

REVIEWS

DEVELOPMENT OF PETROARCHAEOLOGY IN POLAND

J. Skoczylas¹⁾ and A. Prinke²⁾

¹⁾ Department of Geology, Adam Mickiewicz University in Poznań, Grundwaldzka 6,
Poland

²⁾ Archaeological Museum in Poznań, Stone Age Department, Wodna 27, Poland

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SUMMARY

The paper presents the review of the petroarchaeological research in Poland from its beginnings in early XXth century until nowadays. The output in this field, from the earliest macroscopic descriptions of raw-materials, through application of petrographic methods in examining prehistoric pottery and stone implements to the first comprehensive petroarchaeological monographs, was summarized.

The aim of the present paper is a systematic review of the published petroarchaeological studies, carried out in Poland until 1978. Such an aim is justified by two following facts:

1. Lack of the recapitulation of the hitherto obtained results of the use of petrographic methods in archaeology;

2. The necessity of summing up the Polish scientific output in this respect before the coming IInd International Petroarchaeological Seminary to be organized in 1980 in Wrocław by the Institute of Geological Sciences of the Wrocław University (chairman — doc. dr. hab. A. Majerowicz).

Today, petrographic researches of the archaeological finds are carried out in four Polish geological centres, i.e. in Poznań, Wrocław, Kraków and Warsaw. However, results of these studies are not yet widely known. For example, in the extensive monographs of J. Štelcl and J. Malina (1970, 1975) among 350 bibliographical positions from world literature on petroarchaeology, there are only 8 Polish papers; moreover, some of them do not deal directly with the use of petrography in archaeology.

One can suppose, that the unacquaintance of the Polish petroarchaeological research is due mainly to three following reasons:

1. In comparison with some other European countries, the cooperation between the archaeologists and petrographers started rather late, i.e. not before the beginning of the XXth century.

2. The reports on those studies were published in different archaeological

and geological, as well as in popular scientific journals, sometimes of a local character, and in specialistic books of low circulation.

3. Results of several researches still remain unpublished.

During last ten years the said cooperation reached already a considerable size and results. Polish journals published some reviews on the results of petroarchaeological studies abroad (Grodzicki 1978; Kowalski 1977; Prinke and Skoczylas 1975). Intensity of application of petrographic methods differed according to the kind of raw-material of the studied archaeological finds (clay, rocks etc.) and appeared to be the highest in the case of prehistoric stone implements.

The origins of the present cooperation between both disciplines can be traced back to 1904, when E. Majewski described several arrowheads discovered by himself as made of "crystalline quartz" and "smoked quartz" (Majewski 1904). However, those first attempts to introduce the petrographic terminology to archaeology had to be corrected later by S. Krukowski (1920), who determined then raw-material of the said implements as obsidian. In 1909 two then beginning geologists — J. Czarnocki and J. Samsonowicz — published the archaeological monograph of the Kielce district in Central Poland (Czarnocki and Samsonowicz 1909).

During the interwar period (1919—1939) the researches of interdisciplinary character were carried out mainly by three scholars: S. Krukowski — a prehistorian, J. Samsonowicz — a geologist, and L. Sawicki, who was a representative of both these subjects. They did not yet reach that level of integration which nowadays is called petroarchaeology. Due to initiative of S. Krukowski, a systematic archaeological and petrographic field work started as early as 1920. It brought in result discoveries of natural quarries of three popular Neolithic flint raw-materials, namely: of striped flint in the Holy Cross Mountains (Góry-Świętokrzyskie; in 1921), later — of quarries as well as of early mines of chocolate flint (1922), and, finally, of a quarry of grey, white-dotted flint (so called Świeciechów flint) in 1923 (Samsonowicz 1923, 1924). Effects of those discoveries enriched considerably the knowledge of prehistoric flint exploitation in Central and Southern Poland. Due to the endeavours of S. Krukowski and J. Samsonowicz, a law on protection of prehistoric mining sites was set up in Poland in 1928.

Also J. Samsonowicz initiated in 1921 the renewed archaeological and geological research of Góra Puławska massif, where an important Palaeolithic site was discovered. He found out that the implements from this site were made of Senonian marl formations, Jurassic and Astartian silica as well as of silica of northern origin (Krukowski 1922). Prehistoric flint raw-materials were also studied by another geologist — B. Halicki (1930).

A special place in Quaternary geology and in archaeology is taken by L. Sawicki (1893—1972). His scientific activity was concentrated along the borderline of both disciplines (E. Rühlex 1974). Although the range of the research methods applied by Sawicki was not quite identical with petroarchaeology, but his studies carried out since 1921 delivered the best example of the possibility and in some cases (for instant Góra Puławska) even necessity of integration of archaeological and geological research aims (Sawicki 1930).

First microscopic examinations of archaeological objects were carried out in Kraków by T. Reyman (1935, 1936), who published the results of the ana-

lyses of four thin slices of grey pottery. This type of studies was continued by Reyman after the war together with A. Oberc (Reyman 1959).

K. Smulikowski identified the type of raw-material of stone implements found in the graves of the Lusatian Culture (Wrzosek, Ćwirko-Godycki 1938). Also this tradition of research was continued after the war, first by L. Smoczyńska (1953) and M. Kostrzewska (1953). Latter author announces that 61 % of stone implements of Lusatian Culture from Wielkopolska (Great Poland) were made of basalt and diabase, while 27 % of gabbro and diorite, and 12 % of granite and gneiss. All these rocks, according to Kostrzewska, are of the erratic origin. K. Łydka (1956) carried out the microscopic study of the raw-material of stone implements from the Neolithic settlement in Gródek Nadbużny, based upon 24 analyses. In 9 cases, identification with respective sandstones from northern part of the Lublin Upland appeared possible.

In the early 1960s an extensive project of petrographic identification of stone building materials in Wiślica was carried out by A. Weber-Kozińska (1963) and B. Penkala (1963). It was disclosed, that different types of limestone and marl were brought from the distance of several dozen kilometres, i.e. from the quarries in Kamienna Góra, Wałcz and Pełczyska, to build particular parts of the Wiślica church. Besides numerous identifications of rocks in sacral architecture as well as in the quarries, observations gathered by both authors enriched the methodology of studies of stone raw-materials of archaeological finds (Weber—Kozińska, Penkala 1962). A. Grodzicki carried out the examination of stone building material of a barrow grave of Únětice Culture in Szczepankowice, that had been excavated in 1960. This author made also numerous petrographic identifications of archaeological objects, among others: of architectonic details discovered in St. Idzi Church in Wrocław and in Maria Church in Legnica; of rock material building the city walls in Niemcza (Grodzicki 1978). Besides, A. Grodzicki and J. Kaźmierczyk carried out excavations and mineralogical research on the medieval gold mining site (Kaźmierczyk and Gródzicki 1975, 1976). Several petrographic analyses for archaeological purposes in Wrocław research center were made by A. Majerowicz (1980 a, b).

Petrographic examinations of prehistoric and early medieval pottery were performed mainly in Kraków and in Poznań. Due to petrographic methods such facts as i.a. type of formation and grade of surface treatment in the pottery of the Roman Period from Igołomia production centre near Kraków could be established. Those methods were also used during research on tile technology (Dereń et al. 1974). Interesting information on the history of research on building pottery is contained in the paper by M. Wirska—Parachoniak (1970b).

In Poznań, K. Dębska-Luty and Grzegorzczak (1970, 1974) carried out the archaeological and petrographic studies on the early medieval pottery from Łąd and vessels from the settlement of the Lusatian Culture in Kotlin. They proved that, in order to define a petrographic character of a vessel of technology similar to that from Łąd, one should analyze several thin slices of a surface of 100 mm² each.

In 1971 a joint archaeological and petrographic research project on the use of stone raw-materials in Neolithic of the Mid-Western Poland was formulated

in the Stone Age Department of the Archaeological Museum in Poznań. The study included all Neolithic stone implements from collections in Poznań (Archaeological Museum, Archaeological Department of the Adam Mickiewicz University and Archaeological Department of the Polish Academy of Sciences) and in Toruń (Archaeological Department of Regional Museum). The aim of the first stage of research was to identify a kind of rock raw-material in particular implements. Due to the cooperation with Geological Department of the Adam Mickiewicz University in Poznań, 1557 macroscopic identifications were obtained, and subsequently controlled by a series of 45 microscopic analyses of thin sections.

The research proceedings consist of applying of three groups of methods: a) petrographic (macroscopic, microscopic and micrometric analyse), b) archaeological (typological and cartographic method), c) statistical (non-parametric tests chi-square and Smirnov's) (Prinke and Skoczylas 1978). The results of this research contain several new data on the Neolithic stone production (Prinke and Skoczylas 1974, 1975a, 1978; Skoczylas 1973). The whole problematics of the Neolithic stone-raw-materials was drawn up in three parts: a) exploitation, b) distribution, c) use. On the first stage of the research, a full raw-material structure of the stone production existing on the investigated area (for the whole epoch as well as for particular chrono-cultural groups) was reconstructed. It contains a list of 109 types of rocks, including 25 types of higher frequency (Prinke, Skoczylas 1979a).

Considering the question of provenience of studied raw-materials, three types of their origin were assumed: a) local erratics, occurring on a surface, b) imports from rock-bearing areas, c) rocks from primary Lowland quarries (loams, mainly — the siliceous Poznań loam). Imported rocks are of the greatest concern for an archaeologist, while they are connected with the broader economic problems, intercultural contacts and primitive exchange of goods. Therefore, in a said project one endeavoured to synchronize the Neolithic stone implements from imported raw-materials, found in the Lowland, with original quarries of those rocks. They were based on the results of the thin section method and micrometric analyse. By this way one ascertained the Neolithic imports of the plagioclase-nepheline basalt from its primary quarries in Western Sudeten (Lešna near Lubań Śląski) into the vicinity of Piła (northern Great Poland; distance ca 180—250 kms) and of the olivineless basalts from the neighbourhood of Równe in Volhynia (Ukrainian SSR) into the Western Kuyavia (600—700 kms; Prinke and Skoczylas 1978b, c; 1979).

According to the group of erratic raw-materials, one found their conscious, very distinct and strong selection in order to acquire the most useful kinds of rock. The rocks bearing the most desirable properties occur much more often in the analyzed series of Neolithic stone implements than in the collections of erratics from Polish Lowland (for example: diabase — 8,1 times more often, gabbro — 9,4 and crystalline schists — 7,5). Exploitation of the local erratic resources had, therefore, a rational character and showed a good assimilation of the Neolithic societies to the natural conditions of the Lowland.

By using the statistical tests one defined the variability occurring within the analyzed raw-material structure according to the geographic conditions (the investigated area was divided into six regions) and to the typological aspect (10 main types of stone implements). One can suppose, that such a model of

analysis will be appropriate for the whole area of the Mid-european Lowland

A new form of interdisciplinary cooperation in our country was a participation of two geologists in the field work of the Archaeological Expedition of Adam Mickiewicz University in Novae (northern Bulgaria), to identify the stone building materials used in the Roman fortress from Ist century AD (limy sandstones — 99 %, limestones — 1 %). One determined the differentiation of those materials and their distribution within the buildings. Identified limy sandstones appeared to be of local origin, while the nearest quarries of limestones occur ca 25 kms west of Novae, in the valley of Jantra River, and on the bank of Danube between Svištov and Ruse. One presumes that the limestones were transported along the Danube (Skoczylas and Walkiewicz 1974, 1976; Skoczylas, Tcholakov and Walkiewicz 1979; Walkiewicz and Skoczylas 1975).

Other form of petroarchaeological cooperation was initiated by Department of Geology of Adam Mickiewicz University (J. Skoczylas, Z. Walkiewicz) and Department of Geology of Plovdiv University (N. Tcholakov); in the years 1976—1980 a common project "Petroarchaeological research of prehistoric stone objects from the vicinity of Plovdiv" is accomplished. A similar cooperation is linked between the Department of Mineralogy and Petrography of the Wrocław University and the Section of Petroarchaeology of the J. E. Purkyně University in Brno (Grodzicki 1978).

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