

Natalia Skakun*, Hugues Plisson**

SOME RESULTS OF THE EXPERIMENTAL-TRACEOLOGICAL EXPEDITION AT BODAKI

ABSTRACT

Skakun N. and Plisson H. 2014. Some Results of the Experimental-Traceological Expedition at Bodaki. *Sprawozdania Archeologiczne* 66, 83–90.

During the Experimental-traceological expedition the Institute for the History of Material Culture of Russian Academy of Sciences conducted a wide-range of research of manufacturing techniques and the uses of ancient tools which include: studying the various ways of processing different types of raw materials, including large flint nodules for the manufacture of long blades, they examined different means used to make various types of tools, including inserts and compiled a reference collection of replicas of ancient tools and their different functions. The expedition had a summer school with a tutorial, educating the participants with the bases of use-wear analysis, a system of carrying out a full cycle of scientific experiments was organized: from choosing the raw materials, preparing for processing, producing the replicas of the ancient tools, studying the utilization of tools by means of the use-wear marks left on them and recording all the findings of the experimental-traceological researches.

Keywords: Experimental-traceological researches, the reconstruction of a production activity.

Received: 13.04.2014; Revised: 17.05.2014; Accepted: 24.07.2014

* Institute for the History of Material Culture of Russian Academy of Sciences, Palace Embankment. 18, 191186 Sankt-Petersburg; Russia; skakunnatalia@yandex.ru

** University of Bordeaux, France

Experiments aimed at studying the ancient methods of processing different raw materials (flint and other rocks, antler, bone, plant materials, clay and so on), the manufacturing of replicas of archaeological artifacts, and identifying their many uses, have been carried out by many researchers. The literature on the subject amounts to numerous books and articles, and some of their authors designate this direction of research as “experimental archaeology”. The systemic approach to experimental works in their close association with the study of functions of ancient tools was put forward by S.A. Semenov (Semenov 1957). His ideas were fully realized in the second half of the 20th century, when he organized annual summer expeditions (Semenov 1957; 1963; 1970; Semenov and Korobkova 1979; 1983; Korobkova and Schelinskiy 1996). These expeditions were necessary not only in order to further elaborate the method of traceological analysis of the functions of ancient tools, and to create a collection of reference specimens which would enable one to verify functional determinations, but also to study and reconstruct ancient technologies applied to different materials (Semenov 1957; 1959; 1965; 1968; 1974). Semenov’s experimental and traceological studies were distinct for their systemic nature, deep forethought, clearly stated objectives, and the urge to make the experimental milieu maximally similar to the ancient one. At that, the experiments were neither an end in itself nor a demonstration of the experimenter’s ability to make and use replicas of ancient tools; they were always aimed to solve specific research questions (Semenov 1963, 191–214; 1964; 1965; Semenov and Korobkova 1979). The participants of the experimental-traceological expeditions did massive work yielding important data on different methods of flint knapping, tool manufacture and usage, processing various kinds of stone, obsidian, bone, antler, ivory, shells, clay, wood, grass, weeds, cereals, and other substances. The necessary condition was the mass and serial character of the experiments as well as their ability to replicate. The same approach to experimental studies was also characteristic of G. F. Korobkova, who supplemented scientific field explorations with an educational program, which played an important role in the preparation of future traceologists (Korobkova 1974; 1975; 1978; 1978a; 1980; 1980a; 1994; Korobkova *et al.* 1982), many of whom have become highly qualified specialists (Korobkova 1991; Masson 2003).

In direct line with these traditions, we have conducted experimental works aimed at the study of the Early Metal Period materials (Skakun 1981; 1981a; 2006; 2008; 2008a). Currently the Experimental-Traceological Expedition is expanding the scope of its works in the Ternopol region of Ukraine, near the Tripolian settlement-flint workshop of Bodaki (Skakun 2004; 2006). In 2012, in addition to the field works, a summer school-seminar headed by the authors of this report was organized on the basis of the expedition.

The major objectives of the Expedition were as follows:

- 1 – the study of the methods used to obtain long blades from the local flint,
- 2 – the clarification of functions of some tools, and particularly inserts,
- 3 – the augmentation of the reference collection of replicas of ancient tools,
- 4 – the lecturing and educational program, including practical training.

Despite the existence of a large number of both theoretical and experimental studies, the reconstruction of techniques used to obtain long flint blades, characteristic of the inventory of many European sites dating to the Early Metal Period, still needs additional research. This is because the results of concrete experiments are rather often extended onto all types of long blades, without taking into account the morphological differences between them, indicative of the use of different methods of knapping. Our experiments were based on the study of the inventory from the flint workshops of the Bodaki settlement (Skakun 2004). These workshops were oriented at the production of long blades, which can be divided into two groups. The blades of the first group have super-regular outlines, straight profiles, low dorsal faces, triangular or trapezoidal cross sections, parallel lateral edges, small elliptical – smooth or slightly trimmed – platforms, diffused bulbs of percussion. In view of specialists in stone working technology (J. Pelegrin and W. Migal, personal communication), these types of blades could have been produced through various ways of knapping. The blades of the second group also have a great dimension, but they do not show regular geometric outlines, they have larger platforms and their bulbs of percussion are more protuberant. The experiments have shown that these type of blades can also be obtained by different methods of pressure knapping. The raw materials – large nodules of the Volhynian flint – were collected from the outcrops near the site (Fig. 1). The primary working of the pebbles and subsequent core preparation were done with the help of round flint indentors and antler punches (intermediate tools), analogous to that found at the workshop of Bodaki. The final products (blades) turned out to be similar to the archaeological specimens. However, while the first results of our experiments are positive, the works in this direction should be continued to receive more reliable and statistically significant data.

In addition to flint knapping, the participants of the expedition have undertaken a series of experiments aimed at the specification of criteria diagnostic of flint retouches, the working parts of which were confined to the areas adjacent to their platforms. A number of other experiments were directed to the clarification of differences between the traces of wear observed on tools which served for cutting off different kinds of plants: cereals, grasses, and reeds (Fig. 2). Six experimental bent handle sickles, four sickles of the Karanovo type, and two of the Egyptian or Near Eastern type were used to harvest wheat (Fig. 3). Their handles – one antler and five wooden ones – were manufactured solely with the aid of stone tools. Fragments of blades of Volhynian flint served as insets. They were fixed in the grooves by applying fruit glue. The blades and blade fragments that served to clip off grasses and weeds were used both with and without wooden handles, their backs were wrapped in pieces of leather. The experiments have shown, that the traces of wear observed on the sickle insets, independent of their location in the groove and length of use, differed in most respects from those on the tools used to cut off grasses and weeds. The identification of differences between the knives for grass and knives for weed, particularly regarding those that were not used intensively enough, is more difficult.

In future, we plan to conduct a full cycle of land cultivation works using Tripolian tool replicas, and ancient species of wheat.

The tools employed in the course of our works were described in detail, all the results were thoroughly recorded (with due account for the experimenters' qualification), and the approximate efficiency of the implements assessed. After they are analyzed, these observations will be published.

The second part of the expedition was devoted to the compiling of a reference collection of replicas of ancient tools, as well as to the educational program, consisting of lectures and practical training, which took place in the form of a field school-seminar. In addition to practical tasks, the purpose was to attract the attention of colleagues to the current problems of technological and experimental-traceological studies in archaeology.

The team that gathered at Bodaki consisted of 26 persons: scholars, post-graduate students and under-graduate students from Russia, Ukraine, France, Bulgaria, and Spain (Fig. 4). Among the participants there were also some museum workers, whose interest to the event was caused by the fact that several years ago the staff of the Eneolithic expedition of Institute for the History of Material Culture of Russian Academy of Sciences (IHMC RAS) had organized at the National Architectural Reserve "Castles of the Ternopol Region" an exhibition devoted to the economy of the Tripolian settlement of Bodaki (Tripolye BII).

The program of the school-seminar included lectures on stone knapping, peculiarities associated with processing different kinds of raw material (various rocks, wood, antler, bone, plants) by experimentally made implements, methods used to identify functions of ancient tools, as well as the role of experimental and ethnographical data in traceological research. Special attention was given to the modern methods of use-wear recording with the aid of digital techniques.

The practical classes included training in different methods of flint knapping, manufacturing and using experimental implements, working with microscopes aimed at the identification of tool functions, and mastering new techniques of recording use-wear traces.

In addition to the institutions under the aegis of which the Expedition was organized (Institute for the History of material Culture of the Russian Academy of Sciences, UISPP Commission «A 17», Lviv Branch of the Salvation Archaeology Service of the National Academy of Sciences of Ukraine, National Architectural Reserve "Castles of the Ternopil Region"), it also received valuable and free assistance from the peasants of the Bodaki village.

The work of the school-seminar was organized in the following way: the first half of the day was devoted to theoretical lectures, the second and more prolonged one — to practical training and experiments. Every working day was finished with the discussion of the work done. The multi-nationality of the collective was not an obstacle for communication. Quite the contrary, it facilitated the acquisition of new knowledge and contacts.

The introductory lecture by N. N. Skakun was devoted to the importance of the experimental-traceological method for the study of the history of technological progress and for the social and economic reconstructions in archaeology. H. Plisson in his lecture dwelled



Fig. 1. a-b — Volhynian flint outcrop near the Tripolian settlement of Bodaki (Ternopol region of Ukraine)

a

b





Fig. 2. Experiments in cutting of plants



Fig. 3. Wheat harvesting with experimental sickles



Fig. 4. Participants of the Experimental-Traceological School-Seminar



Fig. 5. Experimental techniques of flint knapping



a

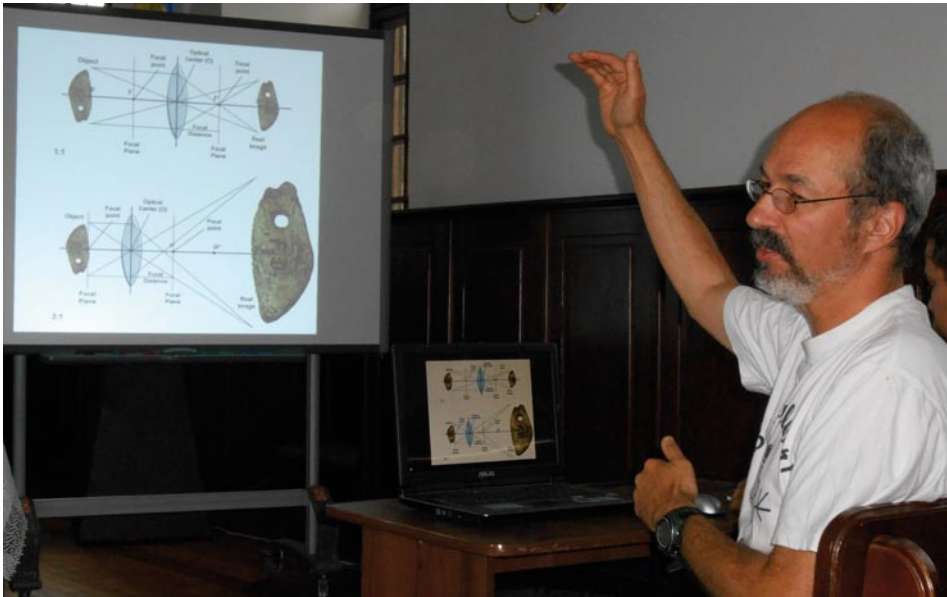


b

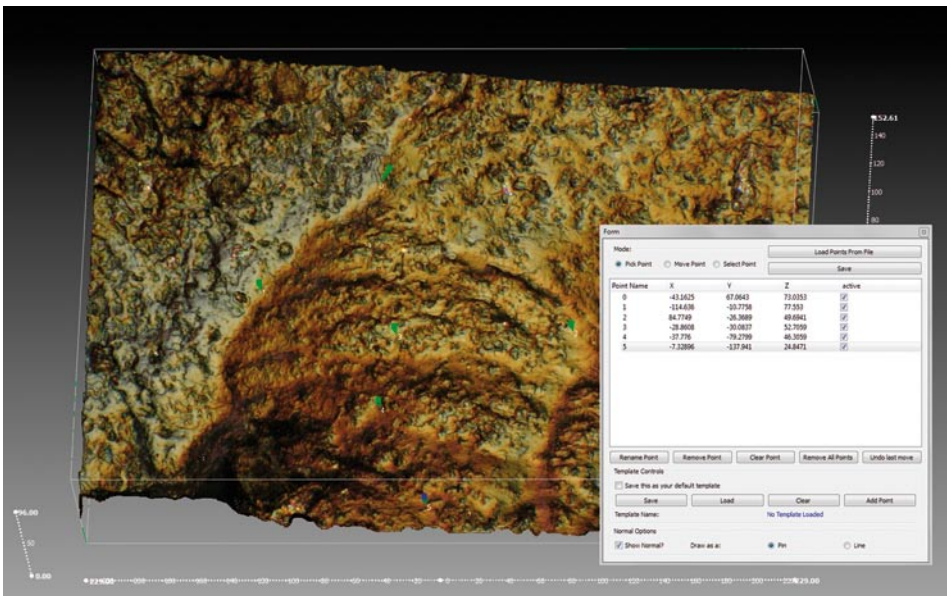


c

Fig. 6. a-c — experiments in flint working



a



b

Fig. 7. a — H. Plisson lecturing on modern methods of use-wear macro-traces recording; **b** — example of a three dimensional recording of an archaeological use-wear micro-polish by using the Ukrainian software Helicon Focus



a



b



c



d

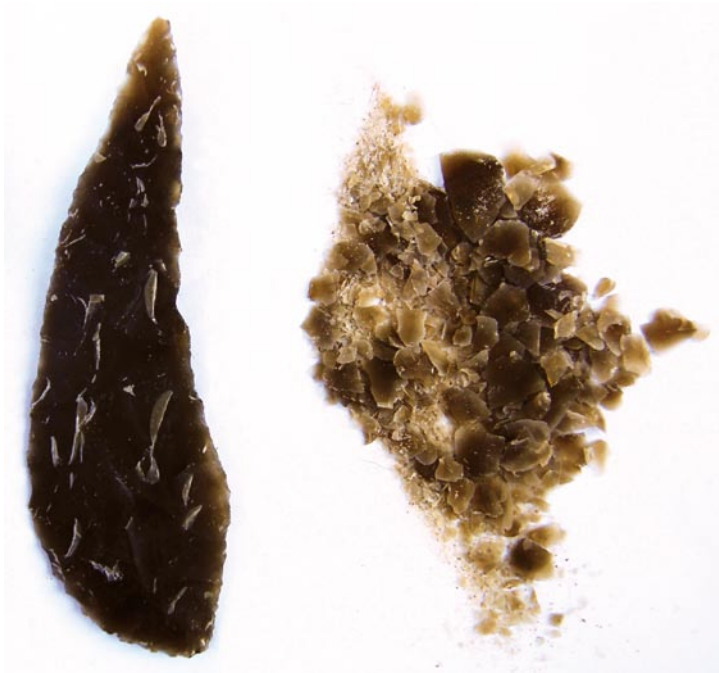
Fig. 8. Experiments in working: a — wood; b-d — skin



Fig. 9. Experiments in working bone



a



b

Fig. 10. Experiments in making replicas of the Vysotskaya culture flint sickles: a — process; b — sickle

on the similarities and differences between the Russian and West European schools of use wear studies. G. V. Sapozhnikova spoke about the history of experimental-traceological analyses as applied to the archaeological materials coming from the territory of the Ukraine.

During the second day of the event the school-seminar participants had the opportunity to listen to the presentations delivered by B. Mateva (Bulgaria) and B. S. Zhurakovsky (Ukraine) on the types of flint sources in Bulgaria and Ukraine and the methods of their exploitation in the Eneolithic. In the course of the excursion in the environs of Bodaki, the participants were able to visit several flint outcrops and to collect raw materials necessary for experimental works (Fig. 1).

In the subsequent days S. Maury and L. Klaric (France) gave lectures on various techniques of flint knapping practiced at different stages of ancient history. They demonstrated different methods of hard hammer and soft hammer flaking, with and without an intermediate tool (punch), as well as methods of obtaining abrupt, long, and flat retouches by applying different types of retouches (Fig. 5, 6).

N. B. Akhmetgaleeva (Russia) delivered an in-depth lecture devoted to the technology of bone/antler/ivory working and manufacturing of bone/antler/ivory tools in the Palaeolithic. The lecture was followed with experiments on the preparation of raw materials for further processing, and on the methods of working bone and antler by means of chopping, sawing, planning, and cutting. N. B. Vasilieva (Russia) spoke about her works aimed at the reconstruction of the manufacture and use of the stone abrasives, found on the sites of the Vologda region. In addition, she shared the experience of organizing a summer camp with elements of an archaeological school for children. Her lecture was of particular interest for the museum workers, who learned a lot of new information regarding both the administration of such events and museum pedagogy.

A course of lectures covering various aspects of the major theme, entitled “The bases of experimental-traceological studies and modern methods of use-wear trace recording”, was given by traceologists who went through training at the Experimental-Traceological Laboratory of IHMC RAS (N. N. Skakun, H. Plisson, G. V. Sapozhnikova, N. B. Akhmetgaleeva, B. I. Mateva, N. B. Vasilieva, V. V. Terekhina).

N. N. Skakun and G. V. Sapozhnikova, who gained experience of working in S. A. Semenov’s and G. F. Korobkova’s expeditions, provided much detail in the characteristics of macro-traceological studies (Korobkova *et al.* 1983).

In a lecture entitled “Traceology and digital photography”, H. Plisson demonstrated the newest methods of micro- and macro-recording of various traces of use wear on tools made of different materials. In addition, he gave practical recommendations of how to use the Ukrainian and Russian software programs for high quality processing of photographic images (Fig. 7a, 7b).

The classes devoted to practical training consisted of experiments in wood working (cutting, scraping, sawing, planning — Fig. 8 a), skin (scraping, unhairing, cutting — Fig. 8 b, c, d); and plant materials (cutting of cereals, grasses, reeds — Fig. 2). All the participants

had the opportunity to manufacture replicas of different types of tools (endscrapers, burins, perforators), and to record all the stages of the experiments by means of descriptions, photographing, and videotaping. Many experiments were devoted to the study of the tools for working bone from the Mesolithic site of Ivanovskoe VII, the Upper Volga region (Fig. 9). A large series of experiments was aimed at the study of the methods used to make curved, fully retouched flint sickles, characteristic of many Late Bronze – Early Iron Age sites of Europe, including the sites of the Vysotskaya culture, the materials of one of which (Mylnoe V) were studied by the participants of the expedition (V. Ilchishin's excavations in the Ternopol region of Ukraine – Fig. 10). The students were also able to acquaint themselves with and to practice in working with binoculars and the metallographic microscope "Olympus".

Thus, the participants of the Experimental-Traceological Expedition and Summer Traceological School-Seminar at Bodaki acquainted themselves with the basics of traceology, and received a knowledge of the full cycle of scientifically structured experiments: from the choice of raw materials and their preparation to further work through the manufacturing of replicas of ancient tools, their use, analysis of the use wear traces, and recording of all stages of the research.

The concluding discussion and summarizing of the results took place in the central hall of the medieval castle of the town of Zbarazh. The participants were unanimous in stating that the Experimental-Traceological Expedition and School-Seminar became not only a source of new knowledge, but also a venue of exchanging ideas and methods of work among those engaged in archaeological reconstructions.

At the end of the Experimental-Traceological Expedition its participants visited the castle and other places of interest at Zbarazh, as well as the Regional Historical and Lore Museum of Ternopol; the French colleagues took the opportunity to acquaint themselves with the sights of Lvov.

This study was supported by funds from project 13-06-90402 of the Russian Fundamental Research Foundation and 14-21-17003 Fr_a of the Russian Humanitarian Scientific Foundation.

References

- Korobkova G. F. 1974. Eksperimentalnoye izuchenie orudiy truda tripolskoy kultury. In *Arkheologicheskie otkrytiya 1973 g.* Moskva: Nauka, 420–421.
- Korobkova G. F. 1975. Eksperimentalniy metod v procedure arkheologicheskikh issledovaniy. In *Predmet i obekt arkheologii i voprosy metodiki arkheologicheskikh issledovaniy.* Leningrad: Nauka, 44–49.
- Korobkova G. F. 1978. Drevneyshie zhatvenniye orudiya i ikh proizvoditelnost (v svete eksperimentalno-traseologicheskogo izucheniya). *Sovetskaya arheologiya* 4, 36–52.

- Korobkova G. F. 1978a. Eksperimentalniy analiz i yego mesto v metodike i teorii arkheologii. *Kratkiye soobshcheniya Instituta arkheologii AN SSSR* 152, 55–61.
- Korobkova G. F. 1980. Metodicheskiye i metodologicheskkiye obosnovaniya kompleksnogo izucheniya orudiy truda. In *Metodika arkheologicheskikh issledovaniy i zakonmernosti razvitiya drevnikh obshhestv*. Ashhabad: Ylym, 20–26.
- Korobkova G. F. 1980a. Paleoekonomicheskkiye razrabotki v arkheologii i eksperimentalno-traseologicheskkiye issledovaniya. In *Pervobytnaya arkheologiya – poiski i nakhodki*. Kiev: Naukova dumka, 212–225.
- Korobkova G. F. 1991. Mezhdunarodnaya shkola po traseologii. In *Drevnie kultury i arkheologicheskkiye izyskaniya*. Sankt-Peterburg: IIMK RAN, 78–80.
- Korobkova G. F. 1994. Eksperimentalno-traseologicheskkiye razrabotki kak kompleksnoye issledovanie v arkheologii. In *Eksperimentalno-trasologicheskkiye issledovaniya v arkheologii*. Sankt-Peterburg: Nauka, 3–21.
- Korobkova G.F., Skakun N. N. and Sharovskaya T.A. 1982. Opredelenie funkciy kamennykh orudiy po makropriznakam. In *XI Kongress INKVA* 3. Moskva, 173–174.
- Korobkova G. F. and Schelinskiy V. E. 1996. *Metodika mikro- makroanaliza drevnikh orudiy truda* 1 (= *Arkheologicheskije izyskaniya* 36). Sankt-Petersburg.
- Masson V. M. (ed.) 2003. *Peterburgskaya trasologicheskyya shkola i izuchenie drevnikh kultur Evrazii: V chest' jubileja G. F. Korobkovoy*. Sankt-Peterburg: IIMK RAN.
- Semenov S. A. 1957. *Pervobytnaya tekhnika (opyt izucheniya drevneyshikh orudiy i izdeliy po sledam raboty)* (= *Materialy i issledovaniya po arkheologii SSSR* 54). Moskva, Leningrad: Izdatel'stvo Akademii nauk SSSR.
- Semenov S. A. 1959. Eksperimentalnye issledovaniya pervobytnoy tekhniki. *Sovetskaya arkheologiya* 2, 35–46.
- Semenov S. A. 1963. Izucheniye pervobytnoy tekhniki metodom eksperimenta. In *Novye metody v arkheologicheskikh issledovaniyakh*. Moskva, Leningrad: Izdatel'stvo Akademii nauk SSSR, 191–214.
- Semenov S. A. 1964. Prehistoric Technology: An Experimental Study of the Oldest Tools and Artefacts from Traces of Manufacture and Wear. London: Cory, Adams & Mackay.
- Semenov S. A. 1965. Eksperimentalniy metod izucheniya pervobytnoy tekhniki. In *Arheologiya i estestvennyye nauki* (= *Materialy i issledovaniya po arkheologii SSSR* 129). Moskva: Nauka, 216–222.
- Semenov S. A. 1968. *Razvitie tekhniki v kamennom veke*. Leningrad: Nauka.
- Semenov S. A. 1970. Proizvodstvo i funktsii kamennykh orudiy. In *Kamenniy vek na territorii SSSR* (= *Materialy i issledovaniya po arkheologii SSSR* 166). Moskva: Nauka, 7–18.
- Semenov S. A. 1974. *Proiskhozhdenie zemledeliya*. Leningrad: Nauka.
- Semenov S. A. and Korobkova G. F. 1979. Issledovaniya Litovskoy eksperimentalno-traseologicheskoy ekspeditsii. In *Arkheologicheskije otkrytiya 1978 g.* Moskva: Nauka, 460–461.
- Semenov S. A. and Korobkova G. F. 1983. *Tekhnologiya drevneyshikh proizvodstv: mezolit – eneolit*. Leningrad: Nauka.

- Skakun N. N. 1981. Eksperimenty v ekspeditsii «Dobrudzha — 79». *Interdisciplinarni izsledvaniya* (Sofia) 7–8, 59–64.
- Skakun N. N. 1981a. Eksperimentalna arheologiya. In *Nauka i tekhnika za mladezhata* (Sofia) 7, 40–43.
- Skakun N. N. 2004. Predvaritelniye rezultaty izucheniya materialov tripolskogo poseleniya Bodaki (kremneobrabatyvayushhiye komplektsy). In *Orudiya truda i sistemy zhizneobespecheniya naseleniya Evrazii (po materialam epokh paleolita — bronzy)*. Sankt-Peterburg: Evropeyskiy dom, 57–79.
- Skakun N. N. 2006. *Orudiya truda i khoziaystvo drevnezemeldelcheskikh plemen Yugo-Vostochnoy Evropy v epokhu eneolita (po materialam kultury Varna) (= Trudy IIMK RAN 21)*. Sankt-Peterburg: Nestor-Istoriya
- Skakun N. N. 2008. Comprehensive Analysis of Prehistoric Tools and Its Relevance for Paleo-economic Reconstructions. In «*Prehistoric Technology*» 40 Years Later: *Functional Studies and the Russian Legacy* (= *British Archaeological Reports. International Series 1783*). Oxford: Archaeopress, 9–20.
- Skakun N. N. 2008a. Experimental Archaeology and Studies of the Functions of Ancient Tools. In *II International congress of experimental archaeology. 26, 27, 28 November 2008 Ronda (Málaga, Spain)*. Ronda, 48–49.