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**Tadeusz Wiśniewski (ed.) Klementowice.
A Magdalenian site in eastern Poland, Institute
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Monographic studies of collected materials coming from the sites, especially the rich ones, known and essential for research in a particular field, are usually valuable and expected items by archaeologists involved in the subject. The same situation occurred in the case of the book presented here – a monograph of the site in Klementowice, one of the most important traces of the settlement of Magdalenian communities in Poland. This work is a summary of long-term, interdisciplinary work, first carried out in the early 1980s (1981–1982) and then continued at the turn of the first and second decade of the 21st century (2007–2011). This dissertation was published as part of the project called “Klementowice monograph – settlement in the eastern peripheries of Magdalenian culture circle” (02498/13/FPK/NID) included in the program of Cultural Heritage priority Protection of Archaeological Artefacts in two-year mode (2013–2014).

The 346-page book, published by the Institute of Archaeology at UMCS, consists of four parts devoted to the main groups of issues: archaeology, natural environment, animal remains, petrography and mineralogy. In total, there are 19 chapters written by specialists dealing with particular issues, in fact creating a situation in which a large team of representatives of various sciences took part. These four parts are preceded by an introduction and a summary with general conclusions. The last chapter is an annex devoted to younger settlement than the one described in the main content of the work. The text is accompanied by numerous tables, figures and charts presenting the most important data and a very large selection of stone artefacts made by knapping technique and other types of items such as stone slabs. Each of the chapters is preceded by a short abstract.

The work has been printed in English but it also has a digital Polish version.

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Part one – “Archaeology” consists of four chapters. The first one (the most extensive), written by T. Wiśniewski, is devoted to the discussion of archaeological materials from the site in Klementowice. The research of materials is carried out according to the classic scheme: research history, research methods – separately discussed time ranges, i.e. 1981–82 and 2007–2011, a short presentation of the site stratigraphy and stratigraphic locations of the finds, chronology and a discussion (the most comprehensive) of stone inventories. In total, during all research seasons, 331 m² was explored, obtaining over 47,000 artefacts made by the use of knapping technology and other items such as hammer stones, fabricators and a series of stone slabs.

A lot of attention (perhaps too much) is devoted to the history of research, where each of the research season and each stage of fieldwork have been described, whereas the stratigraphic and chronological issues have only been signaled. The reader is sent back to the subsequent parts of the book, where these issues were described in detail by other authors. However, attention has been drawn to the presence of two assemblages marked as A and B at the site. As for the further parts of the study, apart from the entire inventory, the analysis includes these two concentrations.

The research of artefacts made by knapping techniques is described most widely. Diversity of raw materials is discussed in detail. Three types of flint dominate here: chocolate, Świeciechów and erratic flint; other flint raw materials play a marginal role. This final arrangement of the raw material issue regarding Klementowice complex should be considered crucial and valuable. It is important, among other things, to reject explicitly the hypothesis about occurrence of the Volyn flint. However, the additional argumentation that a lack of this raw material is somehow conditioned by the absence of the Magdalenian in the east of the Bug river as well as a lack of evidence for relations between the Magdalenian and Epigravettian populations are the issues (in my opinion) debatable. It is necessary to note that there is evidence for long-distance imports of raw materials also originating from areas beyond the range of culture.

Stone artefacts (non-chipped) were made of various rocks, mainly sandstones of various types and quartzites.

The analysis of flint artefacts includes the following groups: cores, debitage and technical forms, tools along with characteristic waste

forms, chips. Each time the description of the group comprises the raw material structure and then the technological or typological diversity of a given category of artefacts.

Considering the description of cores, their diversity due to the stage of the core process, the type of obtained preforms, the number of striking platforms, the location of the flaking surface (on the wider or narrower surface), external angles were taken into account. Technological analysis of this category of artefacts is very limited; there is no description of e.g. the method of preparation or operation, although characteristic wastes indicating the types of treatments were noted. Therefore, the technological development of cores is incomplete.

Debitage is described according to classical rules – flakes and, together, blades and bladelets. The description focuses on the issues of raw materials, metric data and data related to the butt-bulb part. However, the issues of the nature of the upper side were omitted, which is also a kind of deficiency. It is also a pity that the author has not decided to separate blades and bladelets into separate groups. A separate presentation of these two categories could show the possible differences between blades and bladelets in their production. Probably the omission of these factors results from a planned assumption (from the beginning) of not focusing on technological issues, which may be a drawback of synthetic materials to some extent. On the other hand, the author was entitled to such a choice especially in the face of an extraordinary inventory richness.

Research of chips and micro-chips was limited to place them in metric ranges and in terms of raw material classification.

Tool analysis includes 13 typological groups (among others: scrapers, burins, truncated blades, piercers with borers and perforators, microliths divided into bladelets and backed points, combination tools, splintered cores and others). Moreover, participation of particular groups in the whole tool set, their typological and raw material differentiation is presented.

What is more, the presence and share of characteristic waste products (burin spalls and microburins) is noticed. The latter are referred to in the Polish version of the text as *mikrorylce*, which is an unnecessary and unjustified language calque (French *microburin*) in my opinion.

Furthermore, the analysis includes other categories of artefacts – hammers, fabricators and perhaps fire flints, and then one uncovered

pebble and finally stone slabs - one of the characteristic elements in Magdalenian sites.

All these elements are also described regarding a differentiation into the assemblage A and B. Other parts of the study include spatial analysis of the site – differentiation of 24 so-called “features”, i.e. hollows, some of which (13) are filled with red dust. All there are artefacts, the differences depend on their number and type. One of these objects was recognized as a cryogenic structure.

The issue of refits was discussed in a limited way. Until the monograph was prepared, only a very small part of the material was refitted. Therefore, this issue was deliberately omitted. However, regarding the already refitted items there were both the examples of core flaking and tools production (mainly burins and burin spalls) as well as the fitting of cracked artefacts. It gives future prospects.

A very valuable part of the work is spatial analysis and presented density maps. They were made for the whole site, for both assemblages, with a distinction between the artefacts coming from the intact layer and those found in the contemporary soil layer. Separate maps for different categories of artefacts were prepared. The series of maps with densities allows us to observe scattering of individual categories of artefacts, which along with other data (use-wear traces on tools, burned elements...) may provide the basis for presenting the functional diversity of space. However, there is no comprehensive commentary and interpretation of the results in this research.

The last issue in the chapter is a summary – an attempt to interpret the site in terms of function, residence time and number of stays and its interpretation in a broader context. The researchers used both the data presented earlier and those that were discussed in subsequent parts of the book, which of course is not an allegation here.

The whole chapter is complemented by numerous figures presenting flint and stone inventory.

The remaining chapters are much shorter. They discussed the following matters: methods of data digitalization from the site (M. Zawadzki, A. Sabat, T. Wiśniewski), results of traseological research (K. Pyżewicz) and sources for research on Paleolithic settlement of the upland part of the Lublin region after the last glacial maximum (J. Libera).

The short chapter on digitalization is devoted to the ways of preparing records of research and subsequent work related to its

digitalization as well as running a project website. It is a part devoted to the methods of documentation of an archaeological site, therefore, it seems that it concerns rather issues which should be included in the initial part of the monograph.

On the other hand, the chapter presenting studies on use-wear traces is valuable. The results of research of slightly more than 500 flint items were shown here, indicating post-depositional, technological and functional traces. It is worth mentioning that various types of artefacts were analyzed – cores and debitage as well as a large series of tools. Owing to the research, it was possible to identify the activities performed at the site – mainly related to the processing of animal carcasses and raw materials such as bone, antlers and skin, but also few traces associated with the treatment of plants. What is more, some artefacts (single blades) have been identified as products used to strike a fire. The descriptions are accompanied by photos of traces and a table with a detailed description of each analysed artefact.

The last chapter analyses the settlement after the last glacial maximum which presents sources coming most often from surface surveys as well as from accidental discoveries and amateur searches. Overall, there have been catalogued 195 sites, which can be associated with the very end of the Pleistocene and the beginning of the Holocene, and thus the period that is not directly related to the Magdalenian settlement.

The second part – “Natural environment” is devoted to natural issues such as the natural environment in the further and immediate vicinity of the site (P. Mroczek, J. Rodzik), absolute dating (S. Fedorowicz), soil analyzes (J. Rodzik, P. Mroczek) and micromorphology of soil profiles and grain size of loess deposits in the vicinity of the camp (P. Mroczek). The last chapter considers the use of GPS and GIS in the study of the site (P. Zagórski).

Chapters regarding geology and pedology aim to reconstruct environment of both further and immediate vicinity of the site. These findings were based on field, cabinet and laboratory studies on collected samples. Research methods are discussed in the text. On the basis of the research, contemporary terrain of the site's surroundings has been described and the Pleistocene terrain has been reconstructed. The analysis indicated that the site was located in the area covered with loess patches formed by loess blown in the last glaciation, in the end

of eolian sedimentation. It was situated on the flattening of the slope, in the most favourable place: as warm as possible, with easy access to water and with diverse environmental characteristics. It is important to reconstruct the Late Pleistocene terrain (other than contemporary one), as well as to identify and describe cryogenic structures whose presence was also noted within the site, together with the reconstruction of water relations, which were different from contemporary period in micro-scale, and at the same time having a decisive impact on settlement possibilities. Research data on vegetation comes only from literature usually referring to areas not directly adjacent to the site. It was a tundra zone, probably with trees. Soils, including soil levels from the site, were identified and characterized.

It should be emphasized that geological and pedological studies involved the execution of enormous field work, analyses of over 100 profiles and studies of plenty of samples. In total, a series of chapters consists of a comprehensive and deep discussion of natural issues related to the environment and the site itself.

A separate topic of this part of the book is absolute dating. The age was determined by the use of C14, TL and OSL methods. These methods are described inside the text. The dates, obtained by means of aforementioned methods, are presented here and interpreted. Places of taking the samples are shown in the photographs. This is a development of information already contained in the first chapter of the monograph. Summarizing them, it is worth mentioning that as for the group of dates there are two age ranges: older – corresponding to the Final Pleistocene and, at the same time, dating of the site in Klementowice and much younger determination which cannot be connected with Palaeolithic settlement. The most important for the study is the date C14 Poz-54 82 which gave the value of $12\,730 \pm 90$ BP. This is the first absolute date for the Klementowice determining the age of the site that falls into the period GS-2a and thus preceding the warming GI-1e (Interstadial Bølling / Meindorf), for which the complex was dated on the basis of typological features. This determination is extremely important also from the point of view of the research on the entire eastern province of Magdalenian.

The third part, titled “Animal remains” consists of four chapters. It includes an archeozoological and taphonomic study of animal remains (J. Wilczyński), an analysis of seasonal horse migrations (A.J.E. Pryor, R.E. Stevens, A.W.G. Pike) and seasonality of the camp (M. Nývlatová-

Fišáková) and mitochondrial DNA coming from a horse tooth found in Klementowice (M. Gryzińska).

Only 83 pieces of bone remains, teeth and bones of horses were found on the site. These remains are poorly preserved, partly as a result of post-depositional processes, and partly due to the intentional fragmentation of them by the users of the camp, which makes the research difficult. The remains were found in both assemblages, and their location indicates that they are almost certainly related to the Magdalenian settlement. Next chapters are devoted to various studies considering various issues, both natural and cultural. Each chapter contains a presentation of the applied research methods, an analytical procedure and then discussion of the results. Scant amount and poor condition of the materials significantly limits the possibilities of research. Nevertheless, the authors managed to obtain valuable results, taking into account that the site in Klementowice is one of the very few in Poland where any bone remains were preserved.

The most important findings include identification of the number and age of individuals. There are at least two horses; one adult (about two years old) and one young individual (under one year old), which was determined on the basis of teeth analysis. Some bones wear traces of intentional action related to the processing of the carcass. It is not known whether all carcasses or only selected parts were brought to the camp. However, it cannot be unambiguously determined whether it was the only species of game that might have indicated hunting speciation.

The analysis of isotopes (oxygen, carbon, strontium) obtained from the older horse's tooth allows the researchers to determine the time of slaughter (early autumn) and its origin from areas not located in the immediate vicinity of the site, which confirms seasonal migrations of animals. The season of the year in which the animals were slaughtered is also confirmed by the analysis of the teeth. Moreover, it is the same time when the camp functioned. However, mtDNA studies did not deliver any results until the publication, apart from the recorded fact that such attempts to receive this research from one of the preserved teeth took place.

Part four: "Petrography and mineralogy" is devoted to the petrographic research of stone artefacts (L. Gazda), chipped artefacts made of siliceous rock (L. Gazda, M. Huber) and red ferrous raw materials and "black crusting" on the surface of artefacts (J. Trąbska, A. Weselucha-Birczyńska,

B. Trybalska). Petrographic analyses allowed for the identification of raw materials and sources of their origin. Considering non-siliceous rocks, it is worth mentioning mainly different types of sandstones, quartzites and few igneous and metamorphic rocks that are not quartzites. All these rocks are associated with glacial sediments and they were probably obtained in the near vicinity of the site; therefore, it is possible to talk about the use of local raw materials. What is more, analyses of selected artefacts made of atypical siliceous rocks, other than flint material, allowed the researchers to locate probable sources of their occurrence. These are most often areas of the Świętokrzyskie Mountains. Implemented methods, based on microscopic analysis (SEM scanning microscope) and chemical analysis (EDS), allowed for identification of rock origins, which would be impossible with the use of macroscopic observations only. At the same time, it is an example that some raw materials, considered often as long-distance imports, are in fact rocks exploited locally or relatively close regions forming part of the exploited territory.

Equally important are analyses of ferrous raw materials, often described in the archaeological literature as “ochre”. Detailed studies (RLM, PLM, XRD, SEM / EDS methods) of six artefacts allowed to determine their types, chemical composition, features and properties also useful from the point of view of users as well as sources of their origin. What is more, their possible usage was also discussed here. The research included several types of artefacts: artefacts (lumps), and microartefacts collected from the surface of flint products and sediments.

The research also covered black organic and inorganic substances occurring in the form of crusting on the surface of artefacts or in the form of lumps. Observations have allowed to indicate that residues of organic substances can be distinguished as prepared in an intentional way as well as natural black inorganic discolorations, which include, among others, manganese. The latter is also observed on the surfaces of stones in the form of a black coating.

The last part of the monograph is the Summary written by T. Wiśniewski, which is a tabular summary of information obtained during the research, as well as an the Annex, where the traces of the Neolithic, Bronze Age and modern times settlement have been collected by T. Wiśniewski and B. Niezabitowska-Wiśniewska.

The monograph devoted to the site in Klementowice is certainly an extremely important item in the literature devoted to the Magdalenian

complex not only in Poland, but also in Europe, especially in Central Europe. What is more, the publication of the thesis in English broadens the group of recipients and allows it enter the wider circle of information regarding this important site. It is necessary to emphasize the very large interdisciplinary nature of the study. Extensive natural research has allowed the researchers not only to reconstruct the environment, but also to obtain information that might have escaped completely our attention, such as the issue of the origin of rock materials or the issue of black crusting on artefacts. Undoubtedly, a great element of the book are figures, tables and plans. Tables are an extremely important component here due to the fact that they include a huge part of the results of all research. What is more, the summaries written at the beginning of each chapter facilitate the orientation in its content. Valuable elements are also presented introductions to research methods every time, even if they seem a bit too extensive in some places (e.g. discussing subsequent methods of absolute dating).

The work has accumulated a huge amount of data. Its weaker part, especially in the archaeological part, is the discussion and interpretation of the results, including those presented in the tables. Some of the information was not discussed at all, for instance the weight of raw materials; given in the tables when discussing various groups of artefacts, it was not commented. On the other hand, other information, such as those concerning raw materials, are repeated in several places. Moreover, figures indicating places from which samples have been collected for absolute dating are also repeated.

One can also consider the monograph construction and the order of subsequent chapters. Some of them, e.g. a chapter regarding data digitization or the use of GPS and GIS should be included in the initial part of the book. An arrangement proposed by the authors makes it difficult to read, disrupting the internal logic of the disquisition. Similar objections can be raised in some parts of the book to the process of narration. The missing element in this thesis is presenting the site in a wider cultural and settlement background.

The aforementioned monograph, despite some shortcomings and deficiencies, largely unavoidable in case of such a large work prepared by a large team of researchers, is an important and valuable study, obligatory for all researchers involved in both the Magdalenian complex and the beginnings of the Final Pleistocene.

