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The Ramses experience in archaeological research

The research here described concerns a three years project financed by C.N.R.
The main stimulus for this project came out from the necessity to manage the quantity of data obtained from archaeological excavations.
This requires the development of a more "efficient" system then the traditional transfer of numerous archives from a location to another one.
Such a necessity became particularly urgent in the specific case of the annual excavation campaign the then Institute of Archaeological Science, now Darficlet was conducting at the archaeological site of Poliochni in collaboration with the Italian Archaeological School of Athens.
It should be said that the Poliochni excavation in an historical project for the Italian State in Greece. It started in the 1930's and it followed, interrupted only by the II World War, until 1960[1].
Recently, it has been recovered with a ten year campaign, from 1988 to 1998[2].
All these investigations revealed about three quaters of a Bronze Age settlement (datable between 3200 and 2300 bc). It is placed on a low hill near the sea-coast, with a maximum extension of 22.000 square metres.
It is important to stress that, because such a long history of the research, it exists a great quantity of documentation that is at the base of any intervention within the site.
This includes th old photographic and graphic archives, the excavations note-books, together with the more recent evidence (stratigraphic context forms, graphic and photographic documentation, typological cataloguing of the materials, etc.).

All this implied that, at the beginning of each excavation campaign, we had to transfer from Genoa or Athens to Lemnos Island, were Poliochni is placed, of a enourmous quantitty of papers.
On the other hand, the availability of all this material at the mission house in Lemnos was not yet the best result for us. Every morning it was necessary to transfer on the site and in the various excavations trenches spread in the plain the necessary documentation, whit the obvious inconvenience of the often recurring lack of the useful documents.
Furthermore, any excavation, independently from its dimensions, and any location it is carried out, it needs the definition of an area with precise co-ordinates. This is normally

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[1] Bernabò Brea L., *Poliochni I-II Città preistorica nell'isola di Lemnos*, Roma 1964-74
[2] Arkontidou A.-Tiné S.-Traverso A. 1993, "Poliochni 1988. Nuovi saggi di scavo nell'area del Bouleuterion e della piazza principale", *ASAtene, LXVI-LXVII, n.s. L-LI (1988-1989)*: 368-381; Tiné S., "Poliochni: dieci anni di nuovi scavi (1987-1997)", *epi ponton plazomenoi Simposio italiano di Studi Egei,* Roma 1999: 11-20

defined within a frame of squares, usually with a side of one metre. This permits the localisation of the findings, it makes easy the description of the archaeological contexts, and it allows an easier graphic and photographic documentation.

As for the latter, usually each excavation implies:

1   stratigraphic context forms = they consist in the filling out of prefigured forms where it is necessary to answer some questions or to fill some squares. The result is a detailed summary of the data relating not only to the findings but, more specifically, about their archaeological context (layer nature, composition, colour, position in relation with other layers, possible samples, interpretation);

2   scaled plans for each layeer or context;

3   sections of the investigated deposit;

4   field note-book = notes taken daily where the methodological choises and the exposed archaeological contexts are briefly described;

5   photographic documentation.

A series of meeting together with the informatics specialists of the Computer Science Department of the Genoa University have originated the project sustained by CNR[3].

The aim of such a project is to develop a software tool, utilisable with a pen-based computer, a mobile, or a portable computer which, from one side, it could allows to substitute the traditional note-book.

At the same time, it could allows to consult the main frame placed close the nearest electric source.

The Poliochni case was, therefore, an ideal experimental fiel for the development of a hardware propotype, wich should also have the following requirements: shockproof, waterproof, resistant to dust, rain, heat, and capable of all operations needed in open air, including the possibility for drawings and text entry.

Till then, the field use of portable hardware was not yet representing the ideal solution for our needs, because the excessive weight, the low durability to high temperatures, often associated with strong winds, and the low battery life.

The latter was an important element because the difficulties to have access electricity and telephone cable connections directly on the site, making difficult for us to use portable computers in the field. As many other projects similar to Poliochni, archaeological sites do forms a very hostile environment for computers.

Possibly also for this reason, a traditional documentation system is often preferred.

Any proposable solution, therefore, should consider a series of factors extremely limiting, particularly for the requirements of the tools usable directly in the fields.

The experimentation analysed the hardware on the market and we chose a workstation and two or more mobile computers, connected to the workstation, by radio devices.

The choice of machine was conditioned by different factors, and the only real possibility

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was to use the pen-based palmtop computers.

The market offered, at that time, products with a liquid-crystal display safe from external agents,where archaeologists could write or draw everything they wanted.

For this reason we chose a portable instrument versatile and resistent connected with the workstation.The workstation is installed in the archaeological mission house,where archaeologists live during the research, near to the excavation, and it is connected to the Internet.

The mobile computer may connect directly to the fixed host, for the tests near to home; for a longer distance, or to overcome obstacles, like hills, some antennas may need to be installed.[4]

3The other important aspect of the project, it was the development of a software capable to replace the paper documentation, that is the stratigraphic context form, the field note-book and the graphic documentation (plans and sections).

The software ARCHEO has been created, together with the ADE data base. These permit to fill schematic context forms, starting from keywords that recall specific lexicons, to realise scaled plans within an established frame, and also to draw small sections.

<<INSERT FIGURE 1>>

Figure 1. ARCHEO screen

As for the site-forms glossaries, and for the software implementation, a generic references as been made to the Apple Mac Software developped by the archaeological team working in the roman town of Lattes, France.

In the last excavations campaign at Poliochni, in the summer 1998, the mobile prototype and its software have been eventually experimented in the field. We had positive results, particularly the software, with proved to be a very useful tool.

The weakest aspect of the simulation refers to the machine limits:

the screen, well visible in laboratory, was unreadable when exposed to the Greek sun; as for the possibility to record the excavation notes, the software is not yet fully responding to the various needs implied by the archaeological process.

However, the formulation of fixed queries from the context forms, and the creation of graphic frames, it allowed a speeding up of the data collection, avoiding the post-excavation registration process of the exposed archaeological evidence.

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[4] Ancona M. et al., "Taking digital Notes in the Field: the Archeo tool-set" CCA 98 *Computers Applications and Quantitative Methods in Archaeology*, BAR IS 757, 1999: 117-121