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## **The Exploitation and Distribution of Flints From the Central Part of Polish Jura in the Late Neolithic Times**

### 1. Introduction

During the prehistory of all over the world various kind of lithic raw materials were used to the tools production. The following paper is an attempt to understand the organization of flint exploitation in the central part of the Cracov-Częstochowa Upland (Polish Jura) and distribution of tools, blades and other blank made of these flints during the Late Neolithic in central Europe (late Funnel Beaker, Baden and Corded Ware cultures). The main aim is to reconstruct different aspects of the "flint activity" in the relatively small areas (of about 20 square km in size) near village Strzegowa and Barańskie Mountains (Góry Barańskie) (Fig 1). This will be done on the base of geological reconnaissance, archaeological surface survey of 1983, 1984, 1985, 1991, 1992 and archaeological excavations of flint workshops carried out at Pradła in 1985, Huta Szklana in 1986 and 1987, Strzegowa in 1992 and Biśnik Cave and Jasna Strzegowska Cave in 1991 and 1992 (Fig. 2, 3, 4, 5) (Kopacz, Pelisiak 1986, 1987, 1988, 1990, 1991, 1992; Pelisiak 1987, 1988a, 1988b, 1991, 1992, 1993–1994, 2002, 2003–2004).

Functional relationships between cave-sites, workshops, flint mines and deposits of flint raw material will be reconstructed in two separate regions: around Jasna Strzegowska Cave and in the Barańskie Mountains. The first one comprises an area of about 5 km<sup>2</sup>, and the second one, of about 4 km<sup>2</sup>.

### 2. The Flint Raw Material

Three kinds of local Upper Jurassic flints were exploited and manufactured in this complex. According to the typology of Jurassic flint by Kaczanowska and Kozłowski (1976) there were described as variants G1, G2 and G3.

G1. Light brown, similar in macroscopical features to the flint of type A from the southern part of Polish Jura (Kaczanowska, Kozłowski 1976). The nodules are various in shape and size, mostly irregular, up to 15 x 30 x 30 cm in size. Natural deposits were recognized at a distance of about 300 m ES and about 800 m N of Jasna Strzegowska Cave. It

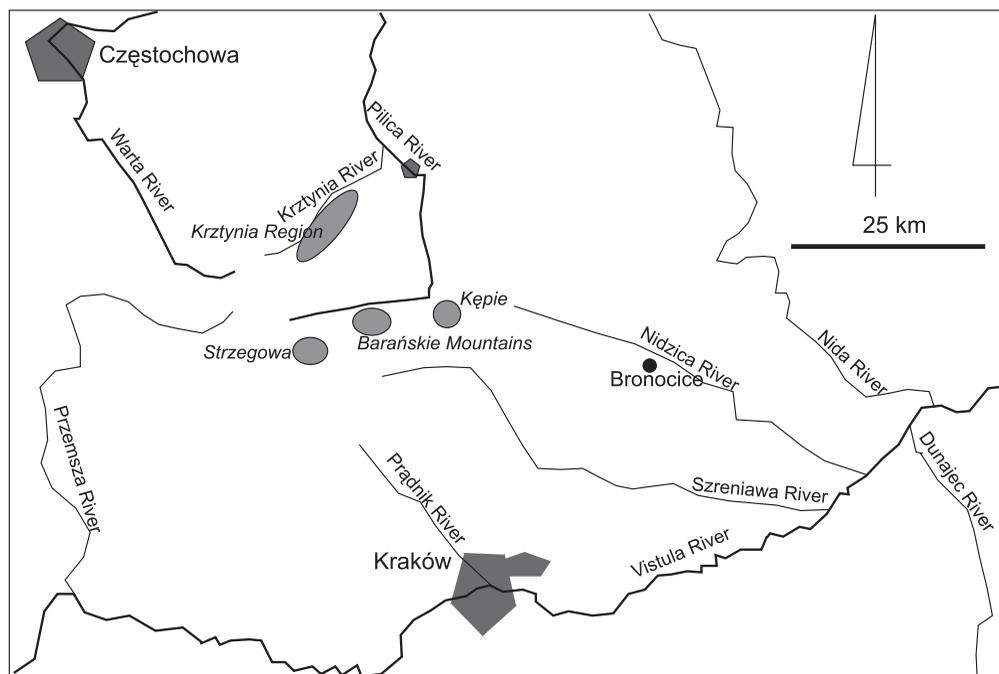
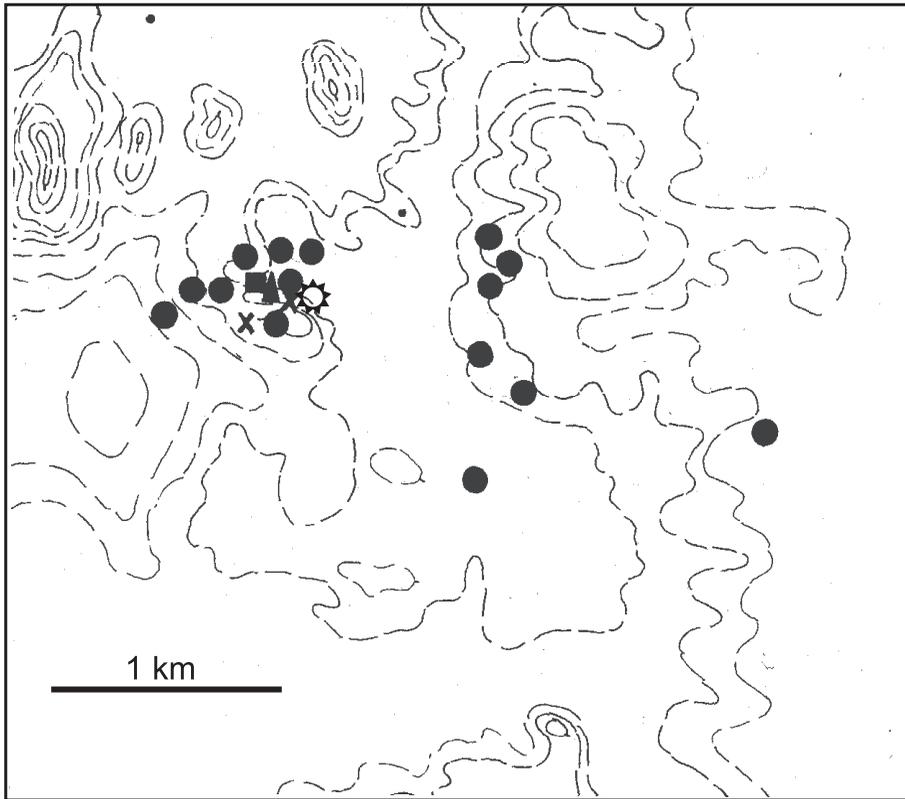


Fig. 1. Regions of mines of Jurassic flints of variant G and workshops of long blades and rectangular axes in the Central Part of Crakow-Częstochowa Upland.

was used in the Lengyel-Polgar complex and the Corded Ware Culture. Blades up to 12 cm in length were made of this flint.

G2. Light gray, the nodules various in shape, up to 40x40x70 cm in size. This raw material was used for manufacture of long blades and rectangular axes. The natural deposits were recognized near Jasna Strzegowska Cave as well as in Barańskie Mountains. It was exploited and processed in the Late Funnel Beaker, Baden and Corded Ware cultures.

G3. Light gray flint with dark spots similar to the variant G described by M. Kaczanowska and J. K. Kozłowski (1976). The nodules are various in shape and size. Some of them are biggest. Natural deposits were recognized near Strzegowa, in the Barańskie Mountains and in the Krztynia Basin. It was used for the production of long blades and axes by the Late Funnel Beaker, Baden and Corded Ware cultures.



1 ● 2 ● 3 ■ 4 ▲ 5 X 6 ⚙

Fig. 2. Strzegowa workshops region. 1 – single finds of flint artefacts, 2 – flint mines and workshops of Funnel Beaker and Baden cultures, 3 – workshops of Lengyel-Polgar Complex, 4 caves and rock shelters, 5 – camps and workshops of Corded Ware culture, 6 – camps and workshops of Mierzanowice culture.

### 3. The Jasna Strzegowska Cave and Workshops

The Jasna Strzegowska Cave is located in the upper jurassic rocky limestone complex. The main entrance to the cave is situated in the eastern face of the rocky wall. An area around Strzegowa different limestones are covered with loess up to 2 m thick, sands and residual clays. The first excavation of Jasna Strzegowska Cave were carried out by L. Sawicki in the late fortieth (Sawicki 1952), but the results have not been published. Sawicki had investigated the greater part of the cave

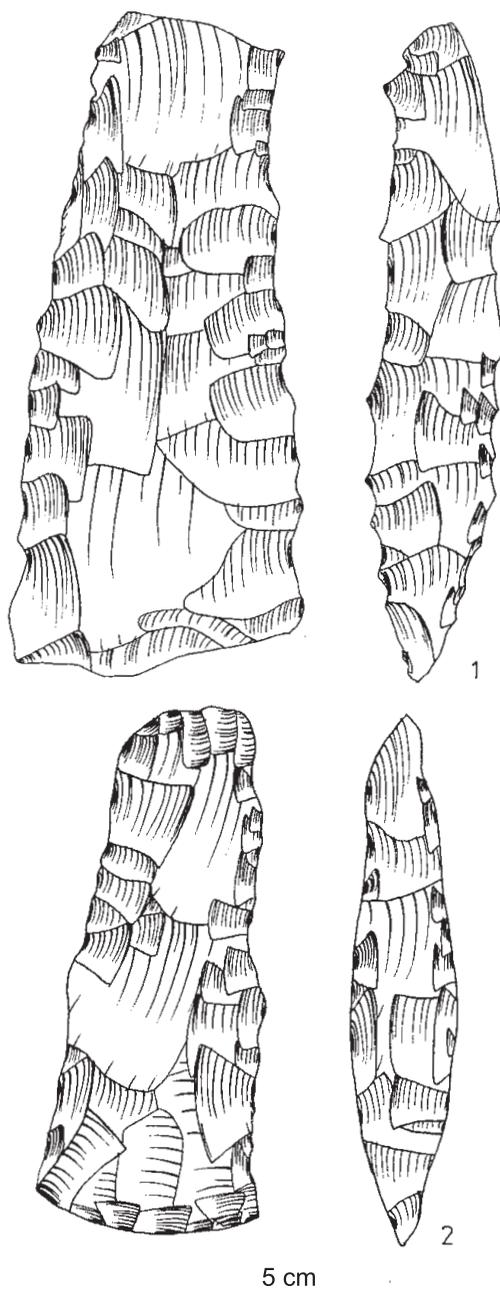


Fig. 3. Strzegowa site 42. Half-products of rectangular axes from workshops located above Jasna Strzegowska Cave.

revealing Middle and Late Palaeolithic assemblages. Moreover in the Holocene layers abundant traces of the Lengyel-Polgar, Funnel Beaker, Baden and Corded Ware inhabitations were found (Rook 1980). The discoveries included potsherds, bones, antler and stone artifacts, flint axes and blank. Waste of the production of cores and axes were scarce. The excavations carried out by K. Cyrek in 1991 confirmed these observations.

During the archaeological and geological reconnaissance in 1991 and surface survey in 1992, seventeen workshops fields were recognized in the neighbourhood of Jasna Strzegowska Cave. These workshops are located at a distance up to 2 km of the cave. One of them is placed on the elevation of the Strzegowska Rock. The workshops are located on variously directed slopes dissected by numerous ravines.

The workshops field on the elevation of the Strzegowa Rock was investigated by A. Pelisiak in 1992. On the excavation area of 110 m<sup>2</sup> seven separated flint workshops were recognized. About 50000 flint artifacts connected with production of blades and axes were found there.

The remains of flint axes production such as fan-like flakes, counter flakes negatives, overpassed flakes, forms with edge intentionally shaped on the dorsal face, half-products of axes and unfinished axes constituted the

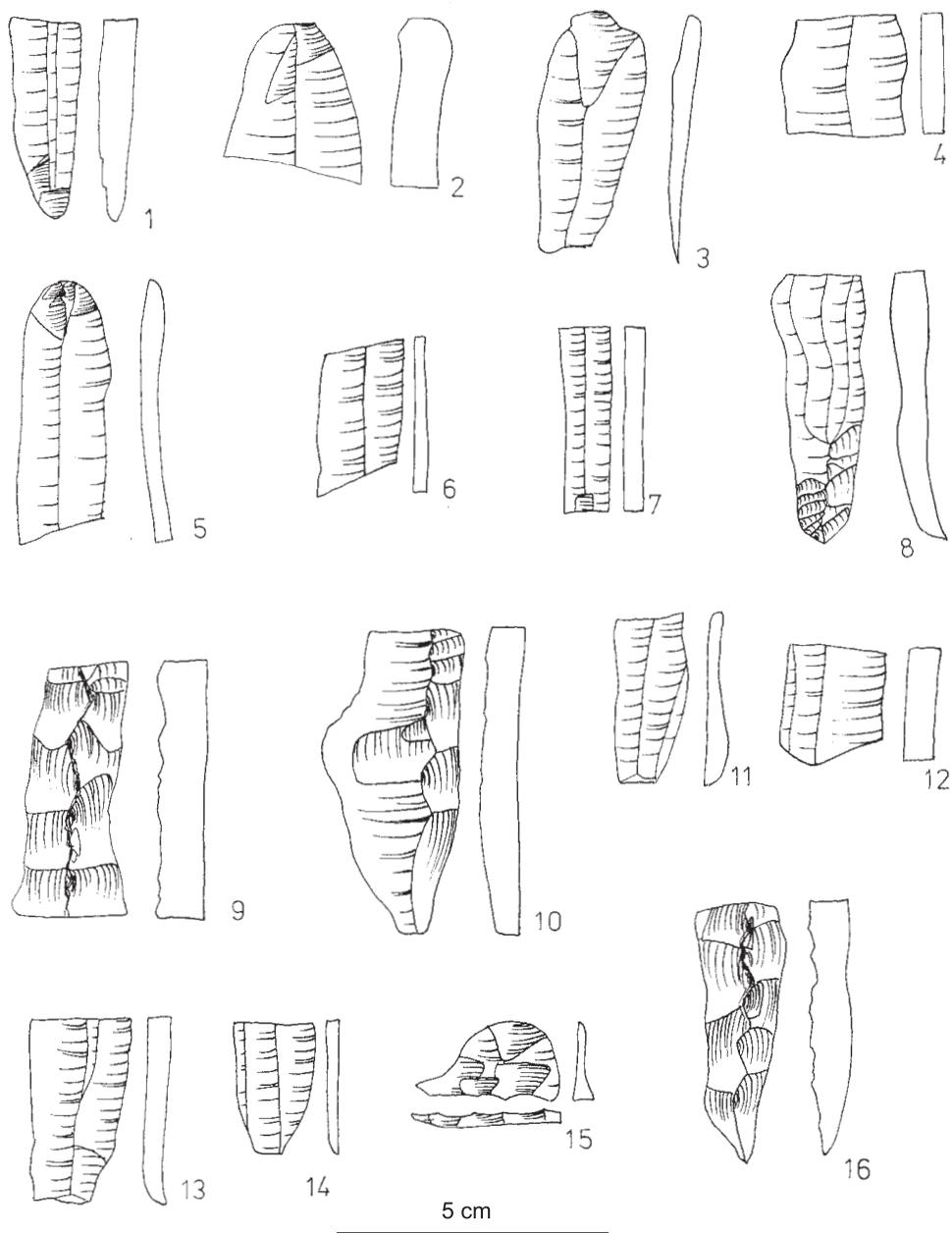


Fig. 4. Strzegowa, site 42. Selection of flint artefacts from workshops located above Jasna Strzegowska Cave.

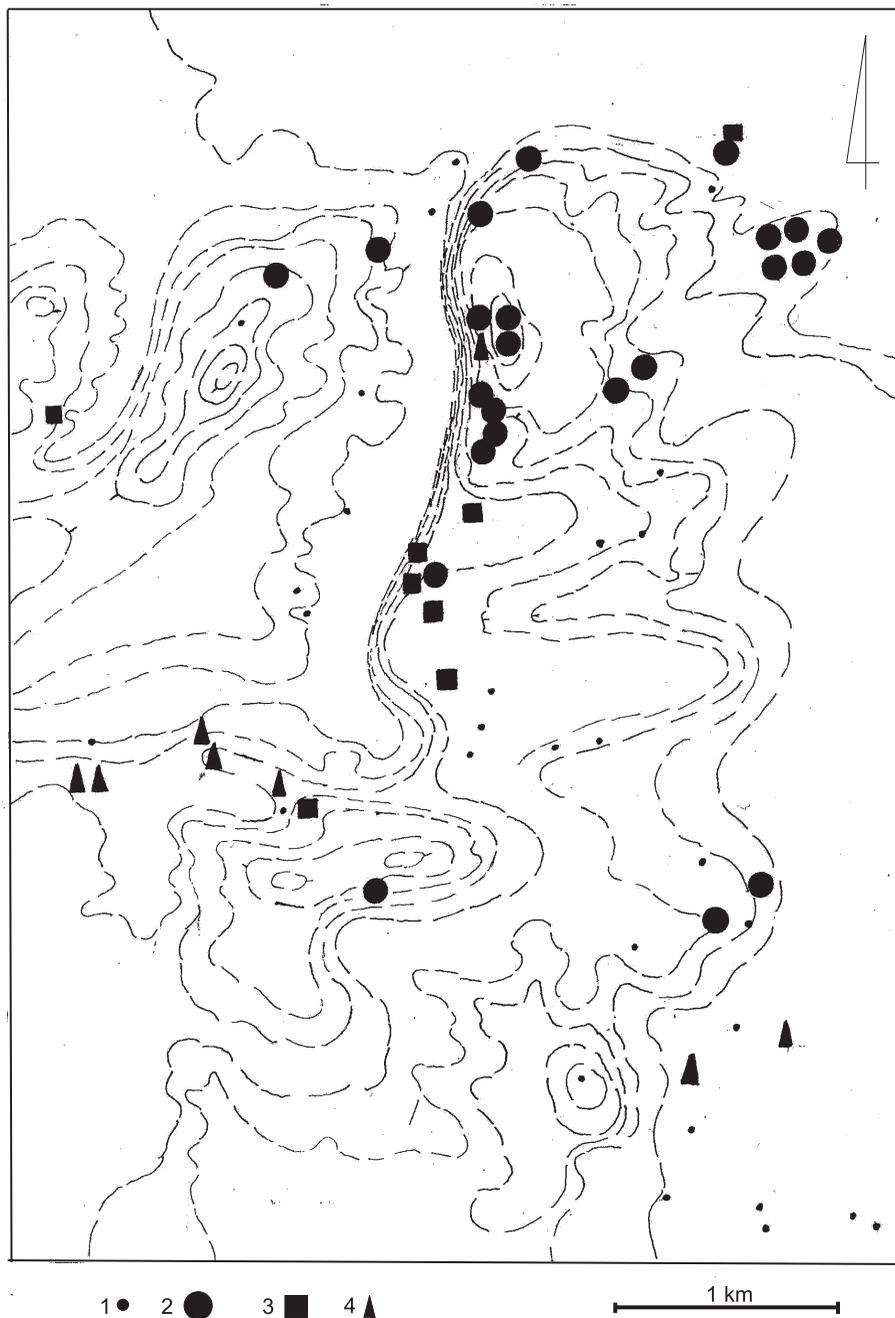


Fig. 5. Barańskie Mountains workshops region. 1 – single finds of flint artefacts, 2 – flint mines and workshops of Funnel Beaker and Baden cultures, 3 – workshops of Lengyel-Polgar Complex, 4 – caves and rock shelters.

strongest category of all. These features of specialized activities are the basis of the reconstruction of all stages of flint axe manufacture.

Using the results of the investigations of the flint axe production in the Krztynia Basin and the experimental studies (Kopacz, Pelisiak 1988; Beuker 1986; Hansen, Madsen 1983) it was possible to distinguish following stages of production:

1. Mining and selection of raw material.
2. Primary shaping.
3. Shaping of the half-products of the axes.
4. Final shaping of the axes.
5. Polishing.

#### 4. The Barańskie Moutains Workshops Complex

The second examined complex consist of two groups of workshops and flint mines located within area of about 4 km<sup>2</sup>.

The first group contains workshops and mines located near the east edge of the hills top and at their foot. The workshops on the top are connected with the flint mines. The flint raw material of variant G1 was exploited in this area. These sites first noted during a surface survey of 1992 offered an excellent opportunity to the study on the flint mining and processing in the Lengyel-Polgar complex. Single platform cores and blades of 7 to 12 cm length were produced in these workshops.

The second group of the sites includes workshops and probably mines of Late Funnel Beaker and Baden cultures. These sites are located on the northern slopes of the Barańskie Moutains. The raw material of variant G2 and G3 was used in this workshops region. Rectangular axes and long blades were made there. The material collected from the surface of the sites seems to indicate that all stages of axe processing and core preparations are represented in these workshops.

The workshops in the Barańskie Moutains concentrated near several small caves and rock shelters. Unfortunately a great part of Holocene deposits was found to have been disturbed but blade blank and remains of axe production as well as scarce potsherds were found on the surface. The material from the caves in Barańskie Moutains suggests that these sites were occupied in the same way as the Jasna Strzegowska Cave.

## 5. The Organization of Flint Exploitation in the Jasna Strzegowska Cave Region

The material from the Jasna Strzegowska Cave and the workshops in its neighbourhood provide interesting data to the study on the organization of flint exploitation, production and distribution. The cave have been repeatedly occupied for brief periods of time by probably small group of people. Contrary to the workshops, a relatively limited number of flakes and other refuse of core preparation and axe production were found in the cave. Blade blank is predominant in these assemblages. Besides of several unfinished but undamaged axes, various tools and potsherds were found. Such composition of cave assemblages suggests that the cave was used as a dwelling place. Flint production took place in the workshops outside the cave. The cores, blade blank, axes and unfinished axes were stored in the cave before being transported to the settlement (Fig. 6).

The functional relationships between the cave dwelling place site at Strzegowa and the workshops is confirmed by the following features:

1. Workshops, natural deposits of flint and Jasna Strzegowska Cave form a separate complex.
2. The cave is located centrally in relation to the workshops.
3. The distance between the cave and the workshops varied from 40 to 2000 m.
4. Flint assemblages from the workshops and from the cave are complementary to each other. Unfinished and unsuccessful axes, mostly broken blade blank and waste were found in the workshops; unfinished but undamaged axes, blade blank and tools were found inside the cave.

Two models of the organization of flint exploitation in the Strzegowa Region in the Late Funnel Beaker culture and Baden culture are suggested (Fig. 6):

1. The first one describes the location of the workshops outside the natural deposits of flint raw material. The cave was a dwelling place. Raw material was carried from its sources to the workshops (A). Blade blank and axes were brought to the cave and stored there (B). Blade blank and axes were brought to the settlement (C).
2. The second model refers to the workshops located at the outcrops of flint. Cave was a dwelling place. Flint was exploited and manufactured in the same area. Blade blank and axes were stored in the cave, and transported to the settlement.

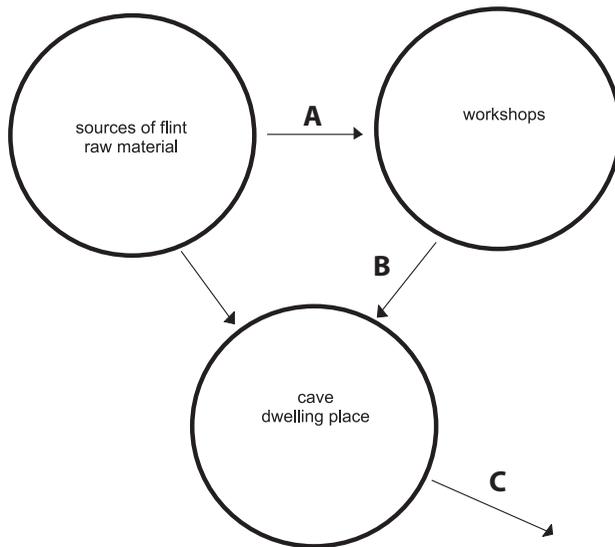


Fig. 6. Exploitation of flint exploitation and processing near the Jasna Strzegowska cave (late f Funnel Beaker culture and Baden culture). The workshops were located outside the natural deposits of flint raw material. The cave was a dwelling place. A – raw material was transported to the workshops, B – half products of rectangular flint axes and blade blank were brought to the cave and stored there, C – Blade blank and axes were brought to the settlement.

## 6. The Organization of Flint Distribution of Axes and Blade Tools of Flint from the Entral Part of the Polish Jura

The flints from the central part of the Polish Jura were mainly used by Late funnel Beaker and Baden communities in the western Little Poland Loess Upland. In the late phase of the Bronocice settlement microregion artifacts of these flints account for 60% – 100% of all assemblages. At the Baden Culture settlements near Kraków Nowa Huta artifacts of these flints account for 10% – 30% of all flint finds.

The rectangular axes, blades and blade tools were found at the sites of Late Funnel Beaker, Globular Amphora, so called Pit- Comb Pottery Marked and Corded Ware cultures. Such artifacts were recognized in Little Poland, Central Poland, Great Poland, Kujavia, the Carpathian Mountains and Slovakia (Kopacz, Pelisiak 1992; Pelisiak 1991). These sites are located up to 700 km from the natural deposits of raw material and from Funnel Beaker and Baden culture settlements in the West Little Poland Loess Upland (Fig. 7).

The distribution of tools and axes show following model (Fig. 8). A – West Little Poland Loess Upland and settlement of the Late Funnel Beak-



Fig. 7. Distribution of artifacts made of flint raw material from the central part of Cracov-Częstochowa Upland (variant G). A – the area more than 500 m below sea level, B – settlements region where the tools made of Jurassic flint of variant G were in general use- C – single finds of flint artifacts made of Jurassic flint of variant G. 1 – natural deposits of Jurassic flint variant G, 2 – west Little Poland Loess Uplands, 3 – southern part of Cracov-Częstochowa Upland, 4, 5, 6 – Carpathian forelands, 7 – Gostynin Lake District, 8 – Kujavia, 9 – Spis.

er and Baden cultures. B – groups of miners and producers moved to the area of sources of flint. C – region of flint mines and workshops. D – producers moved back to the settlements with tools and blank. E – part of the tools was exported out of the Little Poland Loess Upland settlements.

The large scale production of the axes and blank in the Krztunia Basin, Strzegowa and Barańskie Mountains as well as flint mines

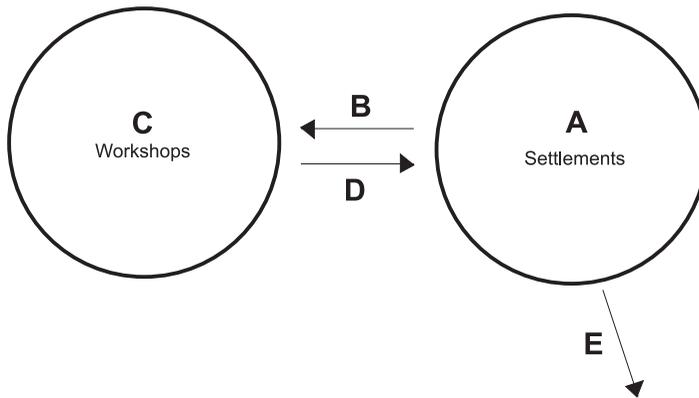


Fig. 8. The distribution of tools and axes made of Jurassic flint from the central part of Cracov-Częstochowa Upland (variant g). A – West Little Poland Loess Upland and settlement of the Late Funnel Beaker and Baden cultures. B – groups of miner and producers moved to the area of sources of flint. C – region of flint mines and workshops. D – producers moved back to the settlements with tools and blank. E – part of the tools was exported out of the Little Poland Loess Upland settlements.

recognized in these areas confirm specialization of flint mining and flint preparation. The caves like Jasna Strzegowska Cave were probably periodically occupied by rather small groups of highly organized miners and producers.

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## **Eksploatacja i dystrybucja krzemieni z centralnej części Wyżyny Krakowsko-Częstochowskiej w późnym neolicie**

### Streszczenie

W późnym neolicie Europy środkowej jednym z najważniejszych surowców krzemiennych były krzemienie ze środkowej części wyżyny Krakowsko-Częstochowskiej. Ich złoża po raz pierwszy zidentyfikowano na początku lat 80. XX wieku wzdłuż rzeki Krztyni. Odkryto tam również duży kompleks pracowni, w których wykonywano głównie siekiery czworościenne i długie wióry od rdzeni jednopiętowych. W trakcie badań powierzchniowych w otoczeniu Strzegowej odkryto następne kompleksy wydobywczo pracowniane w tzw. Górach Barańskich i w sąsiedztwie Jaskini Jasnej Strzegowskiej. Na podstawie informacji uzyskanych w rejonie Krztyni i rejonie Strzegowej wyodrębniono w ramach surowców ze środkowej części Wyżyny Krakowsko-Częstochowskiej trzy pododmiany oznaczone jako G1, G2 i G3, w nawiązaniu do pierwszej klasyfikacji krzemieni jurajskich (surowce te oznaczono jako odmiana G). W niniejszym opracowaniu scharakteryzowano kompleksy pracowniane w Górach Barańskich i w pobliżu Strzegowej. Na podstawie informacji z tych rejonów oraz z dorzecza Krztyni, a także ogólnej wiedzy o użytkowaniu i dystrybucji siekier czworościennych, długich wiórów i narzędzi z długich wiórów podjęto próbę skonstruowania modelu dystrybucji krzemieni G w późnym neolicie.