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Understanding the value of archaeological remains is a prerequisite for their meaningful and well-founded treatment. From the perspective of the archaeological discipline, scientific potential is usually represented as the primary criterion for assessment of their value. This attitude, which saw its peak in processual archaeology, has been generating fierce criticism since the 1980s. The assertion that this approach does not enable comprehension of the full value of archaeological remains marked the beginning of significant change and expansion in the way they are understood. Consequently, theoretical considerations of scientific value have been put aside to some extent over the last few decades, so this subject requires new analyses which are able to provide the basis for understanding scientific value as well as for systems of its assessment.

Key words: archaeological record, scientific value, integrity, quality, informational potential, interpretative potential

Problems of scientific value of the archaeological record[1]

With the development of archaeology as an independent discipline within a wider framework of the Western world, scientific potential of archaeological remains is always represented as the primary criterion for assessment of their value. Since scientific value of the archaeological record lies in its potential to provide answers to important questions posed by the research (Fowler 1982: 26), it was most often defined in terms of research goals and plans for their implementation (Moratto & Kelly 1978: 7). This attitude saw its peak during the 1970s, when an extensive discussion on the questions of scientific value and methods of its assessment developed in

[1] Considerations and conclusions presented in this paper are the result of the research conducted for the purpose of doctoral dissertation *"Ocena izgube vrednosti in znanstvenega informacijskega potenciala pri uničenih arheoloških depozitih/Assessing Loss of Value and Scientific Information Potential on Destroyed Archaeological Deposits"* (Sirovica 2015).

the United States. Framed by processual approach to archaeology, the discussion soon spread to other parts of the world, being especially intense in English-speaking countries and with an emphasis on examining the possibilities of defining scientific value of archaeological remains within the frame of a clearly defined, problem-oriented research design (Binford 1964; Raab & Klinger 1977; 1979; Goodyear *et al.* 1978; Sharrock & Grayson 1979; Barnes *et al.* 1980; Klinger & Raab 1980; Raab *et al.* 1980).

However, already in the following decade, the processual attitude on the primacy of scientific value provokes fierce criticism which claims that this approach does not enable comprehension of the full value of archaeological remains. It is put forward that it represents a self-imposed limitation to consideration of value in scientific and cognitive terms, which results in complete disregard for value of archaeological remains for wider segments of society and various interest groups (Leone & Potter 1992; Briuer & Mathers 1996; Clark 2001; 2002; Smith 2001; 2004; 2006; 2009; Tainter & Bagley 2005; Scarre & Scarre (eds.) 2006; Lafrenz Samuels 2008; Smith & Brandon (eds.) 2008; Hodder 2010). Reducing the value of archaeological remains to mere data category was also criticised as being a reflection of a Eurocentric approach to consideration of the archaeological record in terms of objective, abstract knowledge stripped of value (Smith 2004: 108, 123; Hodder 2010: 861).

This new, postprocessual course in archaeological theory tried to emphasize the existence of various different approaches to archaeological heritage and possibilities of multiple interpretations which do not produce objective knowledge, but reveal deep subjectivity of the cognitive process (McGuire 2008: 59). The goal of postprocessual, and related feminist, Marxist and indigenous archaeology was to show that all knowledge is political and that the process of management of archaeological heritage and its values also represents a political process which is shaped in the present and is derived from a complex, ideologically painted social dynamics.

This new approach resounded significantly all over the world, and it changed not only the attitude within the archaeological discipline, but also affected changes in national and international systems of understanding and valorisation of heritage. To some extent, this caused a disregard for the question of scientific value and for defining indicators of archaeological informational potential during the last thirty years, while the focus was shifted towards social values of both heritage and archaeology. Nevertheless, the subject was not completely put aside and considerations of scientific value of the archaeological record are still present in archaeological discussions. However, archaeologists started emphasizing that the statement of value of archaeological remains formed at the level of research questions and hypotheses about the past is extremely sensitive to changes in scientific, as well as wider social, political and economic interests. At the same time, it becomes widely accepted that value assessments are necessarily based on comparisons and dependent on the context and that each kind of value assessment requires defining clear frames of reference which are able to show in relation to what the value is determined (Moratto & Kelly 1976; 1978; Schiffer & House 1977; Tainter & Lucas 1983; Briuer & Mathers 1996).

By following the course of development of this briefly presented debate, it is noticeable that today both British and Dutch archaeologists emphasize that it is possible to define scientific value of the archaeological record in terms of quality and potential informative value because, to a certain degree, they guarantee meaningful interpretations relevant to both society and science (Carver 1987a; 1987b; Emery 1993; Groenewoudt & Bloemers 1997; Darvill 2005).[2] This results from the fact that value assessment in terms of quality and informational value is a somewhat constant factor which succeeds in avoiding trends which both scientific perspective and social perception of archaeological heritage are susceptible to (Groenewoudt & Bloemers 1997).

Indicators of scientific value of the archaeological record

Independently from the theoretical debates which marked the last quarter of the 20th century in the West, especially in English-speaking countries, and had a large-scale impact on understanding the value of both heritage and archaeology, value assessments of the archaeological record formed in the context of heritage research do not diminish the significance of scientific potential in valorisation of archaeological remains, especially when they are completely hidden underneath the surface and thus often unavailable to development of other forms of potential value. But, since the required data are unavailable without conducting additional research, considerations of value of subsurface archaeological remains based on crite-

[2] Martin Carver (1987a: 124) was the first to introduce the criterion of quality in the assessment of scientific potential of the archaeological record. In this context, the level of quality is determined by clarity and readability as a reflection of the possibility to obtain understandable and meaningful data from the archaeological record (Emery 1991: 38).

ria of quality and informational potential are usually not included in legal acts or guidelines for institutions in charge of their management. Standard assessments of scientific value of the archaeological record are usually determined according to the criteria of integrity, preservation, research potential, representativeness, rarity, group value, etc.[3] Assessments based on these criteria in most cases result from general professional principles of understanding scientific value of the archaeological record and from more or less justified assumptions about the characteristics of an individual record.

assembly of various elements, a kind of 'organic' relationship which is represented by the archaeological record in its entirety as the primary source of archaeological data. Since each potential source of archaeological data is exposed to various circumstances on which its preservation depends, the level of scientific value of the archaeological record can be assessed in relation to the established integrity, as a reflection of its preservation, and also in relation to expected scientific gain, as a possible derivation of scientific potential of a particular archaeological record (Fig. 1).

Figure 1: The process of defining scientific value of the archaeological record (by: F. Sirovica).

Nevertheless, archaeological remains have a solid physical component which enables obtaining various information about human activities in the past, so a more detailed assessment of archaeological value requires insight into physical characteristics of the archaeological record. These kinds of data are, except by means of targeted excavations, usually available for sites where archaeological research was conducted in the past. In addition to excavation, it is possible to obtain them by documenting profiles created in the course of reconstruction of segments of existing infrastructure, demolition of older objects, etc. Despite its limitations, insight into physical characteristics of the record can represent a good basis for assessment of its scientific value, which at the same time necessarily depends on the existing and currently known spatial and temporal characteristics which represent the framework for the construction of value classification.

Unfortunately, there is only a small number of studies which deal with value assessment of physical characteristics of archaeological remains as basic diagnostic and interpretative material of archaeological research (e.g. Glassow 1977; Wildesen 1982; Carver 1987a; 1987b; Emery 1991; 1993). Those studies point out that value assessment of the archaeological record is possible by applying criteria related to their defining. Namely, all types of archaeological remains are found in a specific

If scientific potential of the archaeological record is defined by the quality of archaeological remains and their informational potential, the approach to the problem at hand necessarily becomes focused on preserved elements of archaeological stratification and present artefacts and ecofacts. This places the possibility of defining scientifically relevant data which result from the interrelation of stratification and present archaeological materials in the focus of interest. Thus the data available for the assessment of scientific potential of the archaeological record become comparable with data sets which are available from archaeological excavations.

The basic informative material available to the archaeological research is comprised of archaeological stratification, which includes various types of stratigraphic units, and preserved organic and inorganic materials of cultural and natural origin. Archaeological remains as sources of archaeological data can thus be divided into three standard and well-known elements: stratigraphic units, artefacts and ecofacts; hence, archaeological research represents testing of physical relations between those material traces of past human activities (Djurić 2004: 13) and remains of natural origin which are related to them. All of those archaeological remains can be considered potentially informative since the relations established between them and their interpretation provide insight into a particular spatially and temporally determined type of human activities (Wildesen 1982; Carver 1987a; 1987b; Emery 1993).

Basic archaeological information includes descriptions of individual elements of the archaeological record and their contextual relations. Conclusions are then drawn from them about formative processes, time periods, dimensions of spatial oc-

[3] In this context, especially significant are the standards developed in England and the Netherlands, which are among the rare countries with strictly prescribed set of evaluation criteria and sophisticated schemes for their application (Darvill *et al.* 1987; Wainwright 1993; Startin 1995; Schofield 2000; Groenewoudt & Bloemers 1997; Deeben *et al.* 1999; Willems & Brandt 2004; van den Dries & Willems 2007).

cupation, types of activities; which then represent the foundation for developing general theories and interpretations about the cultural, historical, technological, symbolic, spiritual development, etc. (Hardesty & Little 2000: 70). Consequently, basic archaeological information can be divided into formal, contextual, spatial and temporal (after Glassow 1977: 415; see also Emery 1991: 9). This implies that physical attributes of archaeological stratification and archaeological materials can be viewed through their formal descriptions and their contextual interrelations which include the relationship between archaeological materials and units of stratification. Additional analyses of interrelations between acquired data enable drawing conclusions about spatial and temporal dimension of human activities which took place in the past. The presented data set can be considered an informational potential of the archaeological record whose quality is determined by its physical condition. If each potential source of archaeological information is exposed to various circumstances on which its preservation depends, the quality of the archaeological record depends on the preservation of its elements as a level up to which we can derive those data in a clear and readable manner (Fig. 2).

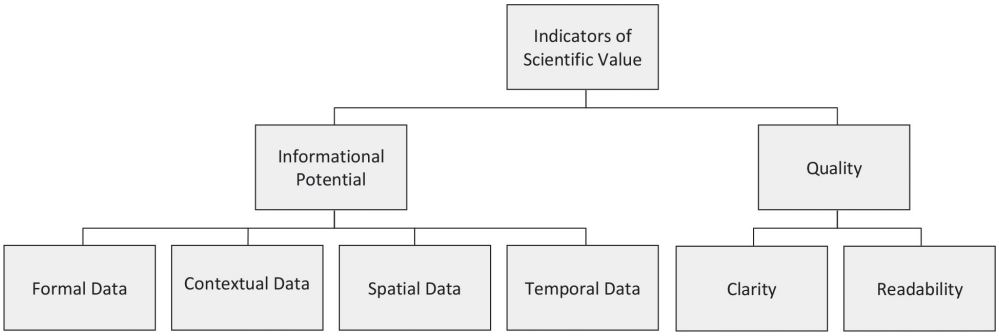

Figure 2: Indicators of scientific value of the archaeological record (by: F. Sirovica).

However, the archaeological record as a spatial interrelation between stratigraphic units and archaeological materials can show significant variations in characteristics which are the result of the cause and course of its occurrence, which are determined by certain depositional and post-depositional processes and functional specificities. This means that the depositional and post-depositional processes, as the cause of variation between different types of the archaeological record, represent the result of both cultural and natural activities in a particular area. At the same time, archaeological sites are, as spatial units containing dense information, a result of activity performed by communities within defined spatial boundaries, and, in principle, they will differ depending on the type of activity which took place in a certain area and on variations in its performance (Binford 1964). Thus the archaeological stratification occurs in the form of more or less complex combinations of stratigraphic units, so various types of archaeological records can be roughly divided into simple and complex single-period or multi-period archaeological records. Since differences in types of archaeological records suggest differences in their scientific value, it is necessary to establish the difference in relation to the criteria of quality and informational potential.

Simple single-period or multi-period records are defined by weak stratigraphic coherence (after Emery 1991; 1993), where the interrelation between stratigraphic units does not show enough complexity to provide more detailed chronological data about the site. It is thus considered that they have a low to medium level of scientific informativity and their additional value is dependent on the quality of related movable archaeological materials.

Complex single-period or multi-period records are defined by a more pronounced stratigraphic coherence, where the interrelation between stratigraphic units shows satisfactory level of complexity and provides detailed data about relative chronological relations. They are thus considered to have a medium to high value of scientific informativity, depending on their quality as a reflection of clarity and readability of the stratigraphic sequence. Additional value of the complex archaeological record is again defined by the quality of related movable archaeological materials (Fig. 3).

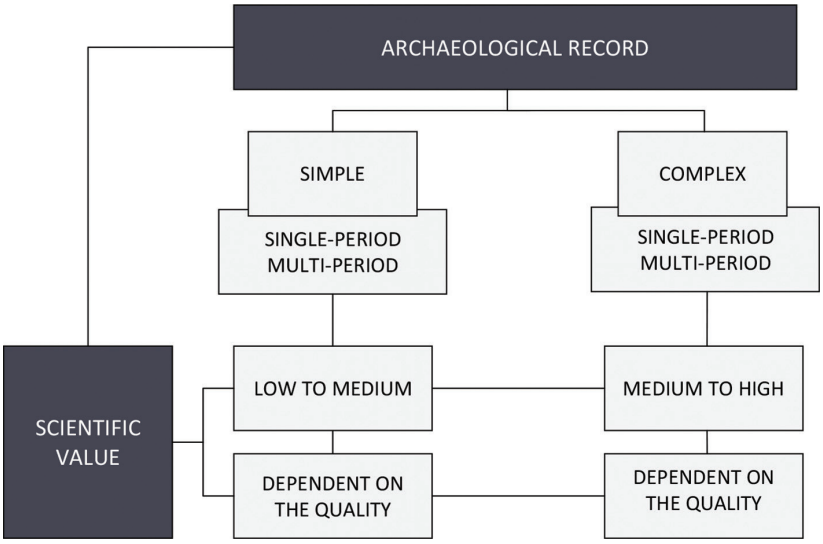

Figure 3: Dependence of scientific value on the type of the archaeological record (by: F. Sirovica).

Criteria for assessing scientific value of the archaeological record

The basis for assessment of scientific value of the archaeological record are physical remains: the stratigraphic sequence and movable archaeological materials. An insight into the stratigraphic sequence enables creating assumptions required for the reconstruction of the type and intensity as well as spatial and temporal boundaries of activity at the archaeological site. At the same time, the analysis of related movable archaeological materials (artefacts and ecofacts) contributes to a clearer understanding of spatial and chronological characteristics of the stratigraphic sequence. The significance of a particular stratigraphic unit as an analytical unit of archaeological research lies in the stratigraphic sequence as a reflection of formative, depositional and post-depositional processes and thus of the relative chronological sequence of events (Van de Noort *et al.* 2002: 3), so this data set can be considered an informational potential of a stratigraphic unit which should be supplemented with data about formal, contextual, spatial and temporal characteristics of related artefacts and ecofacts. Thus the informational potential depends on the interrelation between the stratigraphic sequence and movable archaeological materials, that is, the level of preservation of physical remains at the location of primary deposition. At the same time, it is highly dependent on the quality criterion, that is, the level up to which the basic data can be derived in a clear and readable manner.

The quality criterion refers to assessment of the level of preservation of the physical remains of the archaeological record as a reflection of their clarity and readability, that is, their appropriateness for acquiring information required for the reconstruction of activities which caused the creation of the record. Thus it shows close connection to the criterion of informational potential because it directly affects the ability of acquiring basic archaeological data. However, while understanding the quality of the stratigraphic sequence can be considered satisfactory, the framework for proper quality analysis of movable archaeological remains, especially ecofacts, is not yet developed because large-scale research of quality indicators for these archaeological materials has not yet been systematically conducted.[4] Further development of this kind of research will enable forming a collection of comparable data sets and creating a characterisation of quality indicators, which will enable their proper application in evaluation practice. For now, in this kind of procedure, a significant emphasis should be placed on qualitative characteristics of the stratigraphic sequence, which lie in its clarity and readability as that specific segment which can enable a comprehensive understanding of the informational potential, that is, its formal, contextual, spatial and temporal dimension.

Assessment of scientific value of the archaeological record is, like any other assessment of value, based on the question of comparability, so it depends on its level of preservation in a spatially and temporally defined frame of reference and on topical questions of scientific research. Since archaeological records vary in levels of preservation, by considering their integrity it is possible to determine both their level of preservation and level of long-term endangerment by human activities and forces of nature (Glas-

[4] International symposium *Preservation of Archaeological Remains In Situ* (PARIS), which takes place every 5 years since 1996, is especially oriented towards presenting and discussing appropriate methods for controlling the level of degradation of subsurface archaeological remains (Corfield & Williams 2011) and it contributes significantly to development of methods of controlling the changes which affect archaeological remains and establishing their causes, which is the basic precondition for a well-founded quality analysis of movable archaeological materials.

sow 1977; Darvill 1987; Darvill *et al.* 1987; Startin 1994; Groenewoudt & Bloemers 1997; Deeben *et al.* 1999). But this still does not ensure a thorough understanding of scientific value of an individual record, because it necessarily depends on wider knowledge in context of space and time (Drury & McPherson 2008: 35). Consideration of interpretative potential as an ability to derive general theories and interpretations from basic archaeological data provided by the archaeological record indicates the level to which a study of an individual record can generate new knowledge of the past. Being dependent on the established integrity, followed by quality and informational potential, interpretative potential of the archaeological record is based on analysis of gaps in current knowledge as well as on established research goals and relevant knowledge within spatially and temporally defined boundaries (Saunders 1984; Darvill 1987; Darvill *et al.* 1987; Deeben *et al.* 1999; Willems & Brandt 2004).

Accordingly, it is possible to define four criteria of scientific value of the archaeological record expressed as integrity, quality and informational and interpretative potential. The first three criteria are focused on analysis of its physical features, whereas the fourth criterion deals with its ability to improve scientific knowledge, depending on the value of physical remains, current research goals and existing knowledge gaps. If we view the archaeological record as a source of information, then scientific value represents the potential of archaeological sites for defining credible data and forming meaningful interpretations of the past (Moratto & Kelly 1978: 5), whereas its significance is additionally enlarged by including scientific value in the context of wider social interests and in the framework of general, social values.

Translation: Vinita Ramljak

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