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## **Recent Studies on Past and Present**

### **I.**

## **Human Heritage and Community: Archaeology in the Carpathians and Lower Danube Area From Prehistory to the Early Medieval Age**

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# Topography, Digital Cartography and Gis In Archaeology

## Debates On Research Methods And Perspectives

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FLORIN FODOREAN, IOAN FODOREAN

**A**RCHAEOLOGY BECAME recently one of the most dynamic sciences. The main reason for this situation is mainly the development of geographical and cartographical fields and hard sciences, as well as the design of software products that developed rapidly in the last years.

Not long ago, archaeology was the focus of a limited group of specialists, some of them working out of passion, while data processing was done using classical methods (Rachet, 1970). Lately however, due to the fast pace of economic development, archaeology also needed to undergo a series of quite important changes.

Recently, the issues and discussions on some aspects related to GIS, topography and digital cartography, which may be applied in archaeology, intensified. Evidence is given by the recent international colloquia on these subjects, where we also took part sometimes (Irimuş, Petrea, Surdeanu, Fodorean, Pop 2006: 493-505), or the periodicals and journals that group papers debating such issues (see for example *Journal of GIS in archeology*, at <http://www.esri.com/library/journals/archaeology>).

The general development of archaeology was and is strictly related to the one of technical sciences, which introduced a series of modern methods to the archaeological research. They represent a required means for the investigation of areas where there is a high probability for the discovery of historical traces. Their main task is to supply information to be used for the orientation and better location of archaeological excavations. The initiation of such a topical approach has numerous grounds, among which: the need to get acquainted with all these scientific trends, the requirement to rethink the approach to the study

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of archaeology by means of these methods, the necessity to close the growing gap between archaeology and other sciences.

Topography was the first important field that accompanied archaeology. Of course, the large archaeological sites also benefited from topographical surveys in previous periods. Nevertheless, lately it has been implemented that any saving excavation or systematic site must remake the old topographical surveys. Moreover, the apparition of total stations marked a major change regarding the manner of fieldwork, the number of people involved in a topographic survey, the quality of the measurements, etc. The data stored as a result of the surveys may be easily downloaded to a computer and then processed by programmes, so that they can be visualized in a very short time. A new field has been therefore born, archaeological topography.

Globally, the progress of this field is obvious. Projects have been designed and applied, programmes are developing, the field is taught in prestigious European or American universities. For instance, in many Italian faculties, the subjects "Archaeological Topography" or "Ancient Topography" are included in the curricula, and the professors teaching them are important names in the field (Lorenzo Quilici, the teacher of the course entitled "Topografia dell'Italia antica" in the Faculty of Letters and Philosophy of the University of Bologna and manager of the journal "Atlante Tematico di Topografia Antica", which is issued in Bologna since 1992; Stefania Quilici Gigli – professor at the University of Naples, who coordinates the above-mentioned publication together with professor Lorenzo Quilici; C. F. Giuliani from "La Sapienza" University of Rome; Giovanna Bonora Mazzoli, from the University of Genoa). Their contributions are essential for the understanding of research methods that are specific for this field and the results they produced. In this purpose, we note the work entitled *Introduzione alla topografia antica*, il Mulino, Bologna, 2004, 210 p., written by professors Lorenzo Quilici and Stefania Quilici Gigli, a true handbook of topography, where the authors approach issues like Topographical Research: sources and contributions, p. 23-61 (chapter II); The Archaeological Map, p. 63-80 (chapter III); Elements for the study of cities and territories, p. 81-178 (chapter IV); Ancient topography within the contemporary society, p. 179-186 (chapter V).

Digital cartography is another field that draw very much near archaeology. GIS products have a large range of applications, in the most diverse fields. Practically, everything related to the territory is more or less within the province of GIS products, including public utilities, the environment, territorial planning, agriculture and forestry, natural resources, transports, demography, marketing, land survey. One should also underline the importance of GIS as an interdisciplinary field, in a sense that contributions from various fields are needed for the planning and operation of a GIS, each having a higher or lower weight in different

stages of design or use. For example, geography has a long tradition in spatial analysis and provides a large range of applications. Cartography supplies the main source of input for geographical data in the shape of maps, while digital cartography provides methods of digital representation and manipulation of geographical characteristics, as well as the methods of visualization.

At the same time with the opportunity to buy and use such products, many books and papers on GIS and its applications in archaeology appeared (we mention, for instance: Fairbairn 1993, 23-27; Allen, K.M., Green S.W. and Zubrow, E.B.W. 1990; Johnson, A. I., Pettersson, C. B. and J. L. Fulton 1992; Lock., G. and Zoran, S. 1995; Maschner, H.D.G. (ed.) 1996; Wheatley, D. and Mark, G. 2002).

Archaeologists used the geographical information systems mainly for the creation of digital models of the landforms where the archaeological sites are located. Such digital maps are also used for landscape modeling. In the last years, GIS has experienced an ever-growing coverage and distribution within all fields, especially those that work with elements of the geographical space. Archaeologists understood that the elements of geographical setting had and still have a strong influence on the human settlements of all times. GIS provides answers to all the questions related to landscape dynamics in different periods.

The implementation of GIS products in archaeological projects led to extremely good results. In fact, archaeology became much closer to geography once the geographical information systems developed rapidly. Other elements also help them to get nearer: they both deal with the interaction between man and the environment, they both relate to a geographical space. Before the adoption of geographical information systems, archaeologists were confronted with the issue of spatial analysis of archaeological data. Often, they had to lose a great deal of time in order to make maps. At present, everything simplified with the help of geographical information systems.

During the last ten years, GIS applications revolutionized many fields. In archaeology, the GIS package of programmes reached the end of the trial period, and it is now widely used by many archaeologists. One must notice that the definition of the term is made from the point of view of the functions and fundamental components of such a programme. Stress is laid particularly on data, on the "supply" of a GIS, on the social and political implications and on the innovative potential acquired by such a programme.

An important archaeological field where these methods have been applied is the research of Roman roads. The Roman roads gained an overwhelming importance in the history of the Empire since Rome became a true source of civilization, because their existence facilitated the systematic control of every province. During the Imperial Age, in the time of Emperor Trajan, the length of Roman

roads exceeded 100,000 km. The roads assured the links between different settlements, reducing distances, and defined the Roman perception of space, giving the cities the opportunity to interact. In this sense, the roads represented an efficient device to manifest the Roman power. By creating a communication network, the geographical space was no longer fragmented.

In the case of Roman roads, a series of methods are applied when forests, landslides, alluvia or heavy vegetation covers the route. These types of situation are quite frequent, due to the impact of anthropogenic factors on the features of the environment. We refer to the fact that, in most cases, the field tracing and localization of Roman roads proves to be a difficult task, because today the routes of these roads cross some areas affected by agricultural crops. This fact obviously renders the discovery of a Roman road more difficult, because ploughing and human interventions destroy in time the traces that may provide information on Roman roads. Given the circumstances, one is often compelled to resort to a series of related fields, which are helpful in the work of survey and highly accurate identification of Roman roads. Toponymy, cartography, geology, geomorphology and aerial photogrammetry are among the sciences to which one may call on.

The field identification of archaeological sites requires a thorough knowledge of the genesis and evolution of the field (the dynamics of the landforms) in the last two millennia, as well as the pedological factors that acted on the landforms. We state this because there was always a certain logic in the occupation of the landforms (or of the geomorphological space), in different historical periods. The correct interpretation of the field geomorphology allows, for instance, the identification of the areas where the route of the road may pass by, even if only irregular traces may be found on the ground surface.

The integration of this data and information in a GIS facilitates the archaeological work and provides the spatial dimension to its research.

Together with geomorphology, geology also plays an important part in the identification and analysis of archaeological sites. The geological methods of prospection have a high efficiency when the landforms present numerous natural openings due to erosion. They are also efficient when applied in hilly or mountainous regions, where one can make direct observations, sampling fragments of the geological structures and analyzing the favourable conditions that determined the location of a settlement in a certain area. Based on the direct observations made in natural or artificial openings (such as quarries), supplemented with laboratory analyses, one may perform the mapping of the area, giving prominence to the geological structure of the area and the existing stratigraphical disorders. As a result, one may find arguments for the use of local construction materials in different historical periods, as well as for their precise dating and location.

The archaeological research cannot be made without a cartographical foundation. Generally, for the study of Roman antiquities, one uses medieval and mod-

ern maps, ancient land survey documents, where former Roman roads or buildings are mentioned and marked. Chevallier has made such a type of research in his well-known synthesis on the roads of the Roman Empire (Chevallier 1997). For instance, the maps made by Austrian topographers and cartographers in the 18<sup>th</sup> and 19<sup>th</sup> centuries are highly used for Central and Eastern Europe. They include a series of topographical details, which today can no longer be found. Most of these maps have been made at a scale of 1:75 000 or 1:100 000, but there are many maps at a scale of 1:200 000 or 1:25 000. In fact, these maps provide the primary information regarding the presence of an archaeological site. The next stage is, of course, the field investigation and the proper research of the site. The Austrian military maps are interesting and useful for geographers too, because they reveal, for instance, the presence of a forest at a certain moment in an area where today one finds something else, as the forest has been cleared.

Having acquired all these data, one may develop a GIS for the reconstitution of the habitat in certain geographical areas and the localization of the discovered elements (rural settlements, roads, *villae rusticae* etc) in relation with the geomorphological and geological realities of those areas. These pieces of information, corroborated with those supplied as a result of the analysis of satellite images and orthophotoplans, which became quite accessible, may lead to the reconstruction of the spatial realities from a certain age, to the recreation of the ancient landscape. It is not an accident that the publications related to this new field, *Landscape Archaeology*, multiplied during the latest years. It is one further reason why archaeologists and geographers intensified their cooperation everywhere in the world (Vermeulen, F and Antrop, M., 2001).

Which were the causes for the very fast distribution of GIS products? The answer is simple: the access to personal computers, the opportunity to buy software able to process spatial data, the large scale use of GPS systems in the last years, the access to aerial photographs and satellite images. All these covered a large gap in archaeological research: the difficult field identification of archaeological sites, which have been destroyed in time, either because of agricultural works, or for other reasons. We know this from our own experience. During the last years, we created and developed programmes for the field identification and mapping of archaeological sites. In the first stage, we built a database, consisting of information gathered from bibliographical sources, ancient maps or archaeological inventories. Many times we dealt with large problems regarding the field identification of a number of sites listed in these inventories. They often include very general information, such as "traces from that age have been discovered on a plateau, South-East from that settlement". Such indications render the localization of such sites very difficult, if not impossible. By means of modern technology (aerial photographs, GPS), we discovered a series of new sites, unknown before, and included them in a GIS. The first step has

been made. We now have digital maps and three-dimensional relief models, where we placed the older sites and the newly discovered ones. Spatial analysis allows us now to establish interrelations between different elements: natural environment, Roman roads, *villae rusticae*, necropolises, stone quarries, rural settlements, and resources. All these have led to a better understanding of the modalities and mechanisms in which the Romans understood to occupy and exploit to the utmost extent the resources of an area.

For instance, a research of the Roman roads from a former Roman province involves the analysis of several categories of sources, from literary texts and inscriptions to medieval and modern maps. One should also take into account that this type of research is inevitably made on a very extended geographical space. A GIS is able to process all these data and to analyze them. The great advantage is that all data are integrated into a single product.

The development of a GIS for the study of Roman antiquities was one of our preoccupations during the latest years. We first took into consideration the acquisition of all data related to different Roman sites, data provided by aerial photographs and ancient maps (those made by the Austrians). The interesting discoveries made as a result of this research have been compared to other data and information. Topographical surveys using the total station and the GPS have been made for some of these sites. As both archaeologists and geographers cooperated in this project, we made researches on the older maps regarding the former routes of rivers, forested lands, lakes, which were compared to present day maps, while the data have been introduced into a GIS.

A geographical information system has also other advantages. New discoveries and new details may be added anytime on the digitally resulted maps. In this way, the archaeologist is not compelled to resume the work needed to create new plans, but he simply makes an update to the already existing information on the maps. In many cases, different options may be used, such as the calculation of visibility from a certain point. This fact is important especially when we know the position of Roman camps or towers, which were generally located in such a way as to cover the largest possible range. Consequently, a GIS provides the technical solutions for the integration of aerial photographs, plans of archaeological excavations and different maps (geological, geomorphological, archaeological and geographical maps). The usefulness of these technical solutions has already been demonstrated, but the application of these methods is only at the beginning: a series of Roman roads, settlements, constructions and *villae rusticae* remain still undiscovered. The Internet plays an important part because the specialists are kept informed about the recent technical and scientific discoveries. It is important to acknowledge that such a research can be made only within the framework of international, inter-institutional and interdisciplinary cooperation. □

## References

- Allen, K.M., Green, S.W. and Zubrow, E.B.W. (eds.) 1990. *Interpreting Space: GIS and Archaeology*, London: Taylor & Francis.
- Chevallier 1997. *Les voies romaines*. Paris, Picard.
- Fairbairn, D. 1993. The development of a GIS for Hadrian's Wall. *GIS Europe. Europe's Geographical Information System Magazine*, vol. 2/1, Febr. 1993: 23-27.
- Irimuş, I.A., Petrea, D., Surdeanu, V., Fodorcan, E., Pop, O. 2006. La reconstruction des paléo-paysages transylvains à partir des routes et des camps romains de Dacia Porolissensis. In *Geo-archaeological aspects of rivers and river plains*, Ghent, Belgium, pp. 493-505.
- Johnson, A. I., Pettersson, C. B., and J. L. Fulton (eds.) 1992. *Geographic Information Systems (GIS) and Mapping – Practices and Standards*, Philadelphia.
- Lock, G. and Zoran, S. (eds.) 1995. *Archaeology and Geographical Information Systems*, London: Taylor & Francis.
- Maschner, H.D.G. (ed.) 1996. *New Methods, Old Problems: Geographic Information Systems in Modern Archaeological Research*, Carbondale.
- Rachet, G. 1970. *L'univers de l'archéologie*, I, Editions Gérard & Co., Verviers, Belgique
- Von Hagen, V. 1978. *Le grandi strade di Roma nel mondo*, Rome.
- Vermeulen, F. and Antrop, M. (ed.) 2001. *Ancient Lines in the Landscape. A Geo-Archaeological Study of Protobhistoric and Roman Roads and Field Systems in Northwestern Gaul*, Peeters.
- Wheatley, D. and Gillings, M. 2002. *Spatial Technology and Archaeology: The Archaeological Applications of GIS*, London: Taylor & Francis.

### Abstract

Topography, Digital Cartography And Gis In Archaeology. Debates On Research Methods And Perspectives

This study presents several theoretical aspects and issues concerning some fields that became closer to one another in the last years: archaeology, topography and digital cartography. The debate is supported by a number of examples related to the cooperation between archaeologists and specialists in topography, digital cartography or other geographical fields. Archaeology became recently a dynamic field mostly because of the fast development of geographical and cartographical sciences, which provided new software products that facilitated the work of archaeologists. The design of geographical information systems especially determined a new type of research and storage of spatial data, supplying the specialists with a complete vision on the human habitat in different periods. We stressed the part played by GIS in the research of the Roman era, we discussed these aspects because GIS products have a large range of applications.

### Keywords

archaeology, digital cartography, GIS, Roman roads, topography