The Archaeological Database of Serbia

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One of the permanent requirements of archaeological research - a detailed, accurate, up-to-date, and as objective as possible, documentation of the field data - may more easily be achieved, due to the development of computer technology. However, the problems and dilemmas, concerning many aspects of archaeological theory and practice are not automatically solved by the application of sophisticated machinery, especially, when it comes to adjusting the old data to the new documentation systems. Therefore, the goal of this paper is to pose some general, questions concerning the collection and processing of the data, as well as to present the preliminary stages of our project.

The Archaeological Database of Serbia is founded upon the already existing, field documentation in use, at the sites of the Iron Gates Project, created in the late seventies, by Professor Vladislav Popović, from the Archaeological Institute of Belgrade. The system was planned to cover all kinds of portable, archaeological finds and to standardize the documentation. Our primary aim was to facilitate the storage and processing of the thus, collected data and to explore the possibilities for its implementation, in the further interpretation and publishing of the material. Therefrom, an ideal result would be the database, accessible to all the interested users, comprised of all the collected data. Naturally, the base, originating from the already existing, documentation system, suffered from the same faults as the documentation itself. Therefore, the need arose to adopt the system to new technology, as well as to the new requirements of general, archaeological theory, formulated in recent years. This paper will illustrate the way, in which we tried to solve the problems, posed by the original material we worked upon, and the possible solutions, that we propose and plan to explore, in practice.

The base was made in Microsoft Access, linked to Microsoft Graph. The choice was governed by the need for the quick alternation of the base, required by the practical situation in the field, or in the laboratory. The base may could be easily adapted, and a potential user did not depend upon a skilled programmer. At the same time, the programmes chosen, easily communicated with other software, such as MS Word, AutoCAD, Autodesk Map, and Autodesk World.

The base is still in the experimental stages and it has been tested on a small sample from a Roman site, in the Iron Gates Gorge, called Mihajlovac-Blato. The tests we run proved that the base was reliable on the chosen sample, and several more sites are currently being entered, using the same system. Improvements are still being made, and one of the major advantages of our project is that it can continue to be improved, enlarged, and altered to correspond the new needs.

Among the lists entered, the so-called C-form (fig. 01), or special finds form, is used for all portable finds, except pottery. Its header includes information on excavation dates and the places of the finds, in terms of horizontal and vertical stratigraphy. General data about storage, photo- and graphical documentation, various analyses, and so on, then follows. The description includes the material, type of find, manufacture, decoration, and the like. Provisional dating is also provided. The C-form is linked to the photography of the object in question, its drawing (fig. 02), and the precise coordinates, within the total grid of the site. Reference is also provided, to the journal of excavations. The data may be entered in two ways: by simply typing, or by choosing among the offered options (fig. 03).

The documentation system, we started from, also included the so-called, A-forms, used for pottery, the D-forms, for tiles, and G-forms, for grave documentation, with data on osteological material, as well as on grave goods (fig. 04). Various field journals, such as photo and elevation measurement journals, as well as drawings of finds themselves, formed mutually-linked, separate documents.

The search was possible on two levels, through the commands FIND and FILTER. By using the command FIND, one could search for a specific word, or part of it, in any, or specific field. The FILTER command worked in a similar way, but it could filter data, both on one and more criteria.

The most important output of this base were the statistical results, presented both numerically (fig. 05) and graphically (fig. 06), automatically updated by each new input of fresh data into the base. The message, ERROR, sometimes occurred in certain entries, indicating input failure, and enabling us to more easily locate and correct mistakes, lessening the human factor effect (fig. 07).

The problems we mentioned, caused by the nature of the old documentation, not planned to be automatically processed, and originating from excavations conducted more than twenty years ago, are well illustrated by the example of ornamentation entry, both on the A- and C-forms. The part of the object, where the decoration is placed, the spatial relation between two or more ornaments on the same object, and the ordination of the motif are not stated, since the information is not stored in the original documentation. Problems such as this, and the total lack of a system for documenting some kinds of archaeological assemblages (such as architectural), presented the need to build a new base, not following the path of existing documentation. The idea was to reverse the order and to create new forms for documentation, adaptable to the needs of computer processing. The base, whose creation is still in progress, will be adaptable for each respective site, and will support the specific issues, raised in a concrete, field situation. Eventually, all the data, from all the sites, will be mutually linked and comparable. The problem of archaeological terminology, in general, is well known (Joukowsky, 1980: 332), and becomes even more acute, when it comes to computers (Poulsen, 1972). Therefore, it is planned to equip the bases with a thesaurus, whose creation is in progress, so that all the terms used will be codified and, thus, impede the confusion of inadequate descriptions. We propose mainly numerical codes, composed of one -, two-, or three- digit codes, expressing different aspects of the qualities described. For example, the codes for ornamentation include one numerical codes describing the technique, the other, depicting the motif, and the third, its orientation, all entered into separate fields. In this way, searching and filtering the data is possible, according to any individual trait of ornamentation, or its separate aspects. In case of the use of code systems, other than the one proposed for this base, the codes will be translated into the base, through QUERIES. The original codes, however, will be preserved, and the entries will not be altered, so that the documentation of an individual site will remain in the form in which it was first entered.

For the same reasons of clarity and uniformity, whenever possible, the base will include drawings of representative types. These are not the sketches of individual objects, but the idealized, typological projections, linked to codes of the same types. Consequently, the operator may either enter the code, or choose among the offered, drawn, typological options. With each new site, or corpus, of the material entered into the base, both the thesaurus and the base of typological drawings will be enlarged and enriched, by new entries.
Our ultimate goal, however, was not to create computer-oriented documentation, but to make optimal use of the possibilities, opened by the technology at hand. A problem occurred at this stage, since one of the main objectives of the whole plan, was to make possible the communication between all the archaeological data from the territory of Serbia. Namely, the newly acquired material would not correctly correspond to the old material, i.e., the base we have just described, founded upon the material, documented after the old system, was not completely compatible with the base, created for new excavations. Therefore, the creation of the so-called, "statistical base", started, with the objective of mediating, between the two bases. It was called "statistical", because it included the digested, statistical data from respective sites, easy to handle and not causing jams, due to overload. It was even more important, since the second reason for its creation, besides the establishment of a connection between the two bases, was to embrace in one unique base the data on all the available sites. The result is the possibility to start a base for each site, after the old system of documentation, or the one we were proposing, and to connect them through the statistical base, with all the relevant comparative material, through the processed information it included.

The future development of the system also includes the possibility of automatically creating a three-dimensional reconstruction of the site and the features inside it, by using the already entered data on elevations. The result will be the mapping of the distribution of finds and assemblages.

Current efforts are also focused upon developing the elements of the base, aimed specifically at the documentation of prehistoric material, under the aegis of the Department of Archaeology of the Faculty of Philosophy, in Belgrade, and the Archaeological Institute. At the moment, the most well-developed is the sub-base for pottery (fig. 08) , based upon the system, previously used on several sites (Popović, Stančič, 1988; Govedarica, Babić, 1992), which has proved to be versatile and easily adaptable to the requirements of computer processing. Opposed to the classical repertoire (in the case of Serbia, mainly Roman) and Medieval pottery, very much standardized, concerning its shapes and decorations, prehistoric pottery, from the region, varies mightily, in terms of temper, morphology and ornamentation. Therefore, the forms of its documentation require a more detailed scanning of its properties. The same applies for metal finds, also less readily reducible to typological units, when it comes to materials, originating from prahistoric sites.

The sub-base for flint implement documentation is also very much in progress (fig. 09). It is also based upon the system, already in use, adapted for computer processing (Radovanović, 1981; Radovanović, *et al.*, 1984; Mihailović, 1966). All the traits, usually accounted for in the course of this kind of archaeological analysis, are scanned and entered, but their mutual comparison is much more efficient, allowing for a more efficient and, therefore, more minute handling of the data.

The sub-base for metal finds is in its initial stage, also following the path of the already existing documentation forms. However, in this case, too, an attempt has been made to make more detailed documentation and the subsequent manipulation of the data, possible.

In order to meet the objectives we defined, it was essential to update the base, both in the areas of technological improvements and theoretical requirements. As shown in practice, gaps in maintaining documentation systems (be it

traditional paper work or computer databases) and, in the case of computers, the software accompanying them, may prove fatal to the final outcome. Therefore, we strongly argue for the permanent updating of systems, of whatever kind, and that is why we took constant care in keeping our project open to changes and modifications, in order to avoid the problems that we encountered, some of which we have already discussed. We are positive that the same experience is shared by many of our colleagues.

The need for constant updating during the project, and for its wide application, also directed one of the lateral actions, concerning the base: the teaching course at the Department of Archaeology of the Faculty of Philosophy, in Belgrade, conducted by one of the authors and Mr Vladimir Novaković; new groups of students are instructed, not only in how to use the base, but also in how to make alterations, along the lines of future research needs.

Finally, we feel obliged to stress some other aspects of the presented base, and of databases, in general. The obvious advantage of this kind of data storage is the easy access, processing and filtering of data. However, since the final aim of archaeological research is the interpretation of human culture and the presentation of our knowledge, both to a scholarly and general public, this, and any other database, is merely an aid to a researcher. The material, thus stored, is scanned in the most objective way, for the time being, enabling all the interested researchers to get acquainted with it, and to offer different interpretations. At this stage, we once more enter the field of subjectivity in archaeology, which is one of the hottest issues in current, theoretical debate (Gibbon, 1989; Hodder, *et al.,* 1995). In our opinion, any kind of documentation should retain the maximum, possible level of objectivity and should be prone to reversal, back to the original object or feature in the field, at any time during the process. The terms and techniques we use, in describing both portable finds and structures that we encounter in the field, should be as devoid of researchers' impressions as possible. On the other hand, all the interpretative observations, derived from the subjective stance of the individual researcher, such as cultural, functional and similar attributions, should be stated as such and entered into the field NOTES, we propose to be the standard entry of each documentation system, be it a computer base, or any other means of storing data. For example, the datation entry, causing permanent discussion and resulting in different and often, opposed conclusions, may well be omitted from the basic form, and default statistics, and the proposed value entered into the field, NOTES, may be stated as the conclusion, of the researcher in question. These observations should also be linked to the base of references, and the bibliography, in order to provide all existing information on the specific issue. In other words, the data on technical details and descriptions should be kept separate from the conclusions, based upon them, enabling future researchers to suggest different interpretations. We argue that the more interpretations, offered for the same site, or corpus of the material, allow archaeology to approach its goal more fruitfully - to offer the general public knowledge of the human past, in all its aspects, sometimes meaning, even, the possibility of mutually opposed reconstructions. Our firm stance, being that the subjectivity of a researcher cannot be avoided (and should not, for that matter), we feel that the best possible approach, to archaeological research, is to divide the stages of the process: scanning and measuring of all the measurable variables should be kept separate from our observations and interpretations, in terms of analogies, datation, functional attributions and all the further conclusions, aimed at and reached, in most of the final archaeological publications. Consequently, may it once more be stated that most of the methodological and theoretical problems of contemporary archaeology remain in the domain, outside its techniques of data processing, such as in the application of computers in various stages of research. The questions we ask, and the way that we ask them, will command the mode of usage, of technical devices, and will be as successful, as the complete framework of the research allows. However, it does not mean that one should give up efforts, towards designing ever more improved, technical means, as an aid to our basic research. With these objectives in mind, we shall further improve the tools, for the creation of the complete archaeological base, for the territory of our country.

Acknowledgements

We express our kindest thanks to: Ms Ivana Radovanović, PhD, and Mr Dušan Mihajlović, MA, from the Faculty of Philosophy, for their advice and coaching, concerning the section on flint documentation, and to Mr Petar Popović, PhD, Archaeological Institute, and Mr Vladimir Stančić, Heritage Management Office, Novi Sad, for the advise on pottery documentation. The base we created is based upon the systems of documentation which they developed for their respective fields of research. Mr Igor Bogdanović, MA, from the Faculty of Philosophy, gave advice on the section on metal finds. Mr Miodrag Tomović, PhD, Archaeological Institute of Belgrade, kindly permitted us to use the documentation of the site Mihajlovac - Blato. Mr Miloje Vasić, PhD, Director of the Archaeological Institute of Belgrade, supplied critical support to the project. Ms Staša Babić, PhD, from the Faculty of Philosophy, commented on the previous drafts of this paper, and translated it into English.

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