. The terrestrial remains of the settlement are spread over a range that runs inland from the coast for more than 100 m, and in some areas extend onto the low hills further inland. Settlement traces consist of poorly preserved masonry remains that seem to have been uniformly razed to such a degree as to suggest their destruction due to tsunamis that followed the significant earthquakes in Cyrenaica during the Late Antique period (the pottery collected does not extend that period). A majority of the emerging structures are quadrangular, but there are also a few small circles of stones. Most striking is the widespread presence of crushed murex shells over the entire area of the settlement. Near these heaps of crushed murex shells, along the coast, structural remains of considerable size emerge from the sea that can be interpreted as likely port structures.

In the southern central area of the bay, on a mound with an oval perimeter emerging from the seabed to a depth ca. 2 m, are the remains of a large building consisting of quadrangular rooms. In the southernmost part of the emerging structure are walls constructed with quadrangular bricks (24×24×5 cm) bearing engraved diagonals, almost protruding, and finely plastered lateral

Fig. 6.3 – Ras Etteen, partially submerged structures inserire prima del punto (Photo by C.A. Buccellato)

walls. Near this structure a phallus from a life-size bronze statue came to light. The rest of the building consists of small quadrangular rooms delimited by stonewalls. Near the emerging brick structure are the remains of a series of quadrangular basins lined with *opus signinum*, at times applied in a double layer, which were most likely used for decanting murex in order to extract the Tyrian purple dye. One of these basins was partially excavated and revealed that it was filled with a considerable amount of crushed murex shells.

On a small height located towards the west are the remains of a large building; its carefully-constructed long, rectilinear walls run northeast-southwest and were approx. 0.4-0.5 m thick. There are at least seven parallel walls that sometimes are connected by orthogonal partitions, while in other instances are open. A Doric capital was identified not far from this structure. It is thought that these long, rectilinear buildings could be granaries.

The necropolis for the settlement is partially submerged and partially on the western coast of the bay, near the point. The tombs are hewn in the rock as a rectangular trench or rectangular stone cist comprised of oblique slabs, oriented between 300° and 330°. A stone cist tomb with the skeletal remains of the interred individual was identified at a depth of 1 m. A trench tomb (length 1.83 m, width 0.43 m, depth 0.85-0.88 m) was excavated on the shoreline; inside were a vessel in the shape of a dove on a pedestal, a small achromous olpe, several glass unguentaria, and a small paste amulet depicting a draped adult male deity.

In conclusion, this is a large settlement from the Roman period, previously noted by Stucchi for its structures sinking into the sea (Stucchi 1975: 507, *nota* 5), which can be identified as the Chersonesoi Achilides mentioned in the Periplus of Pseudo-Scylax, as the site of Dionysos mentioned in the Stadiasmus (Purcaro Pagano 1976: 295, 297), as Cherronesos by Strabo and Pliny, and as Chersonesos grande by Ptolemy (Purcaro Pagano 1967: 300 – 301, 333 – 334).

1.2 Villages and encampments

Mn. el Mesceub

A few kilometres along the coast to the east of Ougla, near Wadi Saran, are three small sand mounds with a high concentration of pottery fragments on their surface. Clearly visible walls of blocks

joined with mortar were found on the easternmost mound; these formed a structure with three arches, two of which are parallel at a distance of ca. 4 m from one another. Its internal structure is quadrangular with sides of ca. 13 m in length. A wall surrounds the entire structure. Situated at the base of this structure are three lush date palms that indicate the presence of abundant water in this location. Proceeding east a short distance just before arriving at the sea, 5 tombs were found cut into the rock face. Continuing east, a cistern was discovered carved into the rock at location about 200 m from the coast.

Wadi Saran

A complex with a surface area of ca. 1250 sq. meters was encountered on a rocky promontory that extends a few meters above the sea and the sandy coast behind it. This site was separated from the rest of the territory by a deep, 4-m wide trench excavated into the rock, which probably ran across the promontory from shore to shore protecting the structure. Its connection to the western coast is clearly observable; however, on the eastern coast it is difficult to discern as it is completely covered by sand.
It is not possible to determine a layout plan for the settlement. Surface finds, particularly on the slopes, consist primarily of amphorae sherds that exhibit a corrugated surface, narrow necks, and indistinct flared rims. Other ceramic fragments present were of containers whose surface is covered by deep parallel grooves. Visible on the walls steep surface are two forms of masonry. Some are built of square blocks arranged in rows that are not perfectly joined, while others are of square blocks more precisely arranged. An aerial image reveals one rectangular structure to be internally partitioned into three parts; two rectangular sections at the ends of the short sides, with a space left at the centre. This central section was probably open to the sky and formed a sort of courtyard. This is a layout that is found repeated in many coastal sites, such as at Phykous and Ras Aàmer. These structures were probably fortresses positioned at the border of the empire in the Late Roman period. Going further southeast the following are present within few meters from each other: a quarry, the foundation of a circular structure, two chamber tombs, and the remains of a tower. Various remnants in connection with the cutting of blocks are present in the quarry. The entrance of the circular structure with a double lateral wall faces northwest, as do the entrances of the two hypogeal structures located below ground level. There is a section of the tower's wall and one of its orthostates that are still standing. This site can probably be identified as Nausida mentioned in the *Stadiasmus Maris Magni*.

Ras el Fanara

This site is located between Phykous to the west and Ras Aàmer to the east, near a lighthouse that is ca. 3-4 km west of Ras Aàmer. In front of the lighthouse, over an area that extends for about 500 m, the surface is strewn with pottery fragments from various periods ranging from the Hellenistic period to the Late Roman period. The area containing pottery fragments extends to the sea and includes the land on which the lighthouse stands. No structures are visible on the surface with the exception of crude, irregular, and shapeless lines of stones that enclose large surface areas with an irregular perimeter that could be recent enclosures erected by shepherds. Around 700 m westward along the coast, there is a sizable quarry where the signs of extraction are visible but extremely eroded. Smaller blocks must have been produced here. On the southern wall of the quarry is a quadrangular chamber tomb with a flat roof and a rectangular moulded entry portal. The housing for this tomb's marker was located on the paved surface above the entrance. In the space behind the tomb, inside an annex to the quarry, on the southwest wall, there are two other similar tombs almost completely filled with earth. In the section between the lighthouse and the quarry flint tools were found that are generally attributable to the Palaeolithic due to the absence of typologically diagnostic characters.

Braknota 2

A couple of kilometres west of Braknota 1, on a slightly raised height near the sea, are the remains of a structure of considerable size comprised of ashlar blocks of dimensions identical to those of the production structure of Braknota 1. The structure would seem to have a rectangular perimeter with internal partitions that are not identifiable due to the collapses and sandy sediment covering them. At the top, inside the structure, there are two adjacent wells with a diameter of ca. 1 m built in a very uniform manner with dry stones shaped and carefully laid in place. Roman period pottery fragments observed include several black glazed pottery sherds and pottery sherds engraved with linear or wavy comb patterns as decoration.
At short distance of about 200 m to the west can be noted the sporadic presence of stone tools attributable to the Lower/Middle Palaeolithic. In the same area there is a trench tomb carefully excavated in the rock with an underlying perimeter portion parallel to the edge for housing the cover slab(s). It is oriented in an east-west direction and measures 1.86×0.5 m. The internal walls are wider near the bottom. Also to the west of the structure is the quarry from which were extracted the blocks for construction.

Fig. 6.4 – Braknota 1, structure for oil production (Photo by S. Tusa).

Braknota 1

Situated a few hundred meters northeast of two picturesque ponds located in equally beautiful sinkholes, is a small promontory overlooking the sea where the remains of an oil production workshop was found (Fig. 6.4). On the highest and furthest part of the promontory are the remains of a rectangular structure, 14.6×16.0 m, comprised of well-shaped blocks typically 1.1-1.2×0.55×0.27 m in size. Its long side is parallel to the sea oriented in an east-west direction. To the northeast of this structure is an 9.4×6 m area carved into the rock to a depth of approx. 0.50 m where there is a large press stone and circular millstones with diameters varying between 1.30 and 0.80 m.

To the north of this area there are a number of basins of various dimensions that must have been used for decanting the product after pressing and before storage. In particular, to the north of the structure, there is a pseudo-quadrangular space cut into the rock with a curvilinear-shaped side. This space measures 4.6×4.4 m. Within this space there is the large press block with two holes, extracted from the adjacent quarry (2.1×0.8×0.6 m). A large adjacent rectangular space was used as a storage area to contain large dolia constructed on site to hold the product. There were 23 symmetrically placed *dolia*. A pillar was left in the centre during cutting for use in supporting the roof. A large, high step was left on the south-eastern corner, which allowed access to the semi-hypogeal space where the *dolia* for the oil were stored.

Directly west of the promontory, a few hundred meters from the oil production workshop, are traces of two quarry areas, from which were extracted the blocks for the structure on the promontory's construction; the basis for this conclusion were the similar dimensions of the cuts and the blocks used. On the hill's southern slope, ca. 50 m away, is an area with small flint tool finds. They consist of points, scrapers, end-scrapers, burins, and a considerable number of cores that could be attributed to the Upper Palaeolithic. Of particular note was a discoid scraper, which can be attributed to the Aterian type.

Located ca. 500 m south of the promontory is a large area characterized by the presence of a many blocks of virtually homogenous dimensions, 1.4×0.7×0.4 m, typical in sites along this coast.

It was evident that some were displaced in recent times. Original lines of blocks emerge just above ground level. In the same area there is a considerable abundance of pottery fragments belonging to the Roman period that are almost completely from tableware and kitchenware together with a few black glazed pottery sherds. The presence of abundant pottery would indicate that this area, unlike the area of the oil production workshop where pottery is virtually absent, was a habitation area for those working here.

A short distance away there are traces of a stone channel with a width of 0.4 m and with uniform edges of 0.1 m in thickness. It is probable that this conduit relates to the well found in the vicinity. A *noria* must have raised the water into a channel. It is probable that it was used not only for residential purposes, but also for production purposes on the promontory as water was indispensable for the oil production process. In the same area is the above-mentioned oval well dug out of the rock, whose walls were made uniform by means of isodomic blocks on the upper part. This well collects the water from an underground spring that drained and flowed through a large cave on the northern side. Today the well is dry, probably due in part to the earthquakes that the area must have experienced, especially in the 5th century A.D.

Site on height 34628795; 3637767

A large Roman-period structure occupies an area of approx. 300 m^2 in the coastal area between Cherso and Wadi Latrun, toward Wadi Latrun. The site is about 500 m from the high antenna visible at a great distance placed just a few meters away from the main coastal road. This structure is characterized by many quadrangular and circular spaces, with walls noted protruding from the ground. Of particular interest was a rectangular structure carved into the rock in which traces of a lining of *opus signinum* are still visible. Also of note here is the presence of a hypogeum cut into the rock, with two rows of rectangular niches in its back wall; hence, this could be a *columbarium*. Several fragments of poor-quality impasto pottery and a few fragments of very light *terra sigillata* pottery were collected.

Sciaaba

On the rocky plateau along the eastern side of the large fjord Wadi Chalig, ca. 2 km from the coast, are the traces of several poorly preserved stone structures. The surrounding area features low garrigue scrub. At least 8 quadrangular structures were identified; their walls are typically comprised of medium-sized stones often placed obliquely in a double lateral wall. The most conspicuous unit consists of two almost identical structures with a rectangular floor plan placed parallel to each other and as a mirror image with respect to a space that is approx. 80 m wide. Internally these structures seem to be partitioned into quadrangular spaces that are a mirror image with respect to a central corridor that is ca. 1 m wide. On the basis of the pottery fragments scattered on the ground, these structures can be dated to around the 2nd-3rd century AD, and therefore may be identified as a Roman military encampment.

To the north of these two structures is a smaller building with a rectangular floor plan, and to the east is another similar building also rectangular, but longer. To the south of the structures is another quadrangular building internally partitioned into several rooms, and to the southwest is a large quadrangular enclosure apparently lacking internal partitions. It is interesting to note between the latter large structures the presence of a small oval structure open to the south that is regular in shape with an axis ca. 10 m long. This latter structure appears to have small quadrangular basins inside it, the sides of which are approx. 1.5 m, and are carefully lined with multiple layers of *opus signinum*.

Zaid 1

Near the tip of promontory that closes the Gulf of Bomba to the north, in a town called Zaid, is a large area of ca. 1 ha over which were found scattered pottery fragments. This area, where the narrow strip of land widens right before reaching the point, is characterized by a large concentration of rubble, which is probably from the destruction of the pre-existing structures. In particular there is a circular stone structure with a diameter of ca. 5 m. The area appears to have a considerable number of holes that are probably due to excavations in the past. In the context of the settlement one of the major activities must have been the production of Tyrian purple. Large portions of the site's surface are covered by abundant remains of crushed murex shells. This site is identified as Phaia in the Stadiasmus Maris Magni, while Ptolemy identified it as the port of Phtia.

Mesrata Island

This island's perimeter is virtually rectangular. Along the edge of the island runs a string of sand dunes that are slightly raised above the rest of the surface. On the northern side the coastal dunes have sections that reveal a fair amount of Roman Imperial period pottery fragments and numerous fragments of well-made *opus signinum* walls. Pottery fragments dating from the

same period appear over the entire surface of the island, especially on the western side. Taking into account the short distance between this island and the mainland, it can be identified as the island Aedonia mentioned in the Periplus of Pseudo-Scylax, and subsequently as Sidonia in the Stadiasmus Maris Magni.

El Maracheb Island

The site has already been studied (Bates 1914). The survey of Maracheb Island revealed numerous structures (Fig. 6.5). The area of greatest structure concentration appeared to be at the centre of the island and towards the northern portion of the island near the shoreline. No structures were found on the southern part of the island, nor around its eastern or western coasts. Structural remains are comprised of crude dry stonewalls varying from circular to oval, rectangular, and square; together they form an irregular perimeter. The several compact circular structures have a typical diameter of approx. 3 m, and several large rectangular structures measure between 15-20 m in length and 8-10 m width. Several of these structures have internal partitions as well as small annexes that extend outward from them. The group of structures are positioned with differing orientations, varying distances from one another, and without a discernible plan. The impression one has is that these structures belong to an encampment of tents, each of which was positioned within a crudely-built perimeter wall.

Located amid the structures at the centre of the island where two important elements of the complex. The most significant one is a small, circular mound with a diameter of ca. 13 m, that has a perimeter rising about 1 m above the surrounding plateau. We referred to it as a 'podium' because it could have accommodated an altar, an aedicule, or a temple structure. Around it on the surface were several architectural elements from its cornice; these had an elaborate moulded decoration having parallel ribs. Of particular significance was a long fragment of architrave with cornice featuring various ribs with curved and squared cross-section and notches placed above. Other architectural elements were also present that are possible remains of jambs for a small aedicula or altar. Each of these architectural elements were carved from red granite, and one block had an inscription in what appears to be Greek characters (Howard Carter 1963).

Nearby there is a long rectangular enclosure with rounded corners that is ca. 60 m in length and 16 m in width. The northern side of the structure possesses a sort of circular apse separated from the rest of the structure by a stone partition. Two cavities cut into the rock were also located near this area with the greatest concentration of structures, one of which has a regular rectangular perimeter; they are almost certainly cisterns.

Although survey did not detect structures on the southern part of the island, inspection revealed an area with widely dispersed Late Roman period pottery and a conspicuous presence of crushed murex shells here. This area is near a large marshy zone occupying the southernmost part of the island. It is likely that structures built from unfired clay and/or other perishable materials must have been present in this area, of which remain only small mounds of earth slightly raised above the surrounding landscape. This island can be identified as Plateia, the first landing of the Greek colonists from Thera when, following the response of the Pythia, they landed on the Libyan coasts.

Marshalech

Masonry structures were located in the coastal area of Marshalech on an elevated rock formation. This rock formation was apparently cut to create a circular base on which to place an indefinable structure. There are lines indicating what must have been walls on the north and east sides. The structure appears to be oriented in a north-south/east-west direction. Undeterminable ceramic fragments were found that include one from an amphora with a corrugated surface and one from a vessel with a grooved surface dating to the Late Roman period. Near the small oasis further to the east (ca. 1 km) we identified Roman pottery fragments with a smoothed grey surface along with a well-built stone well having a diameter of 0.6 m.

1.3 Settlements

Wadi Siret Trebbi

A survey conducted on the rocky limestone outcrops overlooking the beach and the site of Ougla had meagre finds. At the top of both sides of Wadi Siret Trebbi are two areas of which the one to the east is completely devoid of pottery but contains abundant stone tools (prismatic cores, retouched chips, end-scrapers, etc. made of flint and quartzite) that can be approximately classified to the Upper Paleolithic. The plateau located between Wadi Sirt Trebbi and Wadi Aled Butreit is distinguished by the smaller presence of stone tools in comparison with the previous plateau, although still abundant and can be classifiable as the same type.

Palaeolithic site A 34577280-3641376 (Apollonia – Hamama Road)

A large survey was conducted from west to east beginning from a marker at km 24 on the littoral road to the east of Apollonia and along the road; in effect the traverse progressed towards Apollonia for ca. 5 km. At one point the ground opens up to an

Fig. 6.5 – El Maracheb Island, circular structure (Photo by C.A. Buccellato).

esplanade approx. 500 m wide that runs from the coastline to the slopes of the plateau. A grotto is located on the steep wall of this plateau, almost below its edge. Survey inside the grotto did not turn up any archaeological finds.

Further east, bordering the road, is an area of ca. 250 m by 50 m that contains a concentration of stone tools characterized by large- and medium-sized implements of the Levalloisian-Mousterian tradition, presumably belonging to the Middle Palaeolithic dated to between 60,000 and 40,000 BP (levels XXXV-XXVI of Haua Fteah: McBurney 1967). Single-side retouching points, discoid end-scrapers, and double-sided scrapers most commonly occur in the finds. There is a considerable number of double-sided tools that can be interpreted as scrapers and end-scrapers present at Haua Fteah; these are defined by McBurney as "*discoid cores*."

Palaeolithic site B 34623252; 3638240

A clayey plateau that extends on the coast for about 3 km contains an extremely high concentration of flint and quartzite tools. Of particular significance is the large tool preparation area with an abundant presence of cores, scrapers, end-scrapers, denticulates, notches, and double-sided retouching tools attributable to the Middle Palaeolithic. The area's surface is intersected by a wadi that forced the survey to end upon reaching it. A tomb carved into the rock with an adjoining trench was also found here.

Roman quarry 34 626315; 3637762

Going west from Cherso along the coast, a large quarry excavated in the sandstone having a rectangular shape with sides measuring ca. 14×9 m was identified on a small peninsula; this quarry supplied large blocks.

Palaeolithic site C 34628489; 3637714

An area with the presence of flint and black flint t probably used as a workshop was found near a site with trace finds indicating that it was frequented in the Roman period. The 'workshop' had a high concentration of flint chips and cores, which can be attributed to the Upper Palaeolithic.

Cherso 2

The survey zone is dominated by rocky outcrops and plateaus completely covered with small rocks. These plateaus gently descend toward the sea, almost becoming flat, and end with low cliffs alternating with small pebble beaches in confined bays. Undoubtedly, flint was present at the site based on the considerable presence of flint-nodule inclusions in the limestone. This would explain the significant abundance and concentration of stone tools, chips, and cores over this vast zone, which can be classified in the Acheulean tradition of the Lower Palaeolithic. Additionally, tools are present that have Levalloisian-Mousterian characteristics and can be classified in the Middle Palaeolithic. One particularly high concentration of tools, cores, and chips within this large area suggests that this sector was functionally used as a workshop (34631222 E – 3636729 N, elevation 2 m above sea level).

Palaeolithic site D 34689830; 3614111

Stone tools were found scattered on the eastern side of a deep valley, including backed tools.

Palaeolithic site E 34690620; 3613979

A large area over which is scattered small flint tools is located on a raised plateau that is bordered to the west by a fjord. It is characterized by the presence of a considerable number of backed tools and a probable *campignan-like* tranchet.

Neolithic site A 34691323; 3614025

Stone tools were collected in the vicinity of a large concentration of sand dunes located to the west of the site of Chiakshak, near the beginning of a small fjord. These tools included finely retouched tools with a very ancient appearance, but which could be associated with the Neolithic, along with Neolithic pottery. The finds also included a coin.

Neolithic site B 34692632; 3613273

A short distance to the west of the site of Chiakshak, abundant Neolithic pottery fragments were collected on a slightly rocky horizontal esplanade; these were decorated with straight, wavy, and zigzagged lines.

Neolithic site C 34692771; 3613616

This site is located between the west side of the Fjord of Beddemban and the immense Fjord of Uel Chalig, in an area characterized by high, sheer, rocky cliffs. This formation blocks access to the sea except through the two fjords mentioned above and in two intermediate fjords. A few Neolithic pottery fragments were found in a space surrounded by these rocky heights.

Chiakshak

There is a large concentration of small stone tools scattered over an area of ca. 200×200 m situated on a rocky terrace to the west of Beddemban. The terrace has a sheer drop to the sea below. Numerous dorsal points, burins, and frontal end-scrapers with no pottery found suggests a date in the Upper Palaeolithic (considering the absence of geometrical aspects). The presence of cores and a large number of chips, many of which are due to reworking, implies that the site is a workshop. Although surface collection does not give a complete picture, this complex can be placed in the category defined by McBurney as "Libyco-Capsian," dated to the 7th millennium BC, and located in level X of Haua Fteah (McBurney 1967: 229-270).

Racuba

This site is different from those found to the east due to its being located on heights that face the sea. The site consists of two areas that are approx. 500 m apart, one of which is about 100×50 m and the other is ca. 50×50 m. Both areas have an abundance of Neolithic coarse impasto pottery, probably from several vessels, with shell inclusions and linear or wavy and zigzag decorations. Stone tools made of white flint (burins, chips, retouched blades), abundant land molluscs, and a smaller number of marine molluscs were also found.

Jiona

This 200×100 m site lies within a large, oblong valley whose axis is mainly parallel to the sea. It is separated by two dunes of modest height that form three depressions, with further sand dunes of about 5 m in height surrounding further out. This expanse is replete with Neolithic impasto pottery sherds that have a large number of shell inclusions; decoration is typically linear and wavy or zigzag engravings. Additionally, there is an abundant presence of molluscs, with land molluscs predominant over marine molluscs.

Ras Etteen 2

The remains of a Neolithic settlement were investigated a few hundred meters to the west of the point of Cape Ras Etteen, along the sandy coast near a small lighthouse, within a large valley running parallel to the coast. This ca. 200×100 m area is sparsely covered with low tamarisk and garrigue vegetation, and

surrounded by high sand dunes. Surface finds included an abundance of impasto pottery with shell inclusions, some of which were decorated with simple linear, wavy or zigzag incisions or with a horizontal band of impressed points. Another grouping of finds consisted of a small number of stone tools with fine straight retouching; ostrich eggshell fragments, some of which are painted; and several carnelian and yellow stone beads of a necklace. There is an abundant presence of both land and marine molluscs (especially *monodonta turbinata*) found here as well. Pottery finds are comparable with that hitherto noted in Cyrenaica (Barker 1989; Barker *et al*. 2007) and, specifically with that found on levels VI – VIII of Haua Fteah attributed to the Neolithic. Comparable material with sherds exhibiting the combination of inclusions, grain, and a grey surface colour is found with material from layer VIII that also had a decoration of impressed points. However, other linear decorations suggest a second classification identified in levels VII and VI. Based on these comparisons and the substantial presence of mollusc shell deposits, a provisional date for this complex (like those of Jiona, Racuba, Neolithic sites 34692771-3613616, 34692632-3613273, and 34691323-3614025) is the first half of the 5th millennium BC (McBurney 1967: 271).

Al Mahalla

Survey was conducted near a small harbour and old anti-aircraft batteries, at a connection point of a narrow strip of land that closes the Gulf of Bomba and to the north joins the expanded tip. Here was discovered a vast area of ca. 1 ha with Late Roman period pottery fragments dispersed over the surface.

Zaid 3

This site is one of two areas found, each with pottery fragments similar in type and chronology. The sites are respectively designated as Zaid 2 (see 1.3.18) and 3. Comparatively, Zaid 3 had a greater abundance of murex shell remains than at Zaid 2. Given that there are no traces of structures, it is thought that encampments of individuals engaged in murex gathering and Tyrian purple dye production during the Late Roman period.

Zaid 2

This is the second site, paired with the Zaid 3 site (see 1.3.17), that shared pottery fragments similar in type and chronology to those discovered at the nearby site of Zaid are dispersed. Given that there are no traces of structures, it is thought that encampments of individuals engaged in murex gathering and Tyrian purple dye production during the Late Roman period.

El Agheila

An area with artefacts on the surface was identified ca. 30 km to the east of Tobruk in the coastal area of El Agheila ca. 200 m from the sea. This site lies about 3 km to the east of the village of the same name, near the rocky western side of a small bay. Finds discovered here included grey impasto pottery with a large number of crushed-shell inclusions, and decorated with engraved linear and wavy patterns. Also noted on the surface were the remains of food preparation consisting of seashells (trochus and limpets) and crab claws. A few amphora fragments Roman period, of indeterminant types, were also present. The site may be the remains of a seasonal coastal settlement of prehistoric (Neolithic) date used by fishermen and gatherers; it was used subsequently in some manner during the Roman period.

1.4 Necropolis

Aina – el Haniyeh

Various hypogeal structures were noted along the road that connects Ougla and Hamama, in the town of el Haniyeh. These structures are divided into three agglomerations with later masonry structures erected on top of them. Traces of quarrying are visible, which attest to the original function of the site as a quarry. From what could be observed, these structures contain 4 to 5 chambers each containing 1 to 3 *arcosolia*. Some of these chambers had entryways that lead to other chambers.

Cherso 1

Near a small gulf there are two low rocky hills, one of which produced finds upon investigation. Several chamber tombs with dromos and niches are carved on the eastern side of this hill, and a quadrangular structure in ruins sits atop it. Other tombs are carved into the rock located nearby. Sporadic Roman period pottery fragments (with a corrugated surface) and a Neolithic pottery fragment with engraved linear decoration were found around this site. A moderate amount of flint tools was also found, most of a type that can logically be attributed to the Upper Middle Palaeolithic.

Kbta 2

Several megalithic-type structures are situated not far from the fortified settlement of Kbta, approx. 200 m to the south on the rocky plateau. The function of these structures is unclear (funerary?) as is their period and cultural attribution. However, they are probably connected functionally and chronologically with the

nearby settlement. One of these buildings differs in its character and morphology. It has a uniform circular shape of ca. 100 m in diameter built with rocks, some of which are large angular slabs. A puzzling association with contemporary military exercises was given by a local falcon hunter. Although the site area possessed a number of undefinable pottery fragments, some sherds had a black glaze on the external surface that had thinned to allow the red surface underneath show through. This pottery is similar to that recovered at the fortified site of Kbta and attributed by McBurney (1967) generally to the period from the Neolithic to the Greek colonization.

A short distance to the south there is a small rectangular dolmen lacking the covering slab, but easily recognizable. Also in the vicinity is an extremely interesting structure that could be identified as a dolmenic, multi-chamber tomb of an indeterminable period. This is a rectangular enclosure consisting of a perimeter of large and medium-sized stones placed obliquely in a double lateral wall. The enclosed space is partially occupied by two structures similar to one another. One is oval and constructed from large stones placed obliquely, while the other is rectangular but built of similar materials, and in its interior there are small rocks on the surface. It is probable that the rectangular structure was flanked by a parallel structure to the south and an adjacent structure on its short side to the east. This structure's northwest-southeast axis is 10.10 m long and its short southwest-northeast axis is 7.90 m long.

The presence of pre-Greek pottery and megalithic-type monuments leads to the hypothesis of the presence of a settlement predating the foundation of the small fortified site of Aziris, which served as the base for the Greek colonists who subsequently founded Cyrene.

1.5 Shipwrecks

Shipwreck of Ougla

A Roman cargo ship dated to the Late Roman Imperial period is located about 300 m off the sandy coast ca. 1.6 km east of the easternmost island of Ougla, on a rocky shoal. This point faces a small lush garden of palm trees. The rocky shoal is at a depth of ca. 3-6 m and is fairly broken up due to heavy erosive action. On the eastern side of this shoal the rocks rise almost completely out of the sea. Here on the easternmost part of the shoal are the traces of the shipwreck, which consisted of an abundant amount of highly concreted amphorae fragments. These amphora remains included a large number of necks, virtually all of which date to the Late Roman period.

Shipwreck of Ras al-Hilal – the Tigre

Traces of a wooden hull were found within a group of sand pockets that dot the rocky seabed off Ras al-Hilal; these remains were identified as the wrecksite of ship *Tigre*. The area of the on-board forge was identified by the presence of numerous bricks and moulds used for small balls. The cannons bear the clear image of the lion of Venice as well as the heraldic coats of arms of the families in shipping. Identified during investigation were iron cannons and a considerable number of various types of objects, including bronze bells, pewter plates and other pewter items, munitions, rigging, etc. Fragments from several bells bearing obvious Christian symbols were located and confirm what is stated in the sources regarding the practice of removing Christian symbols from churches in view of the imminent Turkish expansion westward.

The *Tigre* was built by Giuseppe di Zuanne de Pieri in 1696 and equipped with heavy armaments: two 30-pounder bronze culverins, four 20-pounder bronze culverins, two 14-pounder bronze culverins, twenty-four 30-pounder bronze cannons, two 14-pounder bronze cannons, twelve 12-pounder bronze cannons (Fig. 6.6), two 12-pounder bronze sakers, twenty-two 20-pounder iron cannons, twenty-four 6-pounder bronze breech-loading guns, and twelve 6-pounder bronze petraries.

We know that its last voyage began from Trapani, Sicily under the command of Michiel Cosadino, and was directed toward Nafpli in the Peloponnese, where she took on a cargo of wheat. She set sail from Nafplio on February 26, 1705 and dropped anchor a short time later at the entry to the Saronic Gulf at the island of Spetses (port of Spetses) to take on wood. From here, with a favorable wind between the gregale and tramontane winds, she set sail on February 28. During the voyage the wind became so strong as to make it difficult to navigate the ship. After the rigging broke, the main-topmast fell overboard, possibly due to low quality. In addition to the loss of the main-topmast, the main mast broke and the rudder was damaged, which forced the captain to steer the ship by releasing two long ropes over the stern. However, the damage resulted in leaks, allowing a considerable amount of seawater to enter, which the four hundred crewmen had difficulty in removing. The ship continued its wild rush, propelled by the winds, sailing by means of the foresail at half-mast in an attempt to reach land as quickly as possible. The situation was becoming increasingly dire due to the difficulty in holding the course as well as the colossal effort put forth by the crew, which was near exhaustion at this point, to remove the seawater flooding in from the leaks in the stern.

Fig. 6.6 – Wrecksite of ship *Tigre* (Photo by C.A. Buccellato).

On the morning of the third day, after having left Crete to the east, they found themselves on the Barbary Coast facing Cape Sant'Andrea, known today in Arabic as Ras al-Hilal, which is the northernmost point of Cyrenaica. So as not to allow the ship and everything it held (artillery, etc.) to fall into enemy hands, the captain attempted to blow it up, but discovered that the gunpowder was wet; he then decided to sink it in fairly deep waters near the coast to allow the crew to be rescued and, at the same time, deny the ship and its cargo to the enemy. In fact, there was not a great loss of life. Only two sailors and ten soldiers drowned, because they could not manage to leave the ship in time before it quickly dropped beneath the waves on April 7, 1705.

Shipwreck of Ras Etteen 1

Almost in the centre of the gulf, approx. 100 m west from the submerged structures, is a heap of stones that are striking due to their uniformity in size. Abundant amphora fragments were found together with these stones. The major axis of this oval-shaped heap of stones is approx. 20 m long; hence, the overall size, shape, and nature of the finds indicate it could be the ballast of a shipwrecked vessel.

Shipwreck of Mesrata

The underwater survey indicates the probable presence of the remains of a cargo of amphorae from a shipwrecked vessel off the southwestern coast of Mesrata Island at a depth of about 2 m. The cargo consisted of ovoid amphorae with narrow necks dating to the Late Roman period; in particular were type Dressel 34 / Late Roman 1 (5th century AD).

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7. Ancient mines in pre-roman Maghreb. Present and future of archaeological, geophysical and archaeometric researches

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Abstract. We currently have little archaeological and historical data about mining areas of North Africa that were exploited in pre-Roman times, and even the rare ancient proofs can be mostly dated to Roman period. However, it was the searching for new metals that brought Phoenician to the western expansion: North Africa was one of the richest Mediterranean areas and we believe that such a small amount of information about this region has to be connected to the lack of dedicated studies. Every time that the scientific interest focuses on this important part of the economic and social life in the ancient world (as it was already made in Spain and Sardinia), new data emerges and offers a bigger historical background. Current researches of ISMA-CNR 'Researches about Phoenicians in North Africa: archaeology, numismatic and economic history' aims, first of all, to define historical and technological background of all the metal production cycle, the exploitation, the manipulation techniques and the resources management of mining areas in North Africa, Morocco and Algeria in particular.
Key Words. Mining Archaeology; Morocco; Algeria; geophysical survey; archaeometry.

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Acknowledgments. Research in Morocco began in 2013 and is still ongoing. In 2012 and 2013 the bilateral joint project 'Ancient mines of Morocco. Archaeometry and archaeology researches from mineral to objects' started, led by ISMA-CNR and Equipe Geoxploration & Géotechniques, Faculté des Sciences, Université Moulay Ismail of Meknès. Co-author of this research is Abdelilah Dekayir. Lahcen Bejjit, Mohamed Rouai, Hmidou El Ouard took part in it. From 2014 to 2017 these two institutions (under the responsibility of L.-I. Manfredi and A. Dekayir) worked in cooperation with Moroccan INSAP (in the person of Y. Bokbot). Y. Bokbot is a co-author of archaeological excavations of 2014 and 2015, together with Fiammetta Susanna, joint researcher at ISMA-CNR and Mabrouk Seghir from INSAP. Archaeometric analysis were followed by Daniela Ferro (ISMN-CNR), osteological researches on animal bones by the University Mulay Ismail by B. Ouchaou and A. Dekayir. Pasquale Merola (ITABC-CNR) followed cartographical study and on-site prospection. Marilena Cozzolino and Vincenzo Gentile (University of Molise) made geo-electric researches. From University Suor Orsola Benincasa, Silvia Festuccia studied the fortress itself and the prospection of the Aouam area, while Leopoldo Repola is the author of 3D reconstruction of the fortress; Fiammetta Susanna focused of prospection of the mining areas; Chiara Cecalupo (Pontifico Istituto di archeologia Cristiana) follows the museum projects. The whole mission is funded by CNR and Italian Ministry of Foreign Affairs and International Cooperation; at the same time, it's foundation lies in a cooperation agreements between ISMA-CNR, Commune de El Hamman, Compagnie Minière de Touissit.

1. Introduction

Mining basins of North Africa exploited in pre-roman times are still not well known. Data about mining are almost always connected to roman age, even if searching for minerals was one of the fundamental causes of Phoenician expansion to the West. North Africa, in particular, was one of the richest mining areas of the Mediterranean sea and it seems clear that the lack of data about North African mining basins has to be connected with the absence of specific research programs. Actually, as happened in the Iberic Peninsula and in Sardinia, when these fundamental economic and social aspects start to be deepened, new information and a complex panorama arise (Manfredi 2016b).

The ISMA-CNR research project Researches about Phoenicians in North Africa: archaeology, numismatic and economic history[1] aims to define the historical and technological background of the whole cycle of mineral exploitation (from extraction to final production) and general management of mining basis in North Africa, Morocco and Algeria in particular.

The lack of a systematic description, sampling and study of rocks, minerals and mining basins of North Africa has to be overcome with a special research program that can compare archaeological and geo-mining surveys data and archaeometry analysis on rock samplings (that can help in reconstructing mining landscape) with the few archaeological finds i.e. inscriptions, coins, pottery.

The novelty of this study is the development of a standard analytical methodology based on archaeological research and laboratory techniques. The results made available through a Web platform (GIS) allow one to correlate the information coming from different extraction/processing sites that followed the profile of the exploited mining veins. GIS application aims to be a starting point of an integrated study of the different mining ar-

1. DUS.AD017.039. Ricerche sui Fenici in Nord Africa e nella regione atlantica: archeologia, numismatica e storia economica (project leader L.-I. Manfredi).

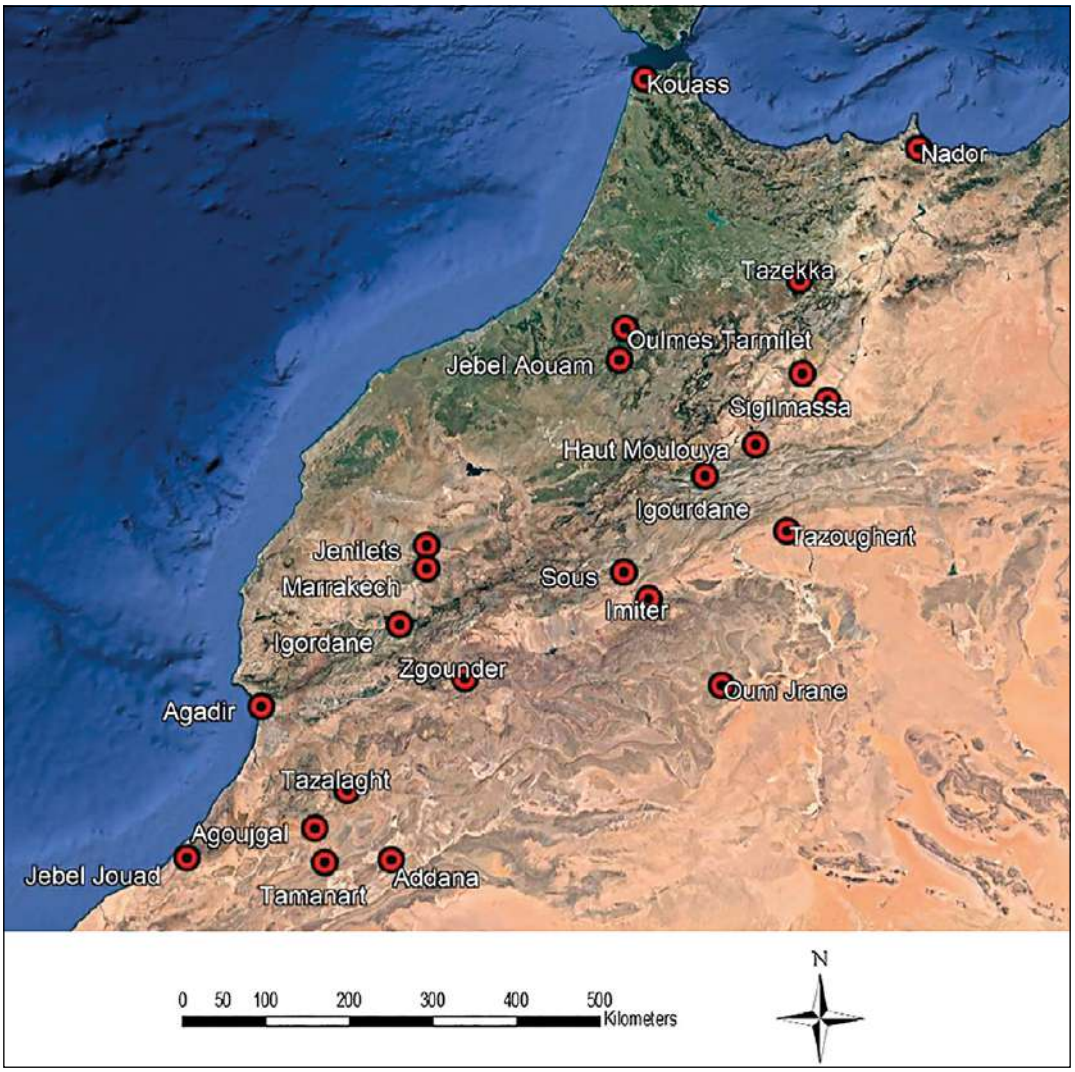

Fig. 7.1 – Geo-referenced map of the twenty-four ancient mining sites identified during the prospects carried out between 2012 and 2013 (GIS processing by A. Celauro and graphic elaboration by F. Susanna).

chaeological sites in the Mediterranean basin proposing an innovative method of data exchange of archaeological, physical and geological chemical results.

Furthermore, there is a lack of data on the small-scale geo-referenced of the location of the archaeological artifacts found. In fact, for the Middle Atlas of Morocco there is a complete absence in the literature of any information that gives a geo-reference of the ancient mines correlating to the various production areas and mining processing and to the active settlements in the investigated period. In this sense, slags, are very useful to understand technologies in use and give chronological information when archaeological objects miss, play a special role. However, this kind of analysis still needs further systematization and it is still not possible to assign each slag to a single moment of metallurgy process. At the same time, none of them were geo-referenced at the moment of discovery and this cannot help the reconstruction of the production cycle. The novelty of this research underlines the passage from simple mining sites to real production centers attesting to an upgrade in the social and human exchange (Manfredi 2016; Manfredi 2016a).

2. Morocco

In 2012-2013, the bilateral joint project between ISMA-CNR and the University Moulay Ismail of Meknes[2] started. During these years many archaeological and geological prospections were led in the area of Jebel Aouam; Oulmes; Tayadirt; El Gour, Ait Ammar, Beni Mellal, Tabaroush, Imiter, in order to find mining basins with archaeological traces of ancient exploitation (Manfredi and Dekayir 2016; Manfredi 2016c; Manfredi L.-I. 2016e) (Fig. 7.1). The mine of Aouam lays 120 km south of Meknes on the so-called "mines road": its huge fortress of 27 hectares gave back many ceramic fragments connected to metal production and many slags of different kinds. Since the beginning of the prospections, it appeared to be the most important site to investigate: in the inner areas of Ighram Aousser many crucial traces of metal extraction were detected and transformation from the pre-historical era to "industrial" exploitation of Almohad times: the fortress can be actually dated to the 9th-12th century AD. It is possible to imagine that, during the whole life of the site, more than 250,000 tons of metals (especially iron, lead, and galena silver) were extracted (Rosenberger 1964; Manfredi and Festuccia 2016; Manfredi 2016c; Manfredi and Seghir 2016e).

During the archaeological campaigns carried out between 2014 and 2017[3], a large study was carried out on the topography of the site and the organization of the surrounding area. To this end, an interdisciplinary and multi-methodological research approach was adopted based on data released, historical and modern cartography, and systematic surveys of surfaces and satellite images. Pasquale Merola has collected published data and historical maps of Morocco before proceeding with the survey of the fortress and the surrounding area. Sixteen historical maps created between the sixteenth and nineteenth centuries have been acquired on digital support (raster).

The map was not georeferenced and therefore has been updated (Fig. 7.2). This operation allowed a general overview of the historical features of the landscape. However, this map is not updated and is not suitable, due to its size, to the study of a small area, such as that of the fortress of Ighram Aousser (Merola 2016; Celauro *et al.* 2016).

In order to integrate and overcome these limitations, satellite images have been added, to define the topography in detail, and to place the archaeological evidence in a more precise way.

For this purpose, images were acquired with a high spatial resolution taken from several satellite sensors. In particular, the satellite images QuickBird and WorldView-2, with a resolution of 0.50 m / pixel for the pandromatic and 2.00 m / pixel for the multi-spectral.

From 2015 to 2016, the three-dimensional survey of the fortress was aimed at producing detailed models of the architectural structures located in the southeastern area of the site. The activities were defined starting from the real numerical models produced using a three-dimensional laser scanner LMS-Z420i from Riegl, which involved the digitization of the entire archaeological area between the walls, parts of the territories and the reliefs near the site, as well as the structures of fortification to the south-east under the acropolis (Repola 2016).

In the wall circuit, that at some points are preserved for 3.5 meters, there are at least two visible doors. As described by S. Festuccia "*On the wall layout two entry gates are distinguishable, the East Gate and the South Gate, whereas the North Gate is only partially identifiable. Following Rosenberger's interpretation, the North Gate is likely to be an entrance, nearly gone nowadays. An examination of aerial photography suggests the presence of a West Gate, due to the trace of a connection route that interrupts itself orthogonally to the external layout of the fortress, which in that segment is in a very bad state of preservation*" (Festuccia 2016: 47-48).

The eastern one is a typical angle entry gate, where it is still possible to see a ladder, which led to the rampart. In the upper part of the structure, holes where wooden beams were inserted to hold the floor of a lofted area of the room are still visible. Following the track of the walls towards south-west, two towers are distinguishable and proceeding towards south, are identifiable three other towers that have been heavily damaged.

Near the eastern door M. Cozzolino and V. Gentile performed Electromagnetic research in 2016. In the area, a rather sterile situation of anthropic structures emerges. The absence of stone structures, despite the conspicuous presence of archaeological material on the ground, can support the hypothesis that at the entrance of the city there were mainly wooden structures of which there are no traces left (Cozzolino *et al*. 2016; Cozzolino *et al*. 2018).

In the south-west part of the walls, it is possible to identify the so called higher *cittadella* with inner walls, whose function is still

2. Bilateral Agreement on scientific cooperation between the Centre National de Recherche Scientifique et Technique of Morocco (CNRST) and the National Research Council of Italy (CNR): 'Ancient mines of Morocco. Archaeometry and archaeology researches from mineral to objects', led by ISMA-CNR and Equipe Geoxploration & Géotechniques, Faculté des Sciences. Université Moulay Ismail of Meknès. (project leaders A. Dekayir and L.-I. Manfredi).

3. International Agreement between Institut National des Sciences de l'Archéologie et du Patrimoine (INSAP) Morocco, the ISMA and the Université Moulay Ismaïl (UMI). 'Les anciennes mines du Maroc: étude archéologique et archéométrique' (project leaders Y. Bokbot, L.-I. Manfredi and A. Dekayir); Prospezioni archeologiche in Marocco per la ricostruzione dei contesti archeometallurgici punici del Maghreb (MAECI. ID domanda: ARC-001685).

Fig. 7.2 – Plan of the fortress of Ighram Aousser (graphic elaboration of © Google Earth Image by P. Merola, F. Susanna).

partially unknown. The first archaeological sample was undertook in September 2014 in north-eastern part of this area, directed by Y. Bokbot and L.-I. Manfredi with M. Seghir and F. Susanna, in order to understand the relation between the external walls and those that protect the *cittadella* (Fig. 7.3). In this way, it was possible to identify an angular tower outside the inner ring of walls that was reused in Almohad times as foundation for the external ring (Bokbot and Manfredi 2016; Manfredi *et al.* 2016) (Fig. 7.4).

In September 2015, the digging campaign, directed by Y. Bokbot and L.-I. Manfredi with M. Seghir and F. Susanna, took place on the southern slope of the *cittadella* where prospections of 2013 brought a little arch to light. The excavation disclosed a round arch of 68 cm and pillars made by a single wood piece (of 60 cm) and two regular smaller ones (25 cm). The SW corner of the archaeological sample was uncovered and a hearth with many animal bones fragment, coals and fire pottery was discovered. B. Ouchaou and A. Dekayir performed the osteological analysis of the material from this excavation. The bone remains show the presence of several zoological groups, with a clear dominance of the domestic caprines (sheep and goat) bones. The other domestic animals represented in the site (dog, cattle and equidae) are less abundant than caprines[4] (Fig. 7.5).

4. The results of this research are being printed in the *Archeologia e Calcolatori* 2020.

Fig. 7.3 – Fortress of Ighram Aousser. The excavation of the 2014 mission: angular tower outside the circuit of the citadel walls reused in the Almohad era as the foundation of the boundary wall of the fortified city (Photo by L.-I. Manfredi).

Fig. 7.4 – Fortress of Ighram Aousser. The excavation of the 2014 mission: Detail of the angular tower USM 100 (Photo by L.-I. Manfredi).

Again, in 2016 the electromagnetic research confirmed the presence on the *cittadella* of a double octagonal concentric wall and identified the position of some probable towers (Cozzolino *et al*. 2016).

The geo-archaeological explorations, started in 2014, allowed proving that the frequentation of the area began in prehistoric times until Islamic Era. In particular, in addition to evidence of Fe-ore (pyrite) mining and working, there are traces of extraction and transformation of the Pb-ore (galena) since the pre-Roman period.

During the different phases of the study, it was possible to collect data for GIS mapping of the area and to sample archaeological materials, slags and minerals for archaeometry analysis by the University of Rome La Sapienza (Ferro *et al*. 2016; Sulpizio *et al*. 2016). Deep attention was given to pottery and metal materials, analyzed with XRF (detection of primary and secondary elements); SEM-EDS (detection of primary and secondary elements, recognition of the structure and morphology of the samples); PIXE (determine the distribution of trace elements in a wide range of samples); ICP-MS; XRD (mineralogical composition and the degradation products) and divided according to their place of discovery: fortress, mines, and slags hills. Actually, slags turned out to be of great interest, because it was possible to identify slags from exploitation processes and slags from smelting processes.

Recently F. Hourri, A. Dekayir, M. Makdoun have examined for their mineral and chemical compositions through a multi-tech-

Fig. 7.5 – Fortress of Ighram Aousser. The excavation of the 2015 mission: the access arch to the citadel (USM 202), the citadel wall (USM 204 and USM 205) and the most recent phase wall (USM 206) (Photo by L.-I. Manfredi).

nical approach (optical and metallographic microscopies, XRD, ICP-AES and XRF) six scraps of the archaeological site of Volubilis, Roman period (II-III century BC) and the ancient mine of Jebel Aouam. The metallic composition of the treated ore is close to polymetallic minerals, probably similar to that of the Aouam mine (lead and silver) (Hourri *et al*. 2018).

In the years 2016 and 2017, archaeological researches were interrupted due to some excavation projects of the Compagnie Minière de Touissit, that is about to open an extraction wheel inside the fortress. However, the team is still keeping on mapping the area and leading geo-physic exploration, 3D survey and general documentation. At the same time, the restoration of recreation center of a French village started: it is now the "Centre du patrimoine minier d'Ighrem Aoussar à Tighza: Archèomine, Archèologie et Minèralogie" (Cecalupo 2014, 2016; 2016a; Bounajma *et al*. 2016).

3. Algeria

The interest for Punic Algeria inside the research module 'Researches about Phoenicians in North Africa: archaeology, numismatic and economic history' focuses on different aspects of Phoenician and Punic culture in Southern Mediterranean. Actually, Phoenicians were the first to understand the great value of mining heritage in Algerian territory: Carthage would have never become a powerful country it was, strong enough to face Roman power, without the huge human, economic and material resources from Algeria (Manfredi 2011, 2016b).

Nevertheless, even here the interest about ancient mines and ancient exploitation techniques appears to be very low. This is the reason why in 2018 the new project 'Atlas storico dell'attività archeometallurgica in Algeria' was presented by ISMA-CNR (in association with Italian MAECI)[5]. The main idea is to insert Algeria, starting from the region of Ténès, inside the bigger program of the Archaeological Map of Algerian Atlas.

The preliminary phase of the project began in 2019 with the study of the documentation of the region of Ténès, ancient Cartennas (*wilaya* of Chlef), where there was one of the few mining basins that, according to classical sources, had been used in Punic era. Actually, very close to Bou Khandaq /Sidi Akkacha there are rich mines of copper with south-west to north-east veins, on the riversides of Wadi Allah: according to S. Gsell, they may be connected to the *kalkorukeia* that Strabo puts in the land of Massesili (Posedonius, in Strabo XVII, 3, 11). In addition, in Cartennas are still visible remains of a necropolis that was probably used in pre-Roman times as well (Gsell 1928).

In connection with the application of new technologies in historical researches, the project wants to create a training program, information service, cultural and environmental consciousness aimed at creating a brand-new tourist's paths of historical, archaeological, geological interest, and to contribute to social and economic development of the area.

Furthermore, the project will be developed involving the eastern area of Algeria. In this context the Italian mission, and the archives of the CNR plan to publish archaeological campaigns carried out in Algeria, from 1969 to 1975 in Annaba along the river Seybouse and near the Mausoleum of Medracen[6].

Carthaginian presence appeared to be very strong in 4th and 3rd century BC in the coastal area from Rusicade (modern Skikda) to Tabraca (modern Tabarka, in Tunisia) and to the south until the Tebessa Mountains. The wealth and prosperity of the area came from its economical projection to the inner African area: Carthaginians moved along the natural pathways that led from Hippo Regius (modern Annaba) and Rusicade (Skikda) to the southeastern area of Libya (Manfredi 2003; Manfredi 2011; Manfredi 2016b).

In order to research in this main direction, the publication of photo archives of the prospection campaigns lead by prof. Sabatino Moscati for Italian CNR in 1969-1971 (and co-funded by Italian Ministry of Foreign Affairs and International Cooperation, after a triennial agreement signed in February 1968 with the Direction Algérienne des Affaires Culturelles) appears very interesting (Bouchenaki 2011). The first campaign took place in 1969 with the aim to detect the structures considered of Punic times in the archaeological area of ancient Hippo Regius (now Annaba) and to record the archaeological material of the local museum (Acquaro 1988). Hippo Regius was the most important city of the region and it probably was a Carthaginian *emporion*. Prospections and surveys were led in different sites: Kasr el Achour, El Magroun, Henchir Torba, Kasr el Kebch, Sidi Cherf, Zoubia, Barrache (Francisi 1992; Manfredi 2016d). The Punic control on this region spread only at the end of the 4th century BC and during the 3rd, as shown by all the archaeological sites on the Seybouse river, that can be seen as fortified centers. As already seen in Carthaginian state

5. 'Atlas storico dell'attività archeometallurgica in Algeria' (MAECI. ID domanda: ARC-001834).

6. DUS.AD017.047. Gli archivi storici sugli studi in Algeria relativi alle missioni archeologiche dell'Istituto dal 1969 al 1975 (project leader L.-I. Manfredi).

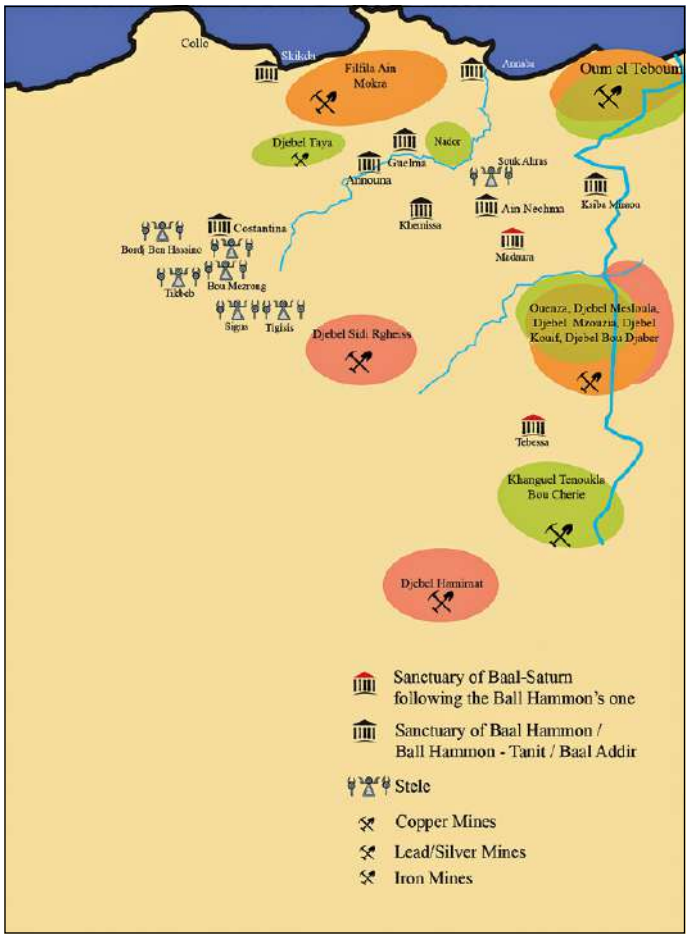

Fig. 7.6 – The eastern area of Algeria: Punic sanctuaries and mining areas (graphic elaboration by F. Susanna).

and in Punic Sardinia, fortified centers always alternate with agricultural and mining settlements, and this happens from Hippo Regius to Souk Ahras (ancient Thageste) following the right shore of river Seybouse until the river Medjerda. In that period, actually, the interest on lead, zinc, iron and copper mines raised in the area of Thagaste and Calama (modern Guelma), where local population was subjected Punic administration (Manfredi 2013).
Given the latest research about mine basins in North Africa, the prospections of 1970 and 1971 appear to be very important and somehow pioneering when they see Phoenician in connection with the hinterland. Georeferencing the archaeological data about the settlements mentioned above, together with findings of Punic sanctuaries and mining areas, is very useful to understand clear N-S pathways along the river Seybouse (D'Andrea 2014). From Hippo Regius and Guelma to Tebessa, where it is possible to reach copper basins of Djebel Sidi Rgheiss and Djebel Hamimat, galena basins in Khanguet Terouka and Bou Charite, or the rich areas with different kind of basins in Ouenza, Djebel Mesloula, Djebel Mzouzia. These areas are strongly connected to sanctuaries or Baal Hammon/Saturn stele in Guelma, Announa (that can be found in the confluence between rivers Seybouse and Medjerda, heading mining basins of Souk Ahras and Ouenza, Dejebl Mesloula, Dejebel Mzouzia, Dejebel Kouif, Dejebel Bou Djabeur), Khemissa (Thubursicu Numidarum), Ain Nechma (Punic tbrbsy and Latin Thabarbusis), Souk Arhas itself, Ksiba Mraou (Civitas Popthensis) and Madaura (Gsell 1928). Going south to the galena mines of Khanguet Tenoukla and Bou Cherite, a considerable amount of findings are reported in Tebessa (ancient Theveste). Especially in the area of Henchir Rohban where the archaeologist found a room, buried and walled in during Christian era, with a considerable amount of statuettes and stele for the god Saturn, probably connected with a local sanctuary of 2nd or 3rd century A.D (D'Andrea 2014) (Fig. 7.6).
The study and publication of the material from the campaigns led in 1969-1971 have therefore great potential.

4. Mines and between Morocco and Algeria: hypotheses for new research

The project involving the mining basins of Algeria, strongly linked to the research conducted in Morocco between 2012 and 2017, in the mining areas located in the north-east in the Middle Atlas. The research hypothesis aims to create a general framework able to describe metal production in North Africa. Namely historical and technical mining methods, metal pyrometallurgical processing, resource management and trade at local, regional and Mediterranean level, activities and artifacts, laboratories, technology of production processes and know-how of craftsmen (Manfredi 2016).
In particular, the mountain line of Atlas goes from Moroccan Atlantic coast to the eastern region of Algeria and makes longitudinal penetration paths very difficult. Middle Atlas can be defined as a watershed (which can be physical, economic, social as well as cultural) between Rif mountains to the north, western Atlantic area, eastern Meseta, Algerian plateaus and Saharan region to the south (Dekayir and El-Maataoui 2001). The only path in Morocco that connects the north to the south is the Moulouya valley, that starts close to Midelt and runs till the Mediterranean Sea, while its tributaries reach the ocean to the south.

The Rif and the Atlantic side of Morocco has always been connected to the ancient, and important cultural *Koinè* defined "*circolo dello stretto*", even if lately E. Papi (2014) has underlined how its local, autochthone group had only partial contacts with Phoenicians in the Iberia Peninsula. The autochthone group was predominant in Eastern Morocco, in the area beyond the Middle Atlas: for this population, the contacts with Phoenician and Punic world are clear, but it is still uncertain if these contacts are connected to the western part of Morocco or can be associated to influxes from Algeria (Manfredi 2016f; Seghir 2016). In addition, this area is historically connected to the land of Massessili, that extended between the river Moulouya and Bougaron Cape in Algeria (the same path that was the border between Numidia Kingdom and Mauretania) (Schettino 2003).

In this sense, the river Moulouya appears to be the most direct and natural penetration path from the Mediterranean Sea to Saharan regions and it is really worth deeper research. Moulouya ends in front of Chafarinas islands (Bravo Nieto *et al.* 2013), between Siga and Rusaddir (Aragón Gómez and Fernández Uriel 2008), which were two of the most important harbors of Punic tradition in Algeria. The islands, where many Neolithic materials were found, seems to have had a crucial role in the paths between North Africa and Iberia Peninsula. From this point, following the river Moulouya from the coast to the south, it is possible to meet several important mining basins (that were probably exploited in ancient times) and many necropoli with Tumulus burial and objects of Phoenician tradition (Bokbot 1991; Bokbot 2003).

Poly-metallurgic district of Zaida, Midelt, Mibladen and Aouli in the province of Midelt appears to be of great importance. In 2013, due to the bilateral agreement between CNR and the University of Meknes, it was possible to lead some prospections in the mine of argentiferous lead and copper of Zaida, very close to the site of Tayadirt and its famous necropolis full of objects that recall Phoenician traditions (Lambert and Souville 1970). During the surveys in Zaida and Mibladen-Aouli no traces of ancient exploitation were found: in this way, it is not possible to prove the hypotheses of Y. Bokbot, who connects the nearby necropolis to these mines (Bokbot 1991; Bokbot 2003).

Necropoli with similar grave goods as in Tayadirt and very close to mines are located in the region of Tafilalet, along the path that goes across Oued Ziz and Oued Rhéris (Bokbot 2005). Grave goods and tomb types of this area can be compared to those in Western Morocco and the pre-desert areas of Algeria. On the penetration path to Souss-Massa-Draa, that leads to mining basin of High Atlas (El Ajlaoui 2008), it possible to find the necropolis of Foum Le Rjam, which is surely in connection to some local mining basins with traces of ancient extractions and where traces of similar funerary ritual as in Tayadirt were detected (Bokbot 2001; Bokbot 2003).

At this point, it seems clear that a path of penetration between Mediterranean areas at the mouth of the river Moulouya and western Mauretania to sub-Saharan mines was used from the 1st millennium BC.

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8. The Egyptological research activities of Sapienza University of Rome. From archaeology to topography and beyond

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Abstract. The Egyptological research of Sapienza Università di Roma includes a variety of activities and fieldworks: from the archaeological expedition at Bakchias (26th dynasty-Late Antiquity), a settlement located in the Fayyūm region, to the study of the transformation of religious space from pharaonic to Christian period, to the realization of a digital archaeological atlas of Coptic literature that aims at exploring and representing the process of production, copying, usage, dissemination, and storage of Coptic works in relation to the geo-archaeological contexts of origin of both the texts themselves and their related writing supports. This article summarizes the main goals of all these projects and the main scientific results achieved until now.
Key Words. Fayyūm; Bakchias; Archaeological Atlas of Coptic Literature; spaces of cults.

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1. Excavating the "Hill of the tamerisks": Ghenut/Bakchias/ Kom Umm al-Athl (Fayyūm)[1]

1.1 Bakchias: its (long) history, its urban development, and its two crocodile patron gods

Bakchias, the modern Kom Umm el-Athl (the 'hill of the tamerisks'), is a little village located in the north-eastern corner of the Fayyūm region, at c. 20 m above sea level. Traditionally classified as a Ptolemaic-Roman settlement, in fact it has a much longer history, as the excavations now carried out by a joint mission of Bologna University and Sapienza Università di Roma have demonstrated[2].

In the next paragraphs, we will try to summarize the results of the most recent investigations of the site and the re-elaboration of collected data concerning this long lasting settlement.

It could be argued that Bakchias returned to life and attracted the attention of the international scientific community following the explorations of Grenfell, Hunt and Hogarth and, above all, after publication in 1900, of their work, *Fayûm Towns and Their Papyri*, a work which is still fundamental today to studies of the Arsinoite *nomos*. In the brief report which they devoted to the excavations which they had carried out in the first weeks of 1896 for the *Egypt Exploration Fund* (now *Society*) in the Kom Umm el-Athl site, where the Greek papyri placed the Graeco-Roman period village of Bakchias, they were unable to hide a certain

1. The archaeological mission to Bakchias is directed by Enrico Giorgi (Bologna University) and Paola Buzi (Sapienza Università di Roma), the latter being also the director of the other projects described here.
2. Between 1993 and 2004 the archaeological expedition to Bakchias was a joint mission of the Universities of Bologna and Salento. From 2005 the University of Salento became the only responsible for the archaeological mission working at Soknopaiou Nesos, while Sapienza University joined that of Bologna at Bakchias. (Giorgi and Buzi 2014).

amount of disappointment, since the Greek papyri which they had brought to light were few in number and of little interest, apart from a few exceptions. Moreover, from an archaeological point of view, no stone monument of any architectural value had been discovered.

As a matter of fact the harsh judgment of Grenfell, Hunt and Hogarth has affected the interest for Bakchias, whose investigation was abandoned until 1993, when the Italian mission started its work.

If, according to the traditional chronology, it was believed that Bakchias must had been founded around 280 BCE, during the reign of Ptolemy II, while the second reclamation of the area was taking place or was about to take place (being the first reclamation that carried out by Amenemhat III, during the Middle Kingdom), we are now aware, thanks to our excavations, that things went differently and that Bakchias was an active centre at least from the 26th dynasty, and probably earlier. A new chronology has therefore been elaborated on a completely different basis compared to what we knew before (Pernigotti 2014a: 17-38).

It is clear now that the urban structure of the *kome*, its religious architecture – with six temples of different ages – and as a result the *pantheon* within them, changed over the centuries. It went from modest village made entirely from mud bricks to the large centre of the Arsinoite *nomos*. It was a great collector of enormous quantity of cereals, which were transferred, in large boats, along the canal it faced to the south, towards Bahr Youssef, as far as the Nile and from there to Alexandria, from where, at least in part, the road led to Rome (Fig. 8.1).

As for the toponomy, Bakchias is a name which appears strictly linked to the Ptolemaic dynasty and to its religious ideas focusing on the Dionysian cult, and it corresponds with other toponymies of the Fayyūm (Dionysias, Philadelphia, Theadelphia etc.). There was a coherent urban policy by the Ptolemaic sovereigns, which was also manifested in the choice of names given to old and new settlements.

The name of one of the two crocodile patron gods, Soknobkonneus – the other patron god being Soknobraisis – (Pernigotti 2014b), the probable significance of which is 'Sobek-lord of *Ghenut*', however, suggested a pre-Ptolemaic phase of the village, when its name was *Ghenut*. The coexistence of two place names (*Ghenut*/Bakchias) could only mean that one name followed the other – that is, that *Ghenut* was succeeded by a new name, Bakchias, when the village was revived and perhaps also repopulated during the second reclamation of Fayyūm carried out in the reign of Ptolemy II. The 'Book of the Fayyūm' – a religious text dating from the Roman period, but probably based on earlier material – appears to associate also a second place name, *Kem-ur*, with Bakchias, although this is more debated.

Certain findings from the western sacred area[3] and from the northern district of the village had already posed questions about the periods before the foundation of the Ptolemaic township.

With regard to the sacred area, these concern the remains of statues which must have been part of the sacred furnishings of Temple A: a fragment of the head of a stone statue, possibly dated to the New Kingdom of Egypt or to the Late Period (750-342 BCE); a headless statue of a kneeling male figure with the inscription erased which can be dated, at the latest, to the reign of Psamtik II (26th dynasty, 664-525 BCE); another headless statue with a hieroglyphic inscription of a figure called Padibastet, also dated to the reign of Psamtik II (Pernigotti 2008; Giorgi 2011: 184). Moreover, below the main temple of the site, Temple A, and under the enclosure of Temple B, a kiln and an amphora from Tyre, which can be dated to between the seventh and sixth centuries BCE (See Gasperini 2014 [no. 556] Rossetti 2014, with related bibliography), was found embedded in the ground.

Excavations in a house interpreted as the residence of an Isiac priestess, where a scarab from the *Menkheperra* series was found, dated to the eighth century BCE, had also already suggested a building phase before the Ptolemaic Period. Thanks to stratigraphic investigations carried out recently in an adjacent area, still within the northern district, we now know that the townships associated with the first Ptolemaic settlement was inhabited before this and – based on radiocarbon analysis of some remains of animal bones – we can trace it back to at least the middle of the sixth century BCE.

If we previously had to consider the hypothesis that some of these portable finds could have been transported to Bakchias even from neighbouring places, the remains uncovered in reliable archaeological contexts suggest to us a real occupation of the site in a pre-Ptolemaic Period. Unfortunately, it is not easy to pinpoint more accurately the chronology, even if we can observe considerable convergence of some dates during the period of Psamtik II (26th dynasty).

In fact, some geographical factors could already reveal the potential of this site from the time of the dynastic epoch. The township grew up above the slope which marks out the hollow of the Fayyūm to the north east, along what was the shore of the

3. For the two sacred areas of Bakchias see Rossetti *infra*.

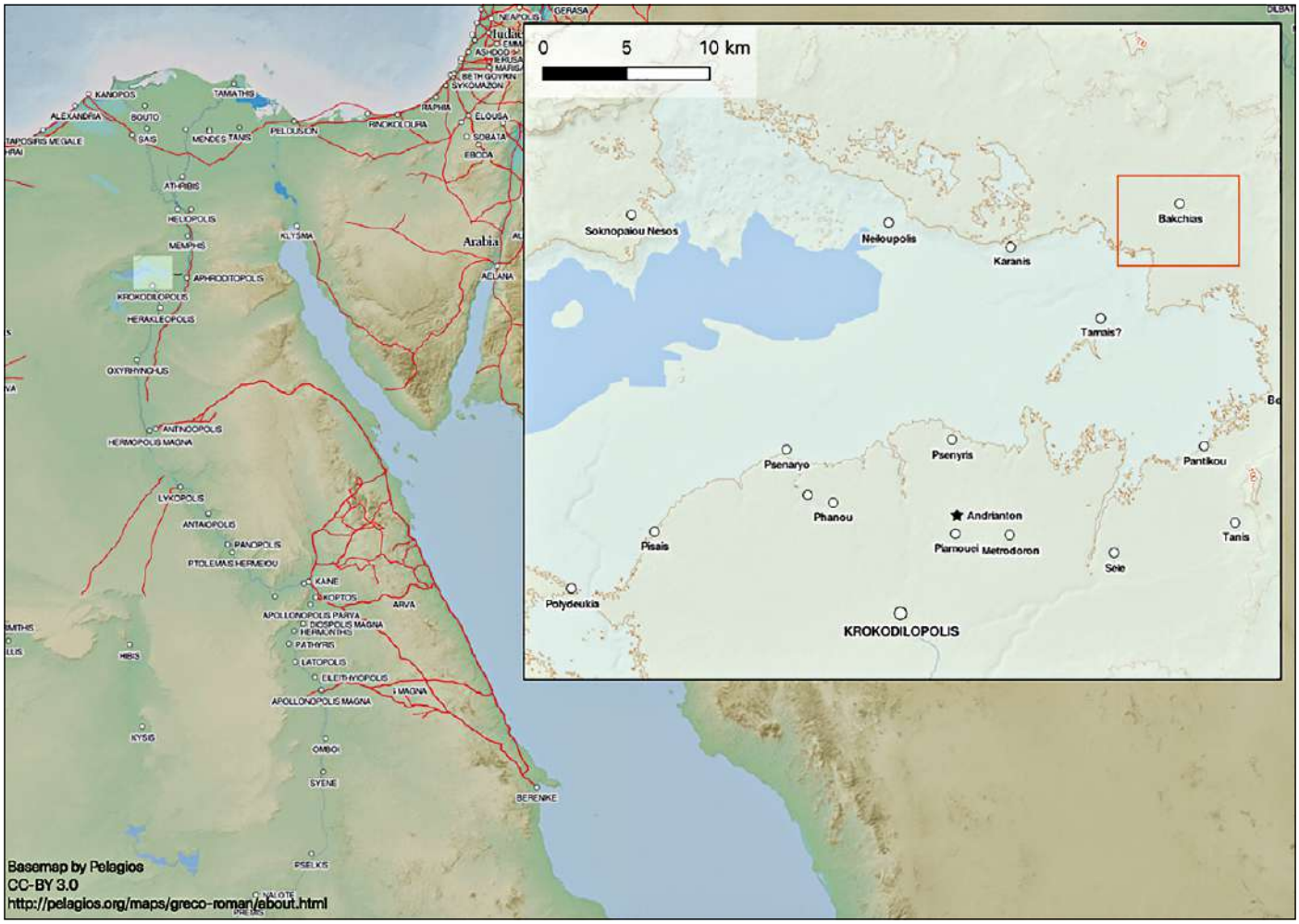

Fig. 8.1 – The Fayyūm area (Elaboration by J. Bogdani).

lake in the dynastic epoch, at the intersection with the northern slope which linked the region with the Nile Valley and Memphis. The location must therefore have been extremely attractive to the ancient population when choosing a site. It is not surprising that other centres in the region located on this raised plateau, such as Shedet/Arsinoe (Madīnat al Fayyūm), or Gia/Narmouthis (Madīnat Māḍī), and Tebtynis (Umm al-Burayǧāt), preserve important remains from the dynastic epoch[4].

The results of the last missions

As for the topography of Bakchias (Fig. 8.2), the northern part was the first to be studied by Italian researchers. The Memphis route entered the city on this side, and entrance was regulated by the northern city gate and a custom house, of which we were already aware thanks to descriptions found in Roman-era papyri (Ippolito 1999)[5]. To the east and west of the gate, a residential district stretched out, whose layers generally match those that cover the entire existence of the city.

4. For a general classification of the sites in question see Davoli 1998. For Tebtynis and Narmouthis in particular, see Gallazzi 2001: 174, 179, 183; Bresciani and Giammarusti 2012: 23-25. At Soknopaiou Nesos, during the reconnaissance of surfaces conducted in the surroundings of the city, pottery remains attributed to the New Kingdom of Egypt were found (Capasso and Davoli 2012). In the case of Soknpaiou Nesos, it has been speculated that a dynastic sanctuary existed on an island in the lake, in a different position from that of the Ptolemaic township, to where the cult would have later moved. See Davoli 2015: 120.

5. These documents actually describe the customs duties that were demanded of those who crossed the city. There is only direct reference to this particular city gate in the case of commerce involving the northern route.

On the other hand, the most recent excavation campaigns conducted in the southern part of the old city unearthed a number of buildings that are of seminal importance for understanding urban living standards in the past. These buildings particularly include the baths, the kiln for making ceramics and the granary. Once more, we were already aware of the existence of these buildings thanks to the information that could be deduced from written records. However, it was only thanks to archaeological surveys that we were able to identify them beyond all reasonable doubt and have a clearer idea of the way they developed over time. Apart from the granary, which was built towards the end of the Ptolemaic era, the other two buildings date from Roman times. They all share, however, their geographical location along the large southern canal, which can easily be explained, if we take into account the need to supply water to the baths and kiln and the benefits to be gained from placing the granary near a waterway[6].

Despite the fact that baths in Bakchias are already mentioned in a papyrus that can be dated to the third year of the Emperor Nero's reign (57 CE), it was only thanks to the surveys work, followed by the excavations, that we were finally able to identify them[7]. Indeed, we now know for a fact that they were composed of a building mainly made of brick with a number of floors that are still well preserved[8]. The presence of more valuable construction materials, such as fired brick and stone slabs, soon turned the building into a quarry, when it no longer performed its function. It is for this reason that the baths of Bakchias are an anomaly from a conservational point of view as well, because many floors are still clearly visible, such as the cobbled floors in the crawl space that clearly could not be reused, while almost all the brick walls have disappeared, unlike the many houses in mud-brick that generally still have visible masonry. Despite the incomplete state of the ruins, we were able to clarify a number of aspects[9]. From a chronological point of view, the baths were built during the early Roman Empire and were in use, with a number of renovation phases, up until the dawn of Late Antiquity. Some diagnostic artefacts that we were fortunate enough to find, particularly coins, unearthed in reliable stratigraphic locations, allow us to date the building to the Augustan age, whilst a thorough redevelopment of the site took place during Hadrian's reign[10]. This second construction phase led to changes in how rooms were used to varying degrees and changed the route through the baths. A further renovation may have taken place in the late era (fourth century CE), before the site was definitively abandoned, which we surmise from the many remnants of *noria* or *saqyia* buckets (dateable to the fourth-fifth centuries CE). These were containers for drawing water that, in this phase, clearly took place using wooden water wheels to which these containers were tied to collect and transport water (Giorgi 2012: 130-136). Some artefacts dating from the early Middle Ages, such as late amphorae and Islamic glazed ceramics, lead us to believe that the area was continuously inhabited even in such a late period in the history of the northern city. Nevertheless, we do not know if it was used in a less organized way or whether the building had fully or partly maintained its use as a bath house in these final phases.

Just south of the baths, a craftsmen's district dating from Roman times was found during the 2010 excavation campaign, where surveys are still ongoing (Rossetti 2011). It is a very complex building (BSE 352), mainly consisting of brick structures, even though there are sections in unfired clay masonry. There are the remains of a kiln and two tanks or cisterns for collecting water or perhaps clay, as well as a third, smaller tank that could have been used to draw on such reserves. Although the poor state of conservation does not allow us to interpret the building with any certainty, we cannot rule out that these three reserves were connected and could have been used as filtering tanks for clay that ended with the smallest tank where the purest clay would have settled. Waste liquid may have run into a channel that flowed into the nearby canal.

From a chronological point of view, the layout seems to be dateable to the Augustan era (late first century BCE).

Bakchias' public granary (*thesauros*), which was also already known to us thanks to two papyrus documents dating from the second century CE and an *ostrakon* from the third century CE (Nachtergael 2007), was investigated in detail, a fact that allowed

6. For a detailed description, see Tassinari 2009; Giorgi 2012; Giorgi 2014: 53-67.

7. This document (BGU I 181) mentions an episode that probably involved an attack and subsequent theft that took place in Bakchias' baths on 15th June 57 CE. The dating of the building and the absence of other contemporary buildings led us to identify this complex as the one mentioned in the papyrus (Nachtergael 2007: 15-19; Giorgi 2012: 36-37).

8. For a more exhaustive description of this building complex, see Giorgi 2012.

9. The most relevant comparisons in the Fayyūm region are those with Karanis and the Roman phase of the baths of Tebtynis. Hellenistic baths renovated in Roman times are also known to us in Arsinoe and Dionysias, while we only know of a Hellenistic phase in Arsinoe, Euhemeria and Theadelphia (Giorgi 2012: 19-28).

10. Among the other findings there are an Augustan coin (that can be dated to the period after 19 BCE) found at the bottom of a cistern; two coins from Hadrian's reign (dateable to 128-129 CE), one of which was unearthed whilst attached to the floor in room A; a coin from Trajan's reign and one from Hadrian's reign; and a stash of 45 mid-Empire coins (c. mid second-early third centuries CE) which was found in the drains (Giorgi 2012: 44-45).

us to detect a late-Ptolemaic layout with an important phase of use at the height of the Roman Empire (second century CE). Despite the fact that only part of it has survived and only in the lower section of the bottom of the storerooms, we can see that it was a large mud-brick building, so large that, to date, it can be considered the biggest building known to us in the Fayyūm region[11]. The north-western part, which must have been where the offices were located, has unfortunately disappeared because it was destroyed by a large looting tunnel. The central part of the building, which is over 25×20 m wide, is edged by thick perimeter walls with a large central spine wall that divided two strips with three rows of 13 quadrangular cells on each side. The southernmost row was edged by another large wall that divided it from a final series of 13 storerooms that were slightly larger[12]. Given the geometric structure of the building, we can imagine another row of 13 similar storerooms against the northern perimeter as well. All of these compartmentalized structures, which we have dubbed storerooms and cells, must have been inside a large courtyard. From a functional point of view, the thicker walls were probably also used as walkways to reach the storerooms below. However, given that this would have been more difficult in the rows of three cells, it is possible that inspections may have been carried out by walking over the removable covers that must have existed in any case[13]. As far as capacity is concerned, it has been estimated that the 78 smaller cells could store approximately 85 *artabae* of wheat each and that the granary must have been able to store at least 6,400 *artabae* of wheat in total, while the remaining 26 storerooms may have held around 2,600 *artabae* of barley[14]. This is the equivalent of 2,000 *modii*, i.e. a tenth of the entire annual grain tribute paid by Egypt to Rome during the Augustan era[15]. With the end of Antiquity, the granary must have lost its purpose and was used in different ways, even as housing, as shown by the discovery of artefacts that can be traced back to Coptic culture and the construction of a brick silo (Buzi 2009; Tassinari 2009: 51).

11. In addition to the many public and private granaries in Karanis, similar buildings are known to us in Bubastis, Dionysias, Euhemeria, Nilopolis, Sinnuris, Tebtynis and Theadelphia (Tassinari 2009: 29-40).
12. The perimeter walls are 135 cm thick, while the interior spine walls are slightly thinner. The smaller storerooms are 160×120 cm, while the larger ones are 153×256 cm.
13. As has been noted with valid arguments, these storerooms could not have been open to the elements, at the very least so as to protect the grain inside from parasites or from becoming a food source for birds of all kinds (Tassinari 2009: 25).
14. Barley was the second most abundant crop after wheat, while that of emmer wheat seems negligible (Tassinari 2009: 28).
15. Ancient tradition (*Epit. De Caes.* 1, 6) states that the total tribute paid by Egypt was 20,000 *modii* (Tassinari 2009: 28).

It is also worth mentioning the surveys and excavations conducted on the other side of the canal, in what is known as the South Kom.

The decline of the township to the north of the canal did not mean that the site was definitively abandoned but rather that the urban centre of gravity shifted to the southern bank of the watercourse, as a result of a retreat towards the south of the cultivated area and a general contraction of the region. According to the scattered remains on the surface, to the uniformity of the techniques and to consistency in the orientation of the buildings, the South Kom was subject to a rationally conceived settlement at the end of the Roman Age (Giorgi 2007: 82-91). It seems that the area occupied by the Ptolemaic and Roman township was abandoned during the course of the fourth century CE. The big temple areas, which had by now lost their function as cultural and economic centres, fell into disuse and were among the first to be destroyed to recoup the precious building material.

In the course of the fourth-sixth centuries CE, many dwellings which were by now disused were covered in sand and several tombs appeared in parts of the township. Later, on top of these little dunes, which now covered the buildings of the ancient city, sheep pens or byres were built as shelter for the flocks or herds[16]. The only exception in this general panorama may be represented by the baths, where there are later findings, some of which can be attributed to Islamic culture. It also seems that a new water supply system came into operation using *saqiya* vessels attached to water wheels (fourth-seventh century CE).

Slightly later, between the fifth and sixth centuries CE, there must have been a further evolution of the South Kom site, as the late Roman structures disappeared and a Coptic monastery (?) was built with two churches architecturally connected to one another.

During this period, the temple areas were transformed into real borrow pits, as is shown by the presence of blocks from Temple C which were reused to construct a Coptic church in the South Kom. The abandonment of the ancient urban area did not mean that the site was now completely abandoned. The plundering of buildings which were no longer in use by citizens is valuable evidence of renewed building activity more focused on the needs of daily life at that time. The two Coptic ecclesiastic complexes were, in turn, supplanted by a township of Islamic culture.

16. This is the trend which in other geographical areas of the Mediterranean was described as ruralization of the urban area but in this specific case was really desertification. In the shallower layers in the area in front of Temples A and C, several remains of sheep-goat dung have been found as well as the remains of an animal.

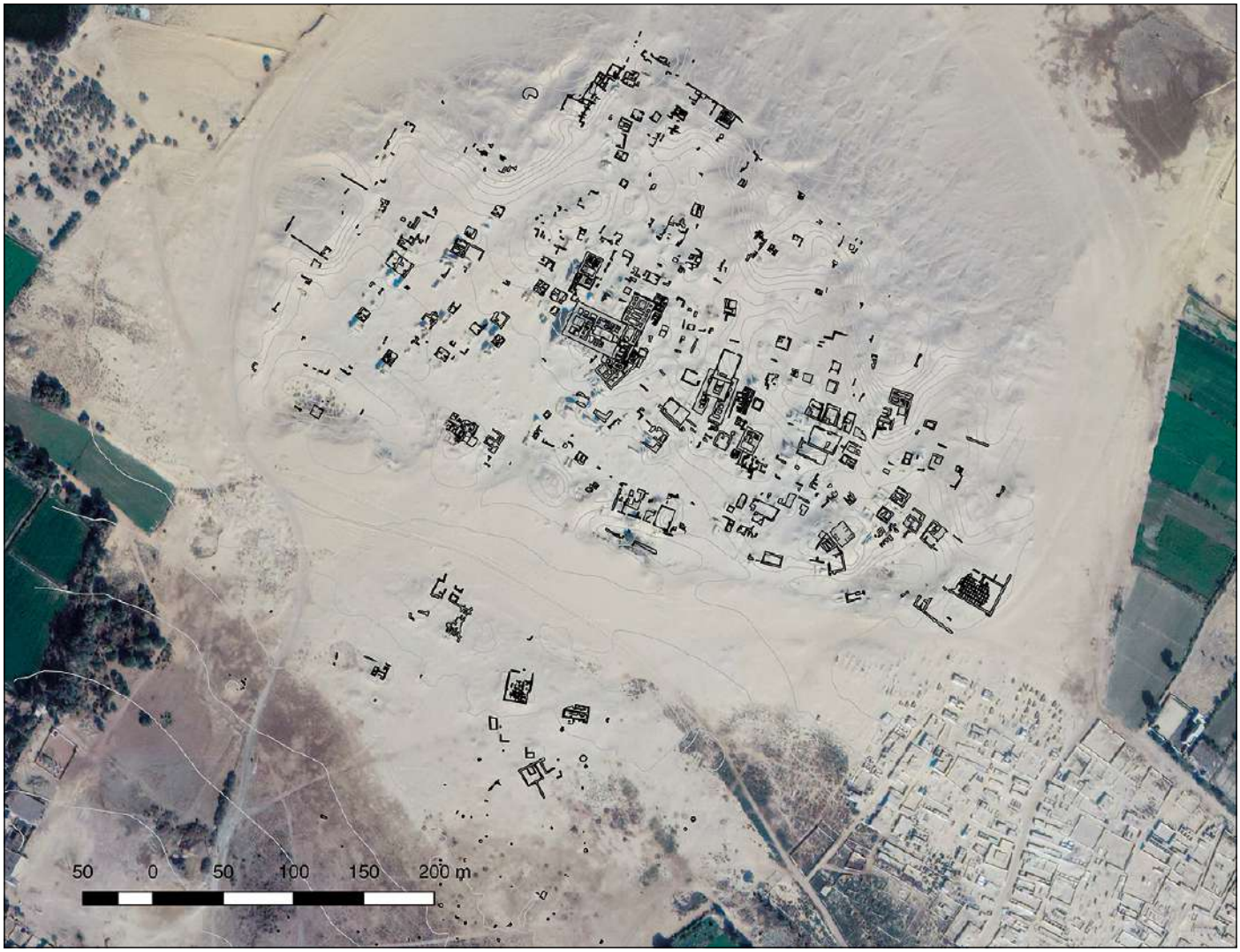

Fig. 8.2 – General plan of Bakchias (© Joint Archaeological Mission of Bologna University and Sapienza University of Rome at Bakchias).

This last medieval Bakchias appears to have featured buildings which were connected with productive activity with evidence of remains of numerous millstones and presses. The churches were redesigned and transformed into functional buildings, with presses, tubs and *silos* (Buzi 2014).

1.2 The temples and the sacred areas of Bakchias in their diachronic evolution

The North Kom of the village has proved to be of particular importance for the understanding and the reconstruction of the religious life of the ancient village, since six temples have been unearthed there. These temples, that are not contemporary with each, were organized in two different sacred areas (Rossetti 2014) (Fig. 8.3).

Within a multidisciplinary research framework, the temples and their annexes were examined by integrating the archaeological data with the information obtained from spatial analysis, papyrological and epigraphic sources (see Rossetti 2017a, with bibliography). The interpretation of this complicated stratigraphic situation, which is largely due to ancient and modern spoliations, has allowed us to study the sequence and the development of the various temples.

The early Ptolemaic period (late fourth century BCE-mid-third century BCE)

As we have seen, the 'new' Ptolemaic hamlet of Bakchias was founded at the very beginning of the land reclamation project and was organized according to a quite regular grid focused around the most ancient temple discovered, named Temple B (BNO 109).

The sacred edifice was built of mud-brick, except for the entrance doors, which were made of limestone. The temple measured 13×16 m and was oriented southwards, probably towards the main canal. The elongated shape of the *naos* together with the discovery of scattered crocodiles' bones, pitched scales and a little statue of the reptile, suggest that one of the Sobek's manifestations was venerated inside the edifice. In front of it, several structures of worship service have been found, including what appears to be the base of a basin.

This oldest sacred area, and consequently the village, was established in a place formerly occupied by other edifices: these structures show a completely different orientation from the others. It is possible that these structures were part of a single complex, perhaps already having a religious character, which belonged to an earlier village dating at least to the Late Period.

The mid-Ptolemaic Period (mid-third century BCE-mid-second century BCE)

During the second half of the third century BCE, when the land reclamation project was almost completed, the settlement was re-organized according to the new temple-*dromos* system, located at a very central position, nearby Temple B. The erection of a new important temple (Temple A) and a rapid expansion of the entire urban planning was probably related with the enlargement of the agricultural area and the increase in the economy and finances of Bakchias.

This sacred building (Temple A, BSO 375), likely a *proton hieron* (a first-class temple) for the Ptolemaic administration, was oriented orthogonally to Temple B and was dedicated to the crocodile god Soknobkonneus (Rossetti 2014: 118-130)[17]. The first mention of this crocodile deity appears in a Greek papyrus dating back to 218 BCE (Enteux 54 – TM 3329) according to one of the most corroborated interpretations, the god's name is the Greek transcription of *Sbk-nb-Genwt*, 'Sobek lord of Ghenut', the dynastic name of the site (Pernigotti 2014a, 2014b).

The sacred building is visible today in its impressive structure of mud-brick (26.3×39.5 m) and it is preserved to a height of about 10 metres (corresponding partly to the elevation and partly to the foundation). The temple consists of 25 rooms in total and it is the result of several building-phases, the last of which led to the raising of the levels of the internal floors and to the creation of an entrance system made of sandstone blocks[18].

The temple and its badly-preserved annexes were surrounded by a mud-brick *temenos*, from which the long *dromos* branched off. The sacred processional way became the most important axis of the settlement, sloping eastwards and running parallel to the main local canal. This new orientation of the system temple-*dromos* and thus of the main axis of the settlement is probably due to the expansion of the village, whose development focus on the main axis parallel to the canal. It cannot be excluded that the *dromos* also pointed to one of the channels that irrigated the field around Bakchias.

The late Ptolemaic Period (mid-second century BCE-late first century BCE)

This new face of the village was not destined to last long. A revolution in the urban planning can be traced back to the end of the second century BCE: the first sacred area was completely rearranged, a second important *temenos* was added and the road system hierarchy was transformed once again.

First of all, in front of the most important structure of the village, the Temple A[19], a new sacred building (Temple C, BSE 384) was erected, completely made of sandstone and limestone blocks (Rossetti 2014: 131-139). The edifice was oriented southwards, towards the main canal, and very likely it inherited both the worship of the local main god, Soknobkonneus, and the administrative status of *proton hieron*. The temple measures 22×17 m and, since Late Antiquity, the structure has been badly affected by the spoliation of the stone material, although the ground plan may be reconstructed on the basis of the foundation rooms. In total, 16 rooms have been identified, with the plan of the inner chambers following the classical Egyptian style, similarly to the sacred edifices of Soknopaiou Nesos and Dionysias) in the Fayyūm (Davoli 2015: 122-123; Rossetti 2015: 314-318. An entrance *pronaos* was erected on the façade, probably decorated with columns, which were later reused in the construction of the churches.

17. For the temple classification during the Ptolemaic period see Rossetti 2015, 2017a.

18. This raising of the temple's level (more or less 3 metres) entailed the obliteration of the earlier buildings, comprising the little Temple B.

19. The Temple A was dismissed as a sacred building, but it was used as a warehouse.

In the direction of the old main axis (the *dromos* of Temple A) a second mud-brick temple, named as Temple E (BSE 408), was built. Although poorly preserved, the internal organization of the structure (34×22.5 m) was very similar to that of Temple A, and showed a south orientation parallel to Temple C. This sacred area, placed inside its own enclosure, was dedicated to the crocodile god Soknobraisis, *Sbk-nb-rsy* literally 'Sobek lord of joy', who was probably introduced later in the village *pantheon* and is attested for the first time in a still unpublished Demotic papyrus dating not long after 192 BCE[20].

Both these sacred buildings altered the ancient processional way, the site's main axis, as well as the structures connected to it. In its place, however, two thoroughfares were realized, the *dromoi* of the two temples, both reaching the canal, which was about 90 metres away.

A second temple (Temple D, BSE 6) was built near the new sacred enclosure similar in size (12.50×17 m) and in architectural features to the ancient Temple B. The temple could be probably classified as a second-class temple (*deuteron hieron*) according to the Ptolemaic administration (Rossetti 2015, 2017b). It was placed inside its own *temenos*, where a priest house and a series of annexes have been found. The deity that was worshipped in it is still unknown, but it is probable that the sacred edifice housed the cult of the god Amon or the syncretistic goddess Isis-Hathor-Aphrodite, for which later papyri attest a probable independent temple in the village[21].

The Roman Period

The long development of the village was completed in Roman times, when the two sacred areas were significantly monumentalized. The two impressive *temene* characterized the scenery of the town and produced an important architectural impact on the village landscape. Their importance is also demonstrated by the papyrus BGU XIII 2215 (TM 8745), which records the existence at Bakchias of two *logima* temples, epithet that classified the most important temple during the Roman era (Rossetti 2015, 2017b).

The temple of Soknobkonneus (Temple C) was decorated on the front with a new courtyard and a majestic entrance stone pylon gateway, the only one known in the whole Fayyūm. Its twin temple (Temple E) was rebuilt in stone and enlarged in its rear part.

Despite the precarious state of conservation, the new temple of Soknobraisis (BNE 14, 21.3×13 m) was probably realized in Egyptian style, similarly to the other one, and adorned with an access *pronaos*. A very important archive probably originated from this second enclosure, and has yielded 34 papyri, ranging in date from 116 to 216 CE, which provide some information about the administrative life of one or, in some cases, both of the temples (TM ArchID 235; Gilliam 1947).

The urban organization of Bakchias seems to have remained unaltered throughout the Roman period until the abandonment of the northern area, which probably occurred during the late third and early fourth century CE, when the gravity centre had moved further south and the ancient remains entered a state of partial abandonment.

2. Tracking Papyrus and Parchment Paths: an Archaeological Atlas of Coptic Literature. Coptic Texts in their Geographical Context. Production, Copying, Usage, Dissemination, Storage. Intellectual production and archaeological context compared: The 'PAThs' project

2.1 Methodological introduction

'PAThs' is the short form of "Tracking Papyrus and Parchment Paths: An Archaeological Atlas of Coptic Literature. Literary Texts in their Geographical Context. Production, Copying, Usage, Dissemination and Storage", a European Research Council founded project aimed to create an online atlas able to comprehensively and clearly represent the long-lasting and complex phenomenon of the Coptic literature production in its actual and concrete archaeological context (paths.uniroma1.it; https://atlas.paths-erc.eu/).

The most peculiar trait of 'PAThs' is its ambition to be a multidisciplinary project: the application of information technology to humanities studies is by no means an innovative approach, but the combination of literary, textual, religious and historical studies with archaeological research, using information technology as a common sharing and working platform, certainly is.

The historical background of this common research is the Late Antique and Medieval Egypt: the third and the eleventh centuries CE are, in fact, the time-frame of the birth, diffusion and sunset of Coptic language, a somehow artificial construction yet representing the very last stage of the millenary history of the Egyptian language (Buzi *et al.* 2017: 2-3). Coptic language was used at

20. P.Stan.Green.dem 23(1)-24(1), preliminary discussed by Arlt and Monson 2010: 114.

21. Respectively, they are the papyri P.Lund IV 9 (TM 11881) and P.Bacch. 7 (TM 15184), both dating back to the second century CE.

an initial moment to translate Biblical works from Greek, and was soon employed to compose original literary works, mainly of religious content. The main aspiration of 'PATHs' is to try to capture, sketch and actually represent the diachronic geography of this literary production by extensively combining philological studies, archaeology and digital humanities, and to explore the process of production, copying, dissemination, usage, transmission and preservation of Coptic texts in a very close relationship with the tangible geographical contexts of their provenance (Bogdani 2017). Besides the philological, papyrological, codicological and literary studies conducted on manuscripts, a careful attention must be paid on the archaeological and topographical aspects of the Egyptian landscape, which certainly are not unknown to the academic community, but have not been yet considered in their entirety and with a particular focus on the later (and less monumental) phases of the Egyptian history, and rarely in connection to text production and dissemination.

This is the main reason why *Places* becomes to us a pivotal resource from which research can be fruitfully conducted (Berno *et al.* 2018). Places are, in our view, first of all archaeological sites, tangible locations that bear archaeological interest, where excavations have been, are being or can be conducted. This is the first and fundamental distinction aspect between 'PATHs' archive and previous publications (Amélineau 1893; Timm 1984) or other richer and most famous online database, such as Trismegistos Places (Verreth 2013; Depauw and Gheldof 2014) or the Pleiades gazetteer (Simon *et al.* 2016); these are resources that have profoundly influenced our work and that have offered a fundamental contribute to our first dataset. Whilst at a first glance the 'PATHs' Places and Trismagistos Places (or Pleiades gazetteer) may seem very similar – and indeed they are, since 'PATHs' owes its first nucleus to Trismegistos (Berno *et al.* 2018) – the basic concepts on which these resources are built on is quite different. Trismegistos records place names (i.e. *toponyms*) found in written sources (texts and documents compiled in any writing support) and provides them with a location – geographical coordinates – and information on dating, when known. 'PATHs', on the other hand, aims at obtaining a complete and up-to-date catalogue of *sites* known to have been active in the referenced period, i.e. third to eleventh centuries CE beyond the attestation or not of the toponym in literary or documentary texts. Each site is thoroughly described, providing a very detailed bibliographic report on previous research and studies, with full description of its urbanistic and monumental shape in Late antiquity, but also an exhaustive overview of the previous (and sometimes later) phases. It is our strong belief that the study of a well-defined chronological phase of a landscape (or even of a very small archaeological site) cannot be fully completed and understood if the wider chronological context is neglected: it is not possible to study Late Antique Egypt without taking into account the Pharaonic, Hellenistic and Roman phases that have radically marked and changed the landscape.

A particular attention is paid to places that are known to have provided manuscripts (or manuscript fragments) or that are somehow related to the manuscript creation, storage, or circulation. These places, even if (or because of being) scarcely documented by archaeological sources need a more attentive analysis, in order to better understand the book creation and conservation process. We should also keep in mind that Coptic literature is made up exclusively of works of religious content, and therefore the religious geography must receive a particular focus in our reconstruction. Consequently, bishoprics, pilgrimage centers and important monastic clusters mark at our eyes inevitable prominent places in the Egyptian Late Antique geography.

These few points briefly clarify our concept of place and the type of archaeological landscape that we are trying to represent. On the other hand, looking inwards, these places must be located in a very detailed network of connections with the other entities analyzed and registered in the 'PATHs' database in order to provide a solid foundation of the atlas. Some few examples may be enlightening beyond any theoretical speculation. Manuscripts are by far one of the most important material evidences we deal with and a pioneering work has been coordinated in the past decades by Tito Orlandi who has implemented a formidable online database (Orlandi, n.d.) aiming at patiently and rigorously reconstructing and returning to the academic community the *codicological units* (Orlandi 2008: 7-11), i.e. the original manuscripts with literary content (Orlandi 2003). We have had great benefit from this important work and are further developing this model by adding, for each manuscript, a very detailed description of its physical aspect in the attempt to provide a useful comparative tool and to obtain a new set of information on the fabrication techniques, the history of the book and the reconstruction of the activities of the ancient *scriptoria*. These are aspects that texts by themselves cannot provide and only an accurate analysis of the fragments can enlighten. Moreover, manuscripts are being related to places, i.e. archaeological sites by several means; in the most fortunate cases each manuscript can be linked to many places. These are qualified links, marked by a limited set of labels, in order to provide significant cluster capabilities without losing precious information. A manuscript can be thus referred to

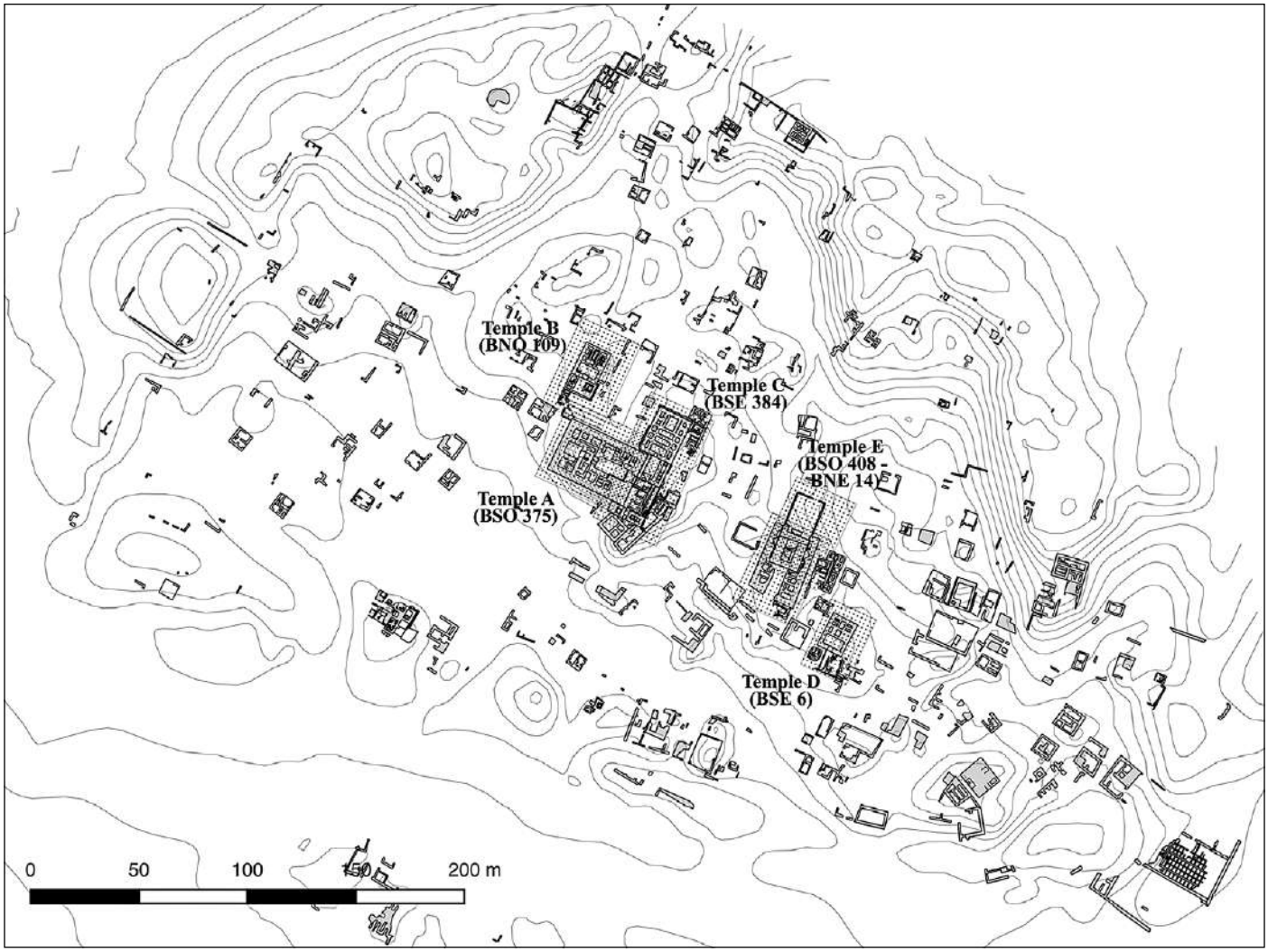

Fig. 8.3 – The two sacred areas and the temples of Bakchias (© Joint Archaeological Mission of Bologna University and Sapienza University of Rome at Bakchias).

a *production* place; this information can be obtained on the basis of palaeographic analysis, codicological examination or even textual evidence[22]. Books are a precious (and rather expensive) good and, as such, displacements and safekeeping locations are sometimes worth registering in paratexts (mainly colophons). These *storage* places too are being carefully filed, in the attempt to retrace on the geographical map the circulation of these very special archaeological finds. As far as the archaeological context is involved, we must not forget the extraordinary climatic context of Egypt, that allows sometimes the conservation of entire volumes (Górecki 2007; Antoniak 2008). *Discovery* places are thus recovered not only from antiquarian notices, but sometimes from first hand archaeological documentation.

The archaeological (re)contextualization of manuscripts is not a plain task, as some over-simplifications introduced in the previous paragraphs may suggest. A very meticulous, attentive and patient work on all the scattered pieces of this disassembled mosaic must be completed before the overall picture is completed.

22. Paratexts, such as colophons, do often provide reliable information on the production process of the book. For a more detailed and documented discussion of this topic see Soldati 2018.

Yet the methodology is set and is being tested and important achievements are being earned.

The archaeological survey of the Late Antique Egypt and the archaeological atlas, besides providing the fundamental base for the overall analysis, do represent, we believe, an important contribution on its own. If it is not considered as a static and immutable contribution but as an open and collaborative platform, it can become foundation of other parallel studies focused on this time-frame, not necessarily related to manuscripts, literature, history of religion, etc., but to any cultural aspect of this most particular region.

2.2 The Places-Database and the case of western thebes: the contribution of archaeology to the study and representation of landscape in Late Antique Egypt

The Archaeological Atlas of Coptic Literature represents the final goal and the main product of the project 'PATHs', meaning that archaeology and geography are crucial issues for the research. The value of such combination in Coptic studies appears even more relevant if one considers – with Ewa Wipszycka (2013: 109) – that "*geography and monks are rarely associated with one another*"; while 'PATHs' aims at addressing such a problem from an archaeological perspective, places are an important domain and a core part of the database system informing and underpinning the structure of the work (Bogdani 2017; Buzi *et al.* 2017: 8-9). Accordingly, their spatial, physical, stratified dimension – i.e. the possibility to link them to a tangible area, with a (more or less) precise location, and a distinctive configuration of material correlates represent a central focus and distinctive mark of the project (*supra*).

As for the structure and formalization of the record within the *Places* category of the 'PATHs' database, each entry has been assigned a permanent identifying number and contains a set of information about the ancient site, as detailed as possible, which defines and articulate its historical identity in terms of designation(s), temporal and spatial attributes, while also linking it to already existing dataset in order to compare data and integrate results[23] (Fig. 8.4). Accordingly, the main established fields concern (1) the different toponym(s) (both ancient and modern) by which the place is known depending on the linguistic and cultural context of reference (in our case: Coptic, Greek, modern Arabic and ancient Egyptian); (2) the link to similar projects as well as the cross references to scholarly *repertoria* providing comparative material and information (Trismegistos GeoID; Pleiades id; Timm 1984-1992); (3) the ancient administrative affiliation (*nomos* and province, according to the division of the country by Diocletian) and possible religious position (episcopal see); (4) the type of occupation that took place at the site together with its spatial and/or historical relationships with other places; (5) the dating of the Coptic settlement within the chronological range of reference and the criteria upon which the attribution relies; (6) a brief description of the site summing up its main topographical and historical features as documented in the extant archaeological record; (7) the link to other related entities of the database, especially manuscripts, which, as stated above, may have an articulated relationship with one or more places; (8) the spatial localization of the site, as identified by its geographical coordinates and illustrated by plans and maps; (9) an essential and updated bibliography; (10) the information about the preceding and possibly subsequent phases to the Coptic occupation.

This last point should be particularly emphasized as it allows us not just to outline continuities and ruptures in the (modes of) appropriation of a certain space, area or environment between the Coptic communities and their pharaonic forerunners but also, and more significantly, to properly contextualize such strategies into a broader perspective of dynamic engagement with a highly diversified and historically stratified surrounding landscape (Hahn *et al.* 2008; Brooks Hedstrom 2017).

Unfortunately, archaeology of Late Antique Egypt is unevenly represented[24]: areas like the Theban necropolis, densely inhabited by a very diverse typology of settlements – from the isolated occupations of Middle and New Kingdom tombs to the well-connected and organized monastic communities – provide unique contexts with a great informative potential (Wilfong 1989; Wipszycka 2009: 171-197; Pimpaud and Lecuyot 2013; Choat and Cromwell 2016). This is the reason why this area was the first to be fully investigated.

A tremendously rich archive and bibliographical documentation was reviewed and became the rationale for a specifically designed survey on the field, aimed at verifying the current conditions of the sites, at obtaining a more precise positioning of their remains and, finally, at collecting a very rich and up-to-date pho-

23. The protocol for the site-description has been developed by Julian Bogdani, Angelo Colonna and Ilaria Rossetti.

24. This situation is mainly the result of the imperialist, colonialist and orientalist values driving the research agendas of the first archaeologists exploring Egypt in the late 19th-early 20th century; within such politico-ideological context of thought and action, pharaonic monuments were accorded a largely uneven preference over the Coptic remains, despite the latter being still an extensive and well visible presence in the contemporary Egyptian landscape. Detailed discussion in Brooks Hedstrom 2017: 7-39, 40-75; Horbury 2003.

tographic documentation[25]. The campaign produced a new set of first-hand data on many major sites as well as precious information on other poorly documented or lesser-known contexts.
Each acquired place was georeferenced and fully recorded; the gathered data need obviously to be processed, refined and fully analyzed, but they already fit into a complex occupational pattern, characterized by (1) an extensive distribution of sites dotting the Late Antique Theban landscape; (2) a certain degree of hierarchization and spatial organization connecting them; (3) a systematic strategy of reuse, transformation and adaptation of earlier pharaonic spaces (temples, tombs) to the needs of the new community (Fig. 8.5).
These points have important consequences on our perception and interpretation of the urban and monastic landscape in the Theban region, which can be only briefly addressed here (cf. Brooks-Hedstrom 2017): firstly, the archaeologically documented diversification of the modes of occupation reflects a wide range of possibilities and arrangements, from massive, walled cities like those implanted at Medinet Habu (ancient Djeme: Hölscher 1934; 1954) and possibly within the temple of Seti I at Gurnah, to differently scaled and structured monastic communities like those of Epiphanius (Winlock 1915; Winlock and Crum 1926), Phoibammon (Godlewski 1986), Cyriacus (Bács 2000), to smaller units and more distant installations not necessarily having a religious character (temporary recoveries, stages of a pilgrimage routes, isolated cells for ascetic practices), located further away in the remote wadis south-west of the Theban mountain (Delattre and Lecuyot 2016). In this perspective, anchoretic and cenobitic monasticism represent two opposite options, with more nuanced transition between them.
This relates, secondly, with the delicate question about the definition of both the social identity of these spaces, their inhabitants, and the context for their mutual connections; this implies that even forms of seclusionism and ascetism might be better understood when re-contextualized as distinctive social practices within a dynamic and stratified framework of interactions, rather than as idiosyncratic religious choices. Finally, the integration of archaeological, documentary and literary information allows investigating how the new-colonized space was understood and narrated by its Christian inhabitants; how spatial relationships with the natural landscape and its monumental 'pagan' past were (re-)constructed (re-)conceptualized, and transposed

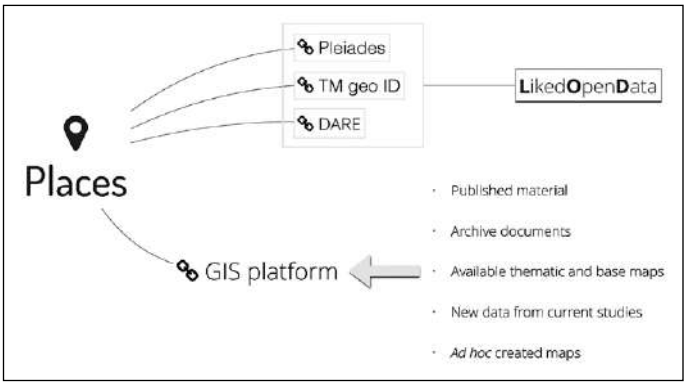

Fig. 8.4 – The mutual exchange of data in the Places section of the 'PATHs' database (© PATHs).

into culturally evocative and influent models disseminated in literary and textual sources; how, eventually, "*the desert was made a city by monks*" (*Life of Anthony*, 14.7) and earlier "*tombs filled with dead* [bodies]" (*Life of Pachomius*, G[1]7, 12) became the appropriate setting for ascetic conducts and practices.
What is therefore relevant, in this perspective, is that once formalized and visualized on a map, the pattern sketched above not only shows a strong continuity between the pharaonic and the Byzantine facies of the Theban region but also illustrates a distinct process of landscape reconfiguration, which set the geographical background and the cultural scenario for a much more complex network of relations between people, places, products than it has been acknowledged so far. This quick overview, finally, exposes the limits of a traditional literary-informed perspective by emphasizing on the one hand the conscious organization and integration of Christian spaces and settlement practices into the local environment and, on the other, the aspect of movement and circulation; as Ewa Wipszycka (2015: 24) aptly remarks: "*I monaci infatti si muovevano spesso. L'immagine del monaco chiuso nella sua cella e che soltanto malvolentieri entra in contatto col prossimo è un topos letterario che ha poco a che fare con la realtà*".
In the light of these considerations, a reassessment of the situation appears a task as appealing as desirable, with scholarship becoming more and more engaged with theoretical models and comparative approaches in the strategic fields of Coptic archaeology and religious studies (Brooks Hedstrom 2012, 2017; Frankfurter 2012; O'Connell 2014). The work of classification and analytical description conducted at Thebes clearly fits with this growing change of paradigm, demonstrating once more the strong contribution of an archaeologically-based perspective in

25. The campaign took place from 8th to 21st January 2018; the team, directed by Paola Buzi, included Julian Bogdani, Angelo Colonna and Ilaria Rossetti.

raising new questions, stimulating discussion and refining tools for the study of both Christianity (in general) and monasticism (in particular) as active forces shaping the cultural landscape of Byzantine Egypt.

3. *Sacri lapides Aegypti*. From the scribes of temples to the copyists of scriptoria. The transformation of spaces of cult, identity and memory from pharaonic and Graeco-Roman Egypt to Christian Egypt

3.1 A project on the metamorphosis of the Egyptian religious landscape

'Sacri lapides' is a new project that is now moving its first steps. It aims to analyze and provide documentary evidence concerning the transformation processes of the sacred spaces assigned to cult, identity and memory from Pharaonic and Ptolemaic-Roman Egypt to Christian Egypt. Such a task will be accomplished through both the topographical-functional analysis and the creation of an exhaustive digital catalogue of the temples and heathen shrines converted into places of Christian worship (basilicas, churches, monasteries, hermitages) designated to book production and preservation (libraries and *scriptoria*), besides, obviously, the cultural function.

Thus, 'Sacri lapides' could be seen as the theoretical precondition as well as the archaeological follow-up inspection of the ERC project 'PATHs'. Like the project 'PATHs', 'Sacri lapides' has a twofold trait (archaeological and historic-philological), but, compared to that, it mainly focuses on the architectural and planimetric features, by tangibly defining how and where Late Antique Egypt was inserting its 'knowledge places'.

'Sacri lapides' fills a gap, since a complete exploration and a methodical consideration of the processes of physical permutation of the sacred Egyptian space is totally lacking. In fact, the scholars who study the final period of Egyptian history until now have devoted themselves to the ideological-religious phenomena, overlooking (apart from some particular cases, which were in any case connected to regional ranges) an attentive analysis of the archaeological contexts and of the physical spaces.

By means of a team of Egyptologists and Classical archaeologists, whose skills complementarity is an essential requirement for the success of the project, the following goals will be achieved:

1) A complete catalogue of temples, but also of chapels and burials, dated to pharaonic and Ptolemaic-Roman ages, which have been re-used as churches, basilicas, monasteries, hermitages and in general as Christian places that are known for the finding of books or have been interpreted as libraries and *scriptoria*. The catalogue will include: a) an analysis of the planimetric relationship between Pharaonic and Christian sacred spaces, with a focus – in the case of temples that have been transformed into basilicas with their archives and libraries – on the disposition of new structures compared to the *naos* of the temple and on the changes of internal paths, also by means of claddings and the creation of new openings; b) an indication of possible continuities between temples' archives and monastic archives; c) an attentive analysis of access roads, of road networks and of maritime and fluvial harbours; d) an accurate evaluation of the distances between the structures that are the object of the analysis, and the urban centres, in order to understand the relationships – cultural, devotional (such as pilgrimages) and commercial – which intertwine the civil

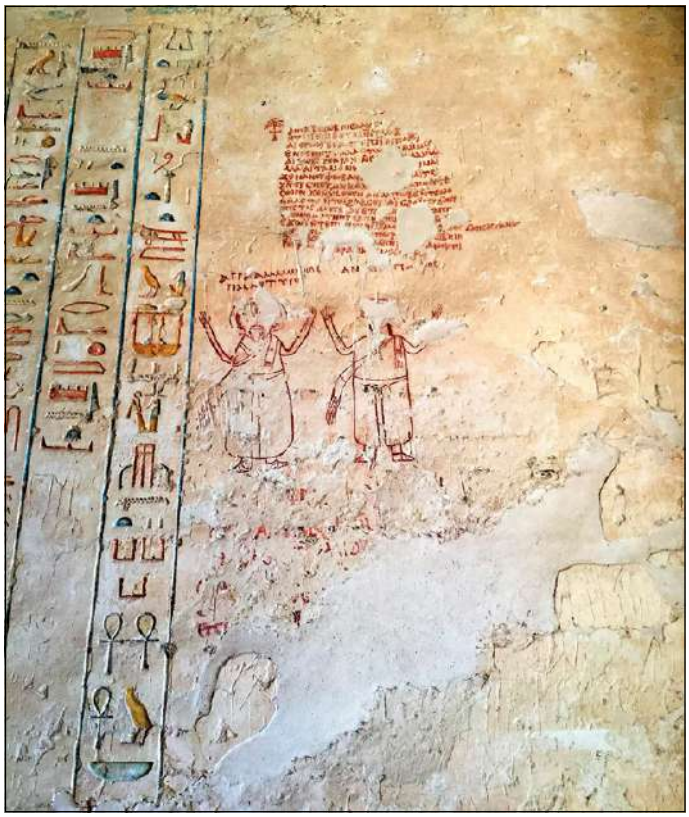

Fig. 8.5 – Coptic graffito showing two crudely painted saints with upraised arms standing below the text of a prayer; north wall of the entrance corridor of KV 2 (Ramses IV), Valley of the Kings. The pharaonic tomb was reused as a chapel dedicated to Saint Ammônios and perhaps saint Abraham (© PATHs).

and religious worlds. 2) A catalogue of the items of the temple décor bearing traces of reuse in Christian period.
3) An annotated survey of the Late-Dynastic devotional inscriptions, exhibiting an overwritten Christian text.
4) A survey of the Greek and Coptic literary sources dovetailing with the archaeological evidence.

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9. Filling the gaps: towards a comprehensive list of archaeological sites in the Kharga Oasis, Egypt's Western Desert

Corinna Rossi, Mohamed Ibrahim Ahmed

Abstract. In comparison with the well-established and long-running archaeological excavations along the Nile Valley, the study of the antiquities located in the Western Desert oases dates to relatively recent times. In the Kharga Oasis, in particular, beside a number of projects focusing on specific archaeological sites, two large-scale survey projects were launched in the last twenty years with the aim to document the existence and position of hundreds of other archaeological sites of all sizes, that lie scattered around. As of today, only a small number of sites remain totally undocumented, but many of them are in immediate danger of being destroyed by the modern agricultural expansion. This article provides a first, short description of each of them, hoping that future investigations will reveal further, precious information.
Key Words. Egypt; Western Desert; Kharga Oasis; archaeology; survey; endangered sites.

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Authors' contribution. Corinna Rossi (Director of the Italian Mission to Umm al-Dabadib) provided the general framework on the oasis and on the previous archaeological work that was conducted there; Mohamed Ibrahim Ahmed (General Manager of the Kharga Antiquities) collected and provided the information on the sites that have never been surveyed.

Acknowledgments. Our thanks go to Laurent Bavay and Sylvie Marchand of IFAO for their kind support. Thanks also to Ahmed Sabri, Inspector at the Kharga Inspectorate, for his help in sorting the information, and to 'Essam' Harby Salah for his constant support of the archaeological work in the Kharga Oasis. Finally, we wish to thank the Ministry of the Antiquities for granting the permission to publish this article. This article is the result of the research carried out by the project L.I.F.E., funded by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 681673).

1. Introduction: the Kharga Oasis

The Kharga Oasis is the southernmost of the five large oases that punctuate Egypt's Western Desert (Fig. 9.1). It covers an elongated area over 160 km long in a north-south direction, and about 30 in an east-west direction; its northern outline is marked by a high escarpment that borders the depression also along its entire eastern side, whereas the western and southern limits of the depression are less defined in physical terms.

In prehistory a large lake covered most of the oasis' depression; the progressive reduction and subdivisions of this initial lake shaped the human occupation of the area, and left abundant physical traces that are still clearly visible in the modern desert landscape (Beadnell 1909: 114-6). Historically, the oasis functioned as a major desert crossroad along the network of caravan routes that crossed the Western Desert and allowed travellers to avoid the Nile Valley (Rossi 2013; Rossi and Ikram 2013).

The oasis' depression contains a number of major archaeological sites, but also a substantial scatter of less-visible sites, ranging from prehistoric sites, to ancient agricultural installations to the elusive remains of the caravan routes themselves. Some of the major and minor sites have been the object of specific studies, but a comprehensive view of the local antiquities is still difficult to grasp. The aim of this article is to contribute to the construction of a global understanding of the archaeology of the Kharga Oasis, by offering some initial information on a number of sites that have never been documented before.

2. An overview of the archaeological studies on the Kharga Oasis

2.1 Projects on specific sites

The antiquities of the Kharga Oasis were noted by early travelers and explorers starting from Frédéric Cailliaud (1821) and Bernardino Drovetti (1822). Between the very end of the XIX and the beginning of the XX century, John Ball and Hugh Beadnell worked in Kharga for the Geological Survey of Egypt and left important descriptions of the local topography, geology and water systems (Ball 1900; Beadnell 1909).

The first major archaeological investigation of the Kharga Oasis was carried out by the Metropolitan Museum of Arts from 1909 onwards, with a break due to World War I, and focussed on the northern area, in particular on the Temple of Hibis and Bagawat (Winlock 1938-41). In the 1930s and 1940s, the Egyptian Egyptologist Ahmed Fakhri started a systematic investigation of the Western Desert oases, and documented the existence of a number of other sites scattered around the central core of the Kharga Oasis (Fakhry 1973, 1974). The late 1970s saw the beginning of a wave of

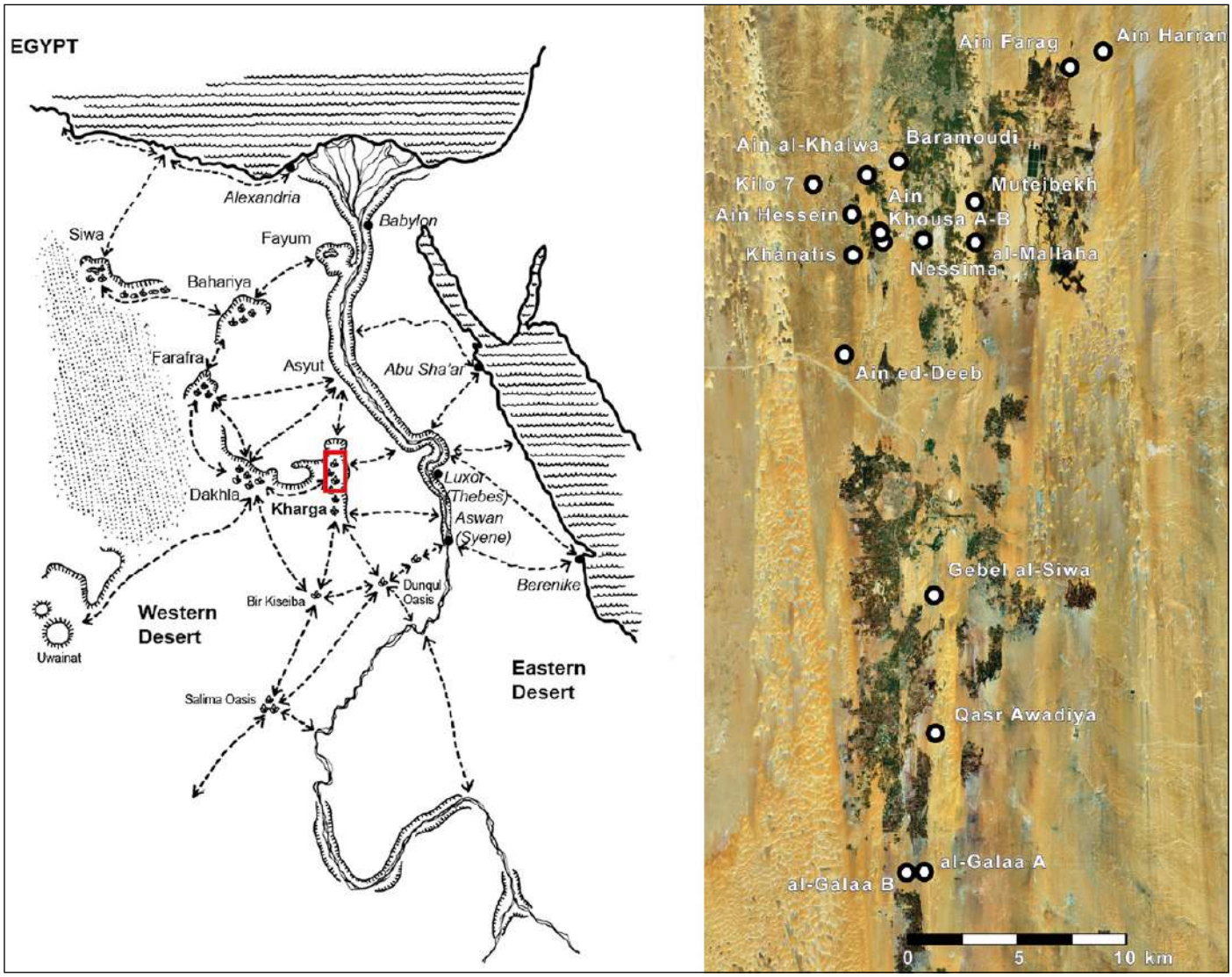

Fig. 9.1 – Map of Egypt showing the position of the Kharga Oasis, to the left, and satellite image of the central portion of the oasis showing the position of the sites described in this article to the right (C. Rossi).

large-scale, modern archaeological projects: Dush (Reddé *et al*. 2004), the Temple of Hibis (Cruz-Uribe 1988, 1995), Deir al-Mounira (Dunand and Lichtenberg 2008; Tallet *et al.* 2013), accompanied by sporadic investigations focussing on other sites; a first global summary of all these investigations was pieced together by Guy Wagner (1987) in his *Les oasis d'Égypte*. The study of the prehistoric remains of the Kharga Oasis occupies an important position and yielded significant results over the decades (Caton-Thompson 1952; Briois *et al.* 2012).

A full bibliography on the early travelers and explorers and on the archaeological projects that have been carried out in the Kharga Oasis can be found in Rossi and Ikram (2018, Chapter I.2).

2.2 Large-scale survey projects

The entire depression is punctuated by a large number of archaeological sites of all sizes. Studying in detail some major sites represented a fundamental starting point to attract the attention of the academic community on this area, but it was clear that only a small portion of the local antiquities had received some attention. This triggered, around year 2000, the birth of two major

survey projects, aiming at documenting all the visible antiquities of the oasis: the North Kharga Oasis Survey (NKOS) acquired the concession to survey the entire portion of the Kharga depression north of Kharga Town, whilst the Institut Français d'Archéologie Oriental (IFAO) acquired the entire southern portion.

NKOS worked from 2001 to 2007 and documented major and minor sites found in the northern area; the results have been published in a series of preliminary reports, and finally in a monograph (Rossi and Ikram 2018). In the larger southern portion of the oasis, the IFAO team worked at an overall survey of the antiquities from 2000 until 2014. Most of the work was carried out in the Dush area, but in the last few years the survey moved to the area around Kharga Town; the team documented a total of 524 sites. The untimely death of Michel Wuttmann interrupted the survey work and the publication of the information collected until then, which are however safely stored in a number of IFAO internal reports (e.g. Wuttmann *et al*. 2004 and 2006, copies of which are stored at the Kharga Inspectorate).

As of today, a relatively small number of sites, mainly scattered around Kharga Town and belonging to the IFAO concession, remain totally undocumented (Fig. 9.1). This contribution aims at presenting the evidence collected on these sites over the years by the Inspectorate of the Kharga Antiquities, consisting on a few descriptive notes and some images. Future, more detailed investigations carried out by IFAO and the Inspectorate will most probably identify a larger number of prehistoric sites and certainly add further valuable information on the Roman sites listed below.

The vast extent of the oasis and the large number of archaeological sites that lie scattered in the whole depression are not matched by sufficient resources, and therefore only a few major archaeological sites are permanently monitored by dedicated *ghaffirs* (custodians). About 15-10 years ago the local antiquities suffered a wave of attacks with heavy vehicles, that left several sites heavily damaged (cf. Rossi and Ikram 2018: 211 and 217, see also below). Currently the Kharga Inspectorate regularly organises tours of all the unprotected sites, carried out by *ghaffirs*, inspectors and policemen. This certainly slowed down the destruction, but cannot represent a final solution and, moreover, can do very little against the growing pressure of land-reclaiming. In the last few years, modern cultivations are expanding in all directions, also towards and around the archaeological sites that lie close to the inhabited part of the oasis, and that are starting to suffer in a substantial and unprecedented way. Some of them, like Ain Gib, Sumayra, Watermelon Settlement, Qasr al-Nessima, Mohamed Tuleib and most of the sites listed below might disappear within a few years. This impending danger triggered the compilation of this article: it seemed useful to fill the existing gaps in the information which is available to the scientific community by publishing these data, even if partial and non-exhaustive.

The approximate position of the sites listed below is marked in Fig. 1; in some cases, the notes provide the distance of the site, as the crow flies, from the junction of the road that, from Kharga Town, leads to Dakhla.

All the notes, observations and images listed below belong to the Kharga Inspectorate and were collected by the Chief Inspector Mohamed Ibrahim Ahmed and his staff in the last couple of years; the date-range for each site was provided by the local inspectors on the basis of the analysis of the ceramics retrieved on the surface.

3. List of unpublished sites

3.1 Sites located to the north-east of Kharga Town

Ain Farag

It is located about 7 km due east of the Kharga junction, just outside the modern patch of vegetation, to the south-east of the Kharga airport. It takes the name from its nearest water source. The site covers an area of about 300×150 m, and includes both a settlement made of mudbrick buildings and its associated cemetery. It appears to date to the Graeco-Roman Period.

Ain Harran

At a distance of 1.6 km north-east from Ain Farag (a total distance of 8,6 km from the Kharga Junction), lies the now isolated site of Ain Harran, also called the 'Spring of Mud'. It consists of a roundish hill, the surface of which is covered by prehistoric artefacts.

3.2 The cluster south of Kharga Town

Kilo 7

This site is located at the 7th kilometre of the road leading to the Dakhla Oasis. Its existence was noted only recently, thus representing the latest addition, in chronological order to the list of archaeological sites of the Kharga Oasis. It consists of a cemetery of rock-cut tombs dug in a small sandstone plateau, and appears to date to the Roman Period.

al-Khalwa

At 2.4 km east of Kilo 7 and 4.7 south of the Kharga Junction lies the area of al-Khalwa, located immediately to the west of a mod-

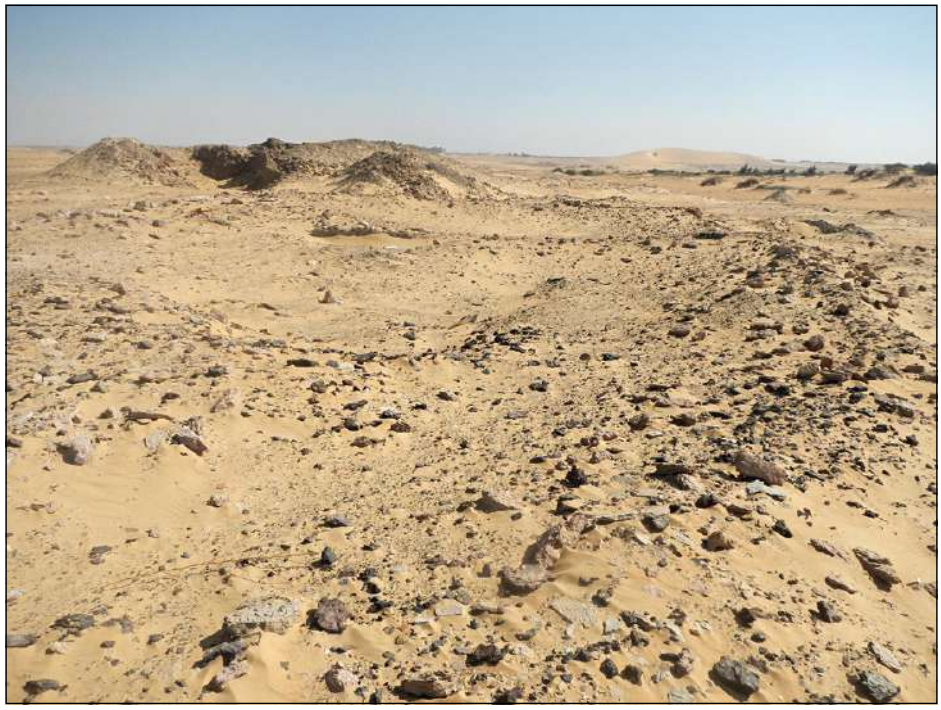

Fig. 9.2a – General view of the site of Ain Khalwa (Photo by the Kharga Inspectorate staff).

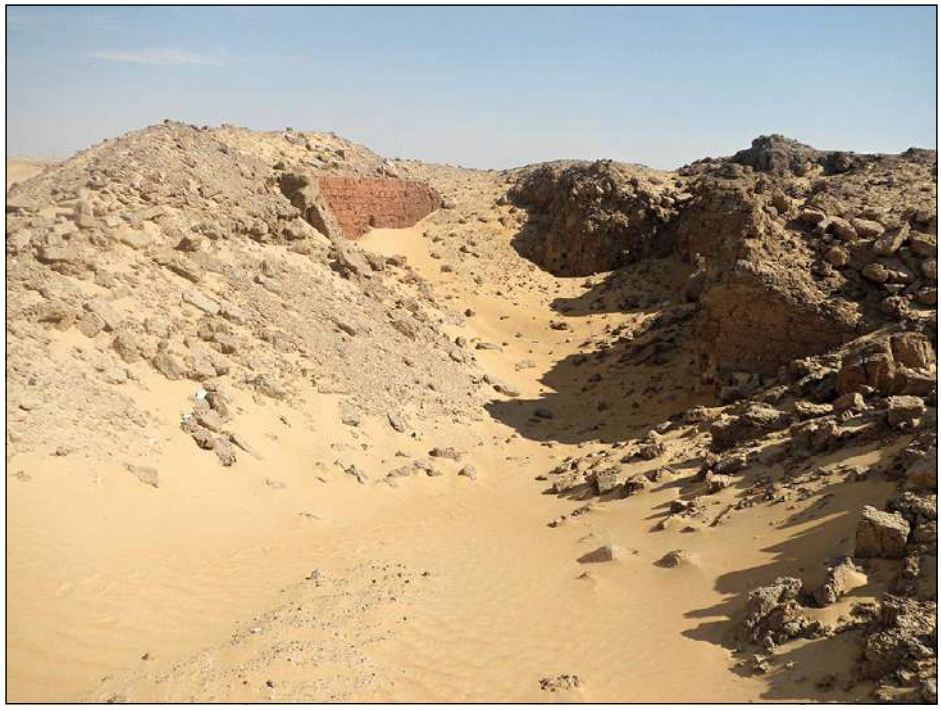

Fig. 9.2b – Archaeological mound dug up by looters, showing mudbrick structures and one burnt wall (Photo by the Kharga Inspectorate staff).

Fig. 9.3a – The central building on a stone basement resting over the flat mound of Ain Khousa (Photo by the Kharga Inspectorate staff).

Fig. 9.3b – The western side of the central building resting on a stone basement (Photo by the Kharga Inspectorate staff).

Fig. 9.3c – The interior of the central building (Photo by the Kharga Inspectorate staff).

ern patch of cultivated land. It consists of the remains a mudbrick settlement founded on a relatively high hill in comparison with the surrounding terrain (Fig. 9.2a; as Ain Hessein (see below), the ancient mound has been extensively excavated either by *sabbakh*-diggers or by particularly active thieves, to the point that it has now the appearance of a crater, open on one side. The exposed architectural remains are all made of mudbrick, and appear to include a rectangular building built on a sandstone basement. On one side of the central hollow dug into the mound, the internal face of the exposed mudbrick wall appears to have been burnt (Fig. 9.2b).

Qasr al-Baramoudy

Along the same east-north-east alignment, 1.5 km further east and 3.7 km south of the Kharga Junction, on relatively high ground and surrounded by high sand dunes, lie the substantial remains of Qasr al-Baramoudy, consisting of two areas. To the north lie the flattened remains of a gridded mudbrick settlement surrounding a central building; to the south, on lower ground, lie the remains of other structures and of ancient cultivations. The site includes also two pigeon towers, one located immediately to the south of the gridded settlement, and the other on lower ground. Whilst the latter corresponds to the common type of tower with a rectangular plan, the former consists of a central structure surrounded by a unique flower-shaped external structure, covered by half domes. The surface ceramics suggests a Roman date.

The site is briefly described in Rossi and Ikram (2018: 423-4), where also two pictures appear, one of the main building and one of the peculiar pigeon tower.

Ain Khousa

Just less than 2 km to the west of Qasr al-Nessima (Ghica 2012: 2017-21), 7.5 km to the south-south-west of the Kharga Junction, lies the site of Ain Khousa. Packed between two patches of vegetation and cultivations and a modern road, the site is made of two parts: to the north, the remains of a mudbrick settlement with a central building resting on a stone basement (Ain Khousa A, Fig. 9.3a); to the south, the remains of a vast cemetery, consisting of rock-cut tombs quarried along the sides of an elongated outcrop (Ain Khousa B). The ceramics suggests a Graeco-Roman date for this site.

The mudbrick building rises on top of a mound, covered by debris, mudbricks and ceramics. Its eastern side appears to have been heavily modified and reconstructed in recent times: new

Fig. 9.4a – The mudbrick remains at Khanafis (Photo by the Kharga Inspectorate staff).

Fig. 9.4b – The devastated remains of a large stone building, probably a temple (Photo by the Kharga Inspectorate staff).

walls were built by re-using old mudbricks, mud and reeds. The western half of the building, instead, appears to be original; it rested on top of a basement made of sandstone blocks (Fig. 9.3b), an arrangement that can also be seen at the Late Roman buildings of Qasr al-Sumayra, Qasr al-Lebekha and Qasr al-Nessima (Rossi and Ikram 2018: 67, 177 and 378). In this case, however, the blocks are more regular in terms of shape.

The western side of the building appears to have been about 20 m long; the east-west length, measured up to the modern wall, amounts to slightly less, about 18 m. Along the southern side, the original wall recedes and, immediately after this inward step, part of a mudbrick arch is visible, embedded in the masonry; the original wall then ceases there, and gives way to the modern reuse. The arch might correspond to the usual design of the gates of the northern forts, as they can be still seen at Qasr al-Gib, Qasr al-Sumayra, Qasr al-Lebekha and Umm al-Dabadib (Rossi and Ikram 2018: 446-9). The interior appears to have been occupied by several rooms, but the confused state of the remains makes a precise reconstruction extremely difficult (Fig. 9.3c).

Khanafis

On the other side of the patch of vegetation, at about 1 km west of Ain Khousa B and at a distance of 8 km south-south-west from the Kharga Junction, lies the vast site of Khanafis. It covers an area of over 1 square km, and consists of a combination of settlement, cemetery and ancient water systems.

The mudbrick settlement lies in the north-eastern portion and includes the depleted remains of a large sandstone temple, once plastered and painted white, accompanied by thick mudbrick structures (Fig. 9.4a). The building must have been ravaged by a heavy vehicle, as large stone blocks lie scattered around in a totally disorderly way (Fig. 9.4b); several blocks show emplacements for dovetails, sometimes still half-filled by plaster (Fig. 9.4c). Nothing can be currently said about the plan of this building, but it is interesting to note that plastered sandstone was used also to build the temples of Ain al-Tarakwa and the central building (perhaps also a temple, or an administrative building) of Watermelon Settlement, both located in the northern part of the oasis (Rossi and Ikram 2018: 102-3, 343). Both temples, Khanafis and Ain al-Tarakwa, were heavily damaged in the same period, the late '80s or early '90s.

The site also includes a large cemetery, dating to the Graeco-Roman Period, as well as a combination of springs and subterranean aqueducts (*qanawat* or *manawir*), that might date to different historical periods (cf., once more, the area of Ain al-

Fig. 9.4c – Detail of a stone block with dovetail emplacements and traces of plaster (Photo by the Kharga Inspectorate staff).

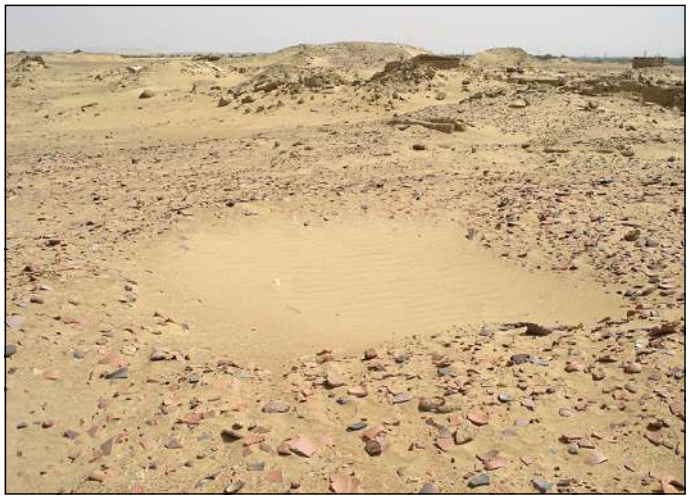

Fig. 9.4d – Ancient water source surrounded by potsherds near the temple (Photo by the Kharga Inspectorate staff).

Fig. 9.5a – View of the mound of Ain Hessein, located close to an inhabited area (Photo by the Kharga Inspectorate staff).

Fig. 9.5b – The interior of the mound of Ain Hessein exposed by looters by means of a heavy vehicle (Photo by the Kharga Inspectorate staff).

Tarakwa, Rossi and Ikram 2018: chapter II.8). Three major springs or wells are especially visible: one in the south, surrounded by a parabolic wall open to the south, from where a large canal winds its way towards the plain; a huge one in the north, surrounded by enormous spoil heaps; and a smaller to the east. A large depression surrounded by potsherds is visible near the temple (Fig. 9.4d).

Ain Hessein

Less than 2 km due north of fino qui Khanafis, at a distance of 6,7 km south-south-west of the Kharga Junction, lie the substantial remains of Ain Hessein, consisting of a large mound engulfed by sand (Fig. 9.5a). The mound contains the remains of a mudbrick settlement, perhaps a *tell* that developed over the centuries, surrounded by a thick scatter of ceramics, especially substantial to the west. The site has been ravaged, also with the help of heavy vehicles: the pottery mound to the west has been flattened and turned into a track leading to the mound, that has been burst open on the north side; a deep track, clearly bearing the marks of a caterpillar, leads into the core of the mound, that has been emptied to reveal the presence of tall, mudbrick buildings, covered by reddish plaster (Fig. 9.5b).

A cemetery of rock-cut tombs lies nearby, and lines of underground aqueducts crisscross the area. The ceramic suggests that this site was occupied from the Graeco-Roman to the Coptic Period.

Muteibakh

The area of Muteibakh is located at a distance of 6 km south-south-east from the Kharga Junction, along the eastern border of a thick patch of sand that interrupts the modern cultivation, to the east of the main road heading south. The archaeological remains are engulfed by a thick layer of sand and include a number of mudbrick buildings (Fig. 9.6a) and at least one large well or spring; some buildings have been exposed by looters (Fig. 9.6b). The ceramic suggests a Graeco-Roman date for this settlement. The site is briefly mentioned in Rossi and Ikram (2018: 422).

Al-Mallaha

At a distance of 1.8 km south of Muteibakh (at 8 km south-south-east of the Kharga Junction), along the same edge of the patch of sand, lie the remains of the cemetery of al-Mallaha, consisting of a group of rock-cut tombs carved horizontally in a sandstone outcrop at a height of over 50 meters above the surrounding land. The ceramic suggests that the site dates back to the Greco-Roman Period.

The site is briefly mentioned in Rossi and Ikram (2018: 422).

Ain ed-Deeb

Immediately to the west of the green patch of Ginah, beyond a thick chain of dunes, lies the area of Ain ed-Deeb, at a distance of 13 km in a south-south-west direction from the Kharga Junction. It covers an area of over 1 square km, dotted by ancient springs or wells. It contains the ruins of a large mudbrick settlement dating back to the Greek-Roman era, engulfed by sand. Its associated cemetery consists of rock-cut tombs quarried in the sandstone outcrop that borders the northern area of the formerly inhabited area.

3.3 Southern sites

Gebel Al-Siwa

This vast archaeological area is located at a distance of 21 km due south of the Kharga Junction. It corresponds to a substantial, elongated hill about 3 km long in a north-south direction, and about 1 km wide. The currently barren area is surrounded by green patches of vegetation and cultivations and is flanked by the main asphalted road to the west and the area of Qasr al-Zayyan to the east. The site consists mainly of a large Roman cemetery, made of rock-cut tombs with shafts leading to the burial chambers. The remains of a mudbrick settlement can be seen in the western part of the site.

Qasr Awadiya

At a distance of 6.2 km south from Gebel al-Siwa, and thus at nearly 27 km from the Kharga Junction, lies Qasr Awadiya, in an area currently barren and half-covered by sand dunes, to the east of the modern village of Bulaq. The site consists of both a settlement and a cemetery, and appears to date to the Graeco-Roman Period.

al-Galaa

Along the same north-south line, 6 km further south, just before the modern area of Ezbet Algier, lies the site of al-Galaa, cut in two by the modern asphalt road. To the west lie the remains of a settlement (al-Galaa A), endangered by the encroaching agricultural expansion; the hills to the west contain instead a large Graeco-Roman cemetery made of tombs cut in the tafla and tombs consisting of shafts leading to the burial chambers (al-Galaa B). The area shows evidence of prehistoric activities as well.

Fig. 9.6a – The remains of Muteibakh engulfed by sand (Photo by the Kharga Inspectorate staff).

Fig. 9.6b – Buried structures of Muteibakh exposed by looters (Photo by the Kharga Inspectorate staff).

4. Summary and conclusions

From a first superficial observation of the sites listed above, a number of conclusions and suggestions for future directions of research can be suggested.

First of all, Ain Khalwa, Ain Khousa and Qasr al-Baramoudy represent yet three other examples of gridded settlements surrounding a central, sturdy building. This arrangement is typical of the Late Roman settlements documented in the northern and central part of the oasis (Umm al-Dabadib, Qasr al-Lebekha, Mohamed Tuleib and Qasr al-Nessima); curiously, so far no similar settlements have been located in the south of the oasis, not even at its southernmost end (cf. the description of Ain Mabrouka, KS009 in Wuttmann *et al.* 2004). Further studies on the architectural characteristics of these three undocumented sites located in the central part of Kharga, paired with a detailed analysis of the ceramics, may be able to refine the date of their occupation, and indicate for how long this type of 'fortified settlement' was built in the Kharga Oasis. The outline and layout of Ain Hessein and Muteibakh, engulfed by sand, are impossible to discern, and it is unclear whether or not they were surrounded by an enclosure wall.

Khanafis is definitely a very interesting site: once large and imposing, it is now apparently flattened and destroyed. However, future excavations might reveal important information on the substantial stone building, most probably a temple, that once stood there. The presence of a cemetery is currently not mirrored by the remains of a settlement, that must be hidden somewhere under the sand. The enormous size of the local wells/springs suggest a significant and long exploitation of the area, which is now barren and covered by sand.

As it happens elsewhere in the oasis, most of the sites listed above include both a settlement and its relating cemetery; it is the case of Ain Farag, Ain Khousa, Ain Hessein, Ain ed-Deeb, Gebel Siwa, Qasr al-Awadiya and al-Galaa. Kilo 7 and al-Mallaha only show the remains of cemeteries, whereas al-Khalwa and Muteibakh only show the remains of settlements. Apart from Kilo 7, quite isolated, all the other sites lie engulfed by sand and very close to modern patches of vegetation (cf. Fig. 9.2), that might well hide further archaeological remains.

As already mentioned above, a thorough study of the ceramics visible on the surface of these sites might narrow down the range of dates of their occupation, broadly indicated above as the 'Graeco-roman Period'. The overall impression is that most of these sites were inhabited well into the Late Roman Period, but it will be interesting to understand if at least some of them can yield clear evidence of early Ptolemaic activities, that are still unevenly documented in the northern part of the oasis (cf. Wagner 1987: 168-9; Wuttmann *et al.* 1998, Ibrahim *et al.* 2008; Rossi and Ikram 2018: 556-9).

In conclusion, we hope that the publication of these notes and of this initial set of information on these sites will trigger further interest for the antiquities of the Kharga Oasis, that is likely to yield a significant amount of fresh evidence on its exploitation in the Ptolemaic and Roman Periods. Clearly in the last part of this period the Kharga Oasis boomed and reached an extent in terms of inhabited and cultivated areas that is being matched only now, thanks to the modern, large-scale investments that have been allocated by the Egyptian Government to the province of the Wadi al-Gedid. Just for this reason, many of these archaeological sites are now in danger of being either swallowed or heavily damaged by the expansion of the modern agricultural installations; we hope that this publication will not be the last record of these sites, but the first of a fresh series.

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10. Egypt and the East. Flaubertian visions between writing and painting

Ettore Janulardo

Abstract. After leaving France in October 1849 in the company of his friend Maxime Du Camp, Flaubert embarked upon an educational journey that brought him into direct contact with landscapes and sights that had for fifty years influenced the history, literature and arts of France. His meeting with the Orientalist artist Gleyre does not appear to be a mere courtesy call on a recognized master painter but may have represented an important turning point in the relationship between the visual capacity – expressed through painting or, in Flaubert, through words – and the object of observation.
Travelling with Du Camp on a mission to collect archaeological documentation, the narrator Flaubert reveals himself as the true eye of the exploration, more relentless and obsessive in depicting and eliciting a reaction from the landscapes through which he passed than the photographic equipment of his friend.
Key Words. Egypt; Flaubert; Gleyre; Du Camp; visions.

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«Orientaliste: homme qui a beaucoup voyagé»
"Orientalist: a man who has travelled a great deal"
Flaubert, *Dictionnaire des idées reçues*

1. The Writer's Journey to the East

"*The water of the Nile is completely yellow: it carries with it a great deal of soil. It seems to me almost wearied by all the countries it has passed through and by constantly murmuring the same monotonous lament about some sort of travel fatigue. If the Niger and the Nile are the same river, where does the water come from? What has it seen?*" (Flaubert 1881 and 1991: 36)[1].

A long excerpt from the *Journey to the East* – a sort of mid-19th-century *Grand Tour*, also comprising visits to Lebanon and Palestine, Rhodes and Constantinople, Greece and Italy – Flaubert's account of his *Voyage to Egypt* covers over two hundred pages.

After leaving France in October 1849 in the company of his friend Maxime Du Camp, also the son of a doctor and possessed of economic means that had already permitted him to travel in Europe and the East between 1844 and 1845, the twenty-eight year old Flaubert embarked upon an educational journey that brought him into direct contact with landscapes and sights that had for fifty years influenced the history, literature and arts of France. From the Napoleonic campaign in Egypt with its myriad reports and archaeological finds to the pictorial depictions of plague victims, battles and wounded soldiers, the journey to the East had become a mythopoeic force, a Romantic transmutation of confused, defeated or unsettled generations as in the emotive and anguished writings of Gérard de Nerval. The foundational text of this 'movement of the imaginary' is Chateaubriand's *Itinerary from Paris to Jerusalem*, published in 1811 using the notes taken during his journey in 1806. The circular route from Paris to Athens, from Constantinople to Asia Minor and thence to Lebanon, Palestine, Egypt and Tunis, became "*so canonical that Flaubert and Du Camp followed it in reverse, with some variations*" (Guichard 2009: 2).

Brought up in this climate of defeats, exaltations and literary sublimations, Flaubert aspired to break the cycle of Norman provincial life interspersed with intervals in Bohemian Paris: he needed to depart on a journey of eighteen months (from the autumn of 1849 to June 1851), before which he refused in exasperation to make a will.

His journey to the south of France only partially contradicted the opening of a paragraph – "*So from Paris to Marseilles* […] *nothing worthwhile to be told*" (Flaubert 1881 and 1991: 41) – in which the journey by train and carriage offers personal echoes of Balzac. Here we find a first conceptual turning point for the young writer, eager to set down in the pages describing river travel 'live' from *La Cange* the highlights of his own experiential journey: "*I was going to recount my trip in this way, paragraph by paragraph, in the form of short chapters, little by little, when I had time: it was not feasible, I had to give it up as soon as the* Khamsin *died down and we could stick our noses out of doors*" (Flaubert 1881 and 1991: 33). Aligning himself with the tradition followed by Chateaubriand, the writing experience had therefore to be postponed and personally transposed by the novelist through notes revised at a later date, specifically for the Egyptian leg of the *Journey to the East*. However, in refusing to publish his own reports, Flaubert

1. This paper takes up and expands upon Janulardo 2014.

Fig. 10.1 – Adrien Dauzats (1804-1868), *A Cairo Bazaar*, 1839, Oil on canvas, 9 3/4×7 in. (24.8×17.8 cm), Gift of Kenneth Jay Lane, 2018, The Met, New York, https://www.metmuseum.org/art/collection/search/441356, Public Domain.

Fig. 10.2 – Maxime Du Camp (1822-1894), *View of Egypt*, 1849-1851, Salted paper print, 6×8 5/16 in. (15.3×21.1 cm), Gilman Collection, Museum Purchase, 2005, The Met, New York, https://www.metmuseum.org/art/collection/search/291433, Public Domain.

moves away from the idea of 'travelling to write' in the name of an educational itinerary that was instead to be assimilated into the pages and personality of the author. Our opening quotation – recalling the difficulties of overland travel in Egypt, even by river – should be read alongside a short paragraph from the start of the book, where the author briefly describes himself in his physicality through natural features and built structures: "*Somewhere, far away, on a more placid and less ancient river, I have a white house whose shutters are closed, now that I am not there. […] I have left the long Louis XIV terrace, flanked by lime trees, where, in summer, I stroll in a white dressing gown. […] I have left the great wall all covered with roses with the little house by the water. […] At one in the morning, in July, by moonlight, it's agreeable to go fishing*" (Flaubert 1881 and 1991: 37).

Stylistic features that we could compare to those of the *École de Barbizon* create – 'frame' at the beginning of the volume – snatches of French liquid brightness that form the self-narrative of the young writer but also a reagent underlying the experiences and sights of Egypt: in his pages, waters, sands and temples have now become the *elsewhere* of *another*, of a Flaubert who on African soil *sees* his earlier self, waiting to reunite with him in new, self-aware ways.

2. Egypt and Art for Flaubert – Charles Gleyre

Travelling with Du Camp on a mission to collect archaeological documentation in the form of notes and photographs for which they were provided with credentials by the French administration, Flaubert the narrator is revealed to be the true *eye* of the exploration, more relentless and obsessive in depicting and eliciting a reaction from the surrounding scenery than his friend's photographic equipment. Sunsets and water, muddy and undrinkable, clothes and customs, children and prostitutes, traces of hieroglyphs and temples flow past, meticulously fixed in what appears to be a Flaubertian 'visual history', whose implicit unseemliness lies in recounting everything that entered his field of vision. Whilst the river waters 'have seen', on arriving in Alexandria the writer cannot himself avoid looking around, greeted by a sailing ship from northern France: "*The first ship I see in the harbour is a brig from Saint-Malo, and the first thing on Egyptian soil, a camel*" (Flaubert 1881 and 1991: 57). As a leitmotiv of pages that juxtapose a series of 'high' and 'low' references to mummification, suffering or dead animals encounter the author's field of vision: "*Here and there a shark stranded on the beach; bones of animals in the sand, including of an ox, partly buried with its intact head mummified. We had already seen a camel, three-quarters devoured, as we left Alexandria*" (Flaubert 1881 and 1991: 60).

A generative break with his Norman youth, echoing through the years and in his future works, Flaubert's writing on Egypt captures, juxtaposes and singles out, within a single 'frame', sophisticated artistic representation and trivial context: "*Leaving the Hôtel d'Orient in search of a worker able to fix the stand of Maxime's camera, I admired the fine doorway of the headquarters of the Tuscan Legation: a Romanesque arch with a broken torus, quadruple columns twisted like ropes; in the courtyard, two freely roaming ostriches scraping the fleas from their backs with their beaks*" (Flaubert 1881 and 1991: 72).

Given the general lack of direct references to artists and the art world in Flaubert's literary oeuvre[2], which differs significantly in this respect from the example of Balzac, it is worth noting the mentions of painters and sculptors in *The Journey to Egypt*. A sort of tribute to the tradition of the educational journey, we thus see goodbyes such as that of James Pradier: "*The good Pradier came to say goodbye to us in the courtyard of the stagecoaches. On the threshold of this journey towards antiquity, the most ancient of the moderns ran up to embrace us; it was a good omen*" (Flaubert 1881 and 1991: 37-38). Or the search, in Lyon, for the Swiss Orientalist painter Charles Gleyre[3], who had travelled to Sicily, Greece, Egypt and the Near East some years earlier, between 1834 and 1837. Flaubert writes of his meeting with the artist, whose recollections present an inversion of the field of vision, with the observers-travellers finding themselves observed: "*We talk about Egypt, the desert, the Nile, he tells us about Sennar and fills our heads with the monkeys who go at night to lift up the lower edge of the tents to look at the travellers*" (Flaubert 1881 and 1991: 44).

His meeting with Gleyre does not appear to be a mere courtesy call on an acknowledged master painter but can be interpreted as an important turning point in the relationship between visual capacity – expressed through painting or, in Flaubert, through words – and the object of observation. Swiss by birth and citizenship, Gleyre had attended the École Saint-Pierre in Lyon in around 1821 and then moved to Paris in 1825, where he enrolled in the School of Fine Arts and the Swiss Academy, and practiced in the Louvre by copying famous paintings. Unable to compete for the Prix de Rome for admission to the Académie de France in Rome since he was a Swiss national, Gleyre was nonetheless willing to pay for his stay in Italy himself and left France on 3 September 1828. Gleyre visited Milan and Florence before arriving in Rome in January 1829. He spent five years in Rome, assiduously frequenting the artist Horace Vernet, Director of the Académie at Villa Medici who was strongly interested in the photographic daguerreotype technique. Forced like other artists to paint portraits of tourists to make a living, in Italy Gleyre practiced observing monuments and copying art works, as well as developing those characteristic traits later emphasised – in a necessarily sober compositional form in the field – in the sketches and drawings of his journey to the East.

Like the later journey made by Flaubert and Du Camp, Gleyre's travels lasted over a year and a half, from April 1834 to November 1835. He seized the opportunity to accompany the American industrialist John Lowell Jr. on a journey taking in Sicily, Malta, Albania, Greece, Turkey, Egypt and Nubia. Gleyre had the task of documenting every important monument visited in drawings,

2. However, *The Temptation of St Anthony*, the first version of which dates to 1849, just before Flaubert's departure for the East, is thought to be inspired by the painting of the same name by Pieter Bruegel the Younger, seen in Italy. And, recalls a page of the *Journey to Egypt* (p.107), at Medinet El-Faiyum in the evening "we speak of St Anthony, Arius and Athanasius […] On a sofa, hanging on the wall: a view of Quilleboeuf, one of Graville, a landscape in the surroundings of Rouen".

3. Among others, his students included Claude Monet, Auguste Renoir and Alfred Sisley.

Fig. 10.3 – Maxime Du Camp (1822-1894), Great Colonnade of the Palace, Luxor, 1849-1851, Salted paper print, 6 7/16 × 8 9/16 in. (16.4 × 21.7 cm), Gilman Collection, Museum Purchase, 2005, The Met, New York, https://www.metmuseum.org/art/collection/search/291427, Public Domain.

as well as sketching people in local costume. The painter thus executed topographical sketches and drawings of monuments, a sort of precise – pre-photographic – inventory of archaeological and architectural heritage. Though Lowell continued his journey to India, where he died in 1836, Gleyre limited his travels to the Near East, spending some time in Egypt and Lebanon before his return to Paris in 1838.

Their separation enabled Gleyre to devote himself to his career as an Orientalist painter, without needing to attend to the documentation required by his collaboration with Lowell. His reinterpretation of figures and monuments of the East also relied on the copies made by the artist of his drawings on his return to Paris, before the original materials were sent to Lowell in Boston. The painter was a member of a fashionable artistic-aesthetic school. In around 1830, in Paris, the East also began to manifest itself in the urban space: on 25 October 1836, following political negotiations and demanding technical tests started with the gift promised by Méhémet-Ali to the King of France in 1830, one of the obelisks of Luxor was installed in the Place de la Concorde.

Fig. 10.4 – Maxime Du Camp (1822-1894), *Palais de Karnak. Sculptures extérieures du sanctuaire de granit*, 1849-1851, Salted paper print, 6 7/16×8 7/16 in. (16.3×21.4 cm), Gilman Collection, Museum Purchase, 2005, The Met, New York, https://www.metmuseum.org/art/collection/search/291428, Public Domain.

3. Visions of Egypt: Flaubert and Du Camp

Highly respectful of Gleyre's experience as a traveller in the East, to the extent that he proclaimed himself willing to follow his instructions regarding the importance of spending a long time in Egypt – even at the cost of curtailing other stages of the journey – in his texts Flaubert showcases what he describes with a capacity for visualization that does not seem to acknowledge painting for anything more than a kind *of analogue* rendering of the visual field, less intense, rich or true than the word: "*A drawing of a woman just looks like a woman […] whilst a piece of writing about a woman makes you dream of a thousand women*" (Cfr. Flaubert 1862: 221-222). The obsession with details and a panoptic notion enter the narrator's ways of constructing his writing: constrained by the sequential nature of the written word, he creates successive series of 'pictures' that go beyond the 'simultaneity of effect' proposed by Delacroix in the name of an overall structure (Cfr. Hurt 2010). With a sort of constructivism *ante litteram*, Flaubert

overcomes the two-dimensional nature of painting by stressing the depth of the 'composition': "*The palm, an architectural tree. – In Egypt, everything seems made for architecture, the lay of the land, plants, human anatomies, the lines of the horizon*" (Flaubert 1881 and 1991: 83).

This 'architectural' structuring is capable of sudden dynamic accelerations, almost like privileged *insulae* in the topography of the script, as in the pages on Giza: "*About half past three, we have almost reached the desert where the three Pyramids stand. I can wait no longer and spur the horse who sets off at a gallop, splashing through the puddles. Maxime follows me two minutes later. Furious race. – I can't help shouting, we fly in a whirlwind up to the Sphinx* […], *the Sphinx rises up, up, from the earth like a dog getting to its feet.* […] *The sand, the Pyramids, the Sphinx, everything is grey immersed in a strong pink colour; the sky is all blue, the eagles wheel and glide slowly around the top of the Pyramids. We stop in front of the Sphinx, it fixes us with a terrifying stare; Maxime is quite pale, I'm afraid of becoming giddy and try to keep my emotions in check. We set off again at full speed, like madmen, carried away among the stones; we circle the Pyramids, around their base, at walking speed. Our luggage is delayed, night falls*" (Flaubert 1881 and 1991: 74-75).

Though Du Camp published three successive volumes between 1852 and 1854[4] – *Égypte, Nubie, Palestine, Syrie, Le Livre posthume – Mémoires d'un suicidé*, *Le Nil* – with the shared geographical and cultural background of Egypt, his legacy in the visual imaginary lies above all in the 'staging' of the Nile ruins and monuments in hundreds of photographs. *Le Livre posthume* ambiguously walks the line between the departure from a certain youthful Romantic perception and the protagonist's death on Egyptian soil – to the extent that the author declares in the 1876 edition that "*This is almost an archaeological book*". By contrast, the calotypes published in 1852 lie between the early heroic phase of photographic representation, at the time considered infallibly *objective*, and the history of the later trivialization of technical reproduction, consigning themselves to the 19th century as a "fixative" of modern knowledge and a possible archetype of the depiction aimed at tourists. On several tens of occasions the virtually frontal view emphasising the isolation of the colonnades, the pyramids or the Sphinx has the same function of highlighting the scene that we stressed for the French 'tableau' opening Flaubert's account. However, whilst the novelist's vision is charged with intense personal colour, partway between the *École de Barbizon* and *Nabis*, Du Camp – partly due to the technical limitations of the time – expunges from the visual field himself and every *local* character that might detract from an idea of an 'intact' and unique monumentality, as a form of control over the visible/visual[5].

There is a single exception to the almost total absence of human figures in Du Camp's photographs: the Nubian Hajj-Ishmael[6]. Displayed/inserted into the recesses of structures as a measuring stick to showcase the monumental size of the Egyptian ruins; a projection into the visual field of the photographer who, framing the scene frontally, seems to be reflected in him; an 'indigenous' otherness with respect to the western eye that frames and dramatizes, he is a dark half-naked figure destined to become a 'statue' in the immobility of his pose, almost an exorcising anticipation of death represented as eternal-eternalizing and therefore potentially absent. The structuring of the scene displays the artefact in a pretence to spatio-temporal *objectivity* that becomes metaphysical perception, as if influenced by the unknown divinities evoked by Barthes: "*What the photograph reproduces* ad infinitum *has only occurred once: it mechanically repeats what can never be repeated existentially. In the photograph, the event is never transcended for the sake of something else […] it is the absolute Particular, the supreme Contingency […], the Tyche, the Occasion, the Encounter, the Real, in its tireless expression*" (Barthes 1980: 6).

In contrast to Du Camp's technical reconstruction, launched into the *modernity* of photographic reproduction, Flaubert feels the absolutely *contemporary* (Cfr. Caraion 2003) need to see to live, to look to remember and tell, sensing all the asperities and inconsistencies of the scenes he observes, avoiding value judgements and unafraid to set down on paper – white/*positive*, contrasting with Du Camp's *negatives* – weaknesses and enthusiasms: "[…] *when I looked at the ripple of three successive waves* […], *I felt a sense of solemn joy emerging from the depths that harmonized with this spectacle, and I thanked God in my heart for making me able to rejoice in this way; I felt fortunate for the ability to think, although I seemed never to think of anything; it was an intimate pleasure of my whole being*" (Flaubert 1881 and 1991: 117).

4. After *Souvenirs et paysages d'Orient* of 1848.

5. On the occasion of the exhibition 'Charles Gleyre, le romantique repenti' – held in Paris in 2016 at the Musée d'Orsay – Michel Thévoz, during a conference, cited the travel diary of the Swiss artist, censored by his nephew, on the dialectics of vision between 'blindness' and 'hyperlucidity' and the 'trigonometry of the gazes': cf. http://www.musee-orsay.fr/fr/evenements/conferences/archives/presentation-generale/article/rencontre-44641.html?tx_ttnews%5BbackPid%5D=221&cHash=5845e88681.

6. Specific attention is devoted to him and his role in Ballerini 2010.

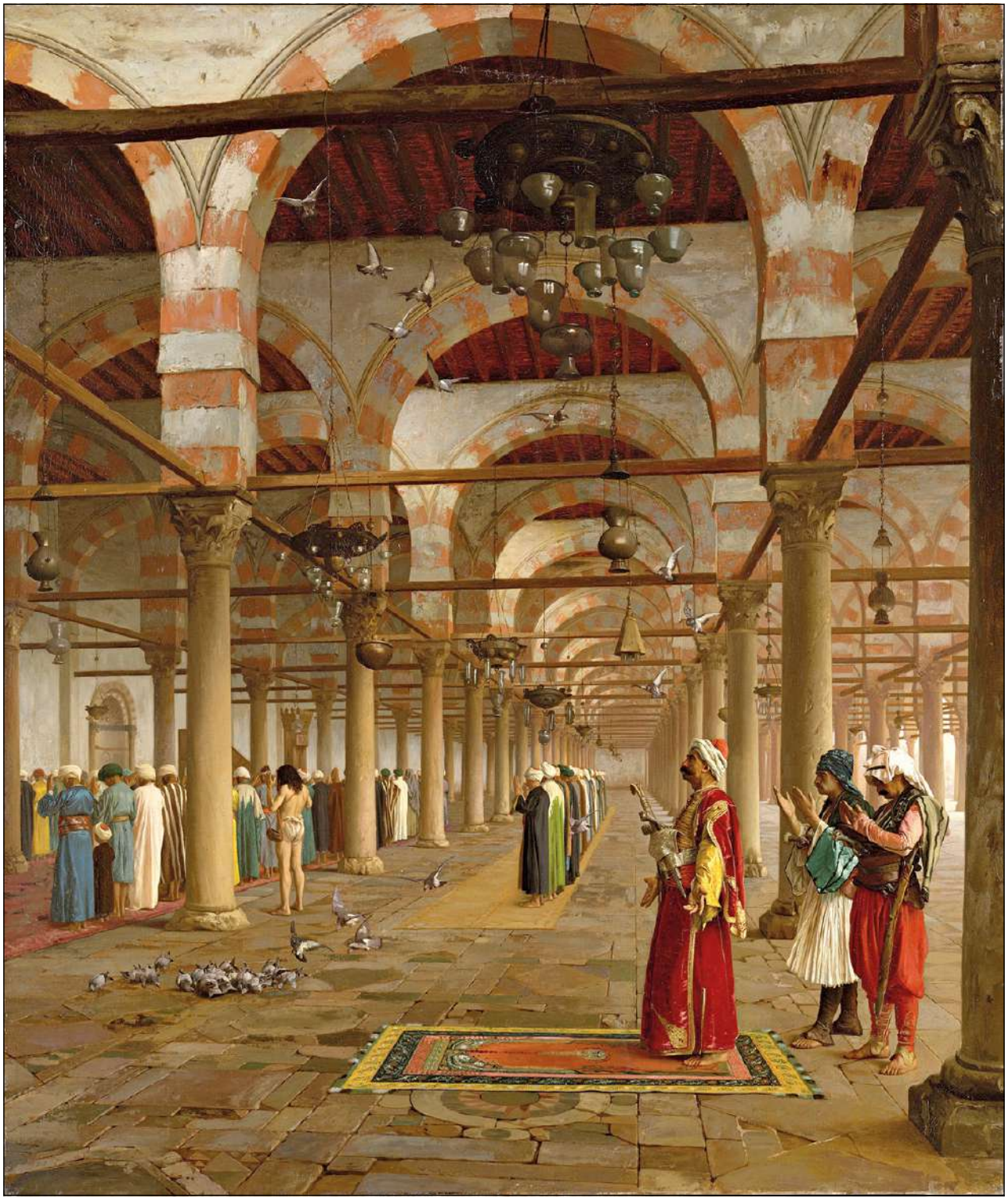

Fig. 10.5 – Jean-Léon Gérôme (1824-1904), *Prayer in the Mosque*, 1871, Oil on canvas, 35×29 1/2 in. (88.9×74.9 cm), Catharine Lorillard Wolfe Collection, Bequest of Catharine Lorillard Wolfe, 1887, The Met, New York, https://www.metmuseum.org/art/collection/search/436482, Public Domain.

Fig. 10.6 – Jean-Léon Gérôme (1824-1904), *Café House*, Cairo, 1884 or earlier, Oil on canvas, 21 1/2×24 3/4 in. (54.6×62.9 cm), Bequest of Henry H. Cook, 1905, The Met, New York, https://www.metmuseum.org/art/collection/search/436481, Public Domain.

4. Epilogue: Deconstruction and Reconstruction

For Flaubert, the southern and eastern shores of the Mediterranean are not the 'mother' land sought by Nerval in his *Journey to the East* published in 1851: rather, they are a test of what he learned during his youth and the reagent for a new perception of self, which also involves a self-identification with his depictions of Egypt: "*Temple of Esna – It is in the middle of the city, sunken into the ground* […] *The columns are covered with hieroglyphs. On the columns we see a kind of bird that has a parrot's body with the ears and legs of a hare; it crouches on its hindquarters, in an animated posture, with the legs near the head. From a sculptural point of view, the overall design of all these depictions is generally ponderous, massive, decadent; the knees, instead of being perpendicular to the leg, are turned inwards like my own, an ugly thing*" (Flaubert 1881 and 1991: 125).

Scenes perceived and described as structured by brightness are represented in Flaubert's writings beneath the auspices of a quest freely open to all experiences, including boredom and disillusionment. An example is the 'Reflection', which once again recalls French landscapes and buildings after some pages devoted to the Temple of Amada: "[…] *the Egyptian temples annoy me profoundly: will they become like the churches in Brittany, the waterfalls of the Pyrenees? Cursed necessity! To do what must be done; to behave always, according to the circumstances* […]*, as a young man, a traveller, an artist, a son, a citizen, etc. should behave!*" (Flaubert 1881 and 1991: 147).

It is precisely this personal quest, where "*beauty is based on the truth and banality of everyday life, on the subjectivity associated with accuracy*" (Cfr. Hurt 2010), that gives rise to the vision of Flaubert's writing: a "myopic" eye for detail and a panoptic definition of vision are moulded into literary expression in the *other* experimental territory of his journey to Egypt and the East.

In addition to the succession of illnesses and fatigues – "*I am reluctant to go to Abydos, exhausted as I still am with fever* […]. *And, frankly, I am beginning to have had enough of temples*" (Flaubert 1881 and 1991: 217), – the tautology of Du Camp's *Nil* – "*It is a ruined ruin*" (Du Camp 1854 and 1987: 69) employed to describe the ravages caused by time and humans, ideally to be discerned and distinguished as if the former were a noble patina and the latter a deplorable evil – contrasts with Flaubert's description of a morning at Sheik Abadeh: "*there is nothing left: holes, grey hillocks, a palm tree here and there, the Arabian mountain range in the background. – Ruins of a bathroom that looks to all intents and purposes like an Arab bath; on the floor, traces of marble columns. In the village, on the ground, a composite capital; a column stands in the middle of a house. Antinoe is the true ruin of which it is said: "Once this was a city!*" (Flaubert 1881 and 1991: 222).

Having reached the furthest point on his Egyptian journey, Wadi Halfa, there remains the return to Cairo and Alexandria. The eye of someone who has recorded so much – never mentioned by name in the pages of his confrontational friend Du Camp, just as Flaubert failed to appreciate his photographic technique – knows it will no longer see and that now is the time to *feel*, in a fruitful short circuit between 'then' and 'now': "*Profound sadness because we are leaving. I feel, in the sadness of departure, the joy I should have felt upon my arrival*" (Flaubert 1881 and 1991: 226).

Perceived by his mother, who meets him in Rome to welcome him on his way home, to be physically and mentally 'different' to the person who left France, the young Gustave was truly becoming the Flaubert of universal literature, in whom travels and experiences are sublimated into the metamorphosis of the word, into the adventure of the quest.

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Arid **Z**one **A**rchaeology
Monographs **8**, 2019
pp. 111-125

11. Central North Africa and Sardinian connections (end of 9th-8th century BC). The multi-ethnic and multicultural facies of the earliest western Phoenician communities

Michele Guirguis

Abstract. This work constitutes a reflection on the oldest documentary horizons of the Phoenician presence in central-western Mediterranean, with specific reference to Sardinia, Tunisian North Africa and the relationships between the different regions affected by the spread of Phoenician culture between the 9th and 8th centuries BC. The analysis of domestic contexts and the material evidence that characterizes some of the most ancient phases documented allow us to affirm that spaces of relationship of daily life represented a favourable scenario of dynamics of encounter between the Phoenicians and the different native realities in direct contact with them. In the case of Sardinia (Sulky) and North Africa (Utica, Carthage, Althiburos), but also in the western Mediterranean and Atlantic regions of Andalusia (Huelva, Cádiz, Málaga), the archaeological record reflects a composite, multi-ethnic and multicultural reality that appears to be the result of the complex phenomena of the 'interweaving' of the economic-political interests and social solutions adopted in the new communities of the Iron Age, which are at the same time heirs of Bronze Age cultural traditions and forerunners of the subsequent political-territorial structuring during the Archaic age.
Key Words. Iron Age; Phoenician; North Africa; Sardinia; multiculturality; ethnic Interactions.

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1. Introduction: the Phoenicians and "the Others"

In this work we intend to reflect briefly on the oldest horizons of the Phoenician presence in the central-western Mediterranean, with special reference to Sardinia, Tunisian North Africa (Fig. 11.1) and the wider relationships between the regions affected by the spread of Phoenician culture between the 9th and 8th centuries BC. The analysis of domestic contexts and the material evidence that characterizes some of the most ancient phases allows us to affirm that the spaces of daily life represented the favourable setting for encounters between the Phoenicians and the different autochthonous realities in more or less direct contact (Delgado and Ferrer 2007, 2012).

Numerous seasons of new excavations and the re-examination of previous discoveries have provided a wide and complex set of data on the earliest stages of the Phoenician presence during the Iron Age. The colonial initiatives detected on the west coasts of the Mediterranean in the first half of 8th century BC may relate to a second wave of expansion from the Levant, that follows an initial movement involving mixed groups from Syria, Phoenicia and

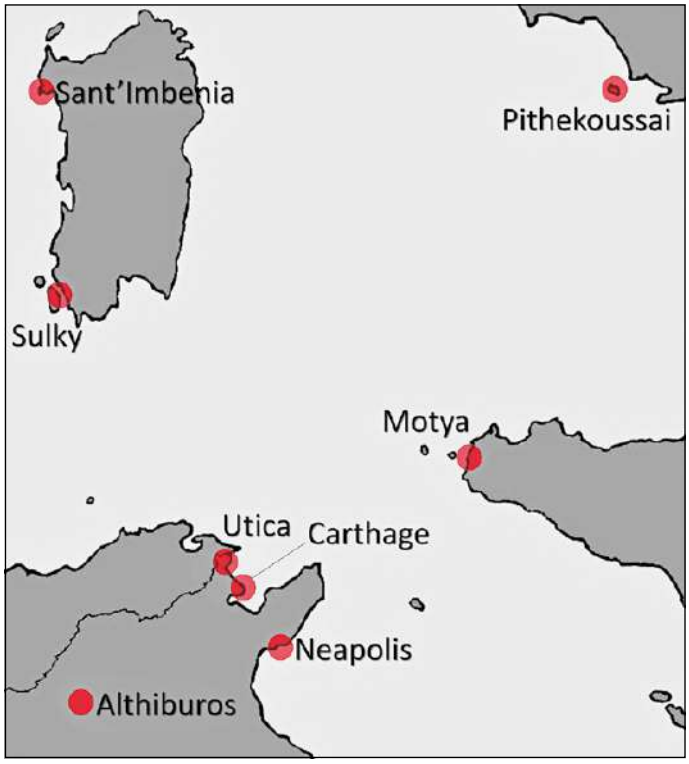

Fig. 11.1 – Central Mediterranean district with the settlements mentioned in the text (drawing by the Author).

the Philistine regions (Nigro and Spagnoli 2017). Literary sources date the Phoenician foundations of Cadiz (Spain), Utica (Tunisia), Lixus (Morocco) to the end of 12th century BC. Mention should also be made of the "phantom colony" of Auza, founded by Ittobaal King of Tyre (887-856 BC) on the Libyan coast, as suggested by some ancient texts and supported by modern scholars (see Boardman 2010).

From a historical and archaeological perspective, the most impressive wave of the Phoenician diaspora was possibly connected with the epochal battle of Qarqar (853 BC), in which a coalition of Syro-Palestinians was defeated by the Assyrian King Shalmaneser III. Nevertheless, as suggested by Maria Eugenia Aubet (2008), the establishment of new calibrated radiocarbon dates for the beginning of the Phoenician expansion to the far west of the Mediterranean suggests we re-consider the theory that the founding of the colonies was conditioned by the Assyrian policy in the East. The new data reveal a much more ancient and gradual process of contact and subsequent colonisation than had previously been assumed. This process may have consisted of an initial horizon of scouting for and exploitation of metal resources in the Atlantic area in the first half of the 9th century BC, followed by the founding of the first permanent colonial establishments, starting in the last quarter of the same century.

From a cultural point of view, the Phoenician colonies had a mixed social structure from the very beginning (e.g. Bartoloni 1995), featuring the co-existence of several elements: a clear Cypriot presence, strong indigenous components, and also Syrian and Philistine elements that took part in the new foundations. The framework underlined shows, in fact, the existence of an East Mediterranean Levantine group of migrants. All these components are well exemplified by the foundation myth of Carthage in northern Tunisia, probably the most important and influential Phoenician city of the central Mediterranean. Besides the Tyro-centric model always applied to the understanding of the Phoenician expansion from the Levantine coasts to the west, we can assume that other elements from central and southern Phoenicia (i.e. from Sidon to the Akko plain) were deeply involved in these activities. The role of Tyre cannot be overemphasised (Aubet 2001); however, other Levantine cities were already active when the colonial movement started. Thus, the vessels crossing the Mediterranean were manned by mixed crews: the "transmigration of people and transmigration of culture need open and flexible models to be studied and interpreted" (Nigro and Spagnoli 2017: 112).

From the North African and Sardinian point of view, the most ancient phases of the Iron Age created the conditions for the evolution of the basis for a network, in the context of a dialectic supported by convergence/divergence phenomena. This process, which is far from linear and rarely based on the adoption/imposition of pre-established models, tends rather to take on a multiform characterisation as a result of diversified internal 'responses' which involve the active and dynamic role played by the indigenous components. Starting from the evidence offered by household contexts, the indigenous people appear no longer isolated and 'frozen' in relation to the external element (in a unidirectional and predefined way), but rather assume a fundamental role in the direction of contacts and stable relationships between the different components, which we find expressed in all the focal points of the Levantine dispersion in the west.

A salient fact that emerges from the most recent research is, in fact, the identification of ceramics of central-Italian, as well as Sardinian, origin, found in Central North Africa (Utica, Carthage: Mansel 2005; Ben Jerbania and Redissi 2015: 188, tab. 6, 2-12; López Castro *et al*. 2016: 77-80, figs. 9-10), in the Iberian Peninsula (Huelva, Cádiz, Carambolo-Sevilla, Rebanadilla/Chorreras-Málaga: González de Canales Cerisola *et al* 2004: 98-99, tabs. XX, LIX; 2011; Botto 2015), and also in Sulky[1], where other materials are comparable with contemporary indigenous productions of North Africa (see below). At the same time, we underline the presence of Tartessian pottery imported from the Mediterranean and Atlantic Andalusian areas, especially in Carthage (Maraoui Telmini 2014: 59, 62, fig. 8f).

Precisely these materials, progressively recognized and 'isolated' by their nature as products of daily/domestic use, show the vitality of the native populations, not 'isolated' at all in the panorama of Mediterranean urbanism during the 9th century BC. This meditation between innovative cultures and traditions basically occurred in this period, when hybridization with autochthonous populations generated a new cultural identity, which in a few generations developed, with specific self-representation, i.e. that of the Phoenicians in the west. Carthage, Utica, Sulky, Motya, and the centres of Málaga region are powerful examples of this

1. Guirguis in press: in Sulky a group of materials has been recovered that can be ascribed to the Tyrrhenian territorial (and cultural) context of the First Iron Age, and which seems to confirm, also on the Phoenician side, the traditional contact and relations between Nuragic Sardinia and the Middle-Tyrrhenian territories of the Italian Peninsula, at least from the Final Bronze Age onwards; the presence of pottery from "Fase III laziale" was already known in the Cronicario area, with a fragment of an "anforetta" related with similar specimens from the Osteria dell'Osa necropolis (Usai 1990: 115, fig. 8, f; see also Bernardini 1993: 58, tab. I, 3); for a *kyathos* in *impasto* connected with the Vulci region: Bartoloni 2008: 1603-1604, fig. 13; for an amphora from the necropolis of Nora, dated to the end of the 8th century B.C. with comparisons in the "III periodo laziale" of Osteria dell'Osa and in the IIB phase of Veio (Quattro Fontanili): Bonetto and Botto 2017: 201, notes 65-67, figs. 8-9.

growth in a framework of extraordinary integration established in the practices of daily life, in religion, in the production processes, in social organization and territorial expansion.

2. The Phoenicians in Sardinia and Sulky: in search of a different identity

In recent years, numerous excavations and surveys have led to a singular advancement of knowledge in all areas affected by the presence of the Phoenicians in Sardinia, with a diachronic and integrated approach favouring – by the nature of the Levantine cultural physiognomy – the analysis of interference and contact with the indigenous population of the Nuragic tradition (e.g. Tronchetti 2014). At present, the Phoenician settlements – after a long period of "stopovers" and occasional visits – are perceived as consolidated from the end of 9th-early 8th century BC and are represented materially by the foundation of Sulky (Sant'Antioco) and by the presence of Levantine groups, from Tyrian and central-southern Phoenician areas, within the most receptive indigenous settlements in the Iron Age I-II periods[2]. In Sulky, the first phases of the late 9th-early 8th centuries BC were characterised by the coexistence of different material cultures (Greek, Tartessian, Numidic: see below) and original results, although these were initially in a minority in comparison with the predominant *nuclei* of the Phoenician and Nuragic traditions (Bartoloni 2008, 2010, 2017; Bernardini 2016; Guirguis 2012; Guirguis and Unali 2016; Pompianu and Unali 2016). The case of Sulky, as we will explain, would appear to represent a fertile field of study for the evolution and transformation of social structures, following these early forms of coexistence, which directly influenced identity codes and perceptions (Guirguis 2014; Bernardini 2015), overcoming the traditional monolithic visions between different cultures and allowing us to emphasize, rather, the creation of a new *habitus*: as Anick Coudart underlines in a recent book on European archaeology of identities and migrations (2017: 86): "*one belongs to a culture by impregnation, but one constructs one's identity*".

2.1 Sulky in the 9th-8th centuries BC and the Sardinian-Phoenician *facies*: an example of 'hybrid middle ground'?

The analysis, interpretation and historicization of data relating to the urban planning of the first Sulky, allows us to reflect critically on the knowledge acquired and deeply rethink the phenomena of multiculturalism, interculturalism and transculturalism. In the recent excavations, several contexts of the most ancient layers examined until now have been brought to light. The settlement, founded in an area devoid of the previous presence of Nuragic structures, was precociously active from the central years of the 8th century BC, but a considerable quantity of pottery fragments can determine one early phase dating to around 800 BC. The predominant material culture shows a very strong link with the Phoenician ceramic repertoire in the Levant, especially during the Iron Age II. In a previous analysis of the Phoenician pottery of Sulky, we highlighted the presence of a Nuragic background to the handmade productions and the rapid development of the local manufacture of red-slip technique pottery. Therefore, the material culture also presents several aspects that mark a strong link with the oriental roots, namely with central and southern Phoenicia, up to the 6th century BC.

The overall review of the most significant contexts has made it possible to identify a varied set of pottery productions, reflecting a multi-ethnic and multicultural reality (Guirguis in press), where the first eastern and local families were joined by additional individuals or groups, giving rise to a living space in which the interaction between individuals transcended the original linguistic, religious and cultural barriers.

The particular ceramic *facies* that can be dated to as far back as the end of the 9th and, in continuity, to the whole of the 8th century BC[3] is basically expressed by a 'material range' that can be extended also to the contexts of the *tofet* and the necropolis and subdivided into three macro-categories, of unequal proportions and with further internal sub-classifications:

A) Phoenician ceramics, mainly wheel-turned, of Levantine tradition and of both eastern and western production;

2. In fact, on the island there were some autochthonous central places able to respond to external stresses in new and original forms and results that have evolved during the 8th century BC – such as S'Urachi in San Vero Milis, Sant'Imbenia in Alghero, Nuraghe Sirai in Carbonia, Nuraghe Tratalias and elsewhere – but that only in a few cases seem to have developed beyond the end of 7th century BC, exhausting the embryonic urbanistic experiences and progressively limiting their external projection (even extra-insular) by the end of the 6th century BC: Rendeli 2014, 2017; Dessena 2015; Roppa 2015; Perra 2016; Stiglitz 2016.

3. The excavations carried out by Antonella Unali and Elisa Pompianu, in the perimeters of Rooms IIG, IIH and IIE of the Roman age, have made it possible to reconstruct stratigraphic contexts of great interest; in Room IIH some plans emerged for the use of a floor covering ("battuto") which remained in use until the early 7th century BC, and, below this, numerous levels of floor preparation and the layers of filling of a *silos* dug into the virgin soil, voluntarily covered with an uneven filling; the chronological horizon delineated by these finds is in the range of 750-730 BC, but numerous 'residual' materials appear, suggesting the original existence of habitation levels that can be traced back to at least the very start of the 9th century BC: Pompianu 2011; Unali 2012; Pompianu and Unali 2016; Guirguis in press.

B) ceramics, mainly not wheel-turned, of an exclusively autochthonous tradition and production in the central-western Mediterranean;
C) Greek wheel-turned productions.
In light of this primary division, the archaeological record offers elements of mixed material culture that can be integrated, as part of a process of experimentation, adaptation and local processing, in such a way that these different macro-categories gave rise to original and particularly interesting results; in this case, too, a large and varied series of objects can still be attributed to three large groups:
D) Phoenician/Eastern-style pottery made in *impasto*;
E) wheel-turned indigenous-western tradition productions;
F) hybrid-technique examples in which different methods of production can converge (slow/fast wheeled, moulded, impasto) and various techniques and decorative styles characteristic of the first three macro-categories.

3. Defining horizons: the Phoenicians in North Africa and new perspectives

Examining the aspects most directly related to the Phoenician and Punic archaeology of Central North Africa, the focal points are as follows: 1) the acquisition of a high and well-documented chronology for the first Phoenician foundations in present-day Tunisia, namely Carthage and Utica; 2) the identification of other sites whose oldest phase of occupation can now be attributed to at least the Phoenician age, both on the coast and inland, as in the case of Althiburos and Nabeul/Neapolis; 3) the consequent emergence of settlement contexts and elements of material culture ascribed to the earliest forms of interaction between the Phoenicians and the native populations of the central-western Mediterranean.
As specialists in Phoenician archaeology know, there is an ongoing and lively debate concerning the chronological definition of the most ancient phases of contact between the Levantine and the autochthonous populations of the Mediterranean, in the context of a general chronological revision process that mainly concerns the cultural horizons of Iron Age I-II. Beyond the chrono-sequential clarifications and the different positions of the single scholars, it now appears to be widely accepted that the beginning of the 'process of sedentarization' and foundation of the first settlements, in substantial agreement with the historiographic sources, must be set back by about half a century in terms of absolute chronology, thus bringing us from the traditional horizon of the middle of the 8th to at least the last decades of the 9th century BC. This is the picture that can be outlined for the main cores of the Levantine diaspora. The consequent anthropic development of these regions belongs to a successive phase of consolidation and expansion of some settlements (such as Cádiz), but also that of abandonment, decadence and synecism that concern other areas (such as Sa Caleta/Ibiza or the Málaga region), demonstrating a particular dynamism that characterizes the whole of the 8th century BC.
The oldest documentary horizons of Carthage, that have been known for a long time and characterized by numerous elements of interest, confirm – among other things – the urban and multiethnic character of the most famous Phoenician city, inferable from the particular *facies* that characterizes the most archaic building present on the southern slopes of Byrsa, but also from the archaeological remains of the *tofet* sanctuary (Morel 2003; Boardman 2006; Mansel 2010; Di Stefano 2011). To this *dossier* one can finally add the striking data from Utica, following the campaigns carried out by the Tunisian Missions in collaboration with Spanish and French Universities (Monchambert *et al*. 2013; López Castro *et al*. 2016). In the case of Utica, which was already unanimously indicated in the sources as a settlement founded before Carthage, it is considered useful here to focus attention on an assemblage of ceramics and other material that is composite in nature, featuring the prevalence of forms of Phoenician production (both local and imported from the East), flanked by handmade pottery from the local tradition (defined as Libyan: López Castro *et al*. 2016: 80-81, fig. 11) and imported pottery mainly of Greek and Sardinian origin. As it seems to suggest the presence of typical shapes of the Middle Geometric II and/or Sub-Proto-Geometric III period, represented by meander *skyphoi* and pendent semi-circles of Attic, Cycladic and Euboean origin, the chronology is to be placed in the second half of the 9th century BC, preferably in around the last quarter.
The relevance of this new research, derived both from the natural scientific interest towards the first phases of the Phoenician diaspora, and from the unforeseen development and extension of the documentary horizon that now invests and incorporates the native western realities in a decisive way, is given in our opinion by the overcoming of some general approaches in which the study of the oldest attestations referring to stable settlements was based, with the integration of new

perspectives of observation. The reference is to the traditional approaches obtainable from the association with Greek ceramics, to which new proposals for chrono-typological seriation have been added in recent years, claiming the usefulness of both Phoenician (Núñez 2014) and indigenous material culture (Ialongo 2017) in order to define the chronological indicators 'intrinsic' to the context. In the case of North Africa and, more specifically, of Carthage and Utica, we are still far from having a complete definition of the only presumably homogeneous autochthonous material culture, which would have been present in the sub-coastal and coastal regions of today's Tunisia and Algeria between the 9th and 6th-5th centuries BC. The theme concerns, as Paolo Bernardini (2016) recently reiterated, the definition of a precise strategy of expansion implemented by the mercantile and aristocratic Tyrian classes, of which a faint echo can be perceived in the fragmentary literary record that provides shreds of information on the foundation of Carthage by Elyssa/Dido, the Tyrian/Cypriot elements and the relations with the Numidic component active in the region. In this sense, the recent acquisitions from Althiburos are even more precious, where the existence of a phase dating to at least the 9th-8th centuries BC has emerged (based on calibrated radiocarbon dates: Sanmartí *et al*. 2011: 345-346), with Phoenician and autochthonous materials and productions definable as "hybrid".

Also from the point of view of analysing, along the temporal line, the progressive evolution of a Phoenician-Levantine 'presence' into a Punic-Carthaginian 'hegemony', it seems important to continue along the lines traced; the recognition of new elements in the Phoenician settlement in areas that were thought to be inhabited exclusively starting from the late 6th century BC, as in the case of Nabeul/Neapolis at the base of Cap Bon (Fantar *et al*. 2017: 48, fig. 2), may well be part of a more complex framework from which the autochthonous component cannot be expunged, in analogy and concordance with what is being specified in other settlements of the Phoenician Mediterranean, especially in Sardinia and in the south of the Iberian Peninsula.

With reference to this issue, we believe that a renewed season of territorial research and stratigraphic investigation can lead to the acquisition of important innovations on the articulation of the Phoenician-Punic dimension in the internal territories of Tunisia, in the context of the extraordinary historical process of relations between the Carthaginian and indigenous groups. In fact, as we know, these components find a complete 'historical visibility' and appear in the sources only in reference to events that did not take on clear contours before the 6th-5th century BC in counterpoint with the emergence of Carthage: but as we have seen archaeology indicates that the forms of contact were composite and diversified since the two previous centuries.

4. "From Pots to People": Sulky, North Africa and connections with the Carthaginian and Numidian *milieu*

The formal and decorative similarities between a part of the Phoenician tableware found in Sardinia, in the specific context of Sulky, and contemporary production documented in Carthage, as well as in other settlements of the west Mediterranean (Cadiz) have been underlined many times (e.g. Guirguis 2012). While waiting for an enlargement of the archaeometric analyses for the characterization of ceramic compositions (from which we can deduce a plurality of artisan centres or a single direction of origin), we underline the presence of a particular repertoire which, together with the traditional hemispherical profile and carinated open forms, was realised from the first half of the 8th century BC onwards in the form of a series of dishes with a short flat or pendant rim. These dishes, while almost entirely covered in red-slip and derived, albeit loyally, from the metropolitan repertoire of Phoenicia, appear to be the result of formal experimentation developed in the colonial context. In addition to the shapes with red-slip decoration, there is a series of products defined as bichrome: on a carefully polished surface, two or more lines were added using black paint, isolating the top of the rim, which was coated with red-slip. This particular type of dish is found in the most archaic levels of Sulky, Cadiz (Ruiz Mata *et al*. 2014, fig. 7; Torres Ortiz *et al*. 2014, fig. 4, e-f) and Carthage (Núñez 2014, fig. 4, 5; fig. 5, 1-2; fig. 6, 3) (Figs. 11.2-11.3). From the Sardinian site there are some unpublished fragments, found in the central layers of the filling of an occluded *silos* during the renovation of a Phoenician house used until the end of the 8th-early 7th century BC. (Fig. 11.4). It is therefore a closed context that shows particularly interesting associations of materials with strong parallels between Sulky and Carthage.

The contact between Sardinia and North Africa within the Phoenician circuit, however, seems not to be limited to merely a common ceramic *koinè* and shared cultural aspects, but probably involved diversified forms of human mobility (Bondì 2006), not only limited to individuals of the eastern tradition, but extended to the same indigenous components involved in these processes. Even though the most important data on trans-regional mobility previously – and to a large extent – depended

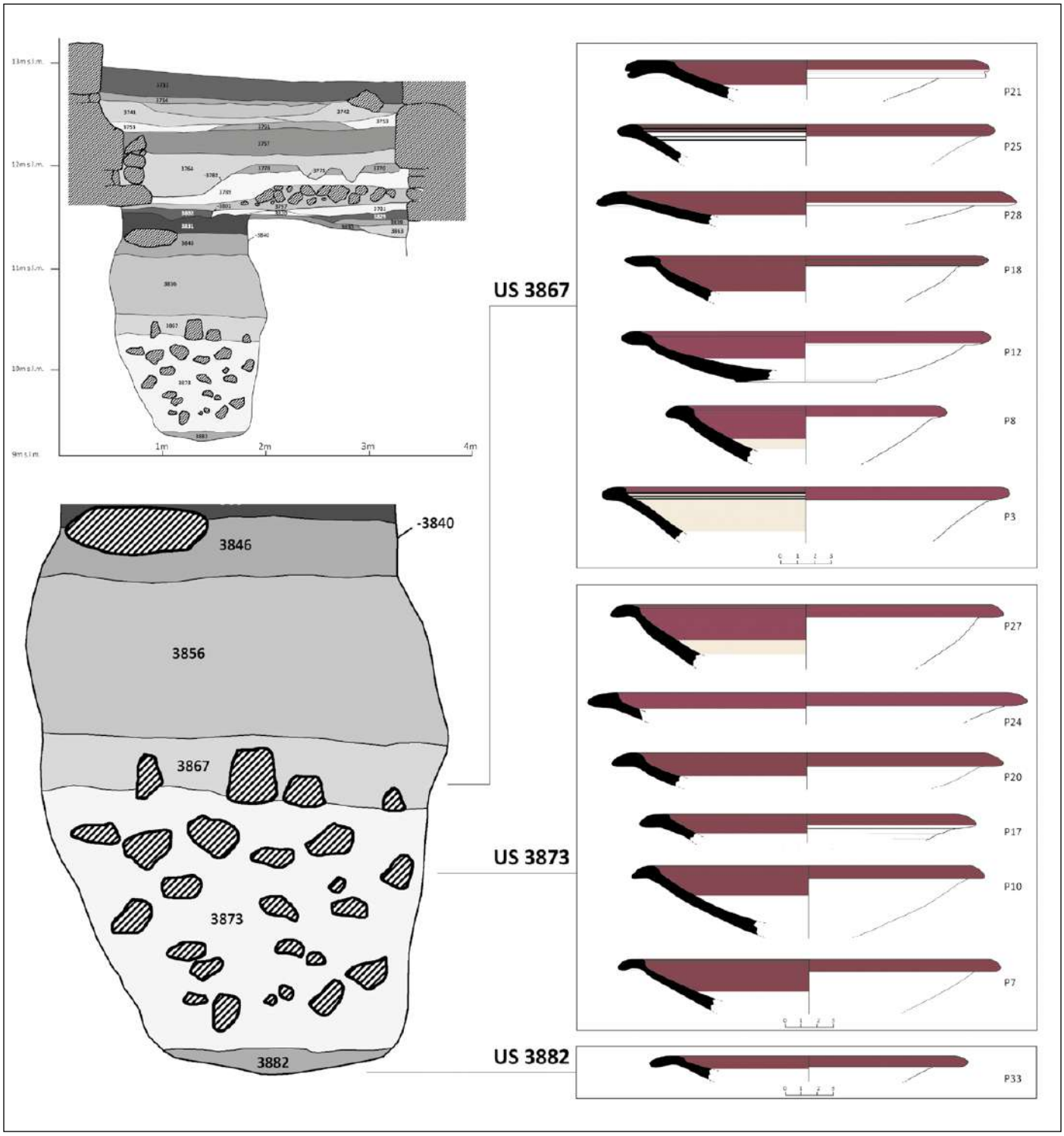

Fig. 11.2 – Phoenician red-slip plates/dishes from the archaic levels of Sulky (US 3882, 3873, 3867) – Cronicario area, Locus IIH, filling of the *silos* US -3840 (photos & drawings by the Author, with Antonella Unali & Rosana Pla Orquín).

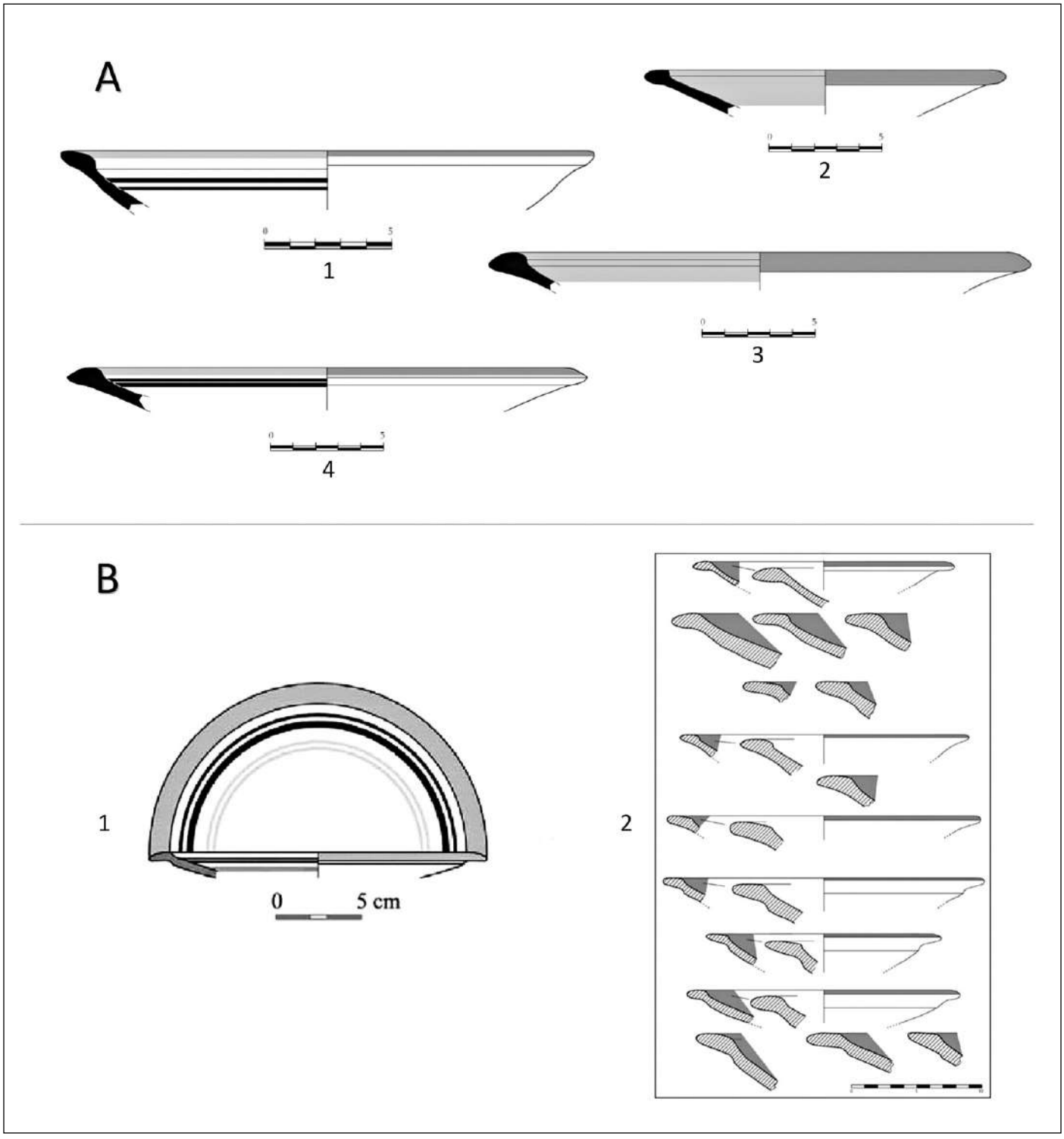

Fig. 11.3 – Phoenician plates from Carthage (A, 1-3 from Núñez 2014: figs. 4,5; 5, 1-2; 6, 3) and Cádiz (B, 1 from Torres Ortiz *et al.* 2014: fig. 4, f; B, 2 from: Ruiz Mata *et al.* 2014: fig. 7).

on the information available on the horizons of the middle-archaic and classical ages, through a convergence between historiographic-literary sources and archaeological evidence. The mobility of individuals is perceived, in these cases, as unidirectional movements, as a flow from North Africa towards the outside (in this sense, the example of the so-called 'Libyophoenicians' appears illuminating). But the new data discussed above converge in indicating a process of human mobility especially with reference to the Sardinian indigenous components (Van Dommelen 1998).

By contrast, in this work we intend to present some material evidence that would seem to suggest a parallel migratory flow of indigenous North African groups to the outer regions of the central Mediterranean. One of the most novel elements consists of the identification of a dough mould in the lower level of the *silos* (US -3840) located inside Locus IIH in the *Cronicario Area* (Fig. 11.5). The object in question is a large flat-bottomed container with thick walls, rounded indistinct edges and with four elliptical rounded-profile ashlars arranged at the top of the shoulder. In the preliminary publication of the context (Guirguis and Unali 2016: 90, figs. 4b, 5), the difficulties in detecting valid comparisons in the context of the Nuragic autochthonous production were underlined and the piece was assigned, due to its stratigraphic collocation, to a local production of the 9th century BC. However, it is now possible to propose a series of comparisons with similar 'vases à profil oval' attested in the phases of the *Numide Ancien* (NA 1-3) of Althiburos, datable to between the 10th and 8th centuries BC. The oldest horizons identified in the area of the *Capitolium* are also characterized by the symptomatic – although not quantitatively overwhelming – presence of Phoenician ceramics attributable to the expansion of Carthage and dated to the second half of the 8th century BC onwards (Kallala *et al*. 2014; Ramon *et al*. 2016: 56-58, fig. 2.4, pl. 1.2, 280106-1, 280337-1). For the purposes of this attribution, we point out, as comparisons of the Sulky finds, some specimens that can be integrated or partially reconstructed together with numerous fragments, which testify to the widespread distribution of a form that is considered rare outside Althiburos (also due to the general scarcity of investigation into the pre-Roman phases of the Numidic settlements) and the lack of convincing modern equivalents (Sanmartí *et al*. 2016: 88). The documentation from North Africa is also enriched by numerous ceramic forms of trays, such as those from such areas of the Tunisian Sahel as El Hekma, although the chronology of these finds is generally from the Hellenistic period, in contexts of a predominantly funerary nature (Ben Younes 1988; Sghaïer 2017). While analogies between these containers and artefacts from Sulky may seem risky, we note the presence of a remarkable sample of handmade trays, compatible with contemporary productions of Sardinia (Fig. 11.6), called '*tajines*' in analogy with the shapes still used today in the inland areas of Tunisia (Depalmas and di Gennaro 2004; di Gennaro and Depalmas 2011).

In this sense, baking trays can be considered particularly indicative; they have been documented transversally in numerous Mediterranean centres with dates as early as the 9th century BC. For the pre-Phoenician horizon of Motya (local phase *Motya IIIB*) there are some fragments, dated to between the 11th and 9th centuries BC, in association with Cypriot imports, Levantine and Philistine pottery and a fragment of a Nuragic *askos* (jug) decorated with concentric circles (Nigro 2016: 355-356, figs. 18-20) that would seem to indicate that the island "*fosse occupata da un insediamento indigeno in contatto con il Levante anche in quest'epoca, ormai a ridosso dello stanziamento di una prima comunità di naviganti fenici*" (Ivi: 356). Further documentation comes from Malta (although most is later: Quercia 2002; Sagona 2008: 525-527, fig. 15, 5-7) and, moving further east, also from Lefkandi, where the trays do not seem to belong to the local repertoire and are considered as a 'not common' form, suggesting that the hypothesis of some form of direct contact between the central Mediterranean (Sardinia? North Africa?) and Euboea could be explored in detail (Catling and Lemos 1990: 63-64, 134, nn. 877-880, pls., 42, 79). A similar spread of baking trays has been noted in Syria, in the southern Levant and in Egypt, in the entire time span of the Middle and Late Bronze Age: as "*items of everyday life, Canaanite baking trays represent a significant piece of evidence for the migration of people of Levantine origin (the so-called "Hyksos") into Egypt These vessels* (…) *can be interpreted as a material expression of the Egyptianization of Canaanite immigrants that created a unique blend of local and foreign features*" (Zukerman 2014: 118).

The question leads us, on one hand, to consider the mobility of individuals and human groups within the 'Phoenician circuits' that did not exclusively concern the coastal territories, and on the other to reflect on the possible existence of a *koinè* and/or a common artisan matrix, autochthonous and central-Mediterranean, which consolidates and spreads due to the complex forms of cohabitation that we have attempted to outline in this necessarily concise way.

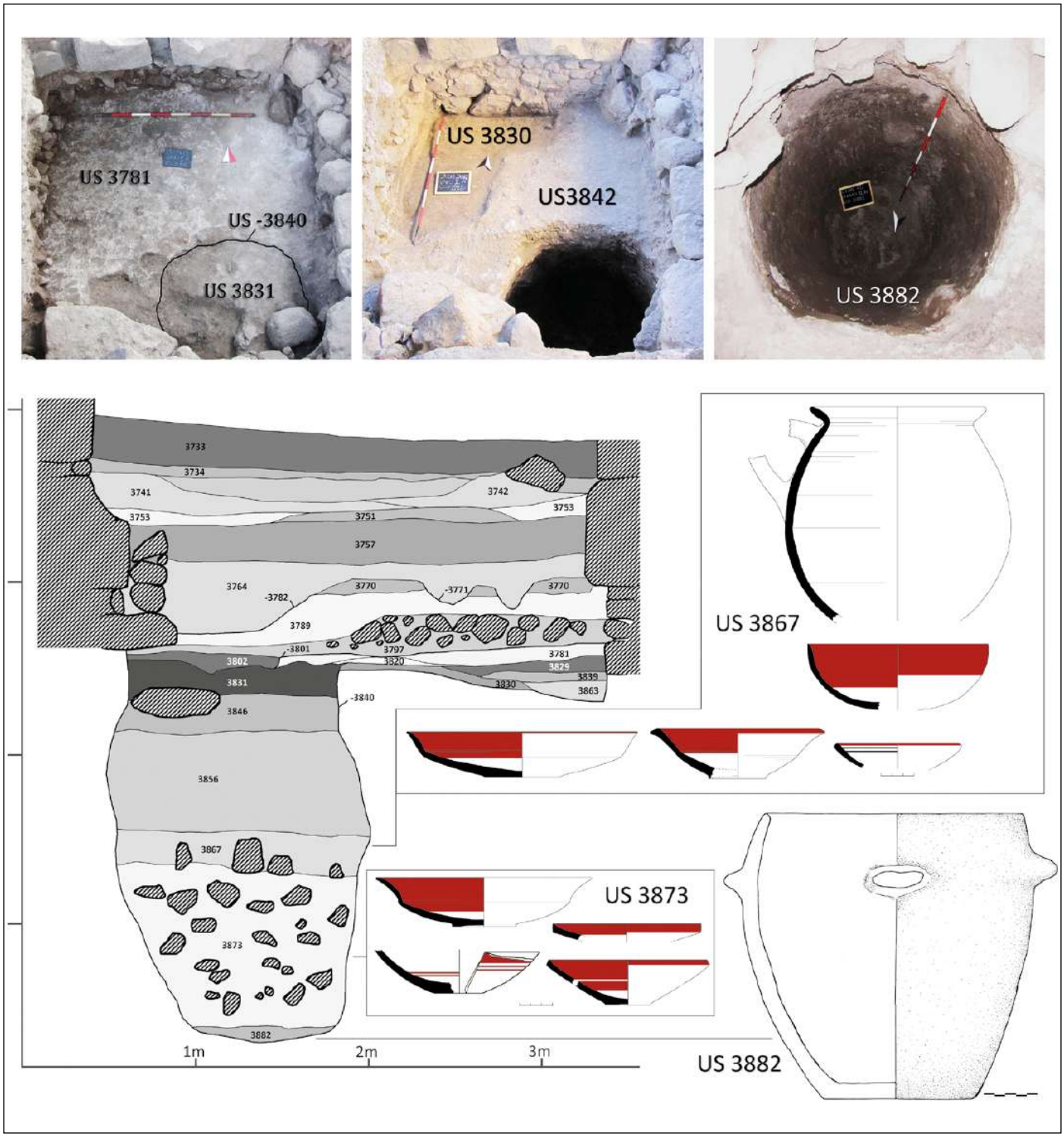

Fig. 11.4 – Images of the Locus IIH in the Cronicario area of Sulky with selection of pottery from US 3882, 3873, 3867 (photos & drawings by the Author, with Antonella Unali & Rosana Pla Orquín).

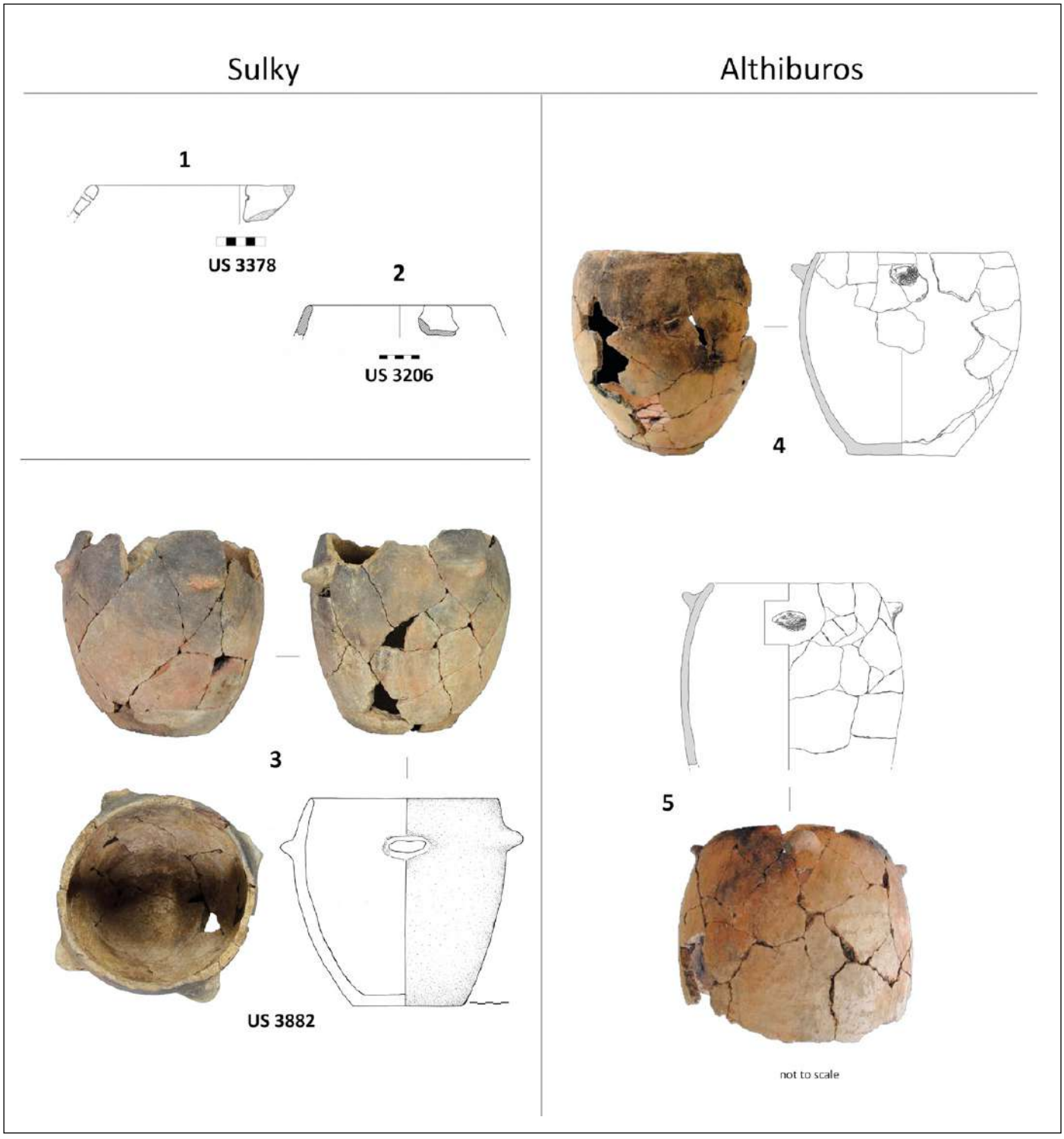

Fig. 11.5 – *Impasto* big containers from Sulky (1-2 from Unali 2012: fig. 4; Pompianu & Unali 2016: fig. 8, 6; 3 from the lowest level US 3882 in the *silos* US -3840: drawings by the Author, with Antonella Unali & Rosana Pla Orquín) and Althiburos (4-5 from Sanmartí *et al*. 2016: 105, n. 202; 106, n. 212; pl. 3.1).

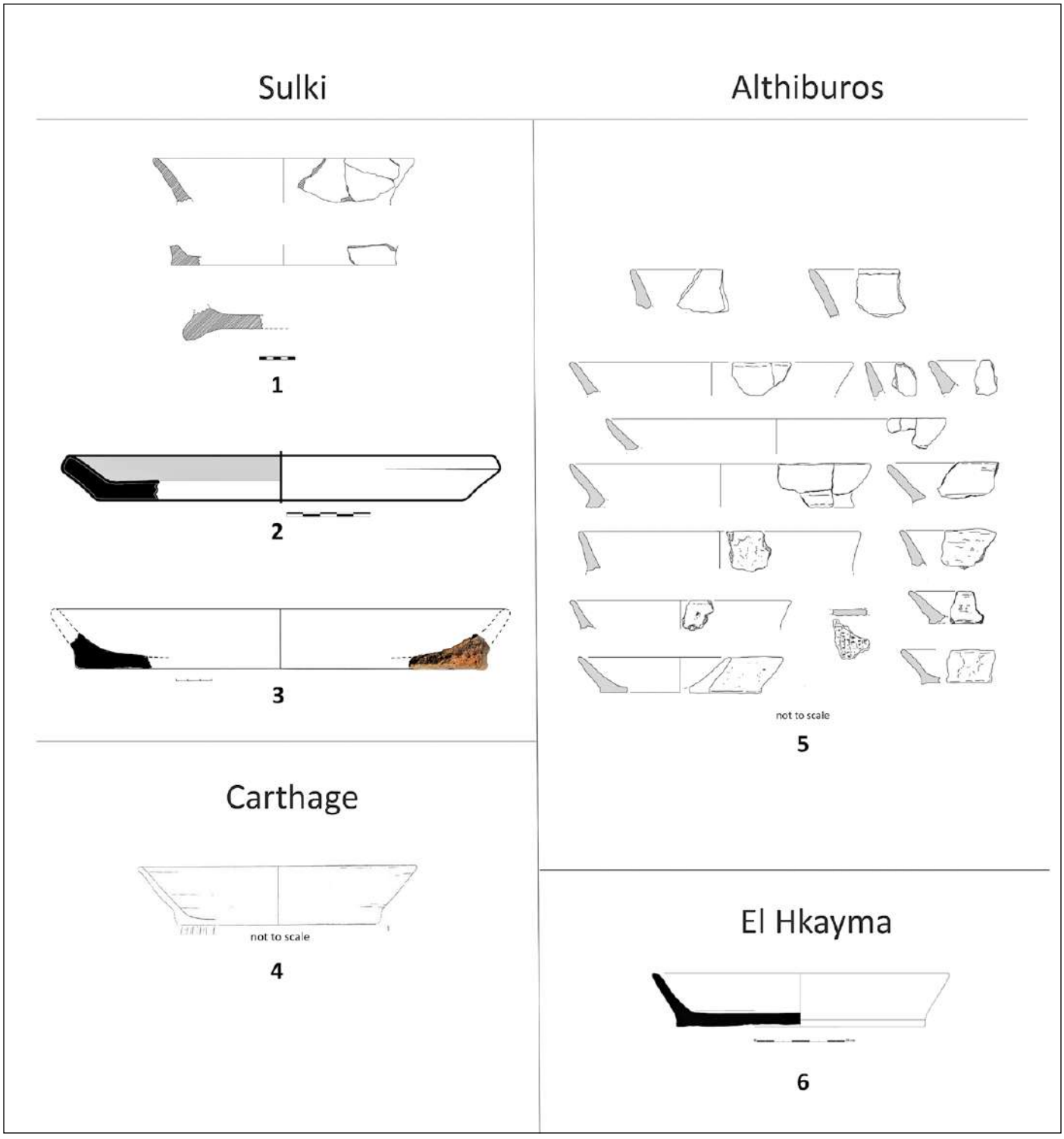

Fig. 11.6 – *Impasto* trays from Sulky (1 from Pompianu 2011: fig. 7; 2 from Bartoloni 2018: fig. 35; 3 from US 3867 in the silos US -3840: drawing Rosana Pla Orquín), Carthage (4 from Mansel 2010: fig. 9, 3), Althiburos (5 from Sanmartí *et al.* 2016: fig. 3.11) and El Hkayma (6 from Sghaïer 2017: fig. 8).

5. Concluding remarks: post-diaspora dimensions

During the Iron Age, the Phoenicians were the bearers of concepts and rules that were unknown in the western Mediterranean. They experimented with a series of innovative solutions. The impact on the autochthonous populations they came into contact with was profound and intense: the new communities successfully integrated all these different components without negating any pre-existing cultural contribution. We think this was a very revolutionary approach that created a new 'Mediterranean civilization', bridging the gap between East and West.

The analysis of the material culture of the most archaic phases allows us to hypothesize the first Phoenician settlements having a markedly multi-ethnic and multicultural character. The hypothesis of a mixed cultural physiognomy can find ample and variegated confirmation in the analysis, and above all, in the contextualization of the material, showing the associations present in some stratigraphic units significantly endowed (due to their location, the nature of the deposit and for the state of conservation of the dating elements) with a high informative potential.

While on the one hand we have noted the lack of 'models', albeit diversified, that can be usefully applied to the flow of sedentarization of the Phoenicians in the west without taking into account the framework previously offered by the indigenous dimension of the Final Bronze / Early Iron Age, nevertheless we stress the promotional role of the Phoenicians, who were able to articulate their settlement policies in a way that was adapted to the characteristics of the populations with whom they maintained and solidified close relations of coexistence and commercial partnership (Guirguis 2016: 11-12).

However, from a certain perspective, for example in light of the data from Pithekoussai, as well as from Al Mina and some coastal settlements in Andalusia, have recently been framed in the context of particular hybrid Middle Grounds, according to a 'powerful model' (Antonaccio 2010) adopted by Irad Malkin for western Sicily and for other 'contexts of meeting' (e.g. Malkin 2002, 2004) and that can be fruitfully adopted also to understand the true nature of many Phoenician settlements of the central-western Mediterranean, especially for (or limited to?) those first horizons that produced new multicultural settlements conceived of "*in a sphere where ethnic and linguistic origins hardly mattered in comparison to the opportunities they had to offer to new settlers, among which were surely economic ones. Planted sometimes on virgin soil, sometimes in the vicinity of existing settlements, and inhabited by a mix of people of whom some came from distant place, they created a hybrid space of the interaction of individuals bearing with them all the distinct traditions, customs, dress codes, diets, languages, and belief Mediterranean shores had to offer, and merged into something new with traits that were mutually understood*" (Sommer 2010: 129).

The networks of connections between the different centres from which the Phoenicians dispersed, therefore, seem to involve a total redefinition of the spaces of social relation according to an apparently 'inclusive' tendency, but without doubt framed in a precise strategy of (inter)action that found its precedents/presumptions in the international policy implemented by the Phoenician cities of the Levant in the sphere of the strategies of commercial expansion (Aubet 2012) from the beginning of the 1st if not the end of the 2nd millennium BC. In the west, during the Iron Age, a unique process of acquisition, metabolization and elaboration of external 'inputs' seems to have been developing, favoured and conveyed by the Phoenician element from the 9th century BC onwards, even though the previous experiences of the Bronze Age, which united the eastern and western coasts of the Mediterranean from the 14th-13th centuries BC, should not be underestimated.

Future research will focus not only on historic, epigraphic and iconographic sources, but also on the theoretical framework of identities, household and gender studies, using different perspectives of analysis. We aim to study the categories of so-called 'maintenance activities', i.e. those practices (generally domestic, linked to production-distribution-consumption) in which the female component took on particular importance, being essential to the management and evolution of the social group. We can assume (as there is still a dearth in the archaeological evidence with regard to this process) that the maintenance activities took on a dimension that was not only domestic, but also relational and social. The identity and the relationship of gender are defined and transmitted through daily practice, which requires special knowledge and skills. These maintenance activities must be carried out to address basic needs and they require the use of new technologies and old traditions, the application of transferred/acquired knowledge, which leave traces in the various repertoires of material experiences, allowing us to define the community's cultural background. In short, these activities have been underestimated by social research studies and interpretations of past societies; their technological contributions have often been ignored by scholars, as has their value in terms of the sharing of knowledge

and expertise. Food-related practices are the best-recognized maintenance activities represented in the archaeological dossier: a series of basic procedures, among which personal and gender networks are established, marked by a deep relation of learning and knowledge. This set of specialized activities represents the basis for the creation and reproduction of individual and collective identities, for the legitimization of power relationships, for the negotiation of gender and age and for the creation of intricate and dynamic networks.

In the ancient panorama of central North Africa and Sardinia, as we have seen, there emerges a complex cultural background that is reflected in the archaeological record: to explain these phenomena, reference has often been made to the establishment of 'mixed marriages', coordinated by élites but probably implemented in different degrees of the social scale, as suggested by the abundant traces of indigenous elements in the most ancient towns of the Phoenician type. The phenomenon of 'mixed' marriage has also been used to explain an important characteristic in the archaeological documentation: we feel it is important to underline, among all the cases, the simultaneous presence of Phoenician, autochthonous and 'hybrid' pottery, in the deepest levels of deposition of the *tofet* sanctuaries. 'Intermarriage' was quite a common practice in the ancient world and it played a fundamental role in forging alliances between different communities. The presence of typically Phoenician-Punic practices hand-in-hand with several expressions of indigenous culture in North Africa, Sardinia etc., indicates the active impact of the autochthonous population and the dynamic effect that diverse members of the community had on the creation and promulgation of a uniquely and multiform 'Mediterranean Cultural Civilization'.

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12. Ichnology and archaeology in the African record: a complementary approach

Flavio Altamura

Abstract. The discovery, in the late 1970s, of the Laetoli footprints in Tanzania (about 3.6 Ma) led the scientific community at large to recognize the importance of sites containing hominin fossil footprints. Since then, only a handful of such Lower and Middle Pleistocene tracksites have been found in Africa: Ileret and Koobi Fora in Kenya (1.5-1.4 Ma), Melka Kunture in Ethiopia (0.85 and 0.7 Ma), and Aalad-Amo in Eritea (ca. 0.8 Ma). Their scarcity is due to the fact that they were formed and preserved thanks to the chance combination of favorable paleoenvironmental conditions. However, the possibility that other sites may not have been detected because of the lack of adequate methodologies in traditional archeological research should not be underestimated. Fossil tracks can provide valuable data for reconstructing the environment, topography and ecology of the ancient landscape, and the ethology of its inhabitants, as well as insights on the behavior and biomechanical capabilities of the earliest hominin species. By recording *in situ* a fleeting biological activity, fossil tracks provide a level of detail that usually escapes other kinds of records, such as archeological and faunal records. This paper gives an overview of state-of-the-art methodologies used to detect, excavate, document and preserve these delicate stratigraphic features, citing examples from the oldest known sites. Its aim is to stimulate the development of 'ichnological awareness' in discussions of archeological research in Africa.
KeyWords. Fossil footprints; ichnology; archaeological research; Plio-Pleistocene; Africa.

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1. Introduction

Encountering a track of some kind is a common occurrence, and anyone can glean at least some information from it. But for populations of ethnographic interest – and surely for ancient communities of hunter-gatherers as well – observing, identifying and correctly interpreting tracks and footprints found on the ground would have been of the utmost importance for the subsistence and survival of human groups (Liebenberg 1990a, 1990b).

Ichnology (i.e. the study of tracks and traces left by living organisms) began as a branch of science that belonged in part to geology and in part to biology. It eventually became a specific area of study, though several theoretical and conceptual aspects are still being defined (Buatois and Mangano 2011). Over the past few decades, ichnology has proved that it can span across, hence can contribute to, various other disciplines, such as ethology and archeology, even forensic science (Buatois and Mangano 2011; Bennett and Morse 2014). The footprints discovered at Plio-Pleistocene archeological sites have attracted due consideration, especially in connection with the study of the evolution of human bipedalism. This aspect caught the attention of the scientific community after the discovery of extraordinary and extremely ancient (3.66 Ma, i.e. Million years Ago) footprints at Laetoli, in Tanzania (Leakey and Hay 1979; Leakey and Harris 1987).

The first book devoted solely to human fossil footprints was published only a few years ago (Bennett and Morse 2014). Finds in contexts dating from the Pleistocene to the Holocene have multiplied over the past couple of decades (e.g. Bustos *et al.* 2018; Helm *et al.* 2018; McLaren *et al.* 2018), as have theoretical works and reviews related to them (De Vos *et al.* 1998; Kim *et al.* 2008; Lockley *et al.* 2008; Bennett and Morse 2014; Lenssen-Erz and Pastoors 2017). Their conclusions have been corroborated by studies aimed at assessing the formation, preservation and meaning of these tracks made in different environments and by different human groups (e.g. Lockley and Rodríguez-de la Rosa 2009; Marty *et al.* 2009; D'Août *et al.* 2010; Morse *et al.* 2010, 2013; Hatala *et al.* 2013a, 2013b, 2016a, 2018; Bennett *et al.* 2013; Ruiz and Torices 2013; Pastoors *et al.* 2015; Grant *et al.* 2018; Wiseman and De Groote 2018; Wiseman *et al.* 2018; Zimmer *et al.* 2018; Bennett and Budka forthcoming 2019).

The study of human tracks has also given rise to a variety of more specific disciplines, for instance ichnoarcheology (Baucon *et al.* 2008) – i.e. the study of traces, including human footprints and coprolites, and bioturbation and bioerosion structures, found in archeological contexts or on archeological materials – and hominin ichnology (Kim *et al.* 2008), which besides footprints comprises all the different types of traces left by prehistoric humans in

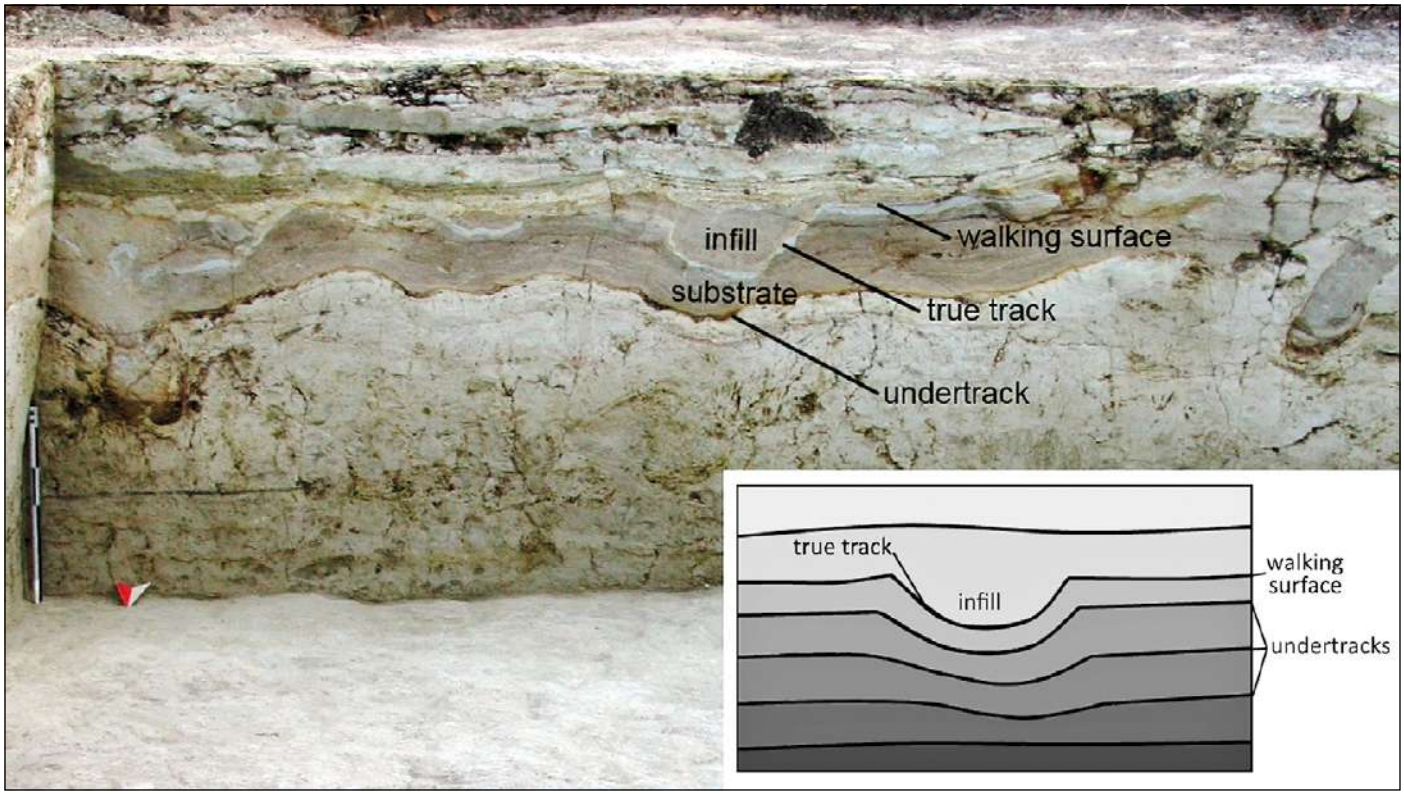

Fig. 12.1 – Gombore II-2. Sectioned bioturbation structures (hippo tracks) on the southern excavation cut made in 2013 (0.7 Ma) and their schematic representation (inset). Note the features typical of tracks: walking surface, track infill, true tracks and undertracks (Photo by the Author, Italian Archeological Mission at Melka Kunture and Balchit).

natural environments, such as marks left by butchering activities, lithic industry, structures and even artistic expressions (Kim *et al.* 2008). One gets the feeling that ichnology often trespasses into other specialist fields, such as taphonomy, archeology, anthropology and architecture, though it has undeniably given them valuable information.

2. What is a fossil track?

Tracks are biogenic structures formed by mechanical interaction between a living organism and a geological substrate. Generally speaking, tracks left by vertebrates are gravity-driven deformations of a soft substrate (Fig. 12.1). When an animal walks, stands or runs, it applies a downward force to the surface on which it moves, compressing it where its feet come in contact with it. If the pressure applied by the track-maker's foot exceeds the resistance of the substrate's sediments under it, they collapse, thereby deforming the substrate itself: the result is an excavated track (Buatois and Mangano 2011; Bennett and Morse 2014).

For this erosion to happen, the substrate must have certain features. The deposit's matrix and texture must be such as to make deformation possible, that is, the sediment must consist of fine-grained materials with a good degree of plasticity; the erosive phenomenon is intensified if these materials are associated with lithological sediments with contrasting characteristics (Laporte and Behrensmeyer 1980; Cohen *et al.* 1993; Ashley and Liutkus 2003).

The water content in a sediment is also a very important factor, because it influences the substrate's consistency and firmness, hence its ability to take and retain an impression. A waterlogged deposit usually will not be able to hold a track, because the sediments flow back in; conversely, a very dry substrate does not have the necessary plasticity to be deformable in the first place. Water content also strongly influences how well-defined a track will be and the amount of anatomical detail it will preserve. Ex-

perimental research (e.g. Milàn and Bromley 2007) has shown that if a sediment is not too wet, the substrate will preserve most of a track's contact surface, i.e. the surface that was in direct contact with the plantar surface of the track-maker's foot (true track, *sensu* Bennett and Morse 2014; Fig. 12.1). A substrate with a high water content, on the other hand, will be unable to preserve a track's original contact surface, so that, whether viewed from above or in cross-section, it will look like a poorly defined disruption.

The substrate's mechanical properties and its water content also influence the dynamics of pressure propagation. The compression of the surface layer also deforms the underlying layers, indirectly originating load structures and microfaults under the track's contact surface (Fig. 12.1); these features are proportional to the animal's weight and the speed and energy of the contact between plantar surface and substrate surface (undertrack, *sensu* Bennet and Morse 2014).

These factors, particularly substrate quality and consistency, influence a track's other morphological features as well. For instance, a marginal rim may be formed by the displacement of sediment during compression, or some substrate material may be dragged up and moved as the track-maker lifts its foot (respectively, displacement rim and track ejecta, *sensu* Bennett and Morse 2014).

If the substrate's characteristics are suitable, tracks can be impressed and preserved in many different environments: fluvial and fluvio-lacustrine systems, dunes and coastal mudflats, caves, volcanic areas, and so forth (Buoatois and Mangano 2011; Bennett and Morse 2014). As regards fluvial and fluvio-lacustrine contexts, tracked surfaces usually occur in the margin zones that border riverbanks and lakeshores, separating the submerged areas from the dry ones, because these are the only places where the water content of the sediments is adequate (Cohen *et al.* 1993).

Once a track has been impressed, another set of taphonomic factors comes into play, and rarely allow it to enter the fossil record. Present-day ichnological examples show that open-air track-bearing surfaces attest to biological activities that are rather close in time; the tracks are only a few days or weeks old, rather than months or years (Cohen *et al*. 1993; Roach *et al.* 2016). Tracks are very delicate stratigraphic elements, and are easily erased or eroded by weather events, geological phenomena or subsequent biological activity.

Hence, for tracks to be preserved, tracked surfaces must be quickly buried by other sedimentary deposits; the energy involved in the deposition process must be low, or the new sediments will erase the underlying tracks. Tracks can also be preserved when track-bearing surface hardens through desiccation and/or lithification, as is the case with volcanic ash (Laporte and Behrensmeyer 1980; Leakey and Harris 1987; Ashley and Liutkus 2003; Mietto *et al*. 2003; Bennett and Morse 2014). Clearly, for these bioturbation structures to remain more or less intact, it is also essential that post-depositional processes, such as compression, deformation and erosion, which could alter their morphology and dimensions – as is often the case when deposits are subjected to tectonic or metamorphic phenomena – be very limited (Bennett and Morse 2014).

3. Informative potential of fossil tracks

The importance of fossil tracks goes well beyond their mere preservation in a museum. Studies of their characteristics, associations and spatial distribution are excellent direct and indirect sources of information in archeological contexts (Cohen *et al.* 1993; Baucon *et al.* 2008; Buoatois and Mangano 2011; Bennett and Morse 2014). Ichnological research can thus reveal data that would otherwise be mostly "invisible," and that complement the information obtained from the archeological record in the usual way (e.g. via geological, archeozoological and techno-typological studies, and so on).

Because tracks form and are preserved in a number of environments only if certain conditions occur, their very existence already provides information on their paleoenvironmental and paleotopographic context, and on the substrate on which they were impressed (e.g. on the existence of paleosurfaces/walking surfaces; on the presence of bodies of water, hence the water content in the substrate sediments; on the rate of sediment deposition; on the desiccation and/or lithification rate, and so forth). Moreover, the presence of diagnostic tracks that can be attributed to specific taxa provides information on the behavior of single individuals or of entire groups (as attested at transit or congregation sites), as well as data on biological activities or on some of the track-maker's traits such as weight, age, walking speed, paleopathologies, and so forth. Faunal associations and their interactions with the environment, which may also be identified through spatial analysis and temporal markers (as in the case of overprints) can help us reconstruct in detail a site's paleobiological context and the chronological dynamics of its frequentation, which usually occurred over a rather narrow timeframe that coincided with the last phase of the context's lifetime before it was buried by new sediments.

It is also possible to compare species documented as fossils or whose presence is suggested by archeological materials, with those evidenced by their footprints (Cohen *et al.* 1993; Roach *et al.* 2016). Tracks do not move and are not formed over a length of time. Hence, they are evidence of a real frequentation that is limited in time and space, and they provide a sort of snapshot that captures a fleeting moment in a person's or animal's long-gone life. A fossil and/or archeological record, on the other hand, is much more affected by taphonomic and biological phenomena, and is therefore usually harder to anchor to any single episode of occupation (e.g. Altamura *et al.* 2018a). A large mammal bone, for instance, may have lain exposed on a surface for decades or have been carried a considerable distance by natural or biological agents before being buried by sediments and thus definitively entering the archeological record (Cohen *et al.* 1993; Haynes 2015). The quantity and quality of information that can be obtained from fossil footprints is obviously directly proportional to how large and how well-preserved the ichnological surfaces are, and to whether it's possible to identify any significant finds; for instance, it is better to find a trackway than single isolated tracks.

4. Human footprints in Africa between the Pliocene and the Middle Pleistocene

There are fewer than a dozen known sites containing human footprints predating the Upper Pleistocene in the whole world (Lockley *et al.* 2008; Bennett and Morse 2014). Africa holds the record for the oldest undisputed hominin footprints, though we must also take into account the possibility that the tracks recently discovered in Crete and dating to the Miocene (5.7 Ma) may prove to be hominin footprints (Gierliński *et al.* 2017). In any case, the oldest African hominin tracksites – i.e. the ones dating from before the Upper Pleistocene – can literally be counted on the fingers of one hand: Laetoli, Koobi Fora, Ileret and Melka Kunture. Finds have also been reported at Aalad-Amo, in Eritrea (Fig. 12.2).
Though they are extremely rare, these finds have been of great value, for they have provided information about the track-makers' physiological and biomechanical characteristics, and insights into their behavior and their social and economic habits.
Analysis of the modes and characteristics of humans' bipedal locomotion, especially as regards the more ancient species, is of primary importance for understanding human evolution. From this standpoint, fossil footprints are a direct source of knowledge that is even more valuable in light of the fact that corresponding fossil remains are very rare. As regards species predating Neanderthals and anatomically modern humans, to date only a few dozen foot bones have been found (Pablos 2015; McNutt *et al.* 2018).

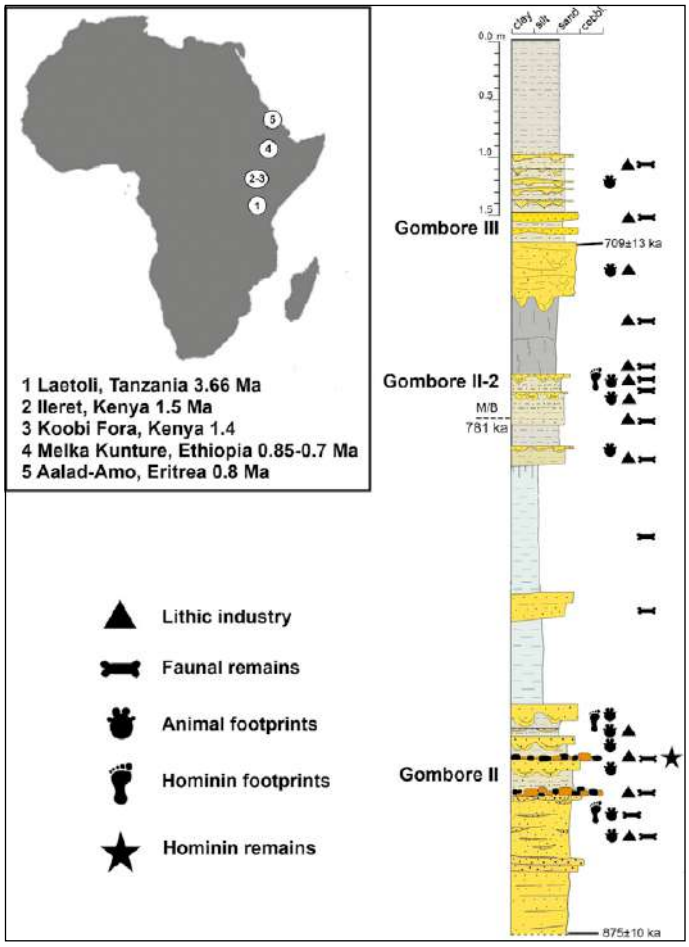

Fig 12.2 – The oldest known hominin-footprint sites in Africa (Pliocene-Middle Pleistocene). Simplified stratigraphic column of the upper part of the Gombore gully at Melka Kunture (late Early Pleistocene and Middle Pleistocene; modified after Mussi *et al.* 2016).

The oldest, and by far the best-known, human fossil footprints are those discovered at the Laetoli site in Tanzania, not far from Olduvai. The site consists of 18 large ichnological surfaces (Leakey and Hay 1979; Leakey and Harris 1987). Thousands of fossilized animal tracks have been found there over the years (Leakey and Harris 1987; Musiba *et al.* 2008). In the late 1970s, a trail of hominin footprints was found at Laetoli's Site G. These had been made by three individuals, and are generally attributed to *Australopithecus afa-*

rensis, this being to date the only species documented in the area by fossil remains found in contemporaneous deposits (Leakey and Harris 1987). Two more hominin trackways were recently discovered near Site G, and were found to belong to the same footprint horizon documented by Mary Leakey (Masao *et al*. 2017).

These footprints provided the first and oldest direct evidence of hominin bipedal locomotion, and led to in-depth studies that significantly advanced our understanding of hominin biomechanical evolution. They also provided important information on aspects such as the track-makers' walking speed and their height and weight, with implications concerning the variability of sexual dimorphism within a given species (Day and Wickens 1980; Charteris *et al.* 1981; Leakey and Harris 1987; Raichlen *et al*. 2008, 2010; Crompton *et al.* 2012; Hatala *et al*. 2016b; Masao *et al.* 2017; Raichlen and Gordon 2017).

The tracks were imprinted 3.66 Ma ago in a layer of volcanic ash which may have erupted from the Sadiman volcano (Deino 2011; Zaitsev *et al.* 2011). Rain had fallen on the ash layer's surface, making it wet and soft enough to receive and retain the tracks made by the hominins that walked on it shortly after the rainfall. Subsequent pyroclastic falls buried the footprints, protecting and preserving them (Hay 1987). Other hominin tracks found in Africa are much more recent. The track sites at Ileret and Koobi Fora date from between 1.5 and 1.4 Ma; the two sites lie at a distance of 45 km from each other in the Turkana Basin, in northern Kenya (Bennett and Morse 2014).

At Ileret, at least two track-bearing horizons were discovered in a fluvio-lacustrine deposit (FwJj14E) about 9 meters thick and dated at 1.52-1.53 Ma. The older track surface, at the bottom of the sequence, has yielded five human footprints on two superimposed levels. The more recent one, which lies higher up in the stratigraphic sequence, consists of several isolated prints and a trail of 9 footprints made by at least two individuals (Bennett *et al.* 2009; Dingwall *et al.* 2013). The tracks were imprinted on layers of silt and sand, and are associated with a rich palimpsest of animal tracks (mainly bovid and avian); these features probably indicate that the paleoenvironment was a delta plain or a lakeside area subjected to intermittent low-energy flooding and sediment deposition. Morphometric analyses of the Ileret footprints have shown that they were made by tall and heavy-set individuals (Bennett and Morse 2014). Bennett *et al.* (2009) tentatively attributed them to *Homo erectus*, while Dingwall *et al.* (2013) suggested that they could have been made by *Paranthropus boisei*.

Research currently under way at the Ileret site has led to the discovery of many other paleosurfaces bearing human and animal tracks (Roach *et al.* 2016). A total of 481 prints, 97 of them human, have been identified to date in five excavation areas. Studies now available indicate that humans moved together in groups, usually along the lakeshore (Hatala *et al.* 2016c, 2017; Roach *et al.* 2016).

At Koobi Fora, a track surface was uncovered on a silty-sandy layer located below a tuff dated at 1.43 Ma. The excavated surface contains 89 impressions made by hippopotamuses, other tetrapods and birds (Behrensemeyer and Laporte 1981; Bennett *et al.* 2009; Bennett and Morse 2014). There are only seven human footprints, lined up along a NW-SE axis; this trail appears to have been made by a single individual. Unfortunately, the prints are poorly defined and do not preserve any significant anatomical details. When the prints were first discovered they were attributed to *Homo erectus* (Behrensemeyer and Laporte 1981); the results of a recent re-excavation of the prints seem to confirm this interpretation (Bennett *et al.* 2009). Based on sedimentological analysis and the presence of tracks made by aquatic birds, most likely the tracked surface was located in a fluvio-lacustrine environment, perhaps a very shallow body of water. Recent excavations of the same paleosurface less than a hundred meters away have unearthed several other track horizons, probably belonging to the same paleoenvironmental context. A great number of hippo tracks were found here, but to date no hominin footprints (Bennett *et al.* 2014).

In June 2016, researchers announced that they had found several fossilized hominin footprints at the Aalad-Amo site, in Eritrea's Danakil desert. No detailed study has as yet been published; the only preliminary information available has been given via press releases and a few interviews (e.g. https://www.uniroma1.it/it/node/26082). The tracked surface, covering several square meters, was brought to light by erosion at the bottom of a dried-out stream bed. About a dozen footprints are preserved on the surface of a sandy-silty layer dating to 0.8 Ma. They may have been made by at least two individuals moving from north to south, and are associated with ungulate tracks. Studies are in progress; however, based on the dating of the deposit, the prints have been tentatively attributed to *Homo erectus*.

4.1 A case study: Melka Kunture

The cluster of archeological sites that make up Melka Kunture, about 50 km south of Addis Ababa, in the Ethiopian highlands (Fig. 12.2), has been undergoing extensive excavation since the 1960s, first by a French team and, then for the past twenty years or so, by the Italian Archeological Mission nowadays led by Margherita Mussi. In the past few years, much of its work has focused

on ichnological research, which has contributed significantly to the characterization and reconstruction of the area's complex stratigraphic sequence.

The identification of track-bearing horizons at such an important site – in part through fieldwork, in part by reviewing documentation from previous excavations – has highlighted the complementary nature of ichnology and archeology, and made Melka Kunture an especially fruitful case for testing the potential of this interdisciplinary approach.

Melka Kunture is located at 2000 m asl in the Upper Awash basin, and spreads over an area of 100 sq. kilometres area. During the Pleistocene, conditions here were ideal for the formation and preservation of track-bearing surfaces. The environment was mostly fluvio-lacustrine, with ponds, swamps and meandering or braided fluvial systems. The paleolandscape's hydrographic and geomorphological features were periodically altered by the accumulation of ash and pyroclastic falls ejected by volcanic eruptions about 30 km away (Chavaillon and Piperno 2004). These volcanic deposits have made it possible to establish a detailed system of absolute ages through $^{40}Ar/^{39}Ar$ dating, which in turn makes it possible to establish – either directly or through stratigraphic correlation – a chronological framework for the main sequences in the area (Morgan *et al.* 2012). Paleoenvironmental data are also available for many sites (Bonnefille *et al.* 2018).

More than 70 archeological surfaces attest to human occupation of the area starting about 1.8 Ma; the oldest sites, located at the same level as the Awash River's current bed, have yielded evolved Oldowan techno-complexes. The Acheulean is very abundant, and is present in its Early, Middle and Late phases in various localities. Archeological levels and finds from the Middle and Late Stone Age show that the area continued to be much frequented during the Upper Pleistocene and the Holocene as well (Chavaillon and Piperno 2004; Morgan *et al.* 2012; Gallotti and Mussi 2018).

In 2013, during excavations at the Gombore II-2 site (0.7 Ma), archeologists noted the presence of some unusual geological features and suspected them to be bioturbation structures (Fig. 12.1). When the ichnological nature of these features was confirmed – the very first Pleistocene fossil tracks recorded in Ethiopia – a specific search for footprints was initiated, both at that site (2013-2015) and at other nearby sites in the Gombore gully (2013-2017). As a result, a number of fossil footprints were found, especially in most of the higher portion of the gully's geo-archeological sequence, which dates from the end of the Early to the Middle Pleistocene (Fig. 12.2). The prints were documented by means of natural and man-made sections and test excavations at several sites: Gombore II-OAM and Gombore II-1 (0.85 Ma), Gombore II-2 and Gombore X (0.7 Ma), and Gombore III (0.6-0.4 Ma) (Mussi *et al.* 2016, 2017; Altamura *et al.* 2017, 2018a, 2018b).

Moreover, field surveys and a review of published data and of unpublished documentation from the Archeological Mission's archive pointed to the presence of more track-bearing horizons at other Melka Kunture sites (Altamura 2017), specifically in the Kella gully (1.8-1.7 Ma), at Gombore I and Gombore Iγ (c. 1.5-1.2 Ma), at Garba IVD (1.5-1.4 Ma) and in the Garba gully (1.3-1 Ma, see also Raynal *et al.* 2004: 150), and at Garba XII (1.3-1.1 Ma), Simbiro III (ca. 1 Ma) and Garba I (0,6 Ma).

Research conducted in the upper part of the Gombore gully yielded the most significant results of this new methodological approach. The gully's geo-archeological sequence (Fig. 12.2) contains many levels bearing human traces embedded in fine-grained sediments of fluvio-lacustrine origin. At the base is a tuff $^{40}Ar/^{39}Ar$ dated to 0.87 Ma, while the ignimbrite at the top of the sequence pertains to an eruption that occurred 0.7 Ma. The Matuyama-Brunhes magnetostratigraphic boundary (ca. 0.78 Ma) was identified in the sequence between these two tephra markers (Morgan *et al.* 2012; Tamrat *et al.* 2013; Mussi *et al.* 2016; Altamura *et al.* 2017, 2018a). Above the older tuff (0.87 Ma) is an extensive archeological level (about 1,000 sq. meters) which dates from about 0.85 Ma and has been explored at various times in a number of sectors (Chavaillon and Piperno 2004; Gallotti *et al.* 2010; Altamura and Mussi 2017). The main archeological layer, which has yielded thousands of artifacts and faunal remains, including two cranial fragments attributed to an early form of *Homo heidelbergensis* (Gallotti *et al.* 2010; Mussi *et al.* 2016; Profico *et al.* 2016), is sandwiched between two deposits consisting of silts alternating with fine sands, the upper one being over one meter thick.

Many track-bearing surfaces were documented at the interfaces between the alternating silt and sand layers (which except for these tracks would be considered sterile), both under and above the main archeological level. The tracks were first noted during surveys of the exposed cuts at Gombore II OAM (Fig. 12.3) and in old photographs and drawings made at Gombore II OAM and Gombore II-1, which showed stratigraphic disruptions which had not been identified correctly (Mussi *et al.* 2016: SI figs. 6-7; Altamura and Mussi 2017).

These structures appeared to be gaps and hollows, usually only a few centimeters wide, which had been filled up by the overlying sands o silts. The bottom of most of these structures had convex morphologies, often with a number of lobes, that had penetrated a few centimeters deep into the underlying sediment (Fig.

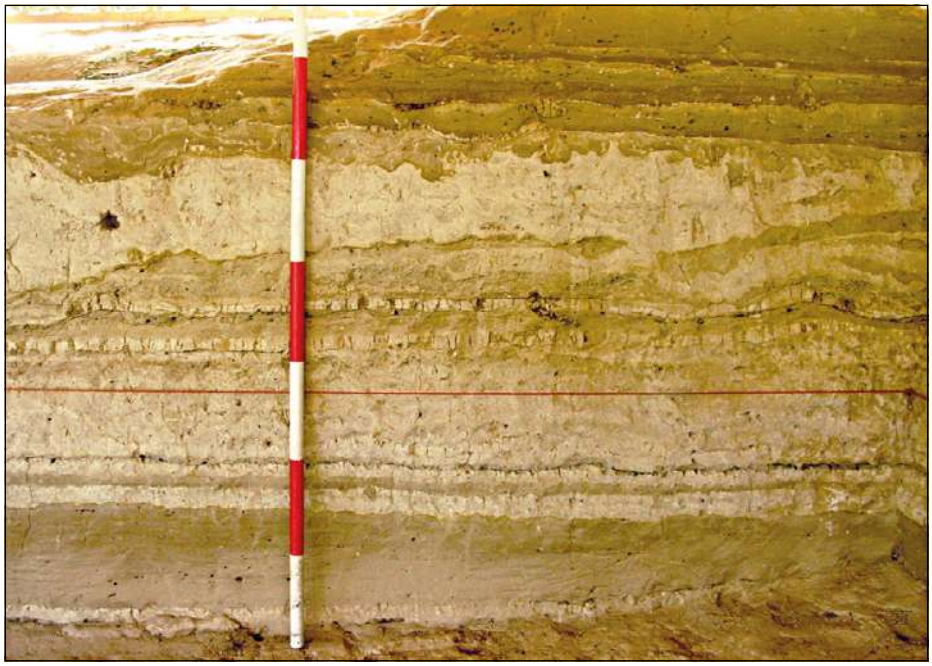

Fig. 12.3 – The southern excavation cut at the Gombore II OAM site at Melka Kunture (ca. 0.85 Ma). Many bioturbation structures (footprints), cross-sectioned vertically, are located at the contact surface between the silt and fine-sand layers (Photo by the Author, Italian Archeological Mission at Melka Kunture and Balchit).

12.3). Other depressions, over 20 cm wide, were also observed; they were identified as footprints of *Hippopotamus* sp. (Mussi *et al.* 2016; Altamura and Mussi 2017).

In 2015, a test excavation (1 sq. meter) was made in the northern part of Gombore II OAM on an exposed silt deposit located below the main archeological layer, hence can dated to between 0.87 and 0.85 Ma or earlier. The excavation revealed a densely packed palimpsest of vertebrate tracks, including one human footprint made by the right foot of a young individual (Altamura and Mussi 2017). In 2017, another test excavation of 2 sq. meters was made in the SW area of the same site, exploring the fluvio-lacustrine sequence (1.3 m thick) that overlies the archeological level. The findings (still being studied) are very interesting: the surfaces of all thirteen silty and silty-sandy layers intercepted by the excavation contain fossil imprints made by vertebrates, including hominins, and by invertebrates (Altamura *et al.* 2018b).

Above these levels lies a massive clay deposit (about 2 m thick), and above it more alternating silt and sand layers formed in a fluvio-lacustrine environment. As recorded both at Gombore II-2 and at the natural cut at Gombore X (about 30 m farther south), this portion of the stratigraphic sequence, dated between 0.78 and 0.7 Ma, contains bioturbations. Excavations conducted in 2013-2015 at the same level as the butchering site found at Gombore II-2 exposed a large track-bearing paleosurface, extending over about 35 sq. meters on a silty-sandy layer (Altamura *et al.* 2018a). Thanks to the overlying ignimbrite layer (1 m thick) which sealed and protected it, this surface is well preserved and contains hundreds of tracks made by large and small mammals (hippos, bovids, equids, suids and others) and birds that were walking through or congregating at the site (Fig. 12.4). Eleven hominin footprints were also found: they had been made by adults and children, some very young (about one year old).

In direct stratigraphic association with this surface is a rich archeological and paleontological record, the first one ever found in an ichnological context this old. Finds show that humans occupied the site for a relatively short time, perhaps only one season, settling at the edge of a body of water to carry out specific activities, including butchering hippo carcasses (several hippo bones found here bear cut marks). The fact that in this context infant tracks were found together with those of older individuals suggests that children were present when adults performed day-to-day activities such as tool-knapping and butchering, and may

Fig. 12.4 – Gombore II-2. Detail of the 0.7 Ma track surface 2015 excavation (Photo by the Author, Italian Archeological Mission at Melka Kunture and Balchit).

indicate that children had to start learning these skills at a very young age (Altamura *et al.* 2018a).

On the top of the tuff layer that seals this paleosurface, archeologists discovered a fossil trackway and exposed a portion over 6 m long (Altamura *et al.* 2017). It is a channel-like erosion structure, with a concave bottom up to 2 meters wide filled with large bioturbation structures (Fig. 12.5). Other similar structures, isolated or in a line, were found elsewhere on the tuff's surface and along the excavation walls. These elliptical structures, some as them as much as 50 cm deep, had filled with sand and silt from the overlying deposits. To study them, researchers either emptied out their infill to expose the tracks' original contact surfaces (true tracks) or isolated them by scraping away the surrounding tuff to obtain free-standing positive casts (natural track casts, Fig. 12.5).

The morphology of the tracks indicate that they were made by *Hippopotamus* cf. *amphibius*. Their study gave a good idea of the shape and size of the soft tissues of these animals' feet, and suggested that by the beginning of the Middle Pleistocene hippos apparently behaved just as they do today (Altamura *et al.* 2017).

Similar footprints were also found at Gombore X, in a similar chrono-stratigraphic context (volcanic sands and tuff, dated 0.7 Ma). The 0.7 Ma-tuff is topped by more sand and silt layers; they too contain many footprints visible along excavation cuts and tests at Gombore III (0.6-0.4 Ma) (Mussi *et al*. 2016, 2017; Altamura 2017).

5. Investigation methods and constraints on research

The abundance of track-bearing horizons identified in these past few years at Melka Kunture shows how focusing on ichnological features can open up important new lines of research even when dealing with deposits that have already been well investigated from other standpoints. Excavations at Melka Kunture started in 1963, but fossil tracks there were not studied at all until very recently. We can only guess how many and what kind of ichnological data have been lost or have not been adequately considered over the decades here and at many other African sites.

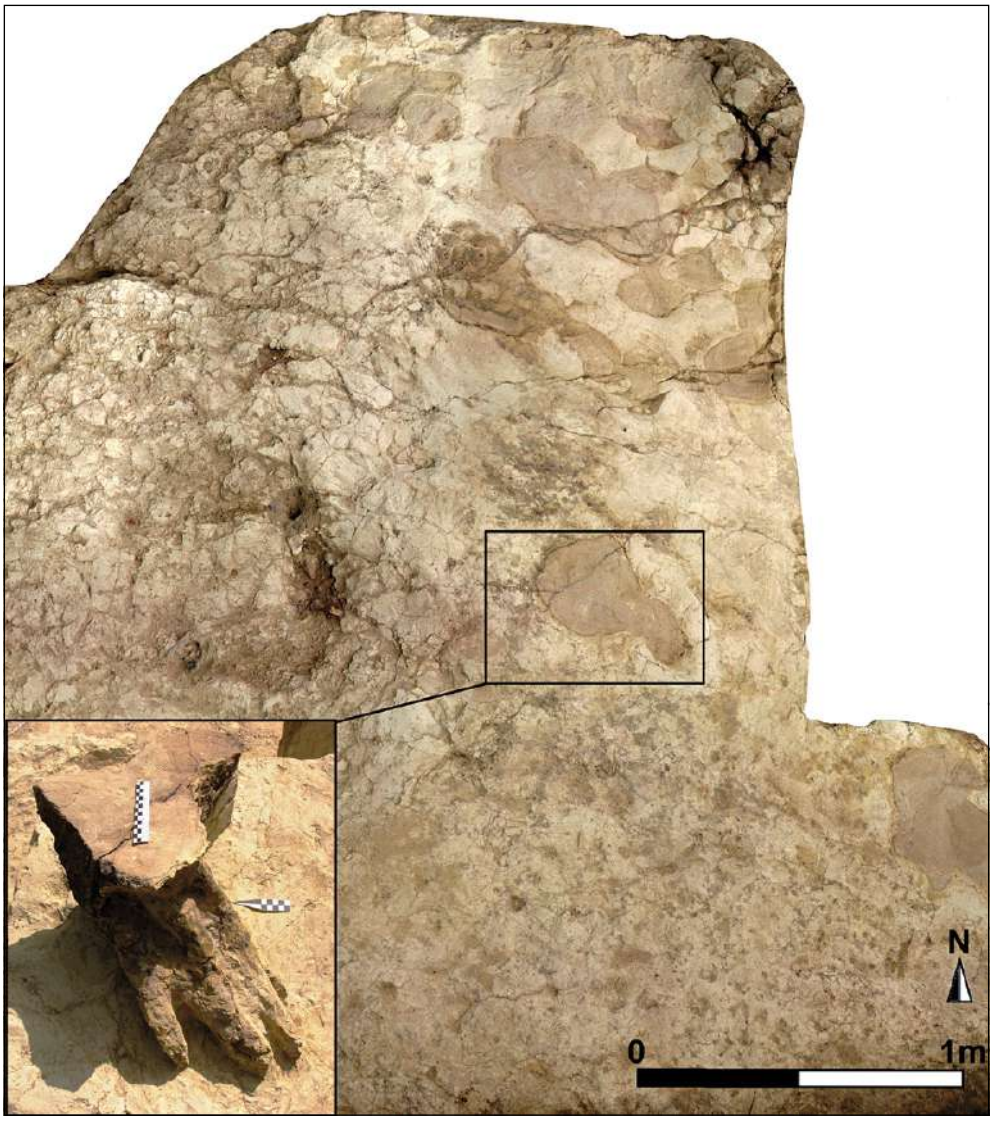

Fig. 12.5 – Gombore II-2. Orthophoto plane of the western portion of the fossil hippo trail (0.7 Ma) found on top of an ignimbrite layer. At the bottom of the channel-like trackway are large sand-filled bioturbation structures. Inset: a natural track cast of a hippo footprint obtained by freeing the infill from the surrounding matrix (photos by the Author, Italian Archeological Mission at Melka Kunture and Balchit; orthophoto plane elaborated by Kristian D'Août).

While it is true that fossil footprints are rare, their scarcity may be due less to a lack of finds than to a lack of awareness, attention and adequate investigation methodologies in traditional archeological research. If we consider that a moderately active person takes about 7,500 steps a day (https://royalsociety.org/science-events-and-lectures/2017/summer-science-exhibition/exhibits/dinosaurs-to-forensics/), and that he or she will normally live several decades, average people may take hundreds of millions of steps in their lifetime. Of course, not all steps leave a footprint, and very few footprints make it into the geo-archeological record. But it is very likely that evidence of this kind is much more abundant than one would think, especially in places whose paleoenvironmental conditions would have facilitated their formation.

Fig. 12.6 – Gombore II-2. Detail of the track surface (0.7 Ma) during excavation (top) and after removal (bottom) of the track infills (Photos by the Author, Italian Archeological Mission at Melka Kunture and Balchit).

It is therefore important that archeologists be aware that they may encounter these delicate structures when doing fieldwork and (as we have seen at Melka Kunture) when reviewing archival documents.

There are two circumstances in which fossil footprints may be identified in the field: at open-air sites where they have been uncovered by erosion, as at Laetoli and Aalad-Amo, or during stratigraphic excavations, as at Melka Kunture, Ileret and Koobi Fora. In the first case, for exposed footprints not to be subjected to severe degradation and therefore to still be recognizable, it is important that the tracked surface be much more resistant to erosion than are the sediments that seal it.

During stratigraphic excavations, cuts must be examined with great care in order not to miss any stratigraphic disruptions (small hollows, gaps, gravity-driven deformations); being located at contact surfaces between deposits, they could be attributed to trampling (Fig. 12.3). If any such disruptions are observed, test excavations can be made to expose the original surfaces of the layers and check whether any gaps have been filled with materials whose physical features and texture differ from those of the substrate sediment.

Exposing footprints – i.e. the contact surfaces between the trackmaker's foot and the substrate (true tracks) – is very time – and energy-consuming. It can be done as a normal micro-stratigraphic excavation (Fig. 12.6), using small tools such as scalpels and paintbrushes, taking care to remove only the track's infill and to correctly isolate the footprint's walls and base, which constitute a 'negative' stratigraphic unit ("cut"). At Melka Kunture, emptying out a medium-sized print (about 15×15 cm) could take several hours. Results are best when the physical characteristics (consistency, color, matrix, etc.) of the substrate and of the infill are different enough that one can distinguish clearly between the two (Fig. 12.6). At Melka Kunture, for instance, the substrate and the infill of a track were sometimes so similar (clay on clay, silt-sand on silt-sand), or the substrate had been so disrupted, that it was impossible to distinguish the track's walls from its infill, hence to expose the original imprint. The same situation occurs when tracks were imprinted on sediments that were not firm enough or were too wet for any preserved tracks to be well defined. In such cases, all one can do is to simply note and record their presence.

Exposing tracks is usually a very delicate operation that should be carried out only by specialists who are also experienced in stratigraphic excavation. Choices must be made about which methods to use to expose and remove track infills, especially when dealing with surfaces containing complex palimpsests (overprinting, *sensu* Bennett and Morse 2014); in these cases, operators must decide the order in which to remove superimposed infills, and must document all the excavation stages.

In the case of large tracks with compact or lithified infills, operators may choose to obtain natural track casts (Fig. 12.5). As explained above, this is done by removing the matrix from around the infilled track. This should be done gradually, from the top down, taking care to stabilize the sediment as one proceeds. The resulting block can then be detached and stored. Besides fully preserving the track's original morphology, this procedure also makes it easier to display the track in a museum.

The traditional methods used to document fossil tracks are drawing and photographing (e.g. Leakey 1987). In recent years, new technologies have proved very useful, especially laser scanning and photogrammetry (Bennett *et al.* 2013, 2016; Bennett and Morse 2014; Belvedere *et al.* 2018; Zimmer *et al.* 2018; Bennett and Budka forthcoming 2019). Using digital data capture and analysis tools such as DigTrace (a freeware solution available at www.digtrace.co.uk), one can create 3D models whose degree of accuracy and detail is vastly superior to what can be rendered in a traditional drawing or photograph. However, these methods can require considerable financial resources and logistic and technical skills (Bennett and Morse 2014), especially when researchers are in a site in a country outside the so-called industrialized world.

These technologies are also extremely useful from the conservation standpoint. Track preservation is a major issue. If a fossil track-bearing surface is located on non lithified sediments, for instance, conservation problems arise as soon it is unearthed, since it will obviously be subjected thereafter to normal deterioration processes (Bennett *et al.* 2013; Wiseman and De Groote 2018; Zimmer *et al.* 2018). To date no definitive protocol for the preservation of track-bearing surfaces on soft sub-layers has been developed. Consolidating the surface with resins such as Paraloid is only a temporary measure. It is also possible to take a cast of the surface, or even remove it altogether. At present, the best way to preserve fossil-track data is to document them by means of advanced technologies (Bennett *et al.* 2014). In the future, 3D digital models could be used to create any number of replicas in other materials (resins, plaster and so forth) through 3D printing, a technology that is being continually developed and improved. Be that as it may, preservation remains a problem that should be solved as soon as possible. Unfortunately, many important ichnological sites are in countries that lack the necessary skills and resources to implement conservation projects or to build

adequate protective or museum structures. Indeed, the scientific community has repeatedly sounded the alarm about the critical state in which the Laetoli footprints have been allowed to fall (Dalton 2008; Musiba *et al.* 2008).

6. Conclusions

Ichnology's interdisciplinary character makes it particularly suitable to complement archeological disciplines. Hence, archeologists should seek to establish long-lasting collaborations and projects with ichnologists (as they do with specialists in other fields). Each side would thus give the other a wealth of information that would normally go unnoticed in a traditional archeological record. This kind of collaboration has already borne fruit at Melka Kunture, where the identification of track-bearing surfaces helped researchers reconstruct certain aspects of the palaeolandscape and revealed the existence of 'ghost' biological elements. There is now evidence that layers that used to be thought sterile from the archeological standpoint – that is, they had not yielded any lithical or faunal material – were in fact intensely frequented by various mammal species, hominins included, and other vertebrates.

Ichnological research proved to be very important – often providing the only information available – for reconstructing the archeological contexts found in the Gombore gully's sequence (Fig. 12.2). Moreover, this kind of research can be associated and integrated with other types of approach, fostering collaborations with researchers from other branches of natural science, such as archaeozoology, geology and palynology (see for example Mussi *et al.* 2016).

It should be borne in mind that archeologists generally do not have in-depth knowledge of subjects such as ichnology and biomechanics, and must therefore turn to specialists. In any case, they have an ethical and material duty to extract the largest possible amount of data from an activity – stratigraphic excavation – that is destructive by nature. It is therefore of the greatest importance that archeologists be aware that they may come upon track-bearing surfaces and should know how to deal with them and how to document them in the best way possible. In other words, archeologists should not only look at the finds they unearth, but also cast their eyes on the sediment that contained them. It's worth the effort: fossil tracks have great potential both for the scientific information they provide and their 'musealization', not to mention the strong impact their discovery has on the public at large.

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Arid **Z**one **A**rchaeology
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13. New footprints from Laetoli (Tanzania, 3.66 Ma): discovery, analysis, inferences, research project and conservation plans

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Abstract. Fossil footprints are of great interest. A number of features help to identify their makers and can be used to investigate on biological and ecological issues. This is of crucial interest in palaeoanthropology, particularly in view of the emergence of our peculiar pattern of posture and locomotion. However, hominin footprints are rare and most of them are ascribed to the genus *Homo*. The only exception is represented by the trackways discovered in 1978 at Laetoli Site G, northern Tanzania, and referred to *Australopithecus afarensis*. These footprints were left on volcanic ashes about 3.66 million years ago by three bipedal creatures walking on a humid layer that was subsequently cemented. At Laetoli Site S (about 150 meters from Site G), we have unearthed new bipedal footprints of two different individuals, who were moving on the same palaeosurface, in the same direction and at the same speed as the three exposed at Site G. Our analysis based on advanced photogrammetric methods shows that the estimated stature and related body mass of one of the new individuals greatly exceed the estimates for those from Site G. This evidence supports marked intraspecific variation, pointing out the occurrence of a considerable difference in size between sexes and suggesting inferences on reproductive behaviour and social structure of these ancient bipedal hominins. A research project combined with conservation plans urgently needs to be developed and submitted to the Tanzanian Authorities for the knowledge, preservation and valorisation of such an extraordinary cultural heritage.

Key Words. *Australopithecus afarensis*; body size; conservation; footprints; Hominini; Tanzania.

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Authors' contribution. The work presented here was carried out in collaboration between all authors. Elgidius B. Ichumbaki and Fidelis T. Masao discovered the new footprints and co-directed field work. Marco Cherin and Giorgio Manzi co-directed field work. Marco Cherin, Angelo Barili, Giovanni Boschian, Dawid A. Iurino, Fidelis T. Masao, Sofia Menconero and Giorgio Manzi carried out field work and analysed the data. Susanna Sarmati and Nicola Santopuoli defined the preliminary conservation plan. Marco Cherin, Giovanni Boschian, Susanna Sarmati, Nicola Santopuoli and Giorgio Manzi wrote the paper, with contributions from all authors. All authors defined the research theme, discussed analyses, interpretation and presentation, and have contributed to, seen and approved the manuscript.

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1. Introduction

1.1 Old and new footprints at Laetoli

Fossil bones and teeth provide a variety of information about different aspects of human evolution, but footprints are particularly informative. Like a spotlight on a prehistoric scene, fossil tracks provide data about the locomotion biomechanics and body size of extinct creatures and reveal the diversity among individuals, explaining even their reproductive strategies. However, fossil footprints are rare: they can be impressed in the ground, preserved over time and eventually discovered millions of years later only because of unique circumstances, like those occurred at Laetoli (Tanzania) more than 3.6 million years ago (Ma).

Laetoli is one of the most important palaeoanthropological sites in the world. It is situated at the southern edge of the Serengeti Plains (Fig. 13.1), within the Ngorongoro Conservation Area (NCA),

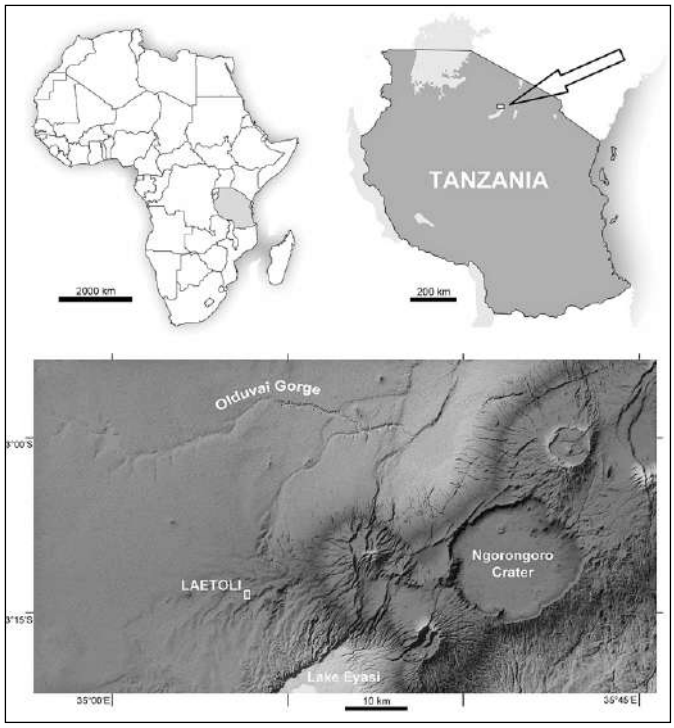

Fig. 13.1 – Geographical location of Laetoli within the Ngorongoro Conservation Area, Northern Tanzania, about 50 km south of Olduvai Gorge.

an area including other relevant palaeoanthropological sites such as Olduvai Gorge, Lake Ndutu and Nasera.

The Laetoli long sequence of Plio-Pleistocene volcano-sedimentary deposits includes the so-called Upper Laetolil Beds, which are rich in palaeontological remains (Hay 1987). The palaeoanthropological relevance of this area is well known since the mid-1930s (Reck and Kohl-Larsen 1936; Kohl-Larsen 1943), but Laetoli became renowned worldwide in the 1970s, after the discovery of the holotype and of other remains of *Australopithecus afarensis* (Leakey *et al.* 1976; Johanson *et al.* 1978), as well as of tracks of clearly bipedal hominins (Leakey and Hay 1979; Leakey and Harris 1987) dated to 3.66 Ma (Deino 2011). These tracks were found in 1978 by Mary Leakey and collaborators at Site G (Locality 8) and were referred to three individuals (G1, G2, G3) of different body size: the smallest individual (G1) walked side by side with the largest individual (G2), while the intermediate one (G3) superimposed his/her feet over those of G2 (Leakey 1981). These trackways are usually ascribed to *Au. afarensis* (White and Suwa 1987), which is the only hominin taxon found to date in the Upper Laetolil Beds (Harrison 2011).

New bipedal tracks were discovered by F.T.M., E.B.I. (University of Dar es Salaam) and co-workers in the new footprint Site S in September/October 2014. In an area only 150 m to the south of Site G, they unearthed fourteen hominin tracks (associated with tracks of other vertebrates) in three test-pits, respectively labelled L8, M9 and TP2 from north to south. To further investigate the new footprints, the discoverers invited M.C. to form a team including researchers from the Universities of Perugia, Sapienza of Rome, Florence and Pisa, which joined the fieldwork in September 2015 (Fig. 13.2). The results of our preliminary study of these hominin footprints were published in December 2016 (Masao *et al.* 2016).

The aforementioned study shows that thirteen of the fourteen new footprints can be ascribed to a single trackway, with an estimated total length of 32 m and trending SSE to NNW, approximately parallel to the G1 and G2/3 trackways. Following the code used for the Site G prints (Leakey 1981), we refer to the new individual as S1. One more track referable to a second individual (S2) was discovered in the SW corner of TP2 at the end of the 2015 field season.

Detailed analyses of the excavation profiles and extended geological observations in the whole Laetoli area indicate with reasonable confidence that the footprints of S1 and S2 lie on the same stratigraphic horizon as those at Site G, i.e. on the surface separating the lower and upper units of the Footprint Tuff, as described by Hay (1987). It can be consequently inferred that the tracks of the two sites were likely left by one larger group of hominins walking in the same direction and with similar moderate speed (mean values ranging from 0.4 to 0.9 m/s, depending on the analytical method applied to estimate speed; see Table 3 in Masao *et al.* 2016 for details).

Our preliminary study sheds new light on the crucial importance of Laetoli in the field of palaeoanthropology. The Laetoli footprints are a unique source of information on the morphology and biology of early bipedal hominins and represent, to date, the earliest direct evidence for such a locomotion pattern among our ancestors. Laetoli is also the only site in the world providing data about body size variation within a single population of australopithecines, because of the occurrence of synchronous footprints of different individuals. Therefore, Laetoli is among the most significant and iconic sites for the study of human origins. For this reason, the whole scientific community is called upon to collaborate in the development of a long-term conservation project of this heritage.

1.2 Laetoli footprints: literature review

The extraordinary Laetoli ichnofossils have been sparking the interest of palaeoanthropologists for the last 40 years, leading to the publication of dozens of scientific articles focusing on many different aspects. After the first publications by Mary Leakey, Rich-

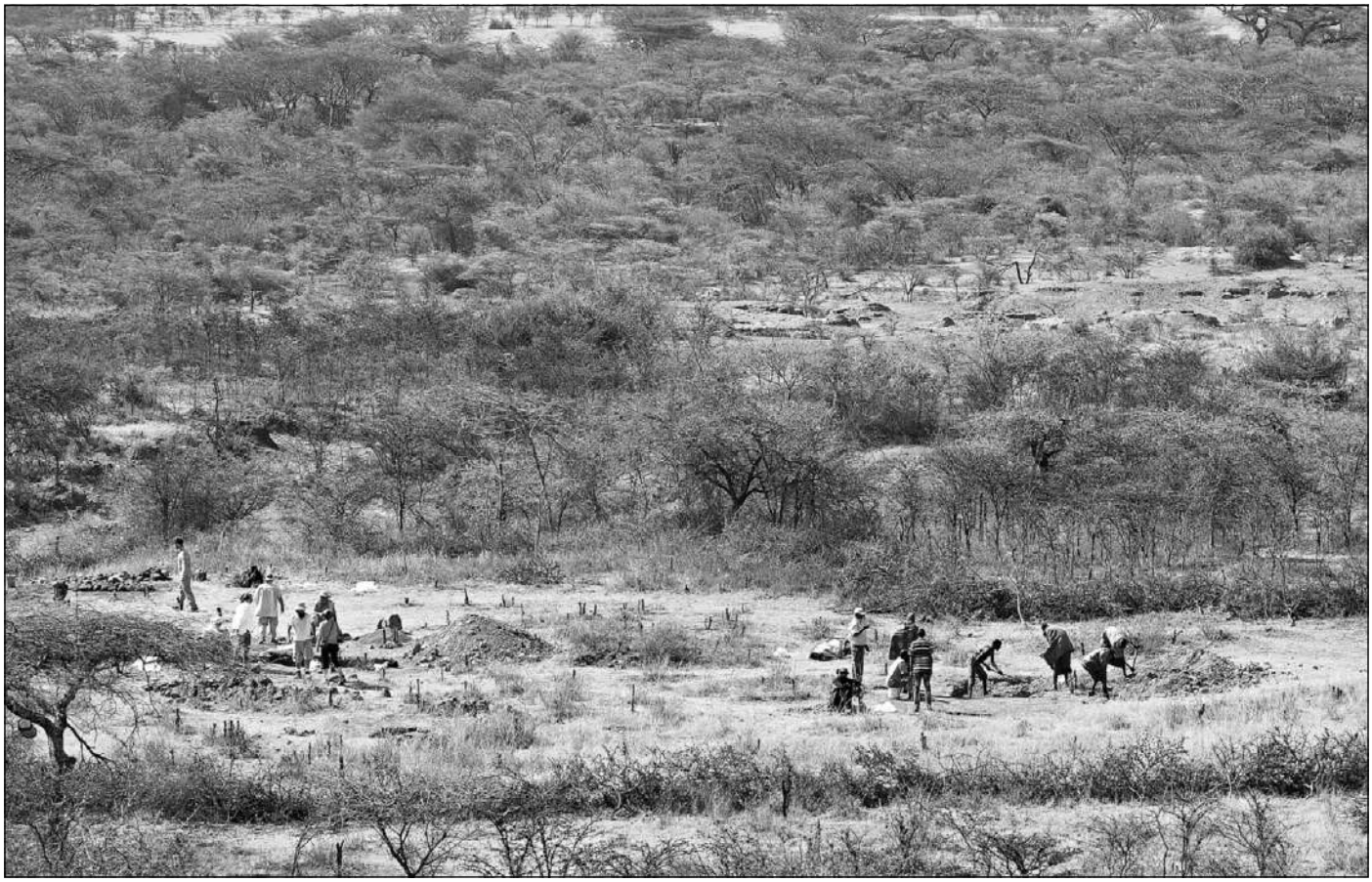

Fig. 13.2 – Tanzanian-Italian research group working in Laetoli Site S in 2015. The renowned footprint Site G discovered by Mary Leakey and colleagues in the 1970s is located about 150 m to the north of Site S, that is, near the central right part of the picture (Photo by Raffaello Pellizzon).

ard Hay and other scholars (e.g. Leakey and Hay 1979; Leakey 1981; Leakey and Harris 1987) devoted to the general description of the tracks and the characterisation of the geological, taphonomic, and palaeoenvironmental context, many researchers used different approaches to infer hypotheses on the locomotion of the Laetoli track-makers. These analyses led to conflicting conclusions: some Authors (e.g. Raichlen *et al.* 2010; Crompton *et al.* 2012) concluded that the gait pattern of the Laetoli hominins was similar to the modern humans', whereas others (e.g. Meldrum 2004; Schmid 2004; Bennett *et al.* 2009; Hatala *et al.* 2016) inferred that it was significantly different, qualitatively and/or quantitatively.
However, all the aforementioned studies are equally biased, regardless of the methods used and the results obtained, because they all focus only on G1. This is undoubtedly the best preserved of the track sets discovered by M. Leakey (mainly because it is difficult to differentiate the superimposed G2 and G3 tracks), but it also belongs to the smallest of the individuals, which was very likely a juvenile, according to our research (Masao *et al.* 2016). These studies were carried out on a limited number of the G1 tracks, which are not homogeneously preserved. Eventually, the original tracks are today buried under a protective cover and most of the studies were carried out on casts (Feibel *et al.* 1996).

2. Laetoli Site S footprints: preliminary results

The preliminary studies at Site S allowed us to achieve several interesting results. First of all, a detailed sequence analysis of the excavation profiles and extended geological observations in the whole Laetoli area, indicate with reasonable confidence that the

footprints of S1 and S2 lie on the same stratigraphic horizon, i.e., the surface separating the lower and upper units of the Footprint Tuff (Hay 1987) as those at Site G. As a consequence, the tracks from the two sites were likely left by a homogeneous group of hominins walking on the same palaeosurface, in the same direction and with similar moderate speed (speed estimates for S1 and G1-3 were computed starting from stride length; see Table 3 in Masao *et al.* 2016 for details).

During the pilot fieldwork, the footprints were analysed by both traditional and advanced techniques. Morphologic and dimensional data were first collected directly on the tracks and on a 1:1-scaled sketch of all the tracks hand-drawn on transparent plastic sheets. Finally, high-resolution 3D models of each test-pit were obtained by the Structure from Motion technique, an image-based process supported by *in situ* topographic measurements. This technique was chosen because of its technical advantages (relatively short time of data acquisition and processing; light and handy equipment; reduced costs) and excellent results in terms of resolution (Westoby *et al.* 2012).

Footprint dimensions and distance (e.g. step and stride) were used to estimate the walking speed, stature and body mass of the Laetoli track-makers by means of different approaches (Masao *et al.* 2016). Stature was computed first with Tuttle's (1987) approach, which is based on the ratio between foot length and stature in modern humans (foot length in *Homo sapiens* is generally about 14% to 16% of stature). We also estimated stature using the two methods published by Dingwall *et al.* (2013). The first is based on regressions of stature by footprint length in modern Daasanach people from Lake Turkana (Kenya); the second – which we considered more reliable because it is not influenced by modern human data – is based on the foot: stature ratio known for *Au. afarensis*. Similarly, we estimated the body mass of the track-makers by means of the regression equation that relates footprint area (i.e., footprint length×max. width) to body mass in *H. sapiens*, as well as of the equation based on the ratio between foot length and body mass in *Au. afarensis* (Dingwall *et al.* 2013). Estimations of walking speed were computed starting from stride length, following the prediction equations published by Alexander (1976) (which also takes into account the stature of the track-maker) and by Dingwall *et al.* (2013) (which instead includes in the calculation the average length of the tracks). All the above data were also measured/calculated for G1-G2-G3, working on a 3D model of a first-generation cast of the southern portion of the Site G trackways.

Our preliminary results show that no matter which method is employed to estimate stature and body mass, the two individuals S1 and S2 were taller and had a larger body mass than the G individuals (S1: 161-168 cm/41.3-48.1 kg; S2: 142-149 cm/36.5-42.4 kg; G1: 111-116 cm/28.5-33.1 kg; G2: 139-145 cm/35.6-41.4 kg; G3: 129-135 cm/33.1-38.5 kg) (Masao *et al.* 2016). These results extend the dimensional range of the Laetoli track-makers and identify S1 as a large-sized individual, probably a male. The estimated stature of about 165 cm for S1 is remarkable and exceeds those reconstructed for any australopithecine. The stature of S1 falls within the range of modern *Homo sapiens* maximum values and also fits the available *Homo erectus sensu lato* estimates based on both fossil remains and footprints (Masao *et al.* 2016).

Our results provide independent evidence for large body-size individuals among hominins as ancient as 3.66 Ma and support a nonlinear evolutionary trend in hominin body size (Jungers *et al.* 2016), contrasting with the idea that the emergence of the genus *Homo* and/or the first dispersal out of Africa was related to an abrupt increase in body size. Moreover, ascribing the S1 tracks to a possible male allowed reconsidering the sex and age of the other Laetoli individuals, who have been object of a plethora of interpretations since Mary Leakey's work. According to our body-mass estimations, G1 and G3 fall within the range of putative *Au. afarensis* females, whereas G2 and S2 span across the upper female and the lower male ranges (25.5-38.1 and 40.2-61.0 kg, respectively, according to Grabowski *et al.* 2015). A possible tentative conclusion is that the Laetoli individuals are: S1, a male; G2 and S2, females; G1 and G3, smaller females or juvenile individuals.

Both the new composition of the group and the impressive body size difference point to a considerable sexual dimorphism in *Au. afarensis*, as hypothesized by many scholars on the basis of skeletal remains (e.g. Johanson and White 1979; Kimbel and White 1988; McHenry 1991; Richmond and Jungers 1995; Lockwood *et al.* 1996; Plavcan *et al.* 2005; Harmon 2006; Gordon *et al.* 2008). In turn, this view supports social organization and reproductive strategies closer to the polygynous gorillas (Harcourt and Stewart 2007) than to other moderately dimorphic species, like the promiscuous chimpanzees and bonobos or most of the extant and, possibly, the extinct humans.

3. Future plans at Laetoli Site S

3.1 Research

The excavation and study of additional footprints at Laetoli would let us contribute significantly in investigating the locomo-

tor capabilities and biomechanics of *Au. afarensis*. Multiplicity is the key to resolve the issues about several still debated aspects of the physical structure (plantar arch shape, hallucal size and structure, etc.) and the locomotion (flexed – *versus* straight-leg gait) of *Au. afarensis*. Considering that almost all data available to date derive from the study of the trackway of one single individual, information from more specimens of different size and age, and possibly with specific characteristics, will provide new and possibly resolving data about these issues. The exposition of more footprints of S1 and S2 (but it is not unlikely that trackways of other individuals can be found) will offer the opportunity to investigate in-depth – as has never been possible before – the bipedal locomotion pattern of these early hominins. The results obtained from our 2015 fieldwork are already questioning part of the interpretations derived from previous work, mostly about the body-size and the social organization of the species involved (Masao *et al.* 2016). The new footprints found in test-pit L8 are not better preserved than those found by M. Leakey because they lack fine detail and consequently could be used only for general observations about body-size. Conversely, those in sondages M9 and TP2 are much better preserved because they are still filled by the undisturbed overlying sediments; the two out of six that we excavated are showing much more detail and can be used in studying the structure of the feet. However, two footprints do not provide a statistically significant sample, whereas excavating a longer trackway would provide a large amount of high quality data that we could use in a completely new modelling of the foot structure and gait mechanics.

Considering the results achieved till now, as well as the preservation state of the footprints found, we hope we can unearth a long series of consecutive tracks of at least two individuals, possibly walking side by side, in excellent state of preservation. This would improve dramatically the available dataset, including aspects that may allow us to relate foot size and structure to body size and age or sex. We suppose with reasonable confidence that at least one of these new track-makers is an adult (Masao *et al.* 2016), representing a more appropriate subject to compare his gait pattern with other samples (e.g. modern humans and/or apes and other hominin footprints).

New excavations at Site S would also open up the intriguing possibility of discovering tracks of additional individuals, allowing us to increase our knowledge of the social structure and behaviour of the Laetoli australopithecines. The data we collected so far suggest a gorilla-like social organization, with one large, probably male individual and other smaller females and/or young individuals. But what if new excavations put into evidence the footprints of other large individuals? Could the spatial distribution of the trackways of a possible much larger number of individuals – compared to the behaviour of extant primates – indicate the organization of the group, also helping in sorting out females from young individuals?

3.2 Conservation

The Italian specialists in conservation firmly believe in the resolution issued by the ICOM-CC during its 15th Triennial Conference held in New Delhi in September 2008, which specified the meaning of the term "conservation" in order to improve the understanding among international experts. Conservation was defined as follows: "*All measures and actions aim at safeguarding tangible cultural heritage by ensuring its accessibility to present and future generations. The term concerns preventive and remedial conservation on the one side and restoration on the other. All measures and actions are expected to respect the significance of the cultural heritage item*".

Our research team includes internationally renowned specialists in stone preservation, who have been working for long time in archaeological sites. We are deeply convinced to be able to contribute effectively in the conservation of Laetoli cultural heritage. Our previous work at Laetoli has shown us the peculiarities and relevance of the site. We have not been impressed only by the importance of the site for palaeoanthropology, or by the incredibly good preservation of the footprints; we have been impressed also by the aggressiveness of the East African environment on the remains. We could ascertain how the disruptive action of weathering, as well as of flora and fauna, is threatening the footprints already before they are excavated, endangering a cultural resource that is still largely unknown. Similar concerns were highlighted by various authors (Feibel *et al.* 1996; Getty Conservation Institute 1996; Agnew and Demas 1998) after the assessment of the state of conservation of the Site G footprints, which had been the subject in the 1990s of a complex project of consolidation, re-burial, and protection coordinated the Getty Conservation Institute and the Tanzanian Antiquities Division (Musiba *et al.* 2012). We are definitely convinced that additional analyses are necessary at Site S to address the crucial issue of the conservation of this invaluable palaeontological heritage. Most of the printed surfaces exposed in the test-pits (especially in L8 and TP2) are already severely threatened by natural agents and are at risk of disappearing even if unexcavated (Figs. 13.3 and 13.4, respectively). Numerous perpendicular fractures lead to the disintegration of part of the

Footprint Tuff into small cube-like blocks, while roots are dislodging the sequence of strata, even in areas previously unexcavated. Therefore, keeping the situation as it is may not be the right way to preserve the site, because unexcavated footprints may be saved from weathering if they are excavated. At the same time, we are aware of the fact that the exposure of the Footprint Tuff to the subaerial environment can accelerate any destructive chemical-physical-biological processes. This means that any excavation without a clearly understanding of what will happen to the exposed areas and surrounding landscape should not be entertained.

Our first goal for the next future is to evaluate the state of preservation of the Tuff in the existing test-pits after more than two years from the excavation and reburial, and to compare it with a newly excavated surface between M9 and L8, in order to evaluate the speed of the alteration and weathering processes. A modern study aimed at new excavations and at conserving and promoting the hominin tracks must be preceded by a thorough and multidisciplinary collection of environmental data, including local microclimate, temperature variability, rainfall, dominant wind, geological and petrographic characteristics of the substrate tuff rock, interstitial water composition and flow, local vegetation composition and its change. The opportunity to continuously monitor the footprints and to make them accessible to other scientists and to all the citizens must also be taken into account.

The inspiring principle of our research will be to work in close collaboration with all the Tanzanian and international cultural and political institutions involved in the management and protection of the Laetoli site. This task will be carried out under the auspices of the Antiquities Division (Ministry of Natural Resources and Tourism, The United Republic of Tanzania) and the direction of the Ngorongoro Conservation Area Authority, whose mission is "*to professionally conserve the natural and historical resources* [of the NCA]*, while providing optimal social services to residents, staff and visitors*" (www.ngorongorocrater.go.tz). The Tanzanian Authorities will act as local connection institutions with UNESCO, being the NCA – into which Laetoli represents one of the most significant cultural hotspots – a World Heritage Site. Keeping in mind the World Heritage Committee Decisions published so far, we are confident that our scientific work can contribute substantially to solve the complex issue of footprint conservation at Site S (and at Site G, by extension).

Fig. 13.3 – Test-pit L8 at Laetoli Site S. In the northern part of the test-pit (at the top), the Footprint Tuff is severely damaged (Photo by Raffaello Pellizzon).

3.3 Valorisation and outreach

The dissemination of knowledge among the citizens is one of the main tasks of the Antiquities Division and of the Ngorongoro Conservation Area Authority. New information about the life of the australopithecines and the environment where they lived, to be offered to the wide public, can be retrieved while collecting data for the aforementioned conservation plan. These information deal with some of most debated topics in modern palaeoanthropology, i.e. the degree of morphological variability and sexual dimorphism of *Australopithecus afarensis*, how this variability influenced the behaviour of the species, and which were the locomotor capabilities of these early bipedal hominins.

Publishing the scientific results of this part of the study can help drawing the attention of the scientific community and of the

Fig. 13.4 – Test-pit TP2 at Laetoli Site S. In the northern part of the test-pit (right side), the Footprint Tuff is particularly altered, damaged by plant roots and dislodged along natural fractures (Photo by Raffaello Pellizzon).

public opinion on Laetoli and will foster its tourist attractiveness over the medium and long term.

Since 2011, the past successful experiences of the Tanzanian-Italian research group in the palaeoanthropological sites of northern Tanzania (Olduvai Gorge and Laetoli) will be the reference point in setting up the educational and social component future projects. As in all the previous occasions, we will focus on continuous two-way knowledge and know-how exchange at all levels (fieldwork, data collection and processing, interpretation, final presentation and conservation) with all the expedition members, including scientists, technical assistants, volunteers, students and with the local communities. In particular, we will devote much care to the involvement of the local Maasai Community, with whom we have been keeping excellent relationships for several years during previous educational and research activities in the NCA. We firmly believe that the active involvement of local communities is vital for the success of the research, through the mutual exchange of information and culture that we can establish with them.

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Arid **Z**one **A**rchaeology
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14. The Italian Archaeological School of Carthage

Attilio Mastino (with the contribution of Sergio Ribichini)

Abstract. The Scientific Society SAIC, 'Italian Archaeological School of Carthage. Documentation, Training and Research', was established in Sassari on 22 February 2016, by public act and has exceeded the number of 150 members. The Head Offices are in Tunis at the Italian Cultural Institute (Embassy of Italy) and at the Agence de Mise en Valeur du Patrimoine et de Promotion Culturelle (AMVPPC).
In the first three years, the School opened in Tunis the Sabatino Moscati Library with over 6000 volumes, has published three issues of the journal 'Carthage, Studies and Research' and launched a series of Monographs. The School has promoted, with the AMVPPC of Tunis and the Institut National du Patrimoine (INP), the publication of the most recent volume on Carthage. The School carries out training activities in Italy and Tunisia and coordinates Tunisian-Italian archaeological research in Tunisia, signs conventions and agreements, successfully presents research projects at the MAECI, the Italian Agency for Cooperation and Fondazione di Sardegna. Among the most important scientific results are some archaeological excavations and the holding in Tunis of the XXI International Conference on Roman Africa, dedicated to Latin epigraphy.
Key Words. Cartagine; CaSteR; Sabatino Moscati; Aenea; Tunisia.

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1. Background

The study that has been undertaken over the last thirty years of the historical relations between North Africa and Europe in antiquity is far-ranging and rich in results. The areas studied include the pre- and proto-historic phases of the Berber world, the colonisation by the Phoenicians, the foundation of Utica and Carthage, the Mediterranean politics documented by the Etruscan-Carthaginian and Roman-Carthaginian treaties, also dealing with Hannibal and the rather hypocritical tears of Scipio Aemilianus, as well as the new urbanisation by order of Gaius Gracchus, then by Caesar and Augustus twenty years after the re-foundation of Carthage. Virgil in Book I of the *Aeneid* describes the builders of Dido's Carthage as being like thousands of bees in a hive at the start of summer, toiling to produce honey with a scent of thyme: it is clear that Virgil was thinking of the Augustinian colony as it was in the years in which he was writing, a Mediterranean capital rich in products coming from the wide Numidian hinterland.

In the fervour of the *structores Tyrii* of *Carthago*, the refugee from Troy, Aeneas is both *hospes* welcomed with respect by the queen and then *hostis* who is cursed for centuries (Fig. 14.1): he observes, through Virgil's eyes, the furrow of the plough as it marks the sacred limit of the *colonia*, renewing the pain and the hope that motivate those who build a new city, in contrast with his original hometown, Ilium, that was devoured by the flames. There is no doubt that Virgil reflects the urbanistic experience of the Augustinean Age in Africa in his description of the birth of Carthage with the *theatrum* of the *immanes columnae* of the *frons scaenae* taken from quarries in which the specialised workers laboured untiringly to extract the stone to build the new city. Or yet again the *portae* of the walls and the *strata viarum*, the urban *viae silice stratae*, the judiciary basilica and the theatre. Virgil's lines exalt the activity of the men of goodwill, even though the gods and goddesses are fully involved in a *studium* and in an *ars* that nobilitates those who practice it.

More in general, Virgil found the words to represent the landscape that had been transformed by man at the side of the lake of Tunis, close to the temple of Juno, which had been built by the queen, the place where a magical finding of a horse's skull had been announced by the oracle. In fact, how can we forget the Virgilian hyperbole of Meliboeus in the first Eclogue, *At nos hinc alii sitientes ibimus Afros*? And then the Vandals, the Justinian reconquest, and the Byzantine organisation up to the opening up (*futûhât*) to Islam. There have been many occasions, on both sides of the Mediterranean to discuss and compare notes regarding an archaeological and historiographical record that is able to go straight to the heart of the ancient world, overcoming the ideological deformation of our times. I take the opportunity to mention the many great international projects that have been and are being undertaken: the patronage of UNESCO for the site of Carthage from 16th October 1979; the *Africa Romana* conferences, which have been organised on an annual basis by the University of Sassari, as well as those of Tunis, Carthage, Djerba and Tozeur, which allow archaeologists, historians, and

Fig. 14.1 – Tunis, Bardo Museum. The flight of Aeneas from Troy on the altar of the *Gens Iulia* (Photo by the Author).

epigraphists to present their findings, with the aim of identifying the regional and national contributions to the phenomenon of Romanisation, as well as to highlight the relations between the dynamic and open Mediterranean area. The last appointment was in Tunis, in December 2018, for the 21st *L'Africa Romana* conference, entitled 'Latin Epigraphy in North Africa: New discoveries, Re-interpretations, New synopses'.

On an international level, the topic facing us today is wider, one that goes far beyond the direct relations between the two shores of the Mediterranean: in a new interpretation, Africa becomes an essential part of the Mediterranean basin, a coastal area that is not isolated, but is instead closely related with the depths of the continent (I use the words of Umberto Cardia), finding in the Mediterranean a space for contact, co-operation, and we might say, super-national integration. This is the view by way of which we would like to build a different future; in fact we are ever aware of the need to show the greatest respect for cultural and religious traditions, for the profoundness of the different histories and different cultures, and for the cultural heritage with the awareness that there are geographical and chronological variables at play in the moment when different cultures come into contact, while always wary of losing concreteness and using scientific data for ideological purposes. We must oppose the simplifications that do not take the complexity of history into account.

The idea of creating the *Scuola Archeologica Italiana di Cartagine* [Italian Archaeological School in Carthage] was that of Antonino Di Vita and Andrea Carandini. It was proposed in several of the *L'Africa Romana* conferences and during the round table entitled 'Mediterraneo Antico, Italia e Tunisia, Cooperazione e Patrimonio Culturale' [The Ancient Mediterranean, Italy and Tunisia, Cooperation and Cultural Heritage], which took place in Rome on 12th April 2013, under the auspices of the Istituto di Studi sul Mediterraneo Antico [Institute for the Study on Ancient Mediterranean], ISMA CNR, Rome, and the Institut National du Patrimoine [National Institute of the Heritage], INP, Tunis, under the project on the sanctuary of Baal Hammon at *Althiburos* co-directed by Nabil Kallala and Sergio Ribichini. On that occasion, two years after the 'Jasmine Revolution', the former Directeur Général of the INP, Adnan Louhichi and Nabil Kallala had invited for a joint effort to reach the aim of presenting to the world the shared roots that unite the Mediterranean, proposing the establishment of an *École Italienne de Carthage* and citing on one hand, the difficult socio-political situation in contemporary Tunisia after the flight of Ben Ali on 14th January 2011 (immediately after this, Azedine Beschaouch, who had been bestowed with an *ad honorem* degree in Sassari, was nominated Minister for Culture in the government headed by Béji Caïd Essebsi), and on the other, the necessity to highlight, with the support of the European countries involved in the cooperation, how much of culture and most ancient history of the north African country needed to be protected and promoted. In 2014 an *Argumentaire* laid out by Sergio Ribichini started to circulate; this contained the bare bones of the project, the start of the art, and the details of the future school, strongly advocated for by the new Directeur Général of the INP, Nabil Kallala. Also mentioned were the partners, its structure, and its aims and budget. These themes were at the centre of an *Atelier de recherche* that was held in Rome on 18th December 2014 at the CNR, presided by the Director of ISMA, Alessandro Naso, with the participation of important representatives of MAECI, and the president of ICCROM in Roma Stefano De Caro, along with Cinzia Vismara, and Luciano Borin (who had initiated the constitution of an *Association pour la Valorisation de l'Héritage Culturel* in Tunisia), various members of the joint CNR-INP archaeological mission at *Althiburos*, and many more of us. In the following months (directeur Général of the INP Fathi Bahri) the Society saw the convergence of a number of bodies, especially the Italian Universities (with the two Departments, History, Human Sciences and Educa-

tion of the University of Sassari, and History, Heritage and Territory of the University of Cagliari in the vanguard), other foreign Universities and Institutions, in particular the CNR's ISMA, with Agence de Mise en Valeur du Patrimoine et de Promotion Culturelle di Tunisi (AMVPPC, then directed by Ridha Kacem, today by Kamel Bchini), the INP (today, 2019, directed by Faouzi Mahfoudh), the Italian Ministry for Foreign Affairs and International Cooperation, the Italian Institute for Culture in Tunis (IIC-Tunis), the Institute for Studies and Programmes for the Mediterranean, and the Fondazione di Sardegna [Sardinia Foundation]. Further participation was offered by the School for Specialisation in Archaeology, and museums, associations and institutions involved in the safeguarding of the archaeological heritage of the Mediterranean, in particular that of Tunisia and the Maghreb, in the fields of documentation, training and research.

The Academic Society SAIC, 'Scuola Archeologica Italiana di Cartagine. Documentazione, Formazione e Ricerca' [Italian Archaeological School of Carthage. Documentation, Training and Research], was established in Sassari on 22nd February 2016, by way of a notorial act at the office of the solicitor Laura Faedda, with 25 founding members. On 10th May, the SAIC was inserted at n. 31 on the 'Registro delle Persone Giuridiche' [Legal entity register] at the Prefecture of Sassari, complying with the law DPR 361 of 10th February 2000[1].

2. The life of the Society

The total number of members, after approval at the last Assembly (2018), was 154, and this figure is divided into Honorary Founding Members (25), Full Members (7), Meritorious Members (6), Honorary Members (88) and Corresponding Members (28)[2].

1. The legal headquarters in Italy is Palazzo Segni, Università degli Studi di Sassari, Dipartimento di Storia, scienze dell'uomo e della formazione, Viale Umberto, 52 – 07100 Sassari (resolution 8th July 2015, cooperation agreement with the President of the University of Sassari in July 2016). The working headquarters in Tunis is at the Italian Institute for Culture – Italian Embassy, Avenue Mohamed V, 80 and at the AMVPPC in Tunisi-Belvedere (Rue 8000 Angle Ibn Nadime – Montplaisir, Tunis 1002). It is currently being recognised as a non-profit organization. About SAIC see also Ribichini (2016).

2. The governing bodies of the school are constituted by the President, the Scientific Committee and the Assembly of Members (Full, Honorary, Meritorious, and Corresponding Members). The Scientific Committee is composed by: Piero Bartoloni (Honorary President), Antonio Corda, Savino di Lernia, Michele Guirguis (Treasurer), Attilio Mastino (President), Sergio Ribichini (Secretary), Maria Antonietta Rizzo, Pier Giorgio Spanu and Alessandro Teatini. The School has adopted a Statute, Regulations, Conventions and Projects. It has approved its budget for 2016, 2017 and 2018. The Assembly and Scientific Committee, after its constitution, have been held in Sassari on 22nd February 2016; Tunis on 18th March 2016; Sassari on 6th April 2016, Rome on 12th May 2016; Tunis on 2nd October 2016, Tunis on 17th March 2017 and Tunis on 6th October 2017.

Fig. 14.2 – Tunis, Bardo Museum (Photo by the Author).

During the year, one of the Honorary Members, Eduardo Blasco Ferrer, a great scholar and close friend, passed away.

The Full Members of the SAIC are those who direct cooperation projects with Tunisia[3]. Some of these projects avail of co-financing from the Direzione Generale per la 'Promozione del Sistema Paese del MAECI' (Settore Archeologia), [General Direction for the Promotion of the Country System of MAECI – Archaeological sector], which assists Italian archaeological, anthropological and ethnographic missions abroad, as well as providing scholarships to researchers in foreign countries.

The school is ever growing: in the framework of an effort to coordinate Italo-Tunisian archaeological projects, it witnesses burgeoning participation by scholars belonging to Italian and foreign universities and academic institutions. The Assembly has met ten times: in Rome, in Sassari, and several times in Tunis at the IIC-Tunis, where, in the presence of the former Italian Ambassador Raimondo De Cardona and the Director of the IIC-Tunis Maria Vittoria Longhi, we were presented on 18th March 2016 and 17th March 2017 in commemoration of the attack on the Bardo Museum (Figg. 14.2-14.3), with Seminars promoted by IIC-Tunis, 'Archaeology and Protection of the Heritage of Carthage: the State of the Art and Future Possibilities for Italo-Tunisian Cooperation'.

3. Currently, the full members are ISMA CNR, Simone Mulazzani, Massimo Botto, the two Sassari departments, and the Cagliari department, Savino di Lernia and Oscar Mei.

Fig. 14.3 – Tunis, Italian Cultural Institute, 17th March 2017 (Photo by S. Ganga).

The last meeting was held on 6th October for the inauguration of the Sabatino Moscati Library, for which communication was given to the Tunisian Ambassador to Italy, Moez Sinaoui.

The SAIC has the aim of favouring forms of coordination between initiatives that characterise Italian cooperation in Tunisia (and in the countries of the Maghreb) in the realm of scientific and cultural studies. It also has the objective of: favouring opportunities for research, training and spreading knowledge concerning the heritage relating to prehistoric, pre-classical, classical, late-ancient, Islamic and modern civilisation; optimising the results of each initiative with functional coordination; contributing actively to intercultural dialogue and to the policies of development of Tunisia.

SAIC has the general intention of working alongside the Ministry for Foreign Affairs, and that of International Cooperation, as well as with the Italian Cultural Institutes, for the organisation and coordination of initiatives of a scientific, documentary, training, service or dissemination nature. To that aim, SAIC has signed agreements for scientific cooperation with institutions (in Tunisia, Italy and other countries) that are involved in the enrichment, safeguarding and promotion of cultural heritage. The School strives to promote, by way of agreements with Italian and Tunisian universities, Masters programmes and specialisation courses that can be attended also thanks to scholarships organised ad hoc.

An institutional site for the school has been set up[4] that can be used to divulge general news about our activities. We are also present and widely followed on social networks[5]. We are also present in the panorama of academic publications by way of an online journal and a series of printed volumes.

Even before the establishment of SAIC, the dramatic attack on the National Bardo Museum of Tunis (18th March 2015) was commemorated in the presence of the authorities in Sassari at the Department of History, Human Sciences and Education on the 26th of the same month ('*Il canto del Bardo*') [The song of the Bardo] and the 5th April 2015 ('*I musei del Bardo, Tunisi e Algeri: Henri Lhote e l'arte africana prima dei mosaici*') [The Museums of the Bardo, Tunis and Algeri: Henri Lhote and African Art before the mosaics]. Once our Academic Society was established we decided to commemorate the victims of the attack by way of the presentation of the book *Je suis Bardo*, edited by Samir Aounallah. This was the first commemorative event to take place at the museum and was held on 18th March 2016 in the presence of the President of the Sardinian Region, Francesco Pigliaru, and the Presidents and Vice-Presidents of the Universities of Sassari and Cagliari.

3. Conventions and agreements

– Convention with AMVPPC Tunis. During the assembly on 12th May 2016 at the National Institute of Roman Studies, Rome, a convention was signed between The Italian Archaeological School in Carthage and AMVPPC, directed by Ridha Kacem and represented for the occasion by Samir Aounallah. In the spirit

4. http://www.scuolacartagine.it

5. Facebook page @scuolaCartagine. The page has almost 20,000 hits monthly, and today is followed by 1,700 subscribers.

of enhancing cooperation in research and the study of the Tunisian territory, the document stipulates the on memo use of class rooms and administration offices for the headquarters of the SAIC in Tunisia.
– Convention with Comune di Sant'Antioco (Mayor Ignazio Locci) for the Ferruccio Barreca Museum in Sant'Antioco (Piero Bartoloni, Sara Muscuso).
– Convention with the University of Sassari. The President of the University of Sassari, Massimo Carpinelli and the President of The Italian Archaeological School in Carthage have signed a framework convention to coordinate educational activities, above all in the PhD programme, "Archaeology, History and Humanities".
– Conventions with several universities in Tunis and the Maghreb. An agreement with l'Institut Supérieur des Sciences Humaines de Tunis / Université de Tunis El Manar ISSHT (26, Avenue Darghouth Pacha – Tunis) directed by prof. Taoufik Aloui is currently being signed.
– All existing conventions with INP are being renewed.
– The finalisation of an agreement with the Institut Supérieur des Langues de l'Université de Carthage.

4. The establishment of the *Biblioteca Sabatino Moscati* [The Sabatino Moscati Library]

On 29th January 2017 Laura and Paola Moscati, heirs of the late prof. Sabatino Moscati sent a declaration with which they formalised the donation of the personal library of the great scholar to SAIC so that it could be conserved and made usable in Tunis at the AMVPPC.
On 3rd February 2017 the Directeur Général of AMVPPC, Ridha Kacem expressed his appreciation on signing the "Declaration of Acceptance of the Donation". On 15th February 2017, Prof. Piero Bartoloni, Honorary President of the SAIC, personally oversaw the delivery of the 215 boxes containing about 6,000 books, weighing four tons, from the Roman home of the Moscati family, to Tunis – Dogana di La Goulette, where there were received by officials of AMVPPC (Fig. 14.4).
The Scientific Council of the SAIC unanimously proposed, and the Assembly likewise decreed that the members of the Sabatino Moscati family (Paola and Laura Moscati) be made Meritorious Members of the SAIC, as is provided for by the Statute, with the following motivation: "*for the generous donation to SAIC of about 6,000 books from the library of Prof. Sabatino Moscati, that are made available to the users in SAIC's Tunisian offices*". The Scientific Council decreed the creation of a special commission for the

Fig. 14.4 – Tunis, AMVPPC. The Moscati Library during the fitting out (Photo by the Author).

management of this library, following the norms laid down in the Regulations of SAIC.
In 2017, thanks also to the contribution of the Fondazione di Sardegna, a new office of the School and Library specialised in Archaeology, Studies of Antiquity and Technology applied to Heritage, and History of Art was inaugurated on 17th March at the AMVPPC in Tunis-Belvedere[6].
The inauguration of the Moscati Library took place on 6th October 2017 in Tunis in the presence of the Italian and Tunisian authorities and the local associations that are involved in the promotion of Carthage.
As is well known, Sabatino Moscati (Rome, 24th November 1922 – Rome, 8th September 1997) in his academic life, which was rich in important contributions to first Islamic and then Phoenician history (with particular attention to the Carthaginian experience), led to a series of achievements, amongst which was the chair at the Roman universities of "La Sapienza" and Tor Vergata (in the 1980s), the vice-presidency of *Istituto per l'Oriente* [The Oriental Institute], the presidency of *Istituto per il Medio ed Estremo Oriente* [The Institute for the Middle and Far East] (1978-79), the presidency of *Accademia Nazionale dei Lincei* (until June 1997), the Presidentship of *Enciclopedia Archeologica* [Archaeological

6. Five students from the Specialisation School in *Nesiotikà* in Archaeology in Oristano (Anna Lucia Corona, Ernesto Insinna, Davide Fiori, Donatella Bilardi, and Alessandro Madau) spent the whole month of March 2017, preparing the set-up of the library, which was then carried out in August by Salvatore Ganga and Raymond Ganga. Finally, the books were put in order and available on the shelves by September.

Encyclopaedia] at l'Istituto dell'Enciclopedia Italiana [the Italian Encyclopaedia Institute] and the foundation of the magazine *Archeo* (1985).

In 1969 he founded the *Centro di Studio per la Civiltà Fenicia e Punica del CNR* [Study Center for Phoenician and Punic Civilisation of the CNR] (from 1993 to 2002, Institute for Phoenician and Punic Civilisation, and today Institute for Ancient Mediterranean Studies ISMA), previously connected with the Institute for Near Eastern Studies of the Roman University. He was amongst the main promoters of a series of exhibitions on archaeological themes in Palazzo Grassi in Venice, of which that concerning the Phoenicians in 1988 was of particular importance. The *Accademia Nazionale dei Lincei* has established a 'Moscati Award' for studies on Mediterranean studies.

In relation to the opening of the Library, the President of the University of Cagliari, Prof. Maria Del Zompo, wrote:

"*It is with great pleasure that I, as President of the University of Cagliari, take the nice opportunity to offer to the Authorities here present, to my illustrious colleagues and all those gathered our warmest wishes from the whole University. The inauguration of a library is particularly important. The great French writer Marguerite Yourcenar has the Emperor Hadrian say in* Mémoires d'Hadrien *(1951): 'Fonder des bibliothèques, c'était encore construire des greniers publics, amasser des réserves contre un hiver de l'esprit qu'à certains signes, malgré moi, je vois venir'. Besides the damning portrait that the writer makes of Hadrian, one which turns out to be prophetic, the image is strong and positive; and it speaks of the essential role of culture in nourishing the spirit and the conscience. On the other hand, such a meritorious initiative as that of the inauguration of the library of the Italian Archaeological School of Carthage, a place for research and advanced education, is perfectly in keeping with its being named after a scholar of Sabatino Moscati's rank; one who mastered with equal skill the fields of archaeological and antiquarian research, epigraphy, philology and linguistics, leaving to the scholars that followed works that are ever valid and essential references (we need go no further than* An Introduction to the Comparative Grammar of the Semitic Languages *in 1964). As President of a Sardinian university, I cannot fail to remember Sabatino Moscati's close links with the island. First of all these are obviously connected with the extremely important Phoenician-Punic presence, that he studied and got to know very well in a fertile network of collaboration with local scholars. In renewing my warm salutation, it is therefore for many reasons a great pleasure to offer my best wishes for the activity of the School and a prosperous future for its library.*"

The School's authorities have also mentioned Anna Enrico in Moscati, who curated the working of the library with passion and dedication over the years. Prof. Piero Bartoloni proposed that Members should contribute to the expansion of the Moscati Library, to enliven it and give it a prestigious future, worthy of the illustrious scholar it is named after, to whom the proceedings of the latest International Conference on Phoenician Studies were dedicated. These were presented in Tunis on the same occasion.

5. Dissemination of research and academic activity

5.1 Conferences and workshops

SAIC has promoted directly or in collaboration with others a series of academic and high level dissemination initiatives amongst which we would highlight the annual meeting entitled *Archeologia e tutela del patrimonio di Cartagine: lo stato dell'arte e le prospettive della collaborazione tuniso-italiana* [Archaeology and protection of the heritage of Carthage: the state of the art and prospectives for Italo-Tunisian collaboration], the first two of which were held in Tunis[7].

The two meetings were made possible with the help of the Italian Embassy, the Italian Institute for Culture in Tunis and our Tunisian colleagues. The themes dealt with were those that are most current in the large-scale projects carried out by ISMA-CNR in North Africa, by the Ministers and Italian universities together with the Tunisian institutions: the subjects addressed ranged from prehistory to the 12th century, arriving at the present day when regarding aspects linked to the safeguarding and promotion of heritage.

At the National Institute for Roman Studies in Rome, on 12th May 2016 the three volumes of the proceedings of the *L'Africa Romana* conference (Alghero 26th-29th September, 2013) were presented. These were entitled 'Momenti di continuità e rottura: bilancio di 30 anni di convegni de *L'Africa Romana*' [Moments of continuity and fracture: the balance of 30 years of "Africa Romana" conferences], and were edited by Paola Ruggeri. The presentation took place after the SAIC assembly and was organised in cooperation with the Centre for Interdisciplinary Studies of the Roman Provinces at the University of Sassari, and the National Institute for Roman Studies. The presentation features talks by Paolo Sommella, Attilio Mastino, Isabel Rodà (Barcelona), Sergio Ribichini,

7. I (18th March 2016) and II (17th March 2017), at the Italian Institute of Culture of Tunis. Their organisation was possible thanks to the support of the Fondazione di Sardegna, the Institute for Studies and Programmes for the Mediterranean, INP and AMVPPC Tunis.

Fig. 14.5 – Carthage, the large inscription of Marcus Aurelius and Antoninus Pius in the maritime baths (Photo by the Author).

and Mario Mazza. The book was dedicated "*to the memory of the innocent victims of the tragic attack on Musée National du Bardo on 18th March 2015, with the solidarity of all the scholars to the people of a free and democratic Tunisia*".

In Rome, on 6th October of the same year, the two volumes of *Studi Africani* [African Studies] by Antonino Di Vita, edited by Maria Antonietta Rizzo Di Vita and Ginette Di Vita Evrard were presented by Attilio Mastino and Giorgio Rocco.

Antonio Ibba and Alessandro Teatini were invited to give talks on mosaics with amphitheatre themes in the African provinces: one, entitled '*Ferae e venatores* in the Amphitheatres: re-readings of some documents of the African mosaic school', took place on 16th June 2016 at the Deutsches Archäologisches Institut – Abteilung Rom within the 'Neue Forschungen' cycle; the other, 'The world of amphitheatres in African Mosaics: aspects and problems', was given on 20th September 2016 at Universidad Carlos III in Madrid on the occasion of the 'X Seminario Internacional sobre Mosaicos Romanos'. On 30th September 2017, Antonio Ibba presented a talk 'Trajan and Africa: colonies, the colonised and soldiers' during the international conference dedicated to 'Trajan: *Optimus Princeps*', held in Ferrara.

International meetings have been promoted in Sardinia, Rome, Tunis and Carthage. These have been activities aiming to enhance intercultural dialogue and policies for development in Tunisia (and in the Maghreb in general). The meetings have been both academic and educational in nature, held in liaison with recognised Masters and PhD programmes. They were held in cooperation with institutes for research and heritage protection in Italy and Tunis, as well as with the Sardinian Regional Government and Fondazione di Sardegna-*UniMed's* project *ForMed*.

The President of the University of Tunis, Hmaid Ben Aziza (who had been nominated general secretary of Unimed – The Union of Mediterranean Universities, a few days before in Paris) participated in the ISPROM Workshop in Cagliari on 17th November 2017 on *Globalizzazione o regionalizzazioni. Autonomie delle Regioni italiane nella "Regione Mediterranea"* [Globalisation and Regionalisation. The Autonomy of Italian Regions in the "Mediterranean Region"]. On this occasion Attilio Mastino gave a talk entitled 'Protection of Cultural Heritage and a Peaceful Mediterranean'. The same President of the University of Tunis was in Sassari in July for the first Masters degree graduations of Maghreb students within the ForMed project.

On the occasion of the conference Borghesi of Bertinoro on '*L'epigrafia nascosta*' [Hidden Epigraphy], research on the Antoninus Baths in Carthage was presented by Samir Aounallah, Attilio Mastino and Salvatore Ganga (9th June 2017): *[E]x permissu [et indulgentia] Optimi maximique principis:* Antoninus Pius and the seaside baths of the *Colonia Concordia Iulia Carthago* (Fig. 14.5).

The results of the epigraphic analysis of *Uchi Maius* was presented by Ernesto Insinna in 'Epigraphica' 2016 (*Nuove osservazioni sulla paleografia delle iscrizioni di Uchi Maius, Henchir Ed-Douamis*). [New observations on the palaeography of the inscriptions of Uchi Maius, Henchir Ed-Douamis].

Epigraphic analysis of Ain Tounga-*Thignica* has started (March-October 2017) in the framework of a project involving other institutions besides SAIC[8]. This initial action involved the detailed analysis of the Temple of Neptune and other unpublished epigraphic documents[9].

The work at the Bardo Museum (Provincial altar from the Augustean Era) was presented at Paestum (Attilio Mastino, *Aeneas' voyage to Carthage, Mediterranean grant for archaeological tourism*, 27th October 2017, '*Aeneas' voyage*' Meeting, La Farnesina and archaeological research in the Mediterranean)[10].

Attilio Mastino presented a paper entitled *Carmina saturnia epigraphica africana ? Popular folk poetry or archaisms in the funerary inscriptions of the central Imperial Era in Africa, Numidia and Mauretania* in Barcelona on 18th December 2017.

8. INP (Tunis), the University of Sassari, AMVPPC (Tunis) and the University of Cagliari.
9. A.M. Corda, S. Ganga, A. Gavini, A. Ibba, P. Ruggeri, *Thignica 2017: novità epigrafiche dalla Tunisia,* "Epigraphica", LXXX, 2018, pp. 323-342.
10. *Il viaggio di Enea fino a Cartagine. La ricerca archeologica nel Mediterraneo*, "Forma Urbis", Il viaggio di Enea. Mito, storia, arte, archeologia, XXIII,1, 25th January 2018, pp. 28-39.

Raimondo Zucca gave a recent talk (9th-10th November 2017) at Campus Italia in Tunis, at Cité des Sciences, in a meeting promoted by *UniMed*, the Italian Embassy, The Italian Institute for Culture, and the Ministére de l'Enseignement supèrieur et de la Recherche Scientifique, for the promotion of the Italian academic system. The courses on offer at Italian universities were presented and Raimondo Zucca was the delegate chosen by the President of the University of Sassari, Massimo Carpinelli.
Attilio Mastino is due to give a talk in Tunis on 20th April 2018 at *Colloque Presence de L'Africa Romana dans l'antiquité et à l'époque moderne et contemporaine, regards croisés*, on the topic *Le futur du patrimoine: l'informatique et les nouvelles recherches sur l'épigraphie latine d'Afrique.*

5.2 Educational activity

Many of the North African students enrolled at the Universities of Cagliari and Sassari under the auspices of the UniMed project financed by the Fondazione di Sardegna (Fig. 14.6) have earned their Masters degrees. In Sassari on Tuesday 18th July 2017 the graduation took place of the first Tunisian, Algerian and Moroccan students to attend the Masters courses at the University of Sassari under the auspices of the *ForMed* project. Amongst the topics dealt with are: contact between the Arab *Ifriqya* and Sardinia in the period 7th-15th century; and the analysis of aspects connected with Algerian cultural heritage in the post-colonial period (safeguarding and promotion); several archaeological and epigraphic finds from Cirta-Constantine have been analysed. In the afternoon of the same day a round table was held, that was promoted by the University of Sassari. The theme was "a new Mediterranean generation", and the participants included the Presidents of the Universities of Tunis, Algiers and Rabat. The next graduation ceremonies will feature two Tunisian students who will present their Archaeology theses on subjects that focus on commercial relations in the western Mediterranean in the Medieval period. Five more students from Tunis enrolled in the same Masters programme in Archaeology in the academic year 2017-18, joining the other young people attending the degree course at the University of Sassari. We feel it is important to highlight the educational role that the School plays in our relations of cooperation with North Africa.

Higher learning – the PhD programme
The President of the University of Sassari has stipulated an agreement with SAIC, assigning a grant for the PhD programme "Archaeology, History and Humanities" at the University of Sassari,

Fig. 14.6 – Sassari University, Aula Magna. Defence of theses by Dahou Hind (From Cirta to Constantine), Maziz Zahia (Connections between Arab Ifriqiya and Sardinia) and Djedid Hanane (Algerian Cultural Heritage; photo by the Author).

reserved for students from the Maghreb (32nd cycle). The courses are co-supervised and two Tunisian students are currently attending: Myriam Ben Othman, Faculté des Sciences Humaines et Sociales Tunis El Menar: *La céramique de la cité génoise de Tabarka XVIe-XVIIIe siècle*. Supervisor Adnan Louichi, ex Director of INP, co-supervisor Marco Milanese; and Yahyaoui Mahbouba, Faculté des Sciences Humaines et Sociales Tunisi Manouba: *Les nouvelles technologies appliquées à l'étude et à la valorisation du complexe hydraulique romain de Zaghouan à Carthage*. Supervisor Lotfi Naddari, co-supervisor Raimondo Zucca.

Joint action with the Italian Agency for Development Cooperation
The programme of the school's activity will be updated in 2019 in relation to funding for the projects that have also been presented to AICS, the Italian Agency for Development Cooperation, with which SAIC has had contacts since its foundation in 2016.
An initial meeting has been held, which was promoted by the partner Sergio Ferdinandi, the President and the Secretary (also liaising with Dr. Luciano Borin), with the director of Cooperation, Minister Renato Varriale, and later with Dr. Rita Gonelli, in order to discuss the possibility of SAIC accessing the Agency's funding for educational activity and tourism promotion concerning the archaeological sites of Tunisia.
The treasurer, Michele Guirguis, together with the director of the Department of History, Human Sciences and Education

of the University of Sassari, Marco Milanese, represented the school at the meeting on 2nd October 2017 with the director of the Italian Agency for Development Cooperation (AICS), Dr. Laura Frigenti in Aula Milella at the University of Sassari. The Regional Councillor, Filippo Spanu, who is a delegate of Development Cooperation, also participated.

The Urbs antiqua Project

Urbs antiqua is a multidisciplinary project that has been presented for AICS's approval. It aims to contribute to intercultural dialogue and to the policies for development of Tunisia by way of an innovative intervention, to be realised in synergy with public and private players, that are both Italian and Tunisian, within the field of archaeological heritage. It is based on an analysis of the forms of collaboration already established by the school, both with Italian diplomatic and cultural representatives, and with universities and institutes for research, safeguarding and promotion of cultural heritage, as well as with private enterprises in the country.

In light of these aims, SAIC has addressed AICS, proposing a project for integrated and multidisciplinary cooperation, that is able to renew and concentrate the activities of Italian cooperation in Tunisia in the field of Cultural Heritage.

The strategies for Intervention aim to assist the socio-economic development of Tunisia by way of actions in the field of archaeological heritage, favouring the introduction of a considerable number of experts in the workplace and in the realms of direction; experts that have been trained through cooperation with the institutions of the country. The specific objectives have the aim of: training experts in the fields of the archaeological and historical/antiquities studies disciplines; increasing the synergy between Italy and Tunisia; offering expertise to Tunisia and other parts of the Maghreb; favouring new points of contact for cooperation in the fields of science, technology and innovation.

Urbs Antiqua is divided into five sections, each divided in turn into two modules to be carried our according the circumstances and the availability of funding: Documentation, Educational Activities, Conservation, Valorization, and Promotion. Each sector and the relating modules have been programmed in detail in relation to: human resources, the skills to be deployed, and the specific organisational route. Amongst the strengths of the project, we underline the organisation of the programme on the basis of the distinctive proposals of SAIC, that are those of documentation, training, conserving, promoting and disseminating archaeological heritage, as well as the possibility to extend or repeat these experiences also in other countries of the Maghreb. The standards adopted avail of the most up-to-date research methodologies in the fields of historical and antiquities studies, enriched by technologies applied to cultural heritage.

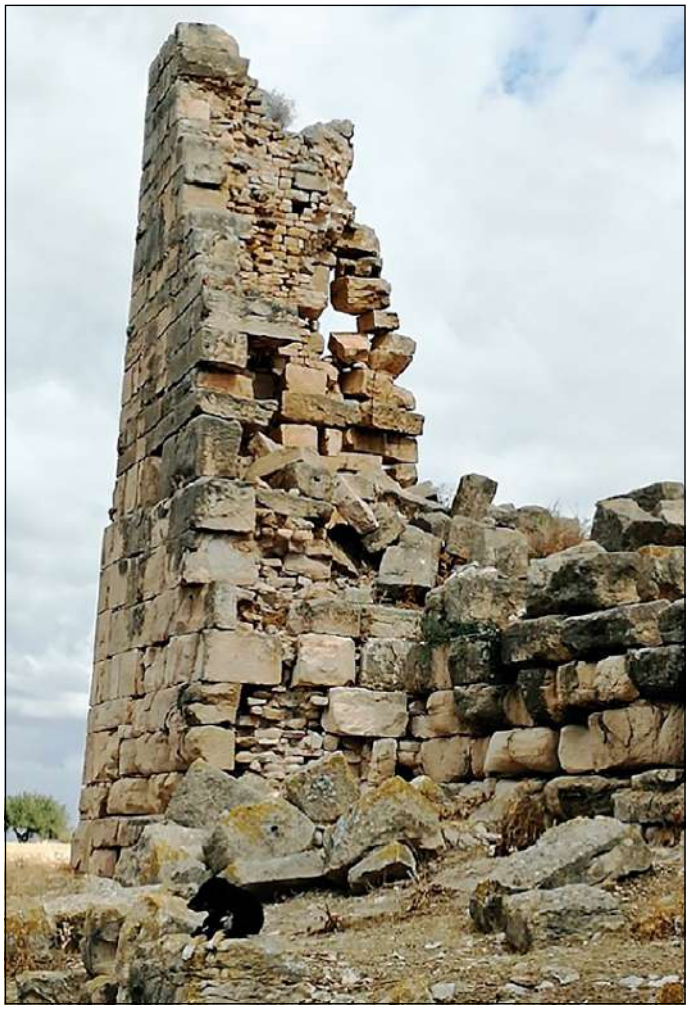

Fig. 14.7 – Thignica, Ain Tounga (Photo by the Author).

SAIC can count on the cooperation of dozens of scholars from the scientific and academic world, both in Italy and Tunisia: an entire professional class that no public or private body has up to now had the opportunity to involve in a cooperative initiative of this type.

Furthermore, by way of the numerous foreign correspondent partners, SAIC today constitutes the key partner in a project that aims to present itself not only in the national, but also in the European and International arena.

Project Fondazione di Sardegna [The Sardinia Foundation]

The 2017 Project, which was partially funded by the Fondazione di Sardegna (prompted by experience acquired in several missions in Tunisia by the Universities of Cagliari and Sassari), allowed the initiation of the activities of the School in Tunisia and the realisation of the Sabatino Moscati Library in Tunis. The project presented to the Fondazione di Sardegna for 2018 (which has been partially funded) is entitled *Carthage: Education and Promotion in the Cultural Domain in Tunisia*. This project aims to be a training workshop inspired by the experience acquired during several missions by the Universities of Cagliari and Sassari in Tunisia. It starts off from such a concrete case as that of Carthage and its archaeological park. The aim is that of training a group of Tunisian and Italian young people in advanced techniques of management, documentation and communication concerning cultural heritage. Amongst the objectives are: the training of the Tunisian archaeologists; the birth of a network of connections between the Italian and Tunisian universities in the field of archaeology; dissemination of the data regarding the excavations of Neapolis, Zama, Uchi Maius and Thignica by way of conferences for the academic community and meetings with the population; and a study of the archaeological park of Carthage and shared activities in co-direction with various archaeological sites in Tunisia. Besides the implementation of new protocols for cooperation in the field, it is also amongst the objectives of the project to increase the publishing activity (the journal *Cartagine. Studi e Ricerche* and the series *Le Monografie della SAIC*).
Operationally, the main activities foreseen for 2018, with the contribution of the Fondazione di Sardegna, are the following;
– An increase in the book collection and of the donations to the Moscati Library in Tunis.
– The realisation of an exhibition on current or recent Italian archaeological initiatives in Tunisia, coordinated by ISMA-CNR and the University of Sassari, and other universities and institutions.
– Two or more scholarships for a study period in Italy for a young scholar or official from Tunisia, for a period of two months, financed by MAECI, to be carried out in Rome and Sassari.
– The realisation of workshops, lectures and specific seminars, or talks in Tunisia by an Italian archaeologist and analogous didactic activities held in Italy by a Tunisian archaeologist.
– Involvement of the Tunisian students enrolled at the Universities of Cagliari and Sassari in the UniMed project financed by the Fondazione di Sardegna.
– Surveys and excavations conducted in cooperation with INP.
– Further agreements for Italo-Tunisian cooperation.

Conferences

The 21st international conference *L'Africa Romana* [Roman Africa] was hold in Tunis in December 2018.

Projects for Individual Research proposed by Partners

Dr. Valentino Gasparini has asked that the Society join his LARNA ('Lived Ancient Religion in North Africa') research project, which has been financed within the framework of 'Programa de Atracción de Talento. Ayudas destinadas a la atracción de talento investigador a la Comunidad de Madrid'.
The European Association of Archaeologists has agreed to a proposal for a panel on the cults of North Africa for the 24th Annual Meeting in Barcelona (September 2018). Besides Valentino Gasparini (Carlos III Madrid), the organisers of the panel will be Jaime Alvar Ezquerra and Attilio Mastino.

Research Grants and Scholarships

Scholarships for students from the Maghreb for the 34th cycle of the "Archaeology, History and Human Sciences" PhD programme. The School has transferred a sum from a private donation for a scholarship on Archaeology of North Africa at the University of Bologna (Department of History, Culture and Civilisation, Ancient History section).

5.3 Publications

The publishing activity of SAIC takes two main forms. The first is the online journal *Cartagine. Studi e Ricerche* (CaSteR) (of which a hard copy is printed for libraries). This is published for SAIC by the Department of History, Cultural and Territorial Heritage of the University of Cagliari and directed by Antonio M. Corda, University of Cagliari. The first three editions of this journal are available. The second publishing activity regards *Le Monografie della SAIC* directed by Paola Ruggeri of the University of Sassari. This is published directly by the SAIC Editore [SAIC Press]. The first volume to be published is entitled *Archeologia e tutela del patrimonio di Cartagine: lo stato dell'arte e le prospettive della collaborazione tuniso-italiana* [Archaeology and protection of the heritage of Carthage: the state of the art and prospectives for Tunisian-Italian cooperation] [SAIC Editore, Sassari, pp. 288, ISBN 978-88-942506-0-2].

5.4 Current partners

Public bodies

– International Center for Conservation Studies and the Restoration of Cultural Heritage ICCROM, Rome.

– Agence de Mise en Valeur du Patrimoine et de Promotion Culturelle (AMVPPC), Tunis.
– Institut National du Patrimoine (INP), Tunis.
– Italian Cultural Institute, Tunis.
– Italian Embassy, Tunis.
– Department of History, Human Sciences and Education of the University of Sassari.
– Department of Humanities and Social Sciences of the University of Sassari.
– Department of History, Cultural and Territorial Heritage of the University of Cagliari.
– National Research Council (CNR).
– Joukowsky Institute for Archaeology and the Ancient World, USA, Rhode Island.
– Various Italian universities and research programmes.

Private bodies
Association pour la valorisation de l'Héritage culturel (Luciano Borin), Tunis.

5.5 Exhibitions

2nd August 2016-22nd January 2017: *Annibale. Un viaggio*. [Hannibal. A journey] Angela Ciancio and Filli Rossi, the designer and curators of the exhibition, also edited the catalogue. The exhibition presented the physiognomy of the great Carthaginian leader by way of the voices of ancient and modern historians and chroniclers. The exhibition was held in Puglia, in the Barletta castle, on the anniversary of the Battle of Cannae (216 BC). Representing SAIC, Michele Guirguis, Attilio Mastino and Giuseppe Solinas, with a contribution by Salvatore Ganga, wrote the article *Riflessioni sulla localizzazione della battaglia di Zama* [Considerations on the localisation of the Battle of Zama] (Catalogue: 179-191). Sergio Ribichini contributed with the paper *Conquistare, accettare, confondere. Gli dèi pro e contro Annibale* [Conquest. Acceptance, Confusion. The Gods for and against Hannibal] (Catalogue: 21-29).
November 2017 – March 2018: following a proposal by the member Giovanna De Sensi Sestito, SAIC has become a patron of the exhibition *Annibale. La fine di un viaggio* [Hannibal. The end of a journey], Crotone, the Archaeological Museum of Capo Colonna. The exhibition was promoted by the Museum Center of Crotone and the Magna Grecia Scientific and Technological Center, sponsored by the Presidency of the Italian Republic. The exhibition, which benefits from contributions from the greatest experts and the most important Italian historical and scientific institutions, has the aim of telling the tale of Hannibal's extraordinary adventure in Italy, which concluded with his stay at the Hera Lacinia sanctuary in Crotone, a stop that was of symbolic significance.

5.6 Excavations and other activities in North Africa in which SAIC is involved directly or indirectly by way of its members

The School has followed the renewal of the agreement with INP for the archaeological excavations in Tunisia. The School has also ensured the coordination between the different archaeological activities currently being carried out, and continues to do so.
Thignica (Ain Tounga). Work in the field has already started, and about 500 Latin inscriptions are expected to be published. The campaign of archaeological investigation was started under the direction of Samir Aounallah (of AMVPPC) and the President Attilio Mastino, on the basis of the convention signed by the President of the University of Sassari, Massimo Carpinelli and the General Director of INP, Faouzi Mahfoudh (19th May 2017).
The campaign was carried out in March and October with help of the students of the School for Specialisation in Archaeology of Oristano (Ernesto Amedeo Insinna, Davide Antonio Fiori, Alessandro Madau, Annalucia Corona and Donatella Bilardi), and Attilio Mastino with Salvatore Ganga.
SAIC has also participated, by way of its members, in the work at Althiburos (Gilberto Montali), Carthage (Giovanni Di Stefano), Biserta (Anna De Palmas, Elisabetta Garau), and Sidi Mechreg, Governorate of Biserta (Marco Milanese in cooperation with Sebastiano Tusa of the Soprintendenza del Mare – Sicily and with Ouafa Ben Slimane of INP, for the Islamic/Ottoman phases).
Mounir Fantar, Pier Giorgio Spanu, Raimondo Zucca and the students of the School for Specialisation in Archaeology of Oristano, Nesiotikà, have continued work at Neapolis (Nabeul) with excavations, surveys conducted using drones and underwater surveying.
Also worthy of note is the work by the INP and the University of Cagliari which has been re-started in the centre of Uthina (Oudhna) in Tunisia with a three-year program coordinated by Nizar Ben Slimane and Antonio M. Corda. The agreement, which was signed on 17th March 2017, involves the completion of the publication of the data obtained from previous activity (1995-2007/2013), enlarging the excavation area, the creation of a complete corpus of the town's epigraphic heritage (publication, CAD and WebGis graphic documentation), the study of the mosaics with a view to the creation of a corpus, and the

constitution of an international project group with the aim of creating the archaeological park of Uthina.

Under the auspices of the convention stipulated between INP and the Kore-Enna University, the first survey campaign relating to the research project co-funded by MAE was carried out in Carthage from 16th-23th November 2017. This was coordinated by Mounir Fantar and Francesco Tomasello, and Faouzi Ghozzi, Rossana De Simone, Carla Del Vais and Gilberto Montali also participated in the mission.

This research project involved the study of buildings affected by signs of Punic quarrying, in a framework of provincial Mediterranean contexts. This first phase involves the start of a survey of several areas in the Metropolitan Carthage sector that have already been uncovered for some time. Important epigraphic documentation has been acquired from the numerous limestone and calcarenite blocks used in the Byrsa quarter, on the Islet of the Admiral and in the quarters of Magone and Bir Massouda, above all from the palaeographic and chronological point of view. This material is on the whole unpublished, and of particular importance is the presence of Punic letters dating to the 4th c. BC that are flanked by anepigraphic signs.

SAIC partners are also active in Libya by way of the archaeological research conducted by the University of Urbino at Cyrene. Maria Antonietta Rizzo is editing the publication, which is imminent, of the last five volumes of "Libya antiqua".

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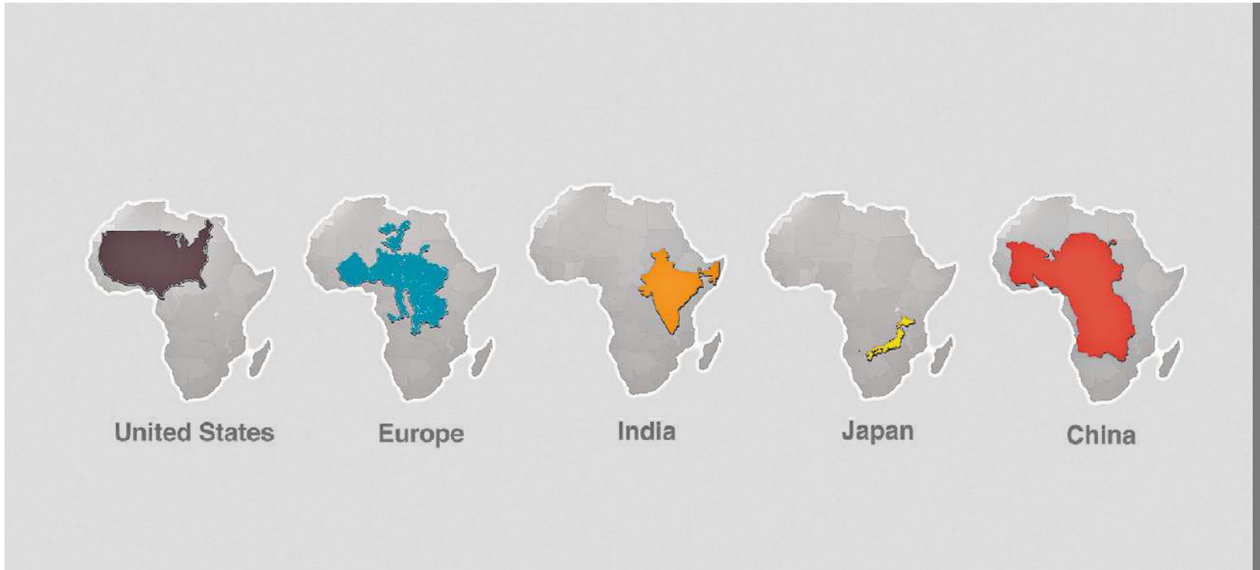
Africa encompasses a multitude of environments and biomes that require specific scientific strategies – from desktop studies to field research to laboratory analysis – to tackle research questions that may range from the emergence of early humans to the ethnoarchaeological investigation. In several areas, turmoil, social instability and security constraints hamper or limit field activities and long-term funded programs. The kidnapping of German colleagues and the tragic death of two local collaborators in Nigeria urge to rethink our agenda and challenge our view of current research practice. This 1st Workshop on "Archaeology in Africa", organized by Sapienza University of Rome, convened several researches from Italy or Italy-based researchers. The aim was to present and discuss theoretical, methodological and financial problems for Africanist researchers today. In a global perspective, the synergy between research groups is crucial. The need to intensify the national and international cooperation is also an essential step. This book collects a selection of the different perspectives presented to the workshop, mostly focussing from North Africa and East Africa.



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