

MAURO CRISTOFANI, COMPUTERISED ARCHAEOLOGY AND THE “CAERE PROJECT”

In 1996 the Consiglio Nazionale delle Ricerche (C.N.R.) promoted, through its National Committee on Science and Technologies applied to Cultural Heritage, the “Progetto Finalizzato Beni Culturali”, to last a period of three years. Its aim is the safeguard, improvement and fruition of our national cultural patrimony, through knowledge, recording, restoration and conservation.

Within this initiative the Director of the Istituto per l’archeologia etrusco-italica Prof. Mauro Cristofani, whose recent, untimely demise saddened us all, proposed a research project, subsequently approved by the C.N.R. The title of this project was “Establishment of an Archaeological Information System model and its application to ancient Caere”. The so-called “Caere Project” constituted the crowning point of research activity carried out by our Institute in a new sector of studies: computing and archaeology. In fact, right at the beginning of the 1980s, Mauro Cristofani, with his far-sightedness and natural propension towards new methodological approaches, had already foreseen the various possibilities of application that would develop in the course of the following years.

I still remember the first attempts at computerisation of archaeological data at the Institute, when it was still not possible to use statistical packages on Personal Computers. At that time we worked with remote terminals connected to centers of calculus. However, our research was carried out in a productive atmosphere of methodological debate, which constitutes a fundamental basis for those working in this sector of studies and which today, unfortunately, is less important than the pressing development of technical tools. In those years Mauro Cristofani promoted, without the slightest hesitation, the basic international relationships with the French school of Jean-Claude Gardin, François Djindjian, René Ginouvès and Anne-Marie Guimier-Sorbets, as well as those with the Roman schools of Amilcare Bietti and Tito Orlandi, whose respective aims were the use in archaeology of the quantitative approach and the revaluation of the theoretical aspects of computer science in correlation with humanistic disciplines.

It was also Mauro Cristofani, with his constant promotion of new generations and his optimistic attitude towards the modelling and testing of innovative research tools, who incited the compiling and the publication of my book “Archeologia e Calcolatori” (Firenze 1987). In fact, he considered the diffusion of information in this new field of studies of utmost importance, and he maintained that it should be introduced in university education. This

was the first step towards the realisation of the journal “Archeologia e Calcolatori”, an enterprise of international character – established at the beginning of the 1990s, and today almost at its tenth year of publication – promoted with enthusiasm by Cristofani and his colleague and friend Riccardo Francovich.

In order to understand Cristofani’s clear and competent knowledge of the main themes that constitute the basis of computerised archaeology, I would like to quote a passage of the editorial with which he opened the first issue of the journal: «...L’intervento dell’informatica ha così imposto a studiosi legati a una tradizione scientifica che troppo concedeva alla soggettività, da un lato l’esigenza di descrizioni normalizzate di strutture e reperti secondo i loro elementi pertinenti, dall’altro l’applicazione di metodi che individuano le proprietà formali caratteristiche di un contesto o di un insieme di dati. Operazioni, ambedue, comunque mirate nei confronti di obiettivi che rientrano nell’interpretazione storica dei fatti culturali...» (CRISTOFANI 1990).

Thus, an open approach towards the new techniques, but not an end in itself. In fact, Cristofani, with his clear evaluation of historical problems, thought that the final purpose of each experimentation should always be the reconstruction and interpretation of historical and archaeological phenomena.

The scientific stages followed at the Institute in the sector of archaeological data computerisation, as well as the internationally obtained recognition, are numerous and various. But the very seal of this research activity arrived in 1995, with the realisation in Rome, at the C.N.R., of the “III International Symposium on Computing and Archaeology”, organised by our Institute together with the Centro Linceo Interdisciplinare “Beniamino Segre” and the CISADU of the University of Rome “La Sapienza”. The proceedings of this Symposium were published in two volumes in the seventh issue of this journal.

Once again, I would like to cite Mauro Cristofani in his introductory speech to the Conference. In this he expresses a sense of pleasant surprise at the massive international attendance at an event that he had tenaciously promoted and constructively supported in the different phases of its realisation: «Quando l’Associazione internazionale ‘Archéologie et Informatique’ ha scelto come sede del suo III Congresso Roma, e il CNR in particolare, non pensavamo certo che un campo d’azione così specialistico avesse tanti cultori e – soprattutto – che le iniziative in questo settore fossero così sviluppate. Una sorta di monitoraggio ci proveniva certo dal successo arriso alla rivista ‘Archeologia e Calcolatori’ che pubblichiamo da sei anni, ma la *ratio* che, inizialmente, aveva guidato le nostre scelte era quella di un confronto diciamo pure teorico fra umanisti e informatici: avevamo tuttavia sottovalutato quanto, nel frattempo, si fosse ampliato il settore applicativo...» (CRISTOFANI 1996a).

Thus, approval of the "Caere Project" arrived in this lively atmosphere of research activity and scientific promotion in the sector that Cristofani was fond of calling the "interface" between the two cultures: humanities, from which he originated and to which he was still strongly attracted, and science, in which he found himself involved through his long experience in field research. This approval came also as a further recognition of the long scientific path that has led to the creation at the Institute of a laboratory devoted to computer applications in archaeology. In addition to the impressive research activity promoted and carried out by Mauro Cristofani in the urban area of the Etruscan town, the Caeretan choice was closely linked to a series of initiatives related to the application of new technical tools, as for example geophysical prospecting.

With regard to the characteristics of the "Caere Project", Cristofani believed that its main purpose was to use an archaeological information system in the study of the ancient Etruscan town and territory of Caere, where our Institute had been carrying out surveys and excavations since 1982, together with the Superintendence of Southern Etruria. Results of these excavations, edited by Mauro Cristofani, have in part already been published (CRISTOFANI 1992, 1993), while others are now in course of publication.

Through an international census of all the research projects carried out in this sector of studies, the initial aim of the "Caere Project" was the definition of some methodological and technical problems: 1) data representation and encoding; 2) data structuring and formalisation of the procedures; 3) use of descriptive standards; 4) alphanumeric, graphical and cartographic data analysis and image processing; 5) application of inter- and intra-site Spatial Analysis; 6) definition and testing of new software; 7) application of our model to Caeretan data; 8) establishment of a parallel multimedia product for data diffusion and conservation.

On the basis of the necessity of an international comparison, one of the principal aims of our Institute in the sector of computer applications, the first step of our project was therefore the creation and circulation on line of a questionnaire, whose aim was the preliminary gathering of general information concerning the research projects carried out in the sector of studies relative to the application of GIS in Archaeology, with particular reference to their use in excavations. Our goal was not so much to obtain an exhaustive census of all the projects, difficult to achieve in any event, but rather to get a complete a panorama as possible of the activities carried out in this sector of studies. Above all we wanted to stress several technical and methodological issues common to many projects and to note, where present, particular trends within the various countries that had responded to our initiative.

For this reason Cristofani favoured, during the first year of the Project, the establishment of an international Scientific Committee. Its members are

among the most distinguished scholars in this field of studies. They have been given the specific task of co-ordinating our initiative within smaller geographical areas and of helping us to publish a survey as complete as possible on GIS and Archaeology. The Committee is co-ordinated by François Djindjian and its members are Daniel Arroyo-Bishop, Juan A. Barceló, Ian Johnson, Kenneth L. Kvamme, Gary Lock, Torsten Madsen, Tito Orlandi, Zoran Stančić, Albertus Voorrips and myself.

Each member of the Committee has examined the collected results and integrated them on the basis of his own knowledge, with the addition of projects that are not provided for in the survey and, in any case, quoting the relevant bibliography. All of them then sent us a text prefacing the list of projects, stressing particular topics, also from a methodological point of view, and above all synthesising the present situation and future perspectives. All collected information is now published in the present issue; the analysis of the results achieved is well synthesised in the introductory article by François Djindjian.

I would like to recall that the questionnaire, simple enough in appearance, was compiled not so much with a view to scrutinising the description of each project, but rather to propose synthetically some precise questions regarding different issues. Some of these issues are intrinsic to the project (the title, the promoting institution and the length), but they are also of spatial character (the geographic area of reference and the excavation area), of technical character (the hardware and software used), or methodological (the use of descriptive standards or rather the application of Spatial Analysis). Lastly, they regard data diffusion, for example, the presence of information in Internet. A complete reply to all these questions obviously presumed research not in a merely planning stage. This allowed us to limit the panorama of our survey only to those projects already in course of realisation.

Let us now analyse the practical part of the “Caere Project” itself. From an archaeological point of view, our survey allowed us to identify those sectors, whose automatisisation has brought real benefits to research aims, and to verify the extent of common problems in each project, also related to the choice of specific geographical areas and cultural environment. On the basis of the computer data analysis experience already acquired at the Institute, our information system model foresees the computerisation of different archaeological issues: from survey to excavations, laboratory analyses, documentary research, information diffusion and safeguarding of archaeological heritage. Subsequent operating stages are therefore aimed at developing the following points: integration of different systems, normalisation of descriptive language, standardisation of technical and methodological tools.

It was the enquiry itself that suggested our procedure along certain

successive well defined phases. First of all, following Cristofani's teaching, continuously aimed at the rapid publication and diffusion of scientific results, it was decided to initially limit our research to the plateau of the ancient city of Cerveteri and to consider the problems regarding the surrounding territory only in a second phase. With this in mind, an *ad hoc* low altitude flight over the area of the ancient settlement and the necropolis on the overlooking hills has been planned. A successive phase envisages the aerophotogrammetric restitution of data relevant to the plateau in digital format on the scale of 1:1000, in which will also be included marks from preceding air photographs, information from bibliography and archive documents, as well as results from geophysical prospecting already carried out.

The two areas under excavation, carried out by our Institute in cooperation with the Superintendence of Southern Etruria, will be positioned on this cartographic basis. In both cases, as Mauro Cristofani underlined (CRISTOFANI 1996b), these excavations have led to the discovery of the remains of temples and structures of the ancient urban area. This will allow us to test the potentiality of GIS in the field of archaeological excavations, a sector that, as evident from data acquired through our census, is today poorly represented.

With regard to the alphanumeric database, we plan to follow two distinct procedures. In the excavation at St. Antonio, a relational database using Access is being set up. The central nucleus comprises Stratigraphic Units, recorded according, as far as possible, to the rules of the Istituto Centrale per il Catalogo e la Documentazione. There are also numerous correlated tables regarding the recording of excavation areas, the objects organised in typological classes and the artefacts, as well as archives containing graphic and photographic documentation.

However, in the excavation at Vigna Parrocchiale, it is our intention to propose a different innovative procedure. The yearly excavation diaries are now being recorded in hypertext form, using the SGML encoding system. The aim is to visualise the text in an easily transferable HTML format illustrated with photographic and graphic information, which will be immediately available in Internet. This kind of text will permit us to test new forms of queries and information retrieval that will enable us to diachronically examine the successive stages of our excavation and to organise the documentation relative to different areas, until we finally reach the essential association and the subsequent study of artefacts. In the future, this type of procedure may become a model for the retrieval of information from excavation diaries, dating for example from the end of the last century or from the beginning of this one: a period of deep investigation both for Caere and for the Etruscan area in general.

Finally, the archaeological information system model, which will con-

stitute the scientific product of our three year research, will have a double aim: it will be used as a research tool, but it will also be supported by a multimedia version for a wider public. The purpose is to favour widespread information and at the same time to safeguard the Caeretan archaeological patrimony, an intention always present in Mauro Cristofani's proposals and well demonstrated by the promotion of the Caeretan Archaeological Park (CRISTOFANI 1988).

It is unanimously acknowledged that in archaeological studies, and in particular in Etruscology, Mauro Cristofani leaves a gap that cannot be filled. This is even more evident and painful because of his immature death, which deprived the research world of his expertise at the height of his scientific activity. But also in a sector as new and finite as that of computerised archaeology, his perseverance, openness of mind, lively intelligence, desire for methodological experimentation, equal to few other scholars, leave an indelible sign.

We would like here to remember with regret the affectionate and close relationship with the Master, his daily and generous teaching, his incitement to cover new scientific paths, often strewn with various obstacles, and finally his humanity and courage. If, on the one hand, all these aspects render it difficult and painful to face the future, on the other they comfort us as they remain an abiding guide for ongoing projects and for our studies in general.

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Rome, December 1997

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