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## REVIEWS AND SHORT REVIEW NOTES

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(Review) Janusz Kruk, Tomasz Oberc, Kathryn M. Hudson and Sarunas Milisauskas, *Neolithic Flint Technology at Bronocice (4<sup>th</sup> millennium BC)*. Kraków 2023: Institute of Archaeology and Ethnology. Polish Academy of Sciences, 314 pages, 33 tables, 55 figures, 37 plates, ISBN: 978-83-66463-78-3

The Neolithic site of Bronocice, situated on the western loess uplands of Małopolska, holds a particularly significant position on the archaeological map. Prior to the more recent commencement of research before highway construction, the spatial scope of investigations conducted there had no counterparts in post-war Polish archaeology (except for the sites in Olszanica and Iwanowice, which were examined as part of the same international project). As a result of excavations at this impressive site between 1974 and 1978, a vast array of diverse archaeological artefacts and ecofacts were obtained, along with information on the natural environment and both natural and anthropogenic transformations thereof.

The Neolithic site of Bronocice has been the subject of monographic publications, numerous papers, conference presentations, post-conference publications, and various commemorative works. Materials from Bronocice have served as the basis for studies dedicated to various aspects of the life and activities of Neolithic community, including economy, social organisation, demographic estimates, and various forms of human-environment interaction and their outcomes. The discovery of the depiction of a wagon on one of the vessels earned well-deserved international acclaim. Findings regarding the dating of the settlement in Bronocice serve as an important reference point for research into Neolithic chronology and cultural changes in the 4<sup>th</sup> and 3<sup>rd</sup> millennia BC.

The discussed work represents the long-awaited introduction of comprehensive information on the lithic industry of the Neolithic communities in the area into the scientific literature. It consists of several sections divided into unnumbered chapters and subchap-

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ters, totalling 314 pages. The core of the work focuses on the lithic industry of the Funnel Beaker Culture and the lithic industry of the Funnel Beaker-Baden phases. Complementing this are 32 tables, 43 figures embedded within the text (photographs of lithic artefacts, charts), and 37 plates featuring illustrations of archaeological material. The work is written in English, but concludes with a condensed version in Polish. An integral part of the book is the Appendix authored by Piotr Mączyński and Sarunas Milisauskas, entitled “The Results of the Functional Analysis of Flint Artifacts from the Fortified Settlement of Lublin-Volhynian Culture at Bronocice”, accompanied by one table and 12 figures containing schematic drawings of lithic artefacts with marked locations of microscopic analyses and photographs of use traces.

Tables 16 and 17 serve as condensed databases of lithic artefacts from phases BR I-V, representing the Lublin-Volhynian Culture, Corded Ware Culture, and Trzciniec Culture. Table 16 contains information on 3634 artefacts, including their chronology, raw material, location details (specific section of the site where each artefact was discovered, object number, and depth), while Table 17 provides information on a significant (essential) set of 940 lithic materials. This includes typological classification, location, state of preservation, dimensions, cortex coverage (if applicable), weight, and, for end-scrapers, the angle of front inclination. Both tables are presented in two formats: printed, as a separate chapter, and digital, as MS Excel spreadsheets. As noted by the authors (p. 8), this facilitates the use of these materials and helps verify the findings presented in the book. Importantly, it greatly facilitates the comparison of lithic production data from Bronocice with materials from other sites.

The introduction to the main part of this book consists of two short chapters addressing the issues of the work and providing basic information about the Bronocice site. Subsequently, details are presented regarding the selection criteria for materials for analysis (excluding items with a diameter smaller than 1 centimetre) and the quantities of specimens discovered in various sections of the site (Table 3). Information is also provided on the number of lithic artefacts discovered in different sections of the site from successive phases of the Bronocice settlement (Table 4, 5, Fig. 4, including materials from the Lublin-Volhynian Culture, Corded Ware Culture, and Trzciniec Culture). Chronological and spatial contexts are analysed with respect to materials classified into four basic typological groups (pre-treatment, hammerstones, typological tools, blanks, debris, and atypical utility artefacts). The chronological assignment pertains to dating within phases BR I–BR V. Spatial contexts include: ‘cellar’, ‘waste pit’, ‘other features’, ‘ditch’, and ‘burial’. Nearly half of the lithic materials come from two pits mainly containing waste from flint workshops. These inventories, from Features 2-Bd and 1-B8, are analysed separately. Such an organisational scheme is applied to describe materials from successive chronological phases of the settlement at Bronocice (Fig. 5; Tables 6, 7, 8, 9, 10). Additionally, the frequency of materials from various typological groups in features from phases BR I–BR V (excluding materials from Pits 2-Bd and 1-B8) is presented in Tables 11, 12, 13, 14, 15. An

important, albeit not extensive, part of the work consists of considerations regarding the utilised flint raw materials and their procurement locations. The authors highlight the fundamental importance of Jurassic flints from the central (Jurassic flint variety G) and southern parts of the Kraków-Częstochowa Upland, with significant variability observed in both groups. Complementing these are artefacts made from Świeciechów and Volhynian flints, while specimens made from radiolarite and obsidian are rare. The authors emphasise the difficulties in identifying the raw material components of the material, caused by factors such as patina or layers of calcite deposited on the surface during post-depositional processes.

A detailed discussion of lithic technology begins with a chapter featuring a typological analysis. The materials have been classified into two sets: the real set (actual), comprising 3624 artefacts (Table 16), and the essential set (943 artefacts, Table 17). These sets exclude materials from the workshops in Pits 2-Bd and 1-B8, which are discussed separately. The analyses are preceded by a presentation and justification of the assignment of materials to the first or second set, as well as a characterisation of specific forms (flake functional tools). The materials were analysed within several typological-technological groups, considering the context of artefact deposition, the raw materials they were made from, morphometric characteristics, and chronology. A similar analytical scheme was applied to all lithic artefacts from Bronocice. The first group includes pre-treatment types, pre-cores, cores, and axe roughouts. Splintered pieces, numerous at the Bronocice site (particularly during the Funnel Beaker-Baden phase), were analysed separately. Nearly half of the lithic artefacts are made from Jurassic flint variety G. According to the authors, the high frequency of this group of artefacts has practical justification. As they write (p. 40), "...the re-use of old tools was probably less trouble than trekking even the 50 km to the nearest Jurassic G sources".

The category of retouched tools encompasses all tools formed by retouching discovered at the Bronocice site. Individual types were analysed in the commonly used sequence in lithic material studies, including end-scrapers (numerous in Bronocice, mainly blade forms), burins, truncated blades, retouched blades, arrowheads (only seven specimens were discovered at the Bronocice settlement), perforators and claws, drills and blunt drills, side-scrapers and scrapers, notched and denticulated tools, multiple function tools, and undefined tools. Core tools were identified as a separate category, within which axes, chisels, and picks were placed. Graphic representations illustrate the size statistics of individual tool types in a clear manner (Figs 13, 14, 16, 18, 20). Spectacular pre-core and characteristic tools are presented in some excellently executed photographs (Figs 12, 15, 17, 19). Size categories of axes are included in Table 18, along with the frequency of axes made from different raw materials assigned to the successive chronological phases of Bronocice (Table 19). The next analysed group of lithic artefacts is represented by functional tools. Here, forms with and without retouch but with use-wear traces were classified and separately discussed, starting with flake forms and then blade forms. Chronological assignment, raw material characteristics, and information on the size of functional tools are

complemented by relevant tabular presentations. The typological analysis concludes with a discussion of tools and technical waste.

Special attention was given to the specific materials from two features with changing functions: Pit 2-Bd dated to phase BR III and Pit 1-B8 from phase BR IV. In both pits, materials from flint workshops located nearby were discovered, with 5763 specimens in the former and 3698 in the latter (these items were found not in their original deposition place, but in a secondary deposit). As noted by the authors, the possibilities for inference are limited, but it is possible to determine what was done in the workshops and what raw material was used. In the first pit, mainly remnants of production and repairs of four-sided axes made from Jurassic flint variety G were discovered, while the second pit features more diverse workshop material, also in terms of raw material, although items made from Jurassic flint variety G and waste from the production and repair of four-sided axes also dominate in Pit 1-B8. Tables 26, 27, 28 contain information on the distribution of materials within the fills, as well as typological and raw material characteristics.

The next part of the work concerns research on the function and use of lithic tools. Microscopic analysis was performed on 50 artefacts from phases BR I–BR V of the Bronocice settlement (Table 30), with 41 artefacts being assigned a function. As noted by the authors, this sample size is too small to draw conclusions regarding chronological and spatial variability, but it is sufficient to observe significant functional diversity among the analysed forms. In the analysed artefact assemblage, the following tools were identified: for processing meat and leather (scrapers, perforators, knives), for working with bone and antler (drills, chisels, burins), for working with plants (sickle inserts, knives, saws), for working with mineral materials, and arrowheads. The analysed artefacts are illustrated in Figures 23–41, which include carefully executed drawings of the artefacts with marked locations corresponding to the microscopic work traces depicted alongside the drawings. Importantly, the captions for the images include information about the magnification used. Discussions on the functional aspect are complemented by observations on tool modifications and wear traces. The summary of this part of the study includes presentations of simplified *chaines operatoires* schemes illustrating the use of lithic tools in the economy of Neolithic communities from Bronocice.

The chapter “Flint in Neolithic Settlements at Bronocice” offers an extensive summary of considerations regarding lithic technology at this site. It begins with compilations (Table 31) concerning lithic raw materials recorded in the inventories from Bronocice, and a few pages later, a typological-chronological compilation of lithic materials from this site (Table 32). Here, information regarding all Neolithic phases at the Bronocice site (BR I–BR V, L-VC, CWC) and materials from the older Bronze Age (Trzciniec Culture) is included. The authors formulate significant conclusions regarding the cognitive value of this category of archaeological materials and various limitations in inference. They note that only 1.7% of the site has been excavated. They highlight the results of geomagnetic surveys conducted in 2020 and 2021, which revealed a large number and high density of features. This

demonstrates the truly modest (though numerically impressive) pool of source materials from excavations conducted at this site compared to the vast quantity of Neolithic features and movable sources lying in unexcavated areas. They emphasise that this observation calls for caution when formulating general conclusions.

Important findings concern the typology and chronology of lithic materials, utilised raw materials, and flint processing in the settlements at Bronocice. Workshops were discovered in settlements from phases BR III, BR IV, and, as the authors suggest, they may have also functioned in phase BR V. However, the domestic final processing or repair of lithic tools was common. Regarding the sources of raw materials, particular attention is directed towards Jurassic flint variety G, the location of its outcrops, places of extraction, and workshops in the regions of material procurement. The quintessence of the summary is the characterisation of lithic production of Neolithic communities from Bronocice, formulated in eleven points.

Every work concerning Bronocice, especially monographs, is a significant archaeological event. Without a doubt, the publication of “Neolithic Flint Technology at Bronocice (4<sup>th</sup> millennium BC)” falls into this category. The academic community has received comprehensive information about an important economic and social aspect of Neolithic production. Despite various criticisms raised in the work, it is undeniable that the materials from Bronocice largely define the image of lithic technology in the Funnel Beaker Culture and the Funnel Beaker-Baden communities, not only in the western loess uplands of Małopolska. On the other hand, as the authors of this monograph point out, the conclusions presented do not exhaust the issues surrounding lithic technology at Bronocice.

“Neolithic Flint Technology at Bronocice (4<sup>th</sup> millennium BC)” is not only a highly important summary of the existing research on Neolithic lithic technology from the settlements at Bronocice. In my opinion (and I believe the authors share similar intentions), it also serves as an opening for future, perhaps already planned, research into this sphere of activity within the Funnel Beaker and Funnel Beaker-Baden communities from this prominent Central European Neolithic site.

