

Astro-Dacia PROJECT, ROMANIA.

A Data Base with Images and Programs for Archaeological, Archaeometrical and Archaeoastronomical Research in Romanian Statistical Analysis

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Introduction

It is a well-known fact, by now, that any research, regardless of the research branch, needs data. This data is collected, registred and classified in so-called data bases. In the following stages, the data bases are administrated through actualisation and interrogation requests, respectively, and information requests, addressed to the data base, under a specific form.

In order to survive in this informal society and as scientific research progresses, permanent access to these data is required for the dynamic use of this information. No domain, within human society, can avoid this aspect, nowadays.

Close on the heels of computer technology comes informational science, and there are four technologies which offer the infrastructural premises for some permanent databases; these four technologies are:

- mass memory technology;
- optical scanning and electronic editing technology;
- computer network technology;
- on-line data base technology.

Necessity, opportunity and aim of the project

The aim of this project was to create a data base at a national level, to be used in archaeological, archaeometrical, archaeoastronomical, and etnoastronomical research. These data are now available on the Internet. The Universities of Cluj-Napoca, Iasi, Sibiu, and Alba Iulia, as well as the Historical Museums of Bucharest, Cluj-Napoca, Deva, and Alba Iulia, also joined in on this project. This paper also presents the concept of the system, the solutions chosen, the methods of introducing the data, the statistical analysis, and some of the results, obtained so far.

The research items were the following:

- 1) A Data base with dimensions of and orientations in settlement, sanctuaries, and cemeteries of the prehistoric epoch (Palaeolithic and Neolithic: Banat, Transylvania);
- 2) A Data base with archaeological and archaeometrical research from Sarmizegetusa-Regia, Costesti, Racos, Pustiosu, Fetele-Albe, Batca-Doamnei, and in the Dobrudja area, Enisala, Celic- Dere, etc.; Astronomical orientations in the Dacian worlds;
- 3) Systems of orientation and axes of territorial organization, in Roman buildings located in Romania (Ulpia Traiana Sarmizegetusa, Alba-iulia, Cluj-Napoca);
- 4) Inventory and research regarding the sundial in Romania;
- 5) Dimensions, and orientations in medieval cemeteries and sanctuaries, including the following churches:
 - Palaeochristian and Byzantine churches, especially from Dobrudja: Capidava, Histria, and Niculitel;
 - Medieval cemeteries from Alba-Iulia;
 - Medieval, fortified Saxon churches (Wehrkirchen), from Southern Transylvania;
- 6) The mapping out of some topographic and photographic areas, atlases of archaeological, archaeometrical and archaeoastronomical interest, within the country;
- 7) Astral folklore of Romania (etnoastronomy);
- 8) A Data base with authors and papers on archaeology, archaeometry and archaeoastronomy, from our country and also foreign countries; this data base includes e-mail addresses, as well as links to those papers, written by the above mentioned authors.

All these data bases, marked 1-8, made up the project's main menu, which is presently available under HTML and, since the autumn, of this year, can be found on the Internet.

Characteristics, instruments and circumstances

Numerous failures and disfunctions (and even renunciations) in our attempt to create some data bases, designed to benefit archaeological, scientific research, required us to approach this activity in two stages. At first (and still) our work was dominated by the use of relational data bases, actually by the Data Base Administrating System - "ACCESS". But, scientific applications impose numerous restrictions on using relational data base systems, because these applications are used to determine application of some complex , mathematical operations, which relational request idioms cannot satisfy; also, analyses and operations, applied to the data tend to be extremely complex and cannot be easily expressed, with the relational language.

In response to these unsatisfactory results and near successes, the data base research and development led to the creation or perfection of some high-level instruments, that is to say:

- instruments for cognitive discovery, including instruments for data analysis and learning;
- machines for statistical analysis, made for extracting knowldege out of data;
- instruments for integrity and quality control, as a direct cosequence of the dimensional increase of data bases. This is why automatic, detection instruments and error control are absolutely necessary.
- instruments for administrating Hipermedia, respectively, the informal hipermedia systems, able to combine different mediums such as text, data, images, sound, etc.;
- new instruments for data presentation and display, and, in practice, an extension of the instruments for hipermedia administration.
- instruments for decisions and scenery analysis, which permit the simultaneous use of data bases, of tabular calculations and of moulding systems.

Sooner or later, all of these shall impose begunning of the SECOND STAGE of the ASTRO-DACIA project development, passing to another data base type, leaving behind the relational one, used in the actual step.

Hypertext applications to data bases; to use hypertext idioms, the data base registrations are made up of texts, linked to the relational chart columns. As well known, the documents linked to the hypertext network can be accessed, both directly and indirectly. Moreover, the hypertext allows users to have their own vocabulary, which is a remarkable facility.

Finally, we consider that without a mathematical solution of the problem, precisely, without emerging of a new mathematical instruments of qualitative analysis type, it will be pretty difficult to obtain desired archaeological outcomes. But there are still reasons to be optimistical in that sense.

Resources used

The ollowing resources were used in the project:

- a) hardware resources:
 - Pentium with HDD MMX, scanners
- b) software resources:
 - ACCESS data bases

- HTML editor for the Internet
- The system we have in mind allows the accessing of some special software, f.i. Matchad or Matlab, as well as other assistance software.

Present outcomes

We shall present, in what follows, a series of results from the ACCESS system of relational data bases, in subpoints 2, 5, as well as Matchad, Pascal software and HTML editor.

NOTES: Certain project components have been presented at the following international conferences:

- a) DATA BASES AND PROGRAMS FOR ARCHAEOASTRONOMICAL RESEARCH was presented at the CAA96 Conference, in Iasi, Romania, in March, 1996
- b) STATISTICAL ANALYSIS CONCERNING THE ORIENTATION OF THE ALTAR OF THE CHURCHES BUILT WITHIN THE 13TH AND 15TH CENTURIES IN TRANSYLVANIA, ROMANIA was presented at the SEAC Conference, in Gdansk, Poland, in September, 1997.
- c) STATISTICAL ANALYSIS CONCERNING THE DETERMINATION OF SOME PROBABLE MEASURING UNITS USED IN THE ANCIENT DACIAN BUILDINGS (1ST CENTURY B.C - 1ST CENTURY A.D.) IN THE ORASTIE MOUNTAINS, ROMANIA will be presented at the IV International Symposium on Archaeology and Computing, Bilbao, Spain, in May 1998.

All Figures in CD-ROM.