FROM AN ETRUSCAN TOWN TO MODERN TECHNOLOGIES: NEW ADVANCEMENTS IN THE "CAERE PROJECT"

1. THE PRELIMINARY PHASE OF THE "CAERE PROJECT"

The "Caere Project" (http://www.progettocaere.rm.cnr.it) is being conducted by the Istituto per l'Archeologia Etrusco-Italica – which was recently merged into the new Istituto di Studi sulle Civiltà Italiche e del Mediterraneo Antico – of the Italian CNR (National Research Council), in the framework of the Special Project on the "Safeguard of Cultural Heritage". It began in 1997 with an international survey aimed at gathering information on GIS applications in archaeology, with particular reference to their use in excavations. The results achieved were published in the ninth issue of the Journal "Archeologia e Calcolatori", a monograph with the title "Methodological Trends and Future Perspectives in the Application of GIS in Archaeology" (MOSCATI 1998; all articles can be also found on the Journal web site: http://soi.cnr.it/archcalc/indice/iyear.htm).

This preliminary survey, carried out under the supervision of an International Scientific Committee coordinated by François Djindjian, led to some interesting methodological considerations (DJINDJIAN 1998; MOSCATI 1999). First of all, an evident distinction – considering the technical solutions adopted and the aims pursued – between projects carried out in the CRM framework and those established by research institutions has come about. Secondly, the deep analysis of this kind of approach, i.e. a complex methodology which allows the integration of various computer methods, has brought to an innovative concept of GIS as a model for archaeological data acquisition, representation, structuring and interpretation, especially in the sector of archaeological field research.

A systematic bibliographic survey, conducted in the following years as a further check, has allowed us to closely analyse the advancements in this sector of computer applications in archaeology (MOSCATI, TAGLIAMONTE 2002). So today it is possible to note a substantial confirmation of computer technologies already adopted, but also more attention towards exchange formats and the implementation of specific routines rather than merely using standard algorithms. At the same time, a more complex and accurate definition of the term GIS implies its present connection to other qualifying suffixes, such as Time GIS, Object Oriented GIS, Virtual Reality GIS, indicating both specific requirements of archaeological research and innovative methodological aspects. As usual, the process of consolidating a new research technology has also brought about in recent years much debate concerning its methodological limitations.

2. THE AIMS OF THE PROJECT

As far as the Caeretan information system is concerned, the aim pursued has been to create a digital research model to record, process and publish data coming from excavations carried out by the Institute, together with the Soprintendenza Archeologica per l'Etruria Meridionale, in the central area of the urban plateau of the ancient Etruscan town of Cerveteri (CRISTOFANI 1992, 1993, in press). Lying about twenty-five miles north of Rome, Caere grew rapidly from the Iron Age onwards, reaching its peak in the seventh and the sixth centuries B.C. In the area under study (the so-called "Vigna Parrocchiale"), seven excavation seasons (1983-1989) have brought to light several archaeological phases, beginning in the Villanovan period and continuing through to the Roman period (Fig. 1).

The "Caere Project" has involved the establishment of a complex information system to study not only the ancient Etruscan town but also its surrounding territory. It concentrates on combining archaeological data with methods developed at our Institute over many years of experimentation with computer applications in archaeology, including the use of GIS and other related technologies as well as multimedia applications. Central to the aims of the "Caere Project" has been the emphasis on integrating various computer methods, in order to gain – following the modern trend of "contextual archaeology" – a comprehensive and complete knowledge of the ancient landscape and the organisation of the town.

Much attention has been also necessarily dedicated to discussing methodological and technical issues specific to the research, to form a framework for data acquisition and processing (see in particular MOSCATI 2000, in press). First of all, the problem of encoding and representing landscape and excavation data in digital format has been faced, defining data models aimed at outlining the formation itself of archaeological data.

The first step within this framework has been to assess the problems related to the digital cartographic representation of the urban plateau, both in its vector and raster formats, and in particular the parameters for the construction of a locational DTM. Cartographic data, in fact, constitute a primary tool for archaeological field research and imply complex tasks of coding and decoding procedures to represent spatial data within a dynamic and not a static model of the ancient landscape and to provide a better perception of the physical terrain.

Another important theoretical problem faced by the "Caere Project" is strictly related to the need of structuring and formalising archaeological procedures. The concept of "digital models" has been therefore developed to formalise the traditional processes of scientific knowledge acquisition, through the interaction of "data models" and "theoretical models", in an attempt to

Fig. 1 – A view of the urban plateau and the Vigna Parrocchiale excavation.

represent the relationship between empirical and theoretical data – i.e. between observation and interpretation – and construct an interpretative framework for the past.

3. THE ARCHITECTURE OF THE PROJECT

3.1 *The GIS platform*

To understand the description of data complexity – and of data correlation – in a formalised manner, the description itself should foresee the complexity of an archaeological context in all its aspects: the challenge therefore is to develop an analytical method that can use relational data. In archaeo-
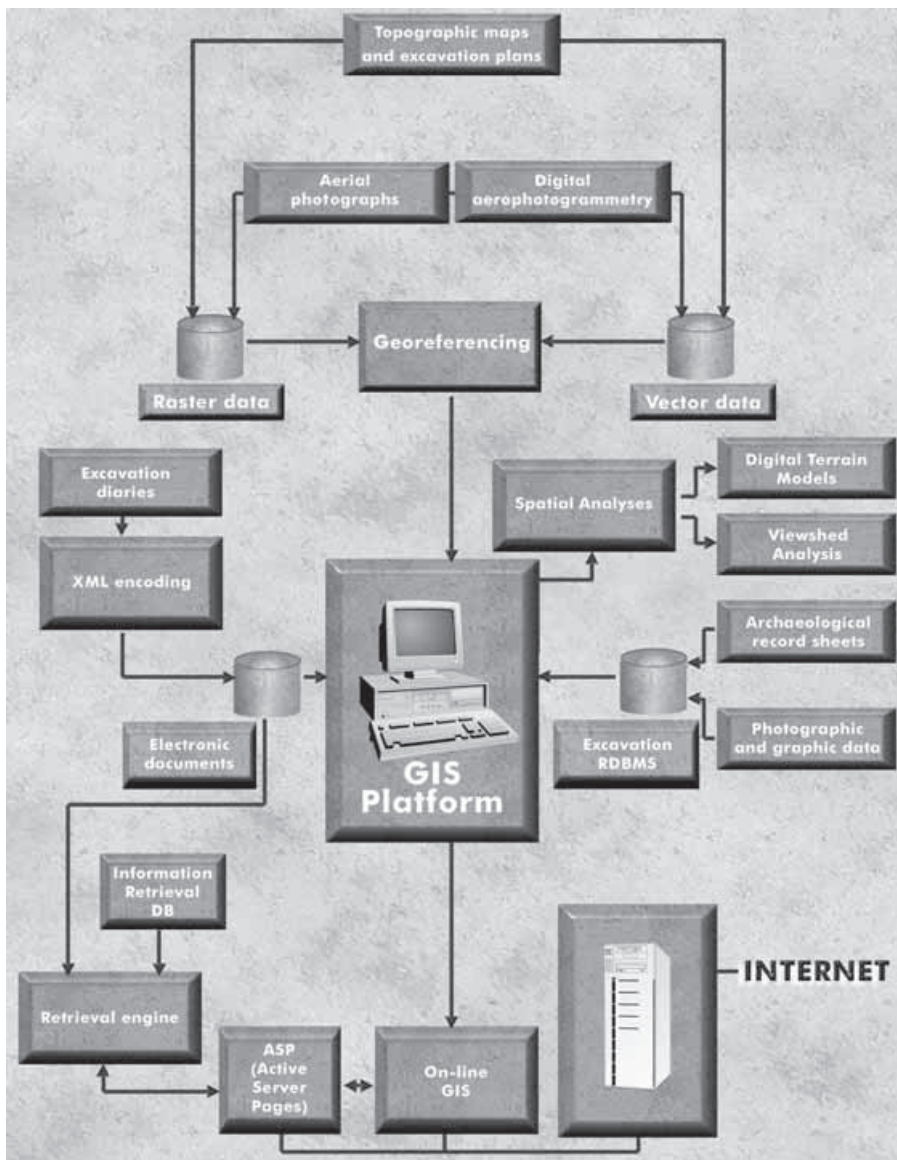
Fig. 2 – The architecture of the "Caere Project".

logical computing this process towards integration can be best achieved through the construction of a relational database and its link with a multimedia system: at the core of the framework is a GIS platform, which provides a
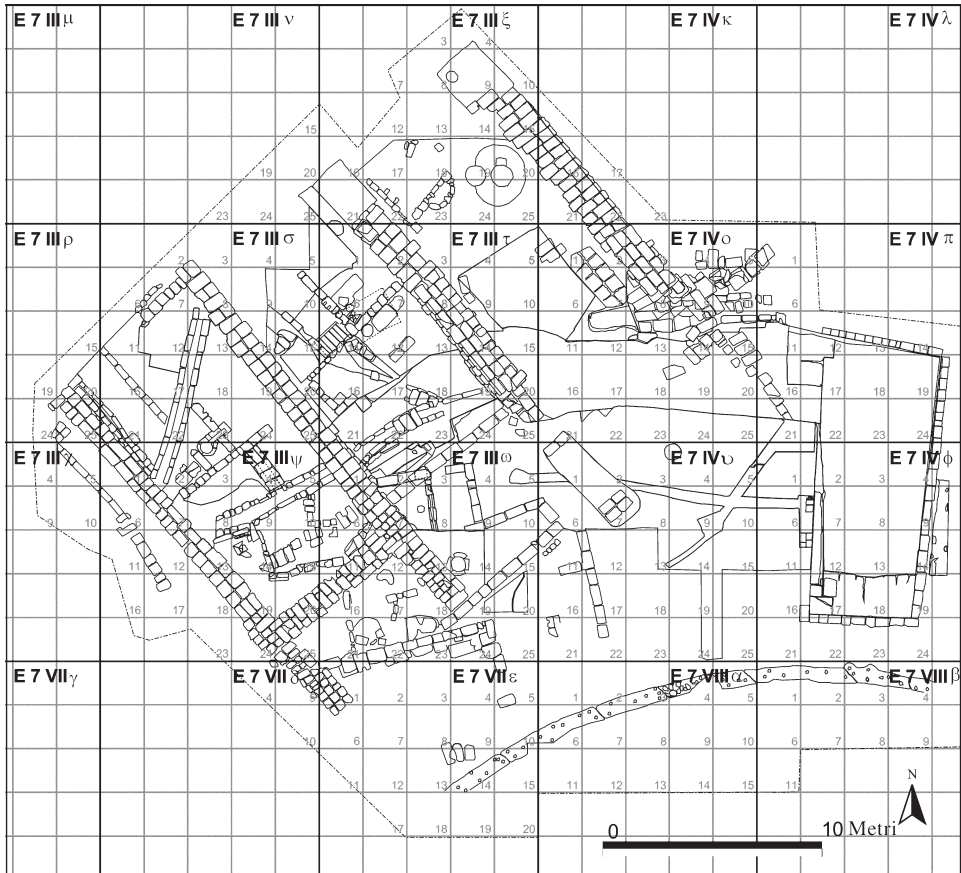
Fig. 3 – Detail of the excavation plan (the walls of the temple are evident), set inside the excavation grid.

pivotal fulcrum around which data hinges and represents a dynamic and flexible environment in which to integrate, display and analyse both spatial and attribute data.

The GIS platform has been fundamental to the "Caere Project" (Fig. 2) as it has provided a forum in which to draw together the diverse data-sets (CECCARELLI 2001). This platform has been built according to the traditional structure of a GIS with geographical and alphanumeric components. Widely available software, such as ArcView, AutoCAD and Access, has been used to create an archive of geographical and tabular data that can easily be migrated from one system to another. ArcView in particular has been chosen as it

adequately fulfils the requirements for the GIS platform. It provides a series of tools, which permit the creation and execution of complex interrogations, the production of high quality thematic maps, and the ability to conduct spatial analysis.

The aerophotogrammetric restitution of the urban plateau has been georeferenced and the file of contour lines, expressly enhanced, has been used to generate Digital Terrain Models, emphasising slight surface anomalies and various morphological characteristics of the terrain. On the DTM, cartographic maps on a scale of 1:10.000 and 1:2.000 together with the plans of the Vigna Parrocchiale excavation have also been integrated through a texture mapping procedure. These plans represent one of the most interesting sources for the reconstruction of the different excavation phases (Fig. 3). Their digitalisation and integration within the GIS have provided the opportunity to carefully study and reconstruct the site, extracting – through the use of thematic layers – all possible information, drawn from topographic and stratigraphic data, photographs, excavation reports and all forms of published data.

3.2 *The use of markup languages*

Other than implementing a more traditional approach, setting up a relational database for the computer recording of excavation data, an innovative procedure has been proposed to encode the yearly excavation diaries in hypertext format (Moscati, Mariotti, Limata 1999). They contain precise and well-structured information relevant to each excavation day, from the description of topographic elements to the list of archaeological finds brought to light. A very rich graphic and photographic documentation is also present, which makes it possible to establish a direct link with the iconographic apparatus and its visualisation.

The diaries give an account of the excavation process, the difficulties encountered, the doubts raised and the diverse interpretations proposed by the archaeologists (Fig. 4). Such information is difficult to record in a database, where post-excavation data are organised on the basis of fixed parameters. In particular, the rigid structure of the recording system within a database does not suit the non-systematic nature of the diaries, written in natural language. Taking these observations into account, we decided to transform the diaries into electronic documents without modifying their internal structure, guaranteeing at the same time the possibility to query the texts like in a relational database system.

During the encoding phase, the problem of homologation in archaeological record description creates a need for a highly formalised language in order to avoid ambiguities and misunderstandings. The choice of the Standard Generalized Markup Language (SGML) has provided a process that has the potential to encode the texts with a descriptive, flexible model suitable
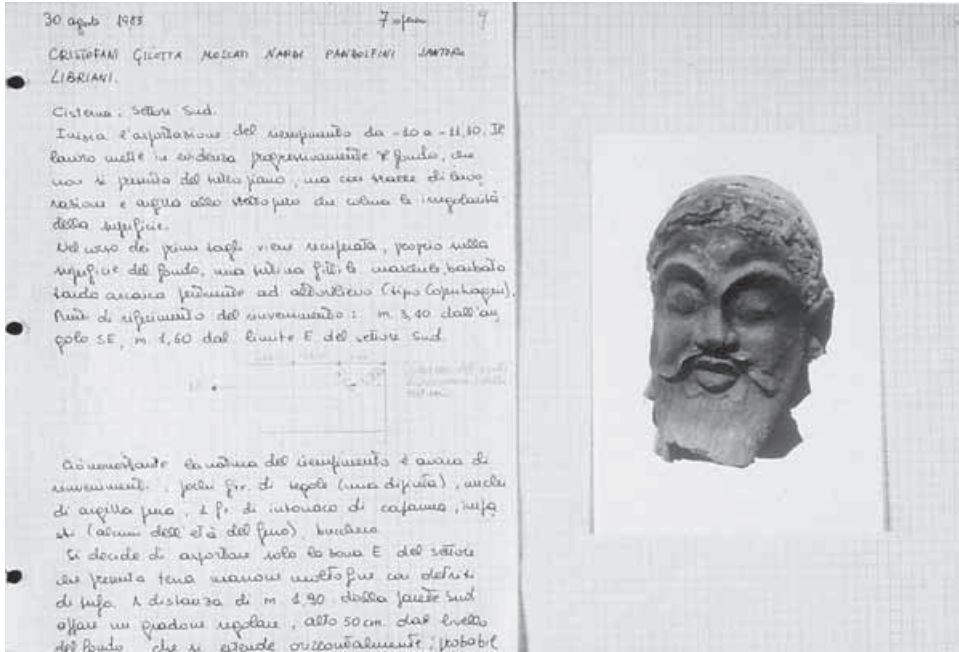
Fig. 4 – A page from the excavation diaries.

for the structuring of each document. The use of a markup language permits for the subsequent establishment of terminological lists, the definition of well-defined contexts, the ability to set up hyperlinks and to supplement and interrogate the original text. The system designed has the capacity to recover not only words but also specific meanings and contexts.

The application of a text encoding standard further insures the complete exchangeability of documents, a fundamental and compelling aspect when data dissemination is envisaged as the ultimate goal. The choice to distribute the excavation data through the Internet to exchange data with other institutions (see § 3.3) has recently involved a study for the conversion of SGML documents into XML; this new encoding language was developed between 1996 and 1998 by the World Wide Web Consortium (W3C) to simplify the syntax of SGML and consequently permit a more widespread diffusion within electronic publishing. An XML version of the SGML DTD has already been created, requiring only a few modifications to normalise the element declaration with the XML syntax (BONINCONTRO 2001).

The encoding phase of the excavation diaries does not represent the final stage of the research, as it constitutes a new phase of equal importance. The completion of the encoding implies a full revision of the texts of the

diaries, providing new directions for research activity and innovative forms of correlation between the topographical study of the site and the classification of archaeological finds, which are described on a daily basis in the text of the diaries through synthetic lists as well as detailed descriptions.

A further DTD – now at a prototype stage – has been therefore established to encode the textual description of artefacts. The relationship between the main DTD, designed for the excavation diaries, and the derived DTD, designed for the archaeological finds, can be defined as one-to-many (1:m): the main document, which contains each single day of the excavation, can be linked to many records of finds. The user may navigate in the textual archive by reading the documentation and then following the internal links, or alternatively by querying the archive and therefore creating virtual documents that combine information about the excavation and artefacts selected according to the chosen searching criteria.

Another challenge of our project has been the definition and testing of new software. The encoding procedure is independent of specific types of hardware and software and thus guarantees the easy transfer of files to different systems should it be required. Further, the use of open exchange format files and the modular structure of the GIS, customised with scripting languages, have continued the capacity for cross-platform interoperability. Therefore, the capability of this information system has been expanded and the further choice of commonly available software for the processing of both alphanumeric and geographic data has accomplished this task.

3.3 *The Internet environment*

At the end of 2001 the establishment of a web site dedicated to the "Caere Project" has started (Tav. IIa). In fact, since the beginning, the ability to clearly communicate results has been central to the ideology of the project, and its architecture has been aimed at obtaining a multimedia solution for the general topographic publication of the reports on Vigna Parrocchiale excavation. The intention has been therefore to experiment with innovative methodologies of integration, data retrieval and the ability to query excavation material, and then utilise the Internet as a new medium for the electronic publication of archaeological data.

The web site contains – both in the Italian and English version – the description of the evolutionary phases of the project, the aims pursued, the problems encountered during their realisation, the methodology applied and the results achieved. It is not a static, descriptive site, but it constitutes an effective multimedia communication tool, which permits the distribution of data and results to a wider community and enables user interaction, by offering the possibility of querying excavation data, starting either from graphic and cartographic information or textual data contained in the excavation diaries.
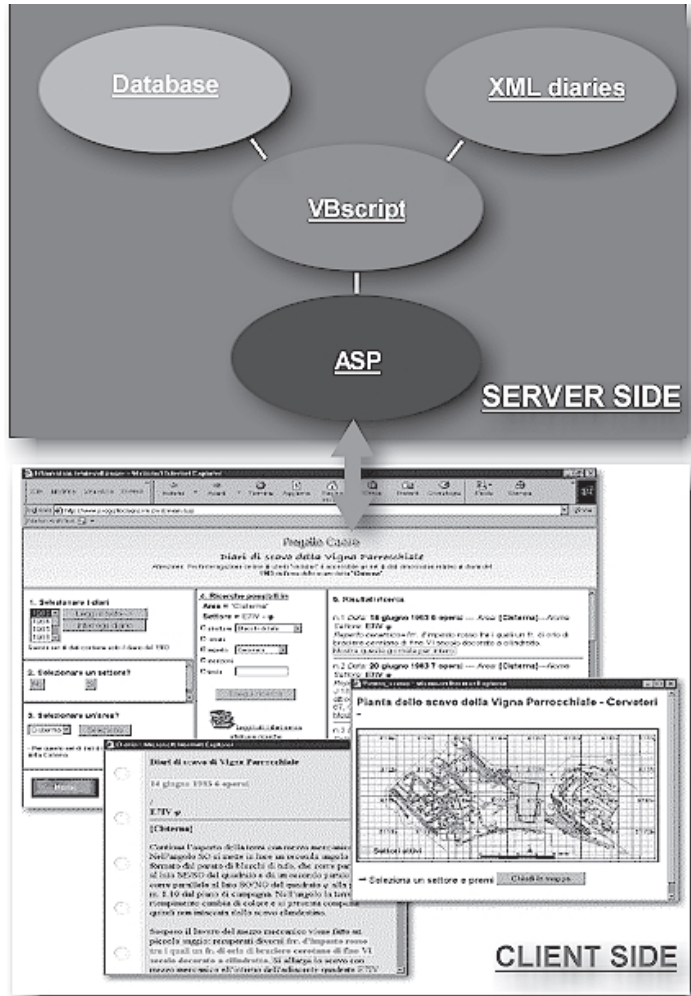
Fig. 5 – The client-server architecture implemented to query the excavation diaries.

In order to make the documents query system more functional and flexible, an Internet application based on the ASP (Active Server Pages) and VBSCRIPT technology has been implemented, using the Microsoft Windows 2000 Server operating system (BARCHESI 2001). This client-server architecture (Fig. 5) has allowed us to implement active pages, created each time on the basis of the choices made by the user. The search of the electronic diaries offers the possibility to interpret the terminology used by archaeologists during the excavation process, implementing in the querying structure a list of

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synonyms to locate identical objects that had been defined with different terms on the basis of the chronology of the diaries and the different interpretation phases.

In order to give the search program a degree of flexibility, the decision was taken to attach a relational database, containing tables with the value-equivalent of specific topographical elements. The final application is able to consult the database in an intelligent straightforward manner and provide the user with a list of options that contains only the values related to the selected context, such as a specific topographical element or a particular excavation year.

The user is able to perform a selective query to a specific topographical excavation area and then may choose between five different types of search: Structure, Layer, Artefact, Inscription, Text. Firstly, the application searches in the text for all the occurrences of the tag corresponding to the chosen element. Subsequently, it verifies the tag content through matching the data, and, once identified, the parser extracts the excavation day from the diary and verifies if all the references are consistent to the excavation area selected. Once all the criteria have been fulfilled, the parser sends the necessary data to the browser in order to visualise the content of the entire excavation day together with a brief summary of the information relevant to the encountered match. The user may scroll all the obtained results and then choose to read the entire contents of an excavation day. If there are references to images in the text, they are also visualised as hyperlinks, which display them in a floating window.

The ASP application has therefore given birth to an active web server, which can manage the texts of the diaries, performing complex searches on the basis of chronological and topological queries. Furthermore, applying this technology it has been possible to connect textual data with digital cartography through specific hypertextual links and visualise the search results in a browser.

For the moment, the test data published in the Internet refers to the diaries of the 1983 season, mostly dedicated to the excavation of a large open-air rock-cut structure of monumental proportions, in which different types of fine and coarse-ware pottery and architectural finds have been found. It is important to mention that during excavations in this structure we did find evidence of illegal digging up to a depth of about seven metres; this has no doubt greatly influenced our standard procedures of stratigraphic investigation (Moscati 2001).

Our intention for the near future is to diffuse on the web all the texts of excavation diaries, which have been already encoded. In the meantime, a new systematic digital high-resolution acquisition of all the iconographic documentation has been carried out. It will substitute the preceding one and the resulting referential database will be also distributed on-line.

The opening towards an Internet-based research has also implied the adoption of an on-line GIS, using MapGuide software, to increase the level of interoperability of the data and take advantage of GIS capabilities through the web. This dynamic multimedia application for data diffusion across the Internet enables users not only to view data but also to interact with the maps, modifying or querying theme layers. ASP technology, already adopted for the textual retrieving system, allows for linking the spatial data with the textual ones, including such information as grid location and typology of structures. Furthermore, a distinct advantage of using ASP is that all commercially available Internet browsers are able to access this form of application.

4. Archaeological results: the application of Spatial Analysis techniques

From a methodological point of view, one of the most promising features in the use of GIS has been the application of Spatial Analysis techniques, both for the study of the distribution of finds at site level and for the wider analysis of the surrounding territory of Cerveteri. Spatial Analysis techniques, in fact, represent a useful tool to investigate the criteria that are at the basis of archaeological spatial distributions. They are focused upon describing the presence of a programmatic choice in land and site occupation and ascertaining if changes caused by post-depositional phenomena and external factors have influenced the settlement structure and location. The ability to query and generate new data is a fundamental characteristic of a GIS, and it is through the concept of spatial "relationships" that these functions permit a new and stimulating approach to the study of regional and urban space.

One technique in particular has been used within the "Caere Project", Viewshed Analysis, which has been applied to investigate the spatial relationships, especially the visual ones, between the archaeological monuments located on the urban plateau and the surrounding hills, occupied by ancient necropoles (Ceccarelli 2001). In particular, the relationship between the monumental temple dating from the beginning of the fifth century B.C. brought to light in the Vigna Parrocchiale area and the tumuli located in the Banditaccia necropolis, to the north of the urban plateau, has been investigated. Assuming that the study of viewshed analysis and line-of-sight imply that the location of monuments can influence the later construction of monuments, these results could be considered in the debate concerning the orientation of the temple.

The initial step of the analysis has been the creation of a TIN (Triangulated Irregular Network), generated from a data-set of over 2000 spot heights. The resulting terrain model comprises of an area of 2.5 kilometres by 3 kilometres, which includes the two previously mentioned plateaux. The model highlights the unique morphology of this territory. The type of DTM that

was used to conduct this analysis offers a more reliable representation of hilltops and crests and it generally better represents the topographical variations of the ground.

The application of Viewshed Analysis has been preceded by a study of the geology and the modern vegetation to reconstruct the paleovegetation and the particular nature of the ancient territory, as well as by the calculation of the original height of the tumuli and the quote of the area of the temple, which was extracted from the excavation diaries. The results achieved reveal that the temple was located at a central point in the Etruscan city. From there it would have been possible to see a large part of the urban plateau and most of the Banditaccia necropolis with its monumental tumuli, some with a diameter of up to 40 metres. Construction of these started at the beginning of the 7th century B.C. and their use continued throughout subsequent generations.

In 2002, a geophysical survey in the Vigna Parrocchiale area has been planned jointly with the CNR Istituto per le Tecnologie Applicate ai Beni Culturali. The use of a geoelectric method – with a system of data acquisition planned and implemented by the ITABC – and a procedure for data processing using techniques of geoelectric tomography have proved very promising. The first results achieved – keeping into account the difficulty in identifying and classifying the geological tufa layers from archaeological structures overlaying or cut out in the tufa – show a very rich concentration of anomalies of regular form, which lead us to hypothesize the presence of underlying structures. These results as well will be distributed on-line at the end of the survey.

6. THE APPLICATION OF THE CAERETAN MODEL

The innovative use of markup languages and multimedia systems in the processing of archaeological information has allowed us to establish a unique and comprehensive model for the digitalisation of excavation data and formulate a model for the structuring of the texts of the diaries. This has enabled the recreation in a digital environment, and in an interactive manner, of the main phases of the terrain "readings", from data documentation to data interpretation. This approach has been mostly based on the principle that information itself is not sufficient unless linked by new forms of knowledge representation, which may promote interactive consultation more than a passive reading.

In order to test the feasibility of our model, this prototype has now been applied to the study of another excavation sector, occupied by an open-air elliptical building dating from the beginning of the fifth century, where a complex archaeological stratification has produced interesting results relating to a long period of occupation (Tav. IIb).

The model, thanks to the way it is constructed and its general characteristics, can be applied to archiving, managing and querying textual data, using such information as excavation reports, archaeological finds and image data (e.g. graphics and photographs), as well as bibliographic information. In fact, the development of this prototype has led to a model structure that can be applied to any archaeological context, as has been confirmed by the study of diverse features in the urban area as well as by its application to published archaeological reports of previous excavations carried out in the urban plateau of Caere.

For example, experimentation with the Text Encoding Initiative (TEI) Lite, integrated by the DTD already defined for the yearly excavation diaries, has been used to encode the article published in 1936 in the tenth issue of the journal "Studi Etruschi", in which Raniero Mengarelli describes his excavation conducted in 1912-13 in the same Vigna Parrocchiale area (*Il luogo e i materiali del tempio di Hera a Caere*). The same procedure has also been tested on a text written in 1937 by Mengarelli himself and extracted from "Notizie degli Scavi di Antichità" (*Iscrizioni etrusche e latine su cippi sepolcrali e su oggetti diversi trovate negli scavi della città e della necropoli di Caere*). Encoding these texts has allowed us to assign a more precise functionality to the structures found in the Vigna Parrocchiale area, which can be either sacred, public or industrial (MARIOTTI 2001).

7. CONCLUDING REMARKS

This research project based on the Etruscan city of Cerveteri has been developed with the intention of creating a research methodology where particular attention is centralised not only upon development within context-related parameters, but also focusing on the excavation process. In this way, an investigation has been also made of the potentials of multimedia systems, not only from a technical point of view but also to work towards achieving a high level of interoperability between heterogeneous data sources and computer platforms, thus aiming to improve dialogue among scientists, which generally comes about through the more traditional printed publications.

From an archaeological point of view, the "Caere Project" has been designed to incorporate data from various levels of detail, ranging from the analysis of the surrounding territory to the detailed level of excavation. Central to the research has been a study of the cognitive landscape with the aim of interpreting, in the light of the acquired data, the choice of location for the activities in the area of Vigna Parrocchiale and their relationships, especially visual, with the whole urban plateau and the other surrounding plateaux.

In conclusion, this project has raised numerous instances concerning the field of computing archaeology. First of all, we were confronted with the

need to achieve a formal description of the data structure and its inter-connectivity between a dynamic model capable of understanding complex realities, as opposed to a static model of retrieving and querying information.

Secondly, the creation of an integrated information system, which contains not only the description of data, as they have been collected, but also their interpretative framework has attracted our attention. The ability to include the scientific terminology, description and interpretation used by archaeologists during the excavation process, is fundamental as these are crucial to the interpretation process.

We have also faced the problem of standardisation in archaeological records through the application of a formal protocol for data encoding, which has the potential to enable large quantities of textual information to be handled in a structured manner. Moreover, the flexibility of the model permits the later creation of data description standards that can be applied to different contexts.

Finally, we have analysed the considerable impact of the representation of the relationship between empirical and theoretical data, as well as between observation and interpretation, through multiple models which reconstruct the content and the methodological process of scientific knowledge. Such criteria, when following well-defined rules, can lead to the analysis of specific research areas, not through general principles but through the re-evaluation of their archaeological context.

PAOLA MOSCATI
Istituto di Studi sulle Civiltà Italiche e del Mediterraneo Antico
(formerly the Istituto per l'Archeologia Etrusco-Italica)
CNR-Roma

REFERENCES *

BARCHESI C. 2001, *Progetto Caere: un'applicazione Internet attiva per l'Information Retrieval di documenti SGML*, «Archeologia e Calcolatori», 12, 70-89.

BONINCONTRO I. 2001, *Progetto Caere: prospettive di applicazione degli standard internazionali per la codifica dei dati testuali*, «Archeologia e Calcolatori», 12, 55-69.

CECCARELLI L. 2001, *Progetto Caere: dallo scavo al territorio. Una soluzione per la distribuzione dei dati mediante un GIS on-line*, «Archeologia e Calcolatori», 12, 105-121.

CRISTOFANI M. (ed.) 1992, *Caere 3.1. Lo scarico arcaico della Vigna Parrocchiale*, Roma, CNR.

CRISTOFANI M. (ed.) 1993, *Caere 3.2. Lo scarico arcaico della Vigna Parrocchiale*, Roma, CNR.

* The bibliography relative to the "Caere Project" can be found at the following URL: http://www.progettocaere.rm.cnr.it/inglese/selected_bibliography.htm.

CRISTOFANI M. in press, *Caere 4. Vigna Parrocchiale: scavi 1983-1989. Il santuario, la "residenza" e l'edificio ellittico*, Roma, CNR.

DJINDJIAN F. 1998, *GIS Usage in Worldwide Archaeology*, in MOSCATI 1998, 19-30.

MARIOTTI S. 2001, *Progetto Caere: proposta di un modello per il trattamento e la codifica di documenti archeologici*, «Archeologia e Calcolatori», 12, 91-104.

MOSCATI P. (ed.) 1998, *Methodological Trends and Future Perspectives in the Application of GIS in Archaeology*, «Archeologia e Calcolatori», 9.

MOSCATI P. 1999, *GIS and Archaeology: The Caere Survey*, in J.A. BARCELÓ, I. BRIZ, A. VILA, *New Techniques for Old Times. Proceedings of the CAA 98 Conference (Barcelona 1998)*, BAR International Series 757, Oxford, 103-106.

MOSCATI P. 2000, *The "Caere Project": Methodological and Technical Considerations*, in A. GUARINO (ed.), *Proceedings of the II International Congress "Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin" (Paris 1999)*, Paris, Elsevier, CNR-CNRS, 119-128.

MOSCATI P. 2001, *Scavi archeologici e scavi clandestini: il caso ceretano*, in M.P. GUERMANDI (ed.) 2001, *Rischio archeologico: se lo conosci lo eviti. Atti del convegno di studi su cartografia archeologica e tutela del territorio (Ferrara 2000)*, Firenze, Edizioni All'Insegna del Giglio, 361-368.

MOSCATI P. in press, *Dal dato al modello: l'approccio informatico alla ricerca archeologica sul campo*, in T. ORLANDI (ed.), *Atti del Convegno "I modelli nella ricerca archeologica: il ruolo dell'informatica" (Roma 2000)*, Roma, Accademia Nazionale dei Lincei.

MOSCATI P., MARIOTTI S., LIMATA B. 1999, *Il "Progetto Caere": un esempio di informatizzazione dei diari di scavo*, «Archeologia e Calcolatori», 10, 165-188.

MOSCATI P., TAGLIAMONTE G. 2002, *GIS Applications in Italian Archaeology: The Results of a Survey and the Development of the "Caere Project"*, in L. GARCÍA SANJUÁN, D.W. WEATHLEY (eds.), *Mapping the Future of the Past. Managing the Spatial Dimension of the European Archaeological Resource. Proceedings of the European Workshop (Sevilla 1999)*, Sevilla, Universities of Sevilla and Southampton and Andalusian Institute of the Historical Heritage, 75-83.

ABSTRACT

In 1997, in the framework of the research activity carried out by the Istituto per l'Archeologia Etrusco-Italica, a census of GIS applications in archaeology was promoted and then published in the ninth issue of the journal "Archeologia e Calcolatori". This international survey allowed us to collect significant methodological and technical information useful to outline the main guidelines of the "Caere Project", aimed at the establishment of an Archaeological Information System for the analysis of the Etruscan town and its surrounding territory. A recent updating of this survey confirms the previsions published four years ago by the members of an international Scientific Committee coordinated by François Djindjian.

Some methodological aspects of the "Caere Project" are also discussed, with particular emphasis on the need of integrating many different computer techniques in order to gain a comprehensive, organic knowledge of the ancient landscape and town organisation. The results of the innovative use of markup languages and multimedia systems in the processing of archaeological excavation data are also presented. In fact, the methodological approach of the "Caere Project" is based on the principle that information is not sufficient if not linked by new forms of knowledge representation, which can promote an interactive consultation more than just a passive reading.