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Siliceous raw material from Bieszczady Mountains: Sources and use

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Lithic chipped materials discovered in the course of research in the Polish High Bieszczady Mts. carried out from 2012 are dated to the Late Neolithic and the Early Bronze Age. They represent several raw material groups: menilite hornstones, siliceous sandstones, siliceous marl, and the so-called Bircza flint. Sources of these rocks are located either in the Bieszczady Mts. or in the nearby vicinity. Individual raw material groups are not homogenous; the same kind of rock can have different physical characteristics, depending on specific sources. Consequently, their effectiveness as tool production raw material is uneven. All raw materials were utilized mainly locally.

KEY-WORDS: siliceous raw material, Carpathians, Bieszczady Mountains, Late Neolithic, Bronze Age

INTRODUCTION

Archaeological research in the Polish High Bieszczady Mountains was initiated in 2012[1], inspired by analyses of pollen diagrams indicating palynological traces of human activities in this region from about 3200/3000 BC (Ralska-Jasiewiczowa 1980). These observations did not correspond with prehistoric evidences which had been until then totally unknown (Pelisiak 2013a, 2013b, 2014b; Parczewski *et al.*, 2013). Since 2012 research has been focused on palynological sites in Smerek and Wołosate, Bieszczady district and in the vicinity of Wetlina, Lesko district involving surface survey and analyses of LIDAR images which revealed the presence of a number of artifacts, including those from the Late Neolithic and the Early Bronze Age (Pelisiak and Maj 2013; Pelisiak 2014a; Pelisiak *et al.*, 2015). The varieties of raw materials used to manufacture these artifacts encouraged extending the scope of the research to include identification of the raw material sources to complement other studies on identification of Carpathian siliceous rocks and their use in the prehistoric times (Dagnan-Ginter and Parczewski 1976; Jarnot-Kozłowska 1988; Rydlewski 1989a, 1989b; Valde-Nowak 1991, 1995a, 1995b, 2009; Foltyn *et al.*, 1998, 2009;

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[1] Archaeological field work 2012–2015 in the Polish High Bieszczady Mountains were carried out by Andrzej Pelisiak, Institute of Archaeology, University of Rzeszów.

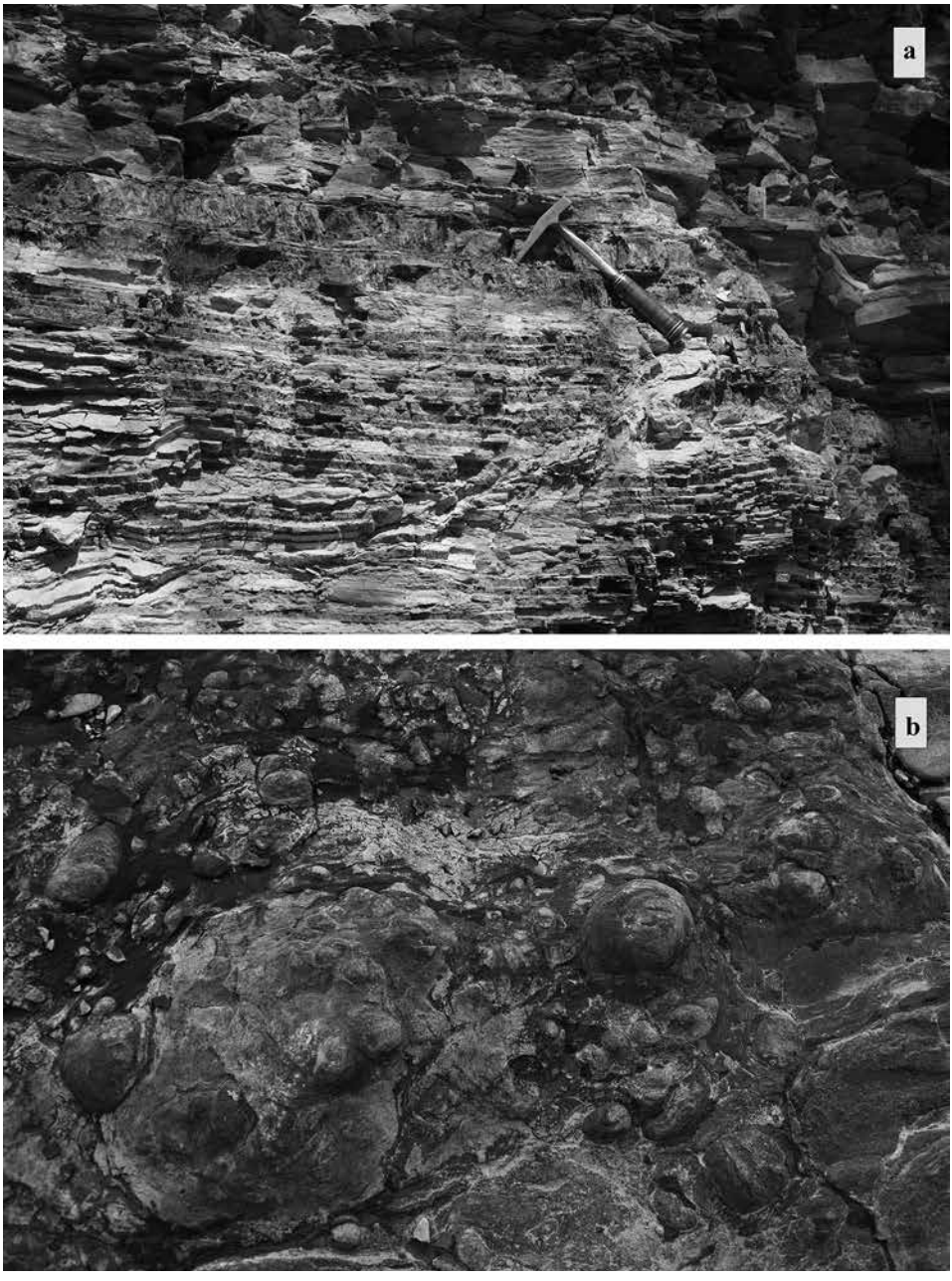

Fig. 1. Outcrop at Leszczawa Górna near Bircza, Przemyśl district, with black menilite hornstone and brown chert (a), and sources of mudstone at Wetlina, High Bieszczady Mountains (b).
Photo: A. Pelisiak and Z. Maj.

Budziszewski and Skowronek 2001; Łoptaś *et al.*, 2002; Pawlikowski 2009; Přichystal 2009; Foltyn and Jochemczyk 2013). Field work was carried out in the area of Dynów, Rzeszów district, Bircza, Przemyśl district, Baligród, Lesko district, and in the Polish High Bieszczady Mts. In the area of the Ulanica near Dynów, in a small quarry, a small outcrop of siliceous Dynów marl was observed. In the Krępak preserved area (about 6 km to NEE from the center of Bircza) there were sources of melinite hornstones, light brown cherts and siliceous rocks with macroscopic characteristics similar to so-called Bircza flint. Moreover, there were discovered possible traces of mining of those rocks in the form of depressions (shafts?) and heaps, with rocky debris, rock chunks and artifacts on the surface. Outcrops of melinite hornstones, brown cherts and siliceous rocks of Bircza flint type were discovered also in Leszczawa Górna, Przemyśl district (about 7.5 km south of Bircza; Fig. 1). In the region of Baligród (Rabe, Bystre) there are outcrops of Lower Jurassic siliceous rocks. In the Bieszczady Mts. the research was focused in the vicinity of Cisna, Lesko district, and Wetlina. Melinite cherts were documented in Cisna (close to the newly-discovered late Paleolithic stone processing site) and in Wetlina, in denuded parts valleys of the Wetlinka and Solinka rivers. In Wetlina, in the same river valleys, there were outcrops of quartzite, melinite hornstones, mudstones (Fig. 1), and – in one place – of siliceous marl. In addition, in Moczarne (administrative part of Wetlina), outcrops of siliceous sandstone were identified to the south of the housing area in Wetlina.

CHIPPED ARTIFACTS

Lithic chipped artifacts appear in various landscape zones, from the low terrace of the Wetlinka River valley to elevations and tops of the nearby hills, up to about 1200 m a.s.l. (Fig. 3). From the Wetlinka valley there is a blade fragment of quartzite (Pelisiak and Maj 2013), discovered on the left-hand low terrace of that river (Wetlina, site 12; Fig 2: d). The most elevated sites are located on the Połonina Wetlińska, Podkarpackie Povince (Pelisiak *et al.*, 2015). Among artifacts discovered in this area is a heart-shaped arrowhead of the melinite hornstone (Wetlina, site 6; Fig. 2: a). Artifacts were also found in a depression called the Orłowicz Pass – an endscraper made on a blade (Wetlina, site 23; Fig. 2: b), a splintered piece (Wetlina, site 26; Fig. 2: c), and a tool on flake (Wetlina, site 22; Fig. 2: e), all of them made from melinite hornstones. The highest number of artifacts were found on the Solinka River and the Beskidnik Creek (Pelisiak and Maj 2013; Pelisiak 2014a). From the area of the former village of Moczarne[2], Lesko district, there is a splintered piece of melinite hornstone (Wetlina, site 15; Fig. 2: f), and single finds of cores of siliceous sandstone (Wetlina, sites 17, 18, 19, 20, and 21; Fig. 2: h). In addition, a blade fragment of Bircza flint was found on the Pod Czerteżem Pass in

[2] The village was abandoned in 17th century. Now it is a small settlement for mountain forest workers.

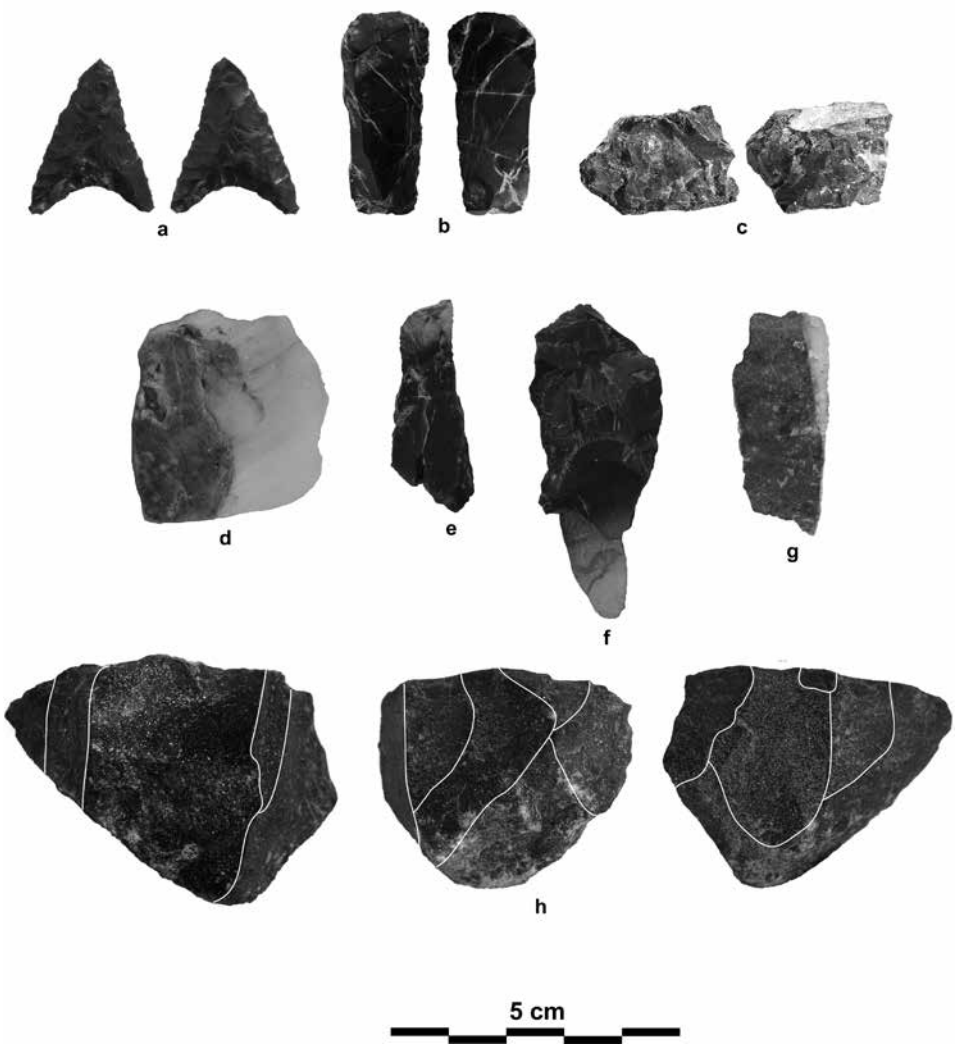

Fig. 2. Chipped artefacts from Wetlina village, Lesko district, and its surroundings (selected sites); a – arrowhead made of menilite hornstone from Wetlina, site 6 (Połonina Wetlińska); b – blade end-scraper made of menilite hornstone from Wetlina, site 23 (Orłowicz Pass); c – bipolar made of menilite hornstone from Wetlina, site 26 (Orłowicz Pass); d – fragment of blade made of quartzite from Wetlina, site 12; e – knife-like tool made menilite hornstone from Wetlina, site 22 (Orłowicz Pass); f – bipolar made of menilite hornstone from Wetlina, site 15 (Moczarne); g – fragment of blade made of Bircza flint from Wetlina, site 25 (Czerteż Pass); h – flake core made of siliceous sandstone from Wetlina, site 17 (Moczarne).

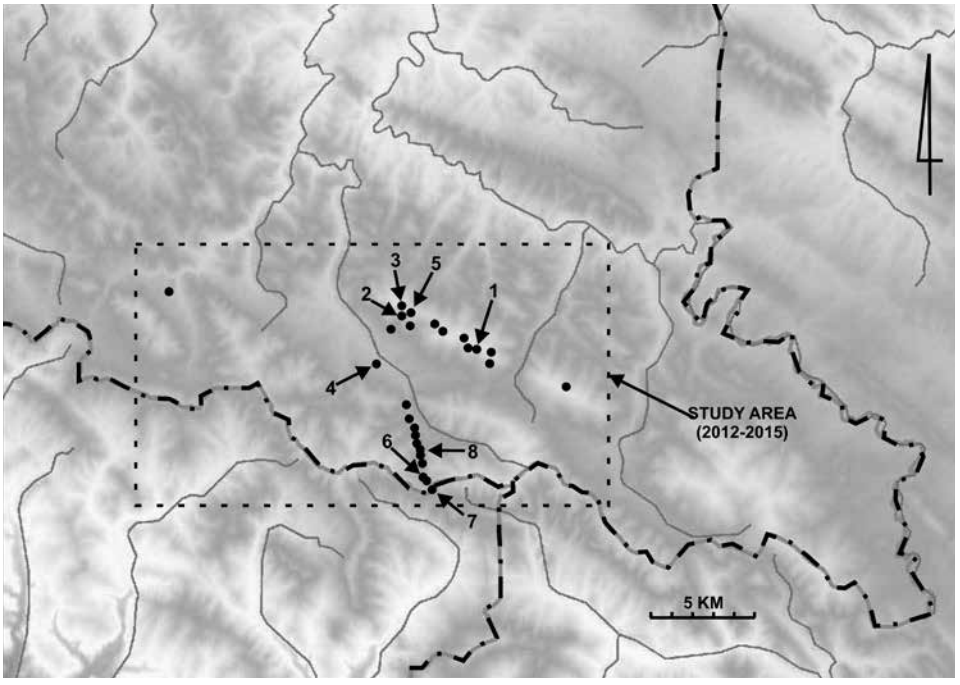

Fig. 3. Neolithic and Early Bronze Age sites with chipped artefacts from Wetlina village, Lesko district, and its surroundings (labeled sites according to Fig. 2); 1 – Wetlina, site 6 (Połonina Wetlińska); 2 – Wetlina, site 23 (Orłowicz Pass); 3 – Wetlina, site 26 (Orłowicz Pass); 4 – Wetlina, site 12; 5 – Wetlina, site 22 (Orłowicz Pass); 6 – Wetlina, site 15 (Moczarne); 7 – Wetlina, site 25 (Czerteż Pass); 8 – Wetlina, site 17 (Moczarne).

the main Carpathian range (Fig. 2: g). Research conducted in 2015, on the Połonina Wetlińska and in Moczarne, revealed new evidence dated to the Late Neolithic and the Early Bronze Age. Of particular interest is a stone processing site focused on melinite hornstone discovered in Cisna, where a pre-form of a rectangular axe was found. An analogous site is known from Ropa (Valde-Nowak 1991, 1995b).

RAW MATERIAL

Raw material identification of all artifacts has not posed any problems (Fig. 4). However, distinguishing local rocks (i.e. originated from the Wetlina area) from those from other regions is problematic. In the first case we can say that the artifacts are most probably a local production in the second case – that they were fashioned somewhere else or brought as pre-forms or just as raw material for processing. In general, the presence of artifacts made from non-local raw materials in the area in question is interpreted

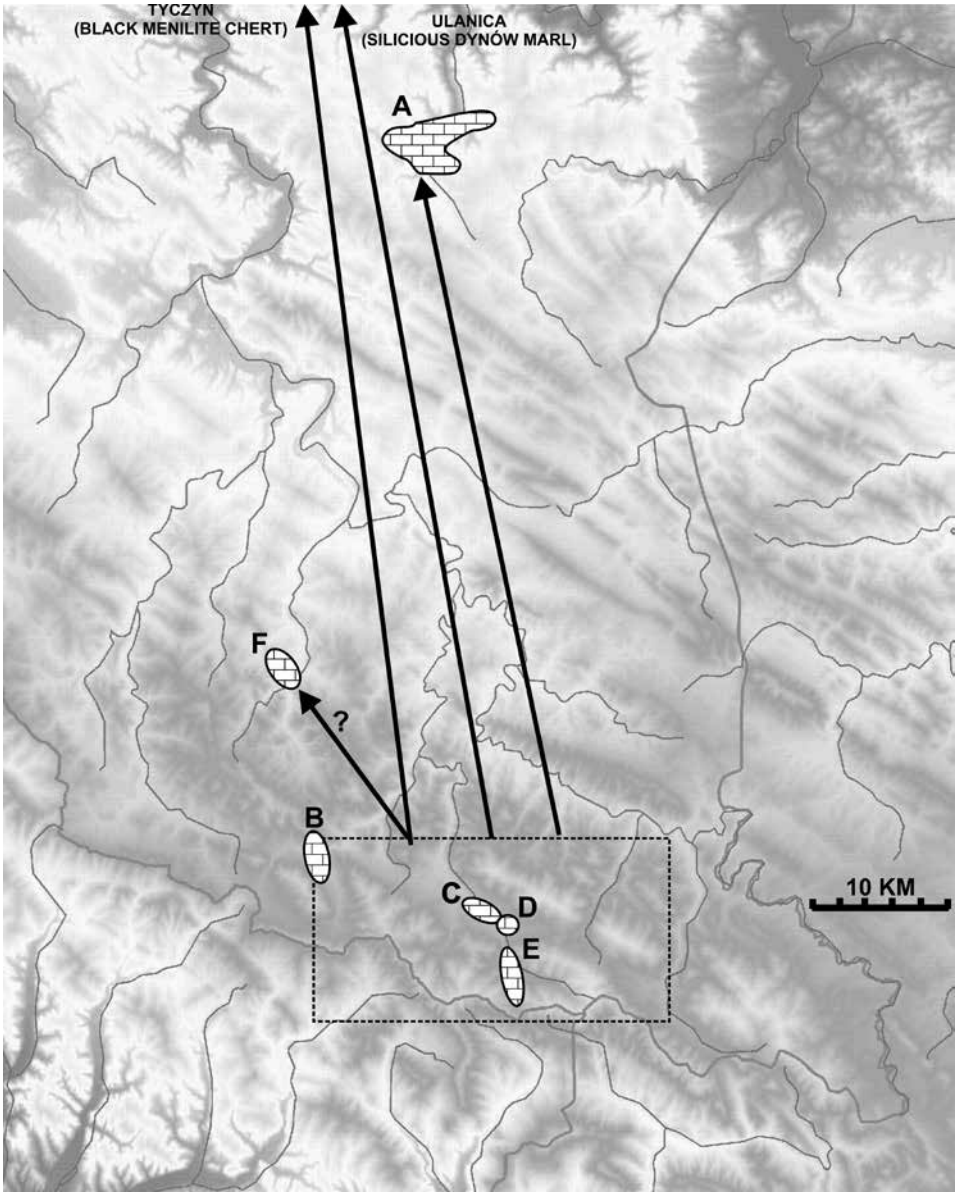

Fig. 4. Sources of raw material recognized in the Neolithic chipped artefacts found in the Wetlina, Lesko district, and its vicinity (study area). A – Bircza region, Przemyśl district (Bircza flint, menilite hornstones, brown-yellow tertiary cherts, tertiary siliceous marls), B – Cisna, Lesko district, and its vicinity (menilite hornstone), C – Wetlina, Lesko district (menilite hornstone, quartzite, mudstones), D – Wetlina, Lesko district (siliceous marls), E – Wetlina-Moczarne, Lesko district (siliceous sandstones), F – Bystre, Lesko district (Lower Cretaceous silicites).

as traces of transhumance (Pelisiak 2013a, 2013b, 2014a, 2014b; Pelisiak and Maj 2013). For that reason identification of the sources of raw materials is linked with a broader prehistoric issue – identification of territories of origin of Late Neolithic and Early Bronze Age pastoral people.

An example of an artifact of undoubted local provenience is the fragment of a blade of quartzite. Quartzites appear in high undercuts of the Wetlinka River valley, in dissected, steep river valley slopes usually in horizontal veins up to 20 cm thick, as well as in the immediate vicinity of the find. They are almost white and milky-grey in color, coarse-grained and opaque. It can be assumed that the artifact in question was most probably made at that place. The same can be said about cores of siliceous sandstone from Moczarne. Siliceous sandstone is fine-grained, and gray in color. Outcrops of that rock appear in beds of the Beskidnik Creek and the Solinka River (near the place of artifact discoveries) as almost vertical slabs up to 20 cm thick. Although difficult to flake when dry, wet blocks of siliceous sandstone extracted from the river-beds were easy for processing using chipping techniques. Cores from Moczarne should be dated to earlier periods of the Bronze Age. It is noteworthy that during the early Bronze Age sandstones rocks from Carpatian Flysch Belt formations were commonly used for producing tools (e.g. *Krummesser*; Valde-Nowak 2003: 49) so we cannot exclude the possibility that the artifacts from Moczarne, discovered within a belt about 300 m long, were produced for local *and* non-local use. This possibility is supported by a find of a Krummesser fragment of siliceous sandstone in the same region in 2015.

Artifacts of menilite hornstones have been recovered frequently in the Polish Outer Carpathians area (Olszewska 1985; Valde-Nowak 1991, 1995a, 1995b, 2003, 2013; Kuśmierek 2005; Haczewski *et al.*, 2007; Jankowski and Probulski 2011). Menilite is a rock of diverse characteristics, not always suitable for lithic artifact production. The materials from the High Bieszczady Mts. confirm this observation; only the arrowhead (Wetlina site 6) was made of high quality raw material, from a homogenous mass without inclusions or cracks. The other artifacts represent raw material of much inferior quality, supporting the supposition that rocks used for artifact production came from different sources. The closest outcrops of menilite hornstones are known from Wetlina and Cisna, where evidence for its processing also has been documented (Fig. 5: d–f). Exposures of menilite hornstones were discovered on steep slopes of the Solinka and Wetlinka rivers valley as well as on the dissections of adjacent hill. This material is black and dark-brawn in color, low transparent, and crumbling appearing in horizontal layers up to 15 cm thick interbedded in Carpatian Flysch Belt formations.

The so-called Bircza flint has been characterized from geological and archaeological points of view (Gucik 1961; Rajchel and Myszkowska 1998a, 1998b; Łoptaś *et al.*, 2002). As currently used, this term encompasses a group of flints of various physical characteristics and value for prehistoric tool manufacturing . This diversity is to a certain extent reflected in the outcrops identified so far (Łoptaś *et al.*, 2002: 324, 331), and those

Fig. 5. Samples of siliceous raw material from the eastern part of the Polish Carpathians. a-c – light-grey hornstone (a – Wetlina, Lesko district; b – Bircza, Przemyśl district; c – Leszczawa, near Bircza, Przemyśl district); d-f – menilite hornstone (d – Bircza-Krępak, Przemyśl district; e – Leszczawa, near Bircza, Przemyśl district; f – Cisna, Lesko district).

discovered during the recent research. Research is planned to better specify to physical and chemical characteristics of different variants of this raw material. In addition to Bircza flint, enilite hornstones and light-brown chert and siliceous marls exposures were recognized in the Bircza region (Fig. 5: a–c). The light-brown chert is matte and opaque with a cortex not delineate from the chert mass. This raw material is harder and compact, and better suited for artifact manufacturing than menilite hornstone. Menilite hornstones and chert appear in Leszczawa outcrop in form of layers up to 15 cm thick. Both black and dark-brown menilite hornstone as well as brown chert appear in horizontal layers interbedded in Carpatian Flysch Belt formations.

SUMMING-UP

The eastern part of the Polish Carpathians, including the Polish High Bieszczady Mountains, contains an abundance of siliceous raw materials. During the field research conducted during 2012–2015 in the Bircza region and in the High Bieszczady Mountains previously undocumented outcrops of melinite hornstones, brown cherts, siliceous sandstones, mudstones, and siliceous marls have been found. In addition, more than 30 archaeological sites, dated to the Late Neolithic and early periods the Bronze Age, have been recorded exclusively in the High Bieszczady Mountains. These new data significantly augment our knowledge of the prehistory of the region, in addition to documenting the presence of prehistorically important raw materials, such as the Bircza flint and the so-called Dynów marl. At the same time the research has revealed great gaps in knowledge of prehistoric raw materials of the region in question. These gaps will require more detailed studies in the near future.

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