Journal of the Flinders Archaeological Society

Volume 3
May 2016

DIG*it*

Dig It
Volume 3

Journal of the Flinders
Archaeological Society
December 2015

Print: ISSN 1440-2475
Online: ISSN 2203-1898

flindersarchsoc.org

E: dig.it@flindersarchsoc.org
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EDITORIAL

Welcome to Volume 3 of *Dig It*. This year we have built on the success of last year's editorial committee to ensure the journal's future. Part of this process was to rearrange the roles of the editorial committee, whereby we now have four people doing the same tasks that the previous editor, Jana, undertook singlehandedly. We also created two positions for short contributions editor, which were taken up by Kathleen Gorey and Rose Santilli, who worked tirelessly to guarantee the quality of the short contributions for this volume.

Another change that our members will have noticed is that we only produced one issue this year. After careful deliberation, the editorial committee found that we could produce a higher quality journal if we reduced this volume to one issue. Additionally, over the last few years, ArchSoc has been producing *Dig It* at a loss; membership fees were not covering the costs of *Dig It* and this meant that we had to come up with a long-term solution to this budgeting issue. Not only has the reduction of issues meant that *Dig It* is no longer produced at a loss, but the remainder of each membership fee can be allocated to fund other initiatives and opportunities for ArchSoc members.

Earlier this year we engaged with graphic designer, Laura Cooper, who agreed to take over from our editor, Jordan Ralph, in designing this volume of *Dig It*. Jordan has designed all five previous issues of the new series of *Dig It* (2012–2014), which—due to his lack of graphic design qualifications—meant that on average each issue would take him two–three weeks to design. The editorial committee decided that it was a cost-effective and time-effective solution to hire Laura as our graphic designer and to pay her an honorarium for her service. This honorarium was covered by a Cadbury™ Fundraiser in semester two. Thank you to everyone who bought and sold chocolates for this fundraiser! We would also like to thank Laura for putting so much work into designing this issue for us.

We encourage all students, regardless of their geographical location, to consider writing for *Dig It*—we want to know what students are researching across the globe. Our advice for future contributors is to make sure your contribution is grounded in current academic literature and deals with a specific topic or question. Most often, it is not enough to try to fit all of the discussion points from a thesis into one paper. We suggest that you pick one topic from your research and write about that specific thing, rather than try to cover a broad range of issues in a few thousand words. This will make your contribution—and your argument—concise, clear, and robust. We look forward to receiving many more contributions from students and recent graduates and to helping them to refine their research for publication.

A few final notes on this volume and the articles herein: *Dig It* is fast becoming a global journal for archaeology students and recent graduates. Despite being based in Adelaide, Australia, this volume of *Dig It* includes papers by authors from Argentina, Australia, Nigeria, and Romania. The diversity and breadth of the theories, topics and sites that our authors write about is a testament to a growing attitude of global collaboration and dialogue in archaeology, not least of which has been fostered by the World Archaeological Congress.

Jordan Ralph, Catherine Bland, Adrian Mollenmans and Fiona Shanahan

<dig.it@flindersarchsoc.org>

PRESIDENT'S ADDRESS

Change and consolidation can best be used to describe the year 2015 for the Flinders Archaeological Society. During this time members of ArchSoc benefited from the hard work and vision of its committee. Not only did the number of workshops offered increase but the type of workshop was expanded, with ArchSoc not only offering the ever popular Total Station but also the Intro to GIS, Geophysics Taster, Mapping and Dumpy Level workshops. Many thanks are given to Rob Koch, Bob Stone, Ian Moffat and Andrew Frost who gave freely of their time, expertise and experience, thus enabling the Society to again provide the workshops free of charge to its members. Attendance at the workshops was excellent and the feedback from members was positive and encouraging. There is a definite ongoing need for these workshops. Thank you again to all those people who have taken the workshops from an idea to a reality.

Congratulations also to Susan Arthure and Cherrie de Leiuen, the very deserving winners of the 2014 Ruth and Vincent Megaw award.

During 2015 ArchSoc again supported the Archaeology Department's Thursday Seminar Series; provided a very successful Graduand Celebration for the 2014 Graduates and stalls at the two O Week events and university Open Days. ArchSoc also gladly supported the UNESCO UNITWIN event and congratulates the Archaeology Department on achieving this outstanding UNESCO recognition. Another popular event was the Meet the Archaeologists and Archaeology Students lectures. In addition, ArchSoc was pleased to again support the South Australian Anthropological Society's Norman Tindale Lecture. The ArchSoc pub crawl was a success and the upcoming quiz night will also be an event not to be missed.

Significant changes were made during this year with regards to *Dig It*. It was decided to publish one issue per year of the society's journal *Dig It* and to also employ the services of a graphic artist. Given the huge amount of commitment needed to produce a journal of this quality, these changes will benefit all concerned with the publication of our journal.

ArchSoc also supported the Palaeontology Society's James Moore scholarship fund with the donation of $500 which money was raised from the proceeds of the Diggers Shield Cricket match and an on campus book sale. Thank you to everyone who supported and contributed to this very worthy cause.

Members might have noticed that significant changes are being undertaken on campus, including several new Archaeology Department facilities, namely the closing of its lab in Social Sciences South and the opening of brilliant new labs/computer resource room in the Humanities quadrant. Due to these changes ArchSoc no longer has the use of the Map room, where we had stored equipment and merchandise as well as using it as an office. ArchSoc would like to thank the Archaeology Department for the use of the Map room over the years; to have been able to use it has been invaluable. Although this loss is problematic for ArchSoc and we have had to come up with different strategies to address it, the department has kindly provided temporary but very much appreciated secure storage.

Volunteering opportunities have again successfully been advertised to our members and we anticipate that similar opportunities will again become available in 2016.

Changes to our constitution are again being taken to our AGM. Some of the proposed changes have resulted from our ongoing affiliation with FUSA and our support of the new student association FUCAHSA. It has been encouraging to see that our membership numbers have been maintained in 2015.

Lastly, as your outgoing President, I would like to take this opportunity to thank the ArchSoc committee for their support but most importantly I thank you, our members for your continued support.

Dianne Riley
President, Flinders Archaeological Society 2015
<rile0066@flinders.edu.au>

AN ARCHAEOGEOMORPHOLOGICAL APPROACH APPLIED IN THE STUDY OF A CHALCOLITHIC CIVILIZATION FROM NORTH-EASTERN ROMANIA

Ionuț Cristi Nicu [1,2]

1 "Alexandru Ioan Cuza" University of Iasi, Interdisciplinary Research Department – Field Science, Arheoinvest Platform, St. Lascar Catargi 54, 700107, Iasi, Romania
2 Flinders University, School of Humanities and Creative Arts, Faculty of Education, Humanities and Law, GPO Box 2100, Adelaide SA, Australia

<nicucristi@gmail.com>

Abstract

The theme approached in this paper is based on interdisciplinary information from disciplines such as geography (cartography, geology, geomorphology, climatology, and hydrology), history and biology. Interdisciplinary investigations were conducted in the Valea Oii watershed area of Romania, by teams that consisted of archaeologists and geographers. The aim was to map the Chalcolithic (5500–3000 BC) archaeological sites found in archaeological repertoires, and also to discover new ones. This interdisciplinary approach allowed the application of methods and techniques used in geography, such as Geographic Information Systems (GIS), to archaeological research, and resulted in a detailed and shared database regarding the location of archaeological sites and the geographical background of those sites, especially the geological evolution and landforms (plateaus, cuestas, gullies, and landslides). Over time, humans, or human communities, moved and placed their settlements depending on changing natural factors—for example, climate fluctuations (colder periods alternated with warmer ones), the appearance of new hydrological resources like springs formed as a consequence of landslides, or the disappearance of forests as a consequence of overexploitation; combining archaeological and geographical information is important as the human-environment relationship is interdependent, with humans or human communities taking into account, with or without their will, the characteristics of the environment when settling an area.

Introduction and archaeological background

The study area represents the place of discovery of the largest and most impressive Neolithic settlement from Moldova—*Cetățuia*, from Cucuteni, which also gave the name of the culture. Cucuteni culture ranges between 4525/4500—3500/3450 cal BC (Bem 2000: 337–369). The cultural complex Cucuteni-Ariușd-Tripolie has developed over a large area, of about 350,000 sq. km (on the territory of Romania, Republic of Moldova and Ukraine), with the relatively high relief (hills, foothills, platforms, terraces) being the determining factor for settlement placement (Monah and Cucoș 1985).

The link between the placement of archaeological sites and the environment (geological factor, climatic factor) has been known since 1863 (Lyell); although more recently the work of scholars such as Brakenridge and Schuster (1986), Bryson (1994), Hubert (2001), Kirkby and Kirkby (1976) has led to the development and implementation of new research methods. Archaeogeomorphology deals with the studies of geomorphological processes (such as palaeolandforms, weathering or erosion) that may also be relevant to archaeological research (such as site location, site preservation) (Thornbush 2012). Research has often become multi-disciplinary in order to reconstruct regional environmental context. Any archaeological research has to begin with a short and fundamental analysis of the environment (Rossignol

and Wandsnider 1992). Therefore, any old documents or records related to the natural environmental conditions (characteristics, analysis, and evolution), need to be studied and integrated throughout the archaeological research to better emphasise possible connections (if there are any) between the two fields of study.

The human-environment relationship is interdependent, because humans or human communities took into account, with or without their will, the characteristics of the environment. For example (Nicu et al. 2012):

- Geological conditions: basement resources of raw material for raising domestic settlements, production of hunting weapons, using flint as raw material, and places of salt resources exploitation.
- Geomorphologic conditions: the placement of settlements on structural plateaus in a defensive purpose or the defence towards natural hydrological phenomena like floods, in contact areas for facilitating mobility between certain communities, exposition towards the sun.
- Hydrological conditions: proximity towards water supply resources, such as ponds, salty ponds, and water streams.
- Pedological conditions: soil fertility, mineral resources, and the existence of consistent clay resources used in pottery.
- Vegetation and fauna conditions: the existence of a rich forest fund which also constitutes a place of existence for wild animals, used as raw material for building houses, heating them in the cold season, food preparation, but also burning pottery.

Study area

The study area is a relatively small basin—Valea Oii (97 km^2), located in the Northeastern part of Romania, in Iasi county, within Moldavian Plain. Past research in this area was mainly focused on the entire Bahlui basin (2032km^2) (Boghian 2004) or Bahluieț basin (558 km^2) (Asandulesei 2012) (Figure 1). The Moldavian Plain is totally overlapped on the Moldavian Platform with a long paleo-geomorphologic evolution (over 70 mil. years) which is also in a state of present evolution (Bacauanu 1967).

The main geologic, geomorphologic, hydrologic, and climatic characteristics are described by Romanescu et al. (2012), Romanescu and Nicu (2014), and Romanescu et al. (2014). The mobility of population throughout the Chalcolithic period and natural risks affecting these sites are analysed by Nicu and Romanescu (2016), and Nicu (2016).

Genetic types of relief (structural, sculptural, of accumulation)

Within the basin is found a denudational relief, represented through sculptural and structural forms, but also an accumulation relief. The origin and type of relief is a very significant part of geoarchaeological research, and could offer more information about the location or dynamics of prehistorical populations.

Structural relief is characterised by the presence of cuestas, found on the right side of the basin and throughout the structural plateau from the upper part of the catchment. Within the basin only the delluvial cuestas are present, almost entirely formed out of the slope processes releases, developed mainly on deposits of loess, clay and loam.

Sculptural relief occupies the biggest surface of the basin on both of the slopes. During the formation of this type of relief the main morphogenetic role is held by the external factors represented through the hydrographic network, the sum of the slope processes to which the climatic conditions are added, and the presence of the soft rock sedimentation complex. Within this type of relief we find the following:

- *sculptural interstream areas* are covered in eluvial clay with light washing processes which are met on the left side of the basin with linear slopes with a tilt of no more than 3–5 degrees. The peak's evolution and stream plateau is due to some weak alteration processes, degradation and erosion, and the descent of the general surface of the relief being slow. Through time these streams were analogised with erosion platformes. The sculptural streams take the form of hills and low plateaus (Lupului Hill, Ciobanului Hill, Făcuți Hill).
- *colluvial slopes* with mixed degradations in multiple staged of evolution, spread on the right side of the basin, where the slopes exceed 3 degrees leaning. Here the majority of the surface erosion processes take place (gutters, trenches, gullies, torrents) favoured by the Sarmatian clay substrate; a special type of relief is the one developed on saline Sarmatian deposits or when, due to intense evapotranspiration and the low groundwater level, the salt reaches the surface soil through capillarity—to these fine texture saline deposits, washings are characteristic. Landslides with a wide diffusion are aquiring feature to this landscape, the majority being stabilised landslides.

Accumulation relief is represented by the Pleistocene and Pliocene terraces met in the inferior half of the basin, but also in plains, terraces, and alluvial cones. The plains were formed in the postglaciar period (about 10,000 years ago) through the succession of erosion and accumulation periods. They are of 3–20m thickness and occupy the lowest portions of the relief (Băcăuanu 1967). A very good example of this is from the upper basin, between Lupului Hill and Mănăstirii Hill, where both of the versants are affected by sliding processes, resulting a typical accumulation relief where village is now located.

Materials and methods

To create the geographical database, GIS software was used, specifically TNT Mips, AutoCAD, ArcGIS. In the realisation of the DTM (Digital Terrain Model), topographic plans scale 1:5000 were used, resulting a very detailed DTM with a 5x5 m/pixel resolution. In terms of the archaeological data, the Archaeological Inventory of Iasi County was used at the beginning; however, after consulting this inventory and then going in the field in order to identify the archaeological sites, it became apparent that some descriptions were not very precise or that some sites are located on the other side of the catchment. Therefore, mapping and identifying again the sites was a necessity for the study. The settlements were identified in the field and located with Leica GPS System 1200. In some cases, detailed topographical plans scale (1:200 m) was made in order to map the geomorphological processes that are destroying archaeological sites.

In analysing the distribution of soil classes, the pedological studies of communes Baltati, Belcesti, Cotnari, Cucuteni, Todiresti and Tg. Frumos city, scale 1:10,000 (from years 1994, 1995, 1997 and 2003), made by Iasi County Office for Soil Survey, were scanned, digitised and integrated in GIS. Finally, 400 polygons were obtained and classified in 155 soil units.

Results and discussions

At the beginning of the research 23 Chalcolithic sites were known, with another three being discovered during the project, bringing the number to 26 discovered, mapped and partially dated. The three newly discovered sites, SV de Boghiu (Cucuteni A 4525/4500–3950 cal BC) (Filiași, Bălțați commune), Dealul Harbuzăriei/vest de Boghiu (Cucuteni unknown) (Filiași, Bălțați commune) and Dealul Hârtopului (Cucuteni A-B 4050— 3700 cal BC) (Boureni, Târgu Frumos) were integrated in a database with the help of GIS (Brigand et al. 2014) (Figure 2).

Location of archaeological sites based on morphology and morphometry

A high quality DTM with 5x5 m/pixel resolution was used. Internationally, there are a number of different methods and techniques used in obtaining the DTM which have a direct applicability for archeological sites, specifically, satellite images from different years (for example, CORONA (Goosens et al. 2006), ASTER, SPOT, and LANDSAT), maps and topographic plans at different scales (Parmegiani and Poscolieri 2003), aerial photography, direct measurements in the field with the GPS and total station, 3D laser scanners (Balzani et al. 2004), LiDAR (Harmon et al. 2006), and all these methods successfuly integrated in GIS (Harrower 2010; Wescott and Brandon 2005).

Taking into consideration the altitudinal difference of the basin, the following altitude classes were chosen when creating the hypsometric map: 61.5–100 m, 100.1–150 m, 150.1–200 m, 200.1–250 m, 250.1–300 m, 300.1–350 m, 350.1–400 m and >400.1 m. The areas which do not succeed 100 m altitude represent 12.4% of the total surface, being spread from the Bahluietului confluence to the half of the basin where the main accumulations are placed (Sârca, Mădârjești, Dobre, Ichim, Podișu).The terraces of the two slopes are also included in the first hypsometric class, with a greater share for the left one. Altitudes between 100.1–150 m get the upper side of the basin with a 41.9%, occupying the inferior third of the slopes on the left side, the majority of the right slope has the upper hand in the middle basin. The stage between 150.1–200m holds 26.6% of total catchment surface, is spread on the extremities of both slopes from the effusion and until the borders of the Boureni and Bals villages, where the transition towards the plateau area takes place, that is accomplished throught the 200–300m stages (7.2%). The hypsometric class of 300.1–350m has a 3.5% share of the total area, the one of 350.1–400m a 6.3% share and the one of >400m–1.6%; the last class includes the surfaces that are existing solely in the Dealul Mare-Hârlău in the NNW extremity, also known as the Broscăria-Laiu plateau.

Analysing Figure 3, refering to the classification of Chalcolithic archaeological sites on altitudinal classes, it can be observed that 17 sites (the majority belonging to the Precucuteni and Cucuteni phases) are placed on the 100–200 m altitudinal difference (which occupies more than half of the basin's surface) and that these are spread in the middle and superior basin until the contact with the plateau area. The preference for lower and relatively high forms is evident, allowing for the natural protection of the settlements, and, where the slopes permit, the practice of agriculture (Asandulesei 2012).

This is not the case of the *Dealul Mândra* settlement, found at an altitude of 73 m in the proximity of the main course of the valley, a settlement which does not fit the pattern, making it one of most interesting sites in the region). *Dealul Mândra* was located without taking into consideration factors such as natural defence, proven through the existence of only one archaeological layer, Cucuteni A, with the settlement being abandoned at the end of this period. Examining the higher plateau area it can be seen that with altitudes between 300–400 m, there are five sites, while in the 200–300 m class there are three sites. In particular, it should be noted, the settlements on higher altitudes were holding an essential role, the one of defence, as inside these settlements fortification systems were found.

The mobilities of the Chalcolithic populations can not be completely understood, if the slope is not taken into consideration for the placement of settlements and their defence, but also the degree of physical effort needed to construct the settlement (Figure 4). With 21 sites located

on slopes of 3–5 degrees the preference for setting up the settlements in places with gentle slopes is obvious. All the other sites being located in the slope class between 5–7 degrees (four sites), or in the slope class 7–10 degrees (one site) and situated either at the contact between the plain and plateau, or on the front of cuesta presently affected by sheet erosion processes.

The predilection to setup the Cucuteni settlements on the north and north-east orientation slopes (Asandulesei 2012; Boghian 2004; Monah and Cucoș 1985) is well known in the archaeological literature. This aspect is once again underlined in Figure 5, which shows twelve sites being setup on the north and north-east slopes, where they could profit from greater thermic comfort and solar light.

Finally, within the basin, there are seven settlements located on the east oriented slopes which were taking advantage of the sun-light and the first rays of sun and three sites set up on south orientation slopes, assigned to phase Cucuteni A and being abandoned towards the end of the period, suggesting that during this time the importance of orientating for sunlight was not realised.

Soil classes distribution and the role of soils in archaeological sites placement

The clear domination of Chernisols (with high contents of organic matter) can be observed in Table 1, with this soil type accounting for three quarters of the basin's surface, 6470.89 ha (74.27%). Second to follow are the soils formed under the anthropogenic influence: Antrisols, with a surface of 1052 ha (12.08%); then Protisols, which occupy about 539.82 ha (6.2%); and Luvisols with 364.83 ha (4.19%). In lower proportions Vertisols, usually associated with forests, appear with a surface of 159.81 ha (1.83%), with an azonal character, and Hydrisols (distributed on the bottom of the valley), occupy the smallest surface of 124.71 ha (1.43%).

Class	S (ha)	% (from total)
CHERNISOLS	6470.89	74.27
LUVISOLS	364.83	4.19
HYDRISOLS	124.71	1.43
PROTISOLS	539.82	6.20
ANTRISOLS	1052.72	12.08
VERTISOLS	159.81	1.83
TOTAL	8712	100

Table 1. Distribution of the main soil classes from the Valea Oii catchment

Knowledge of soils in archaeology is an essential factor as soils provide the medium in which the material remains of past human activity are often preserved. The soil must not be considered a special element, but it must be placed in a physical-geographical context. If in the analysis of the archaeological material found buried only, a study of its sedimentary rock side, spatial repartition, and modifications due to pedogenetic processes is undertaken, then it can be considered that only a part of the archaeological information is being studied (French 2005), an insufficient factor for the realisation of a complete analysis. Before beginning archaeological digging, holding information regarding classes and types of soil, obtained through pollen analysis (Tipping et al. 1999), we can facilitate the understanding of the placement of certain settlements in different places, from different historical periods.

Human communities tend to set their settlements in places where they had noticed a better development of agricultural production, places where the soil properties were able to be used and the existent resources enabled them to survive. After the execution of the distribution map of soil classes, a vectorial layer with the Chalcolithic archaeological sites was overlapped. Thus, the spatial analysis of archaeological sites according to the existence of soil classes was possible, with the main interest being in the fertile soils used for agriculture. The fact that in the past (6000–2000 BC) there existed the same classes and types of soils, which may have influenced the placement of archaeological sites, cannot be stated, however, it appears major modifications did not take place. Exceptions are the areas covered in the past with forests, especially the upper part of the basin, in the plateau area, where hardwood species such as: oak (*Quercus robur*), elm (*Ulmus lamellosa*), and hornbeam (*Carpinus betulus*) are mainly found.

According to Figure 6 it can be observed that 15 archaeological sites are presently placed on Chernisols (soils with a high fertility), which, even if in the past were in the forming stage, held a highly important role in the development of the Chalcolithic civilisation, agriculture being one of the main activities (Boghian 2004). The sites from this category are distributed almost uniformly on the entire surface of the basin, especially in the superior basin, where most of the settlements are concentrated. In the case of the Protisols class, four sites are placed in this class, with soils still in an incipient stage of formation, mainly in meadows. The sites which are found on Antrisols (two sites) are mainly affected by the slope processes, being under strong anthropic influence. Thus results the importance of internal soil properties, because the degree of vegetation coverage partly influences the erosion processes and negatively affects site degradation; the effects being particularly visible when significant quantities of archaeological material are being washed and brought at the base of the slopes by the meteoric water.

Soil undergoes continuous formation and change over time, which makes it difficult to reconstruct the presence and extent of soil types that were present in prehistoric times. In the analysis of this element, the close study of internal (rock type), external (climate, hydrological regime) and anthropic factors, which condition the processes of deposition or erosion, can help in estimating or reconstructing the soil layer from the past. Over time, stratigraphic studies held in different archaeological sites in which excavations took place (Dealul Mandra, La Iaz, Iazul 3 no.1, Dealul Boghiu, Dealul Mare Filiasi no. 5, Dealul Manastirii, la Dobrin, Dealul Gosanul no. 16, Dambul Morii no. 17, Cetatuie no. 20, Hurez no. 21, Dambul lui Pletosu no. 22, Siliste no. 23) have brought a significant contribution to the chronology and evolution of the culture. A well preserved and conserved soil (where agricultural works did not take place in an intensive manner) can offer crucial information regarding the stored archaeological material.

Conclusions

The present study, with a pronounced interdisciplinary character, based on a small territory, has reached sensitive points in the research of some environmental factors, in a tight correlation with the placement and distribution of archaeological sites. All the obtained information through the GIS analysis was stored in digital format. The settlements were individually mapped, with high precision with the help of the GPS—during the in-situ research done along with archaeologists within the country and from abroad, some imprecise or insufficient descriptions were corrected and/or completed.

It was noted that there was a predilection for placing the settlements: on structural terraces and plateaus for a better visibility; on flat terrain for agricultural reasons and minimum physical effort; and on the northeast and east oriented slopes where the profitability of the sun's light was higher. GIS has proven once again a powerful tool in the accomplishment of archaeogeomorphological scientific endeavour.

Acknowledgements
This study was supported by a Marie Curie International Research Staff Exchange Scheme Fellowship within the 7th European Community Framework Program (FLUMEN, Project number 318969, FP7-PEOPLE-2012-IRSES and the Partnership in Priority Domains project PN-II-PT-PCCA-2013-4-2234 no. 314/2014 of the Romanian National Research Council, *Non-destructive approaches to complex archaeological sites. An integrated applied research model for cultural heritage management*

References

Asandulesei, A. 2012 Aplicații ale metodelor geografice și geofizice în cercetarea interdisciplinară a așezărilor cucuteniene din Moldova. Studii de caz. Unpublished PhD thesis, Faculty of History, "Al. I. Cuza" University of Iași.

Bacauanu, V. 1967 Cercetari geomorfologice asupra Campiei Moldovei (extras). *Analele Stiintifice ale Universitatii "Alexandru Ioan Cuza" (new series)*, sect. II, tom XIII, Iasi.

Balzani, M., N. Santopuoli, A. Grieco and N. Zaltron 2004 Laser Scanner 3D Survey in Archaeological Field: the Forum of Pompeii. International Conference on Remote Sensing Archaeology, Beijing, pp.169–175.

Bem, C. 2000 Elemente de cronologie radiocarbon. Ariile culturale Boian-Gumelnița-Cernavodă I și Precucuteni-Cucuteni. *Cercetări Arheologice* XI:337–369.

Boghian, D. 2004 *Comunitatile cucuteniene din bazinul Bahluiului.* Suceava, "Stefan cel Mare" University Publishing House.

Brakenridge, G.R. and J. Schuster 1986 Late Quaternary geology and geomorphology in relation to archaeological site locations, Southern Arizona. *Journal of Arid Environments* 10:225–239.

Brigand, R., A. Asandulesei and I.C. Nicu 2014 Autour de la station eponyme de Cucuteni: Paysage et peuplement (Valea Oii, Iasi, Roumanie), *Tyragetia SN* vol. VIII [XIII] 1:89–106.

Bryson, R.A. 1994 On integrating climatic change and culture change studies. *Human Ecology* 22(1):115–128.

French, C. 2005 *Geoarchaeology in action: studies in soil micromorphology and landscape evolution.* Routledge.

Goosens, R., A. De Wulf, J. Bourgeois, W. Gheyle and T. Willems 2006 Sattelite imagery and archaeology: the example of CORONA in the Altai Mountains. *Journal of Archaeological Science* 33:745–755.

Harmon, J.M., M.P. Leone, S.D. Prince and M. Snyder 2006 LIDAR for archaeological landscape analysis: a case study of two eighteenth-century Maryland plantation sites. *American Antiquity* 71(4):649–670.

Harrower M.J. 2010 Geographic Information System (GIS) hydrological modeling in archaeology: an example from the origins of irrigation in Southwest Arabia (Yemen). *Journal of Archaeological Science* 33(7):1447–1452.

Hubert, S. 2001 Modélisation Numérique de Terrain et analyse spatiale pour une aide à l'évaluation des risques d'inondation dans la region de Nouakchott (Mauritanie). *Mémoire de DESS*, ENSG – Univ. Pierre et Marie Curie, 50.

Kirkby, A. and M.J. Kirkby 1976 Geomorphic processes and the surface survey of archaeological sites in semi-arid areas. In Davidson, D.A. and M.L. Shackley (eds), *Geoarchaeology: Earth Science and the Past*, pp.229–253. Denver: Westview Press.

Lyell, C. 1863 *Geological Evidences of the Antiquity of Man*. London: John Murray, Albemarle Street.

Monah, C. and Ș. Cucoș 1985 *Așezările culturii Cucuteni din România*, Iași: Junimea Publishing House.

Nicu, I. C., A. Asandulesei, R. Brigand, V. Cotiuga, G. Romanescu and D. Boghian 2012 Integrating geographical and archaeological data in the Romanian Chalcolithic. Case study: Cucuteni settlements from Valea Oii (Sheep Valley – Bahlui) watershed. *Geomorphic Processes and Geoarchaeology. From Landscape Archaeology to Archaeotourism:* 204–207.

Nicu, I.C. and G. Romanescu 2016 Effect of natural risk factors upon the evolution of Chalcolithic human settlements in Northeastern Romania (Valea Oii watershed). From ancient time dynamics to present day degradation. *Zeitschrift für Geomorphologie* 60(1):1-9.

Nicu, I.C. 2016 *Hydrogeomorphic risk analysis affecting Chalcolithic archaeological sites from Valea Oii (Bahlui) watershed, Northeastern Romania. An interdisciplinary approach,* Springer DOI: 10.1007/978-3-319-25709-9 (in press).

Parmegiani, N. and M. Poscolieri 2003 DEM data processing for a landscape archaeology analysis (Lake Sevan – Armenia). The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences XXXIV, part 5/W12: 255–258.

Petrescu-Dîmbovița, M. 1966 *Cucuteni.* București: Meridiane Publishing House.

Romanescu, G., C., Zaharia and C. Stoleriu 2012 Long-term changes in average annual liquid flow river Miletin (Moldavian Plain). *Carpathian Journal of Earth and Environmental Sciences* 7(1):161–170.

Romanescu, G. and I.C. Nicu 2014 Risk maps for gully erosion processes affecting archaeological sites in Moldavia, Romania. *Zeitschrift für Geomorphologie* NF–58(4):509–523.

Romanescu, G., I. Sandu, C. Stoleriu and I.G. Sandu 2014 Water resources in Romania and Their Quality in the Main Lacustrine Basins. *Revista de Chimie* 64(12):1416–1421.

Rossignol, J. and L. Wandsnider 1992 *Space, Time, and Archaeological Landscapes*. New York: Plenum.

Thornbush, M.J. 2012 Archaeogeomorphology as an application in physical geography. *Applied Geography* 34:325–330.

Tipping, R., D. Long, S. Carter, D. Davidson, A. Tyler and B. Boag 1999 Testing the potential of soil-stratigraphic palynology in podsols. In A.M. Pollard (ed), *Geoarchaeology: exploration, environments, resources,* pp. 79–90. Geological Society, Special Publication no. 165, London.

Wescott, K.L. and R.J. Brandon (eds) 2005 *Practical Applications for GIS for Archaeologists. A Predictive Modelling Toolkit.* London: Taylor and Francis.

World Archaeological Congress

WAC-8 Kyoto

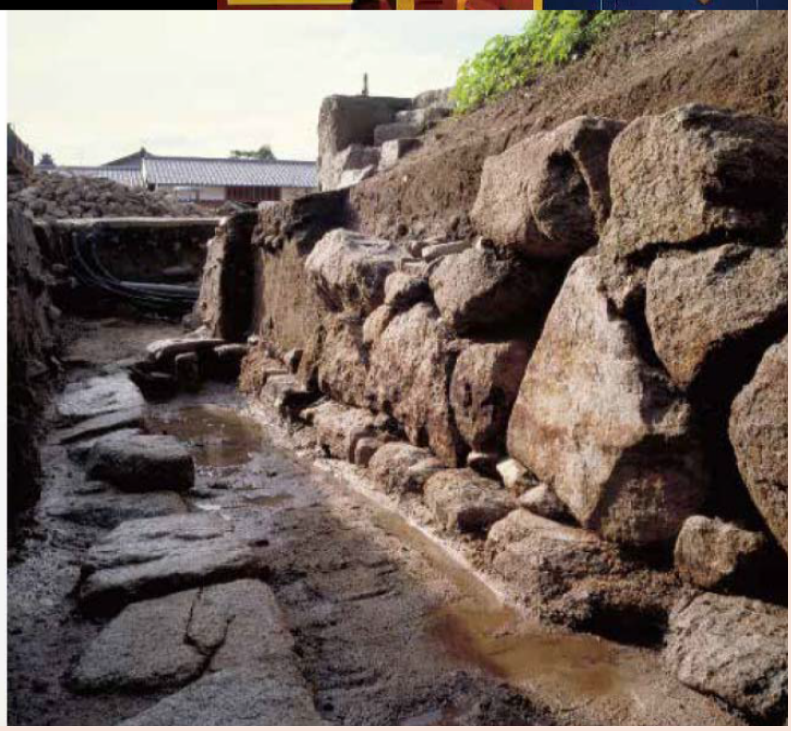
29 August to 2 September 2016

WAC and the local Organizing Committee of the Eighth World Archaeological Congress invite you to join WAC-8 in Kyoto, a traditional Japanese capital with incredible cultural heritage. WAC-8 will be held at Doshisha University, and will include special symposia such as:

- Disaster archaeology today and for the future
- Post-colonial experiences and archaeology practice
- Digital archaeologies

The call for WAC-8 themes will be made in early 2015, with calls for sessions to follow. WAC will support Indigenous peoples, students, and archaeologists from economically disadvantaged countries to attend.

For more information about WAC, visit:
www.worldarchaeologicalcongress.org
http://wac8.org/



Notes

Editorial Committee

Jordan Ralph, Editor
<jordan.ralph@flinders.edu.au>

Jordan completed a Bachelor of Archaeology (Honours) degree at Flinders University in 2012. The focus of Jordan's Honours research was contemporary graffiti of Jawoyn Country. He is an active member of the archaeological community, serving as a Student Representative for the Australian Archaeological Association and the President of the Flinders University Archaeological Society during 2012, as a member of the World Archaeological Congress Student Committee in 2012 - 2015 and as a member the Council of the World Archaeological Congress as the Junior Representative for Southeast Asia and the Pacific in 2013 - present. Jordan has considerable experience working with Indigenous communities in the Northern Territory, and has participated in numerous archaeology surveys and recording projects, with a particular focus on rock art and graphic representation. Jordan now works as a field archaeologist at Wallis Heritage Consulting and is a PhD candidate with the Flinders University Department of Archaeology where is currently researching modern material culture in Aboriginal communities in the Northern Territory.

Catherine Bland, Co-editor
<blan0087@uni.flinders.edu.au>

Catherine completed her Honours degree in 2012 where she conducted a technological and functional analysis on stone artefacts from the archaeological site of Ngaut Ngaut (Devon Downs), South Australia. Her current PhD research involves analysing ceramics with elemental and mineralogical techniques in order to explore questions about provenance and technology, which can be used to infer interregional interaction. The archaeological site of Caleta Vitor is the focus of her research and is located in northern Chile, South America. The ceramic record from the site spans the last 2,000 years and thus covers the rise, consolidation and collapse of two Andean cultures - Tiwanaku and Inka. This is a multidisciplinary international project that will provide insight into the ceramic manufacturing process for the site and identify the possible influences that the overarching political states of Tiwanaku and Inka had on the population.

Adrian Mollenmans, Co-editor
<moll0013@uni.flinders.edu.au>

Adrian completed his Honours degree in 2014 in which he undertook an analysis of Aboriginal fish traps on Yorke Peninsula (Guuranda), South Australia. Adrian's research interests include Indigenous archaeology with an emphasis on adopting and promoting collaborative archaeological and community based participatory research approaches (see also Interview with Dr Amy Roberts in this edition for a further discussion on ethical considerations that underline the need for adopting such approaches). His current PhD research continues his collaboration with the Narungga community of Yorke Peninsula (Guuranda) by undertaking a broader investigation of coastal and marine resource use of this community including how the coastal and marine economy developed over time.

Fiona Shanahan, Co-editor
<shanahanparker@gmail.com>

Fiona completed an archaeological Honours degree at La Trobe University in 2014. Her thesis deals with the management of World War II aviation sites in Australia and the Marshall Islands. Fiona has presented at a number of international and domestic conferences, including the National Student Archaeology Conference (NASC) and Australasian Institute for Maritime Archaeology (AIMA) conferences. She has a broad range of fieldwork experience including terrestrial and maritime archaeology throughout Australia. Excavations include the Penitentiary in Port Arthur, Oatlands Guard House, Australian Historic Shipwreck Preservation Project (Clarence) in Victoria, a shell midden in Apollo Bay, survey work at Ned's Corner as well as consulting work throughout Victoria, Tasmania and Western Australia.

About *Dig It*

Dig It is the student-run, peer-reviewed journal of the Flinders Archaeological Society and its purpose is to provide students - including undergraduates, postgraduates and recent graduates - with the opportunity to practice and familiarise themselves with the processes involved in academic publications, including writing, publishing, editing and reviewing. The publication began in 1997 and after a hiatus of at least five years, it was relaunched in 2012. It aims to offer emerging young academics with an avenue to engage with archaeological dialogues and discourse. In addition, it seeks to keep future and junior archaeologists connected and informed about what is happening in the archaeological community.

Dig It is published once a year and is printed at Flinders Press. Dig It considers a range of contributions, including research articles, essays, personal accounts/opinion pieces, book reviews and thesis abstracts for publication. We welcome contributions from local, interstate and international undergraduates, postgraduates and recent graduates. The guidelines for contributors can be found here: http://flindersarchsoc.org/digit/guidelinesforcontributors/.

Correspondence to the Editor should be addressed to:

The Editor, Dig It c/o ArchSoc
Department of Archaeology
Flinders University
GPO Box 2100
Adelaide, 5001

or email <dig.it@flindersarchsoc.org>

Editor
Jordan Ralph

Co-editors
Catherine Bland, Adrian Mollenmans, and Fiona Shanahan

Short contributions editors
Kathleen Gorey and Rose Santilli

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