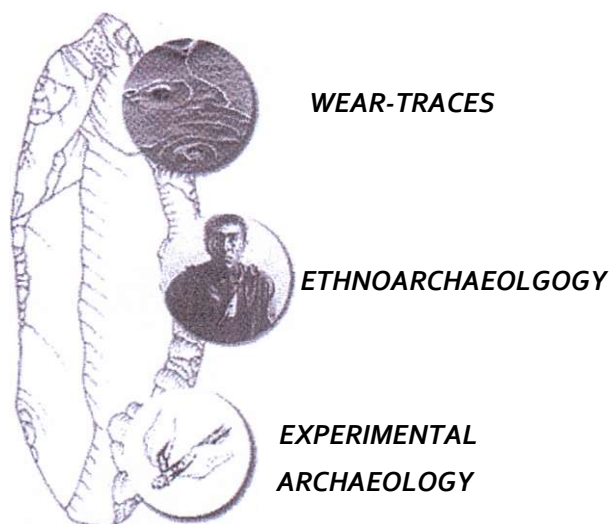


'Prehistoric Technology' 40 years later: Functional Studies and the Russian Legacy

Edited by
Laura Longo and Natalia Skakun

with the assistance of
Massimo Saracino and Martina Dalla Riva



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Contents

1. **Foreword**, *Alessandra Aspes*
2. **Preface**, *Alessandro Guidi*
3. **Acknowledgments**

4. **Introduction**, *Laura Longo, Natalia Skakun*.....:

5. ORAL SESSION

5.1 Methodology

S.A. Semenov and new perspectives on the experimental-traceological method
GALINA F. KOROBKOVA

Comprehensive analysis of prehistoric tools and its relevance for paleo-economic reconstructions
NATALIA N. SKAKUN

The contribution of ethnoarchaeological macro- and microscopic wear traces to the understanding of archaeological hide-working processes
SYLVIE BEYRIES AND VEERLE ROTS

Functional analysis of grinding stones: the blind-test contribution
CAROLINE HAMON AND HUGUES PLISSON

Semifunctional analysis and the mechanism of microwear formation
ANDREU OLLE AND JOSEP M. VERGES

In the knapper's hands identifying handedness from lithic production and use
NATALIE THAIS UOMINI

Kinematics in use-wear traces: an attempt of characterization through image digitalisation
JUAN ANTONIO BARCELO ALVAREZ, JORDI PIJOAN-LOPEZ, ANDREA TOSELLI AND ASSUMPCIO VILA I MITJA

5.2 Hunter-Gatherers

Hafting traces on flint tools
VEERLE ROTS

Subsistence strategies at Zengpiyan, South China
TRACEY LIE DAN LU

Use-wear analysis of retouched lithic tools from the Abric Romani Middle Palaeolithic site (Barcelona, Spain)...
KJENNETH MARTINEZ MOLINA

Typology, technology and use-wear: the necessary integration. An example from the Aurignacian site of San Cassiano (Arezzo, central Italy)
SIMONA ARRIGHI, VALENTINA BORGIA, ADRIANA MORONI LANFREDINI AND ANNAMARIA RONCHITELLI

Functional analysis of the backed tools coming from the Gravettian layers 23 and 22 of Paglicci Cave (Foggia, Italy)
VALENTINA BORGIA

Bilancino, a specialized site for "latent technology": an integrated approach
BIANCAMARIA ARANGUREN, LAURA LONGO, ANNA LUNARDI AND ANNA REVEDIN

The complexity of an Epigravettian site viewed from use-wear traces. Insights for the settlement dynamics in the Italian eastern Alps
SARA ZIGGIOTTI

6.2 Hunter-Gatherers

The bone assagaies of Grotta Continenza (Trasacco, L'Aquila, Italy): technological and microscopic analysis
PAOLA ASTUTI AND ANNACHIARA GALOTTA

Stone tools and early agriculture at Kuk Swamp, Papua New Guinea
RICHARD FULLAGAR, JUDITH FIELD, TIM DENHAM AND CAROL LENTFER

Villa Ladronaia: a Middle Palaeolithic site near Cecina (Livorno, Italy)
PAOLO GIUNTI

Hunting, what? Early Mesolithic backed points in north-eastern Italy
STEFANO GRIMALDI

Payre (Ardeche, France) early Middle Palaeolithic site. An example of macroscopic traces on tools and flakes: utilization as side-scrapers and stone tips in an OIS 5 human occupation
MARIE-HELENE MONCEL AND MARIA GEMA CHACON NAVARRO

Functional inferences of flint implements of the Mousterian site at La Mouline (St. Astier, Dordogne, France)
AMARANTA PASQUINI

Blade technology of the eastern Bromine (Podol culture, Valdai Uplands. Allerod- Dryas III (11.8 - 10.2 ka)
GALINA V. SINITSYNA

Engraved stones from the San Bartolomeo Upper Palaeolithic flint workshop (Abruzzo, central Italy)
BARBARA ZAMAGNI

Perforated bone plates and string production in the Mesolithic: a case-study from site Stanovoye 4, Upper Volga.
MIKHAIL ZHILIN

6.3 Food Producers

Sickles of early farmers of Azerbaijan.....L...
ROZA ARAZOVA

Production and function(s) of obsidian tools at the Neolithic site of Contrada Diana (Aeolian Islands, Sicily)
MARIA ROSA IOVINO AND MARIA CLARA MARTINELLI

Neolithic bone needles and vegetal fibres working: experimentation and use-wear analysis
ALEXANDRA LEGRAND

Eneolithic flint workshop-settlements in north-eastern Bulgaria
BORLANAIVANOVA MATEVA

Cereal harvesting and processing at the Middle Neolithic site of Schipluiden, a coastal site in the Lower-Rhine basin
CHANNAH NIEUWENHUIS AND ANNELOU VAN GIJN

The Neolithic settlement of Lugo di Grezzana (Verona, Italy). A lessinic flint emporium
FULVIA ELETTRA OCCHINI

Use wear analysis: application on the Ripatetta lithic industry. Preliminary results
CRISTIANA PETRINELLI PANNOCCHIA

Functional analysis of tools used in ancient ceramic production
LUBOV YAKOVLEVA AND NATALIA N. SKAKUN

6.4 Complex Polities

Microwear analysis and metal tools. The study of use wears traces and the contribution to the understanding of protohistoric societies

Blade technology of the eastern Bromme (Podol culture, Valdai Upland, Allerod-Dryas III (11.8 - 10.2 ka))

Galina V. Sinitsyna

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Summary. A series of archaeological cultures was identified during the last decade in the territory of the Valdai Uplands, during the tardiglacial period (Allerod-Dryas III). One of the most ancient of them, the Podolsk cultural complex, has direct analogues in the Danish Bromme techno-complexes. Flint knapping technology of the most ancient stage of the Allerod period appears to be unique to the Bromme group. It is characterised by the use of a hard hammer and/or abrasion of the striking platform. Large blades (10 x 3 x 1.5 cm) detached from prismatic or conic cores are dominant. Striking platforms of blades, as a rule, are linear, with a pronounced bulb and a bulb scar. Transition from hard hammer method, having been used at the initial stage of the flint knapping processes, to the soft hammer method aimed at obtaining smaller blades (5 x 1.5-2 x 0.5-0.7 cm) are the diagnostic features of the next stage of the cultural evolution in the Dryas III period. Alongside with the change of the typological set, the change in the method appears to have the chronological meaning in the evolution of the eastern Bromme (Podol) cultural complex.

Resume. Une serie des cultures archeologiques a ete mise en evidence a la derniere decade sur le territoire du massif elevé de la periode tardiglaciaire (Allerod-Dryas III). Un de plus ancienne de ceux-ci, Podol unite culturelle, trouve les analogues directes dans le technocomplex Bromme. La technique de debitage du stade ancien, d'epoque d'Allerod, soit identique a la technique de Bromme typique Danoise. Elle se base sur l'utilisation du percuteur dur a cote de la methode de la reduction du plan de frappe par percussion ou/et par abrasion. Detachement des lames targes (8-10 x 3 x 1.5 cm) des nuclei pismatiques et coniques predominants. Les talons des lames sont lineaires, le bulbe a erailure est bien developpe. Le passage de la technique du percuteur dur, n'utilisait qu'en stade initial de la percussion, a la technique du percuteur doux, orientee sur detachement des lames petites (5 x 1.5-2 x 0.5-0.7 cm) soit l'attribut diagnostique pour le stade suivant d'evolution culturelle durant la periode d'Allerod. A cote du changement de la composition typologique des assemblages lithiques, le changement de la technologie de debitage, ici la signification chronologique dans l'evolution de Bromme oriental (Podol) unite culturelle.

Key words: Final Paleolithic, tardiglacial, eastern Bromme, flint-knapping technology.

Colonization of the territories freed from the ice sheet during the Pleistocene-Holocene transition includes two main issues: chronology and direction of population movement. The principal problem of the first, is that most part of archaeological material from this period lies in a secondary context as a result of the massive erosion occurred during this period. Common scientific methods cannot be used for the dating of these deposits, or may be used very rarely. Traditional comparative-typological methods remain the main instruments for determining the chronological time-frame. Technological analysis, as part of the more traditional approach, provides significant information in terms of retracing the origins of technological traditions and for understanding the dynamics of the adaptation of pioneering colonists to the new environment and to local raw material resources.

The Valdai Uplands is the area where the springs of the principal eastern European rivers are located: Volga, Dniepr and western Dvina. In turn, these rivers represent the main directions for population dispersals for both pre- and proto-historic periods. A series of cultural complexes: Epigravettian, Bromme-Lingby, Swiderian of western type and local Zolotorouch'e were identified for the tardiglacial period at Valdai on the basis of the techno-typological features displayed by their material culture assemblages. Chronological relations among them remain debatable as the most part of archaeological assemblages were surface finds or recovered from secondary contexts. Few cultural layers have been found in intact deposits (primary depositional contexts), and

these appear to have the main function of starting for cultural differentiation and stratification.

Field studies undertaken in the last decade in the Valdai Upland area provided a body of new data and presented an array of new problems related to early colonization of the Valdai Upland. A series of cultural layers *in situ* were identified at several sites on the northern coast of the lake Volgo (Selizl distr., Tver region) in stratified geological deposits of the tardiglacial period. This period is distinguished as a transitional one, from Final Pleistocene to Holocene (B*Olling-Dryas III) in geology, and Upper Palaeolithic in archaeology.

One of the most ancient evidence of human colonization of the Valdai Upland area was associated with the archaeological culture, of the Bromme-Lingby type. Particular assemblages, fossil guides of which are projectile points of Bromme type (Sinitsyna 2002) were recovered from stratified cultural layers of multi-period sites of Podol III/1 and Podol III/2, Bai Gora, Lanino I on the northern coast of lake Selizl (Sinitsyna 1996, 1997), and Ust-Toudovka I in the Valdai Upland (Zhilin and Kravtsov 1991). Lithic assemblages from the sites of Troitskoye 3 (Lantsev and Mironov 1996) and Tioply Ruchey II (excavated by Miretsky), Rostislavl' (Trusov 2004) in the neighboring area, provided typologically similar material, but with the addition of some particular types.

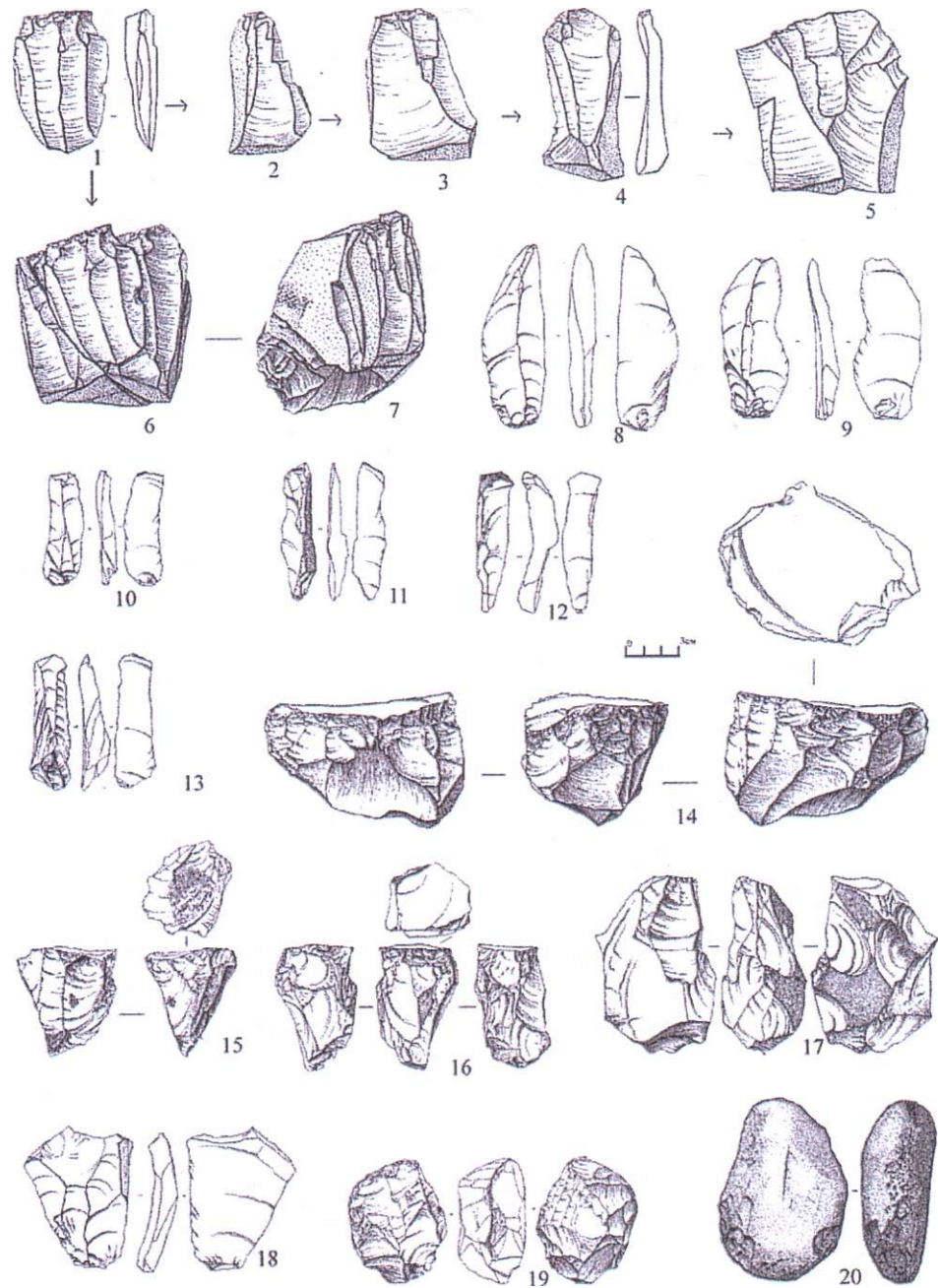


Fig. 1: The Flint knapping technology of Podol III/1 (Ailered period).

In addition to the 'traditional' Danish Bromme sites, other Bromme group sites were identified in England (Roberts and Barton 2000), Germany (Taute 1968), Poland (Schild 1975; Schild *et al.* 1999), Lithuania (Rimantene 1978), Belorussia (Ksenzov 1988; Charniauski *et al.* 1996) and Ukraine (Zalizniak 1998). Bromme assemblages from the Valdai Uplands were recognised as belonging to the Podol cultural complex and appeared to be the most eastern evidence of this tardiglacial techno-complexes of wide north-European distribution and was put in

connection with the west-east hunters following rec herds through the cold and dry forest-steppe enviroi during the Allerad-Dryas III period (Zalizniak 1998'

The sites Podol III/1 and Podol III/2 are the informative owing to the available data on s] organization as well as radiocarbon palynological data, and palaeomagnetic evidence magnetic excursus Gothenburg (~12 ka) was iden inside the lower deposits with cultural remains i Bromme-Lingby cultural group (Gus'kova e

2006). At first, the Allerød dating of this deposit was defined by palynological analysis (Spiridonova and Aleshinskaya 1999). Dating of the sites, obtained with different methods, highlighted their contemporaneity and common cultural background, i.e. Danish Bromme-Lingby (Allerød-Dryas III).

The sites are located one opposite to the other on the edges of a narrow ravine on the northern coast of Volgo lake: 166 sq.m on the right slope (Podol III/1) and 187 sq.m. on the left (Podol III/2) were excavated. Features of everyday life such as dwelling structures with a hearth, flintknapping areas and storage pits were identified at Podol III/1. Three concentrations of archaeological remains in a natural depression among rocky outcrops were identified at Podol III/2. Undisturbed layers were preserved only in this sheltered depression. According to pollen analyses, pit filling was dated to the Dryas III (Spiridonova, Aleshinskaya, 1999).

The aim of this paper is to present results of the technological analysis of two assemblages of the Bromme group belonging to the Allerød-Dryas III period.

Siliceous slabs were the principal raw material for the Podol culture. It is significant that all tools of the assemblages, including projectile points, were made on light-grey flint.

Blade cores dominate the assemblages. Blades have a well-pronounced bulb, as a result of hard hammer use. The most important feature of this assemblage are points, which are similar to the typical Bromme-Lingby tanged projectiles (Sinitsyna 2002). The lithic assemblage of Podol III/1 is the most ancient evidence of the Bromme technocomplex in the Valdai area and seems to represent the first stage in the evolution of the Podol culture.

A 3 sq.m flint knapping area was identified at Podol III/1. This concentration of 2633 chipped stone items includes: 26 cores, 13 pre-cores, 84 thick blanks, 53 crested blades, 49 thick blades, 53 blades, 177 bladelets, 119 small blades. Flakes (Fig. 1: 18) represent 68 % of the total assemblage. There are also a stone anvil, an axe, 4 burins (2 on fractures and 2 dihedral), 4 end-scrapers on blades, which compose the typological repertoire.

Blade-flake ratio as well as general typological composition of the total assemblage and flint-knapping workshop appears to be identical. Unipolar cores with a flat striking platform and a detachment angle of 80° are dominant (Fig. 1: 14-17). Multifaceted cores in the initial stage of their use have a cubic form. Six varieties of cores are distinguished: prismatic (68); conic (24); multi-platform (17); wedged cores (2); dihedral (8); cores on thick flakes (3). Thick massive blades removed from such cores (width of 2-3 cm; thickness of 0.5-1.5 cm; length of 8-10 cm), have a well pronounced bulb, a diagnostic feature attesting hard hammer (Fig. 1: 8-13). A

number of stone hammers was identified (Fig. 1: 19-20). Striking platforms of blades are linear, most bulbs have a bulb scar. A series of cores from the workshop were refitted and put in evidence the method and the sequences of knapping techniques on the basis of prepared longitudinal blanks (Fig. 1: 1-7). Blade blanks have a series of negatives which suggest striking platform reduction and preparation by means of abrasion.

The technology characterising the great majority of the assemblage of the site Podol III/1 (Allerød age) may be recognised as typical of the Bromme group with few peculiar varieties of knapping method, probably related to particular local raw material.

The next cultural stage in the area was identified at the site Podol III/2. According to pollen data this assemblage dates to the Dryas III period.

78 cores from this site suggest that the prismatic unipolar method with the negatives of convergent removals dominated. Several cores show change of platform through the detachment of a transverse blade. Removals were made from both smooth and retouched striking platform, and sometimes from the lateral edge (Fig. 2: 7-9). There are seven preforms of cores in the assemblage. These are massive (12x14x10 cm) nodules with several prismatic negatives.

Large blades connected with initial stage of core utilization have a length of nearly 10 cm, width of 3 cm, and an average thickness of 1.5 cm. Striking platforms of these blades are in general linear, the bulb is well pronounced and carries a bulb scar (*erailure*). Blades provide a set of attributes diagnostic for hard hammer use in association with abrasion of the striking platform, as it was identified in the lithic assemblage of Podol III/1. Such blades represent nearly 30% of the total assemblage. Cortex often remains on their dorsal surfaces. Their size and morphology would point to the initial stage of core reductions. Blades of 5 cm in length, 1.5-2 cm in width and 0.5-0.7 cm in thickness are dominant (up to 70%) in this assemblage (Fig. 2: 1-3). One of the diagnostic features of these blade blanks appear to be the asymmetry in section. Hard hammer use is attested by the following: a well pronounced bulb with a bulb scar, a linear and wide striking platform (Fig. 2: 6), deep scars on conic cores (Fig. 2: 5). Change of hammer type during the process of core reduction was recognised through refitting analysis. The use of soft hammer was identified on the basis of punctiform striking platform and lip (Fig. 2: 4).

In general, technological analysis of eastern Bromme assemblages (Podol culture) has highlighted the principal developments of the flint knapping method from typical Bromme large blade-technology (Fisher 1985; Madsen 1996) produced with a hard hammer to middle size blanks obtained with a soft hammer.

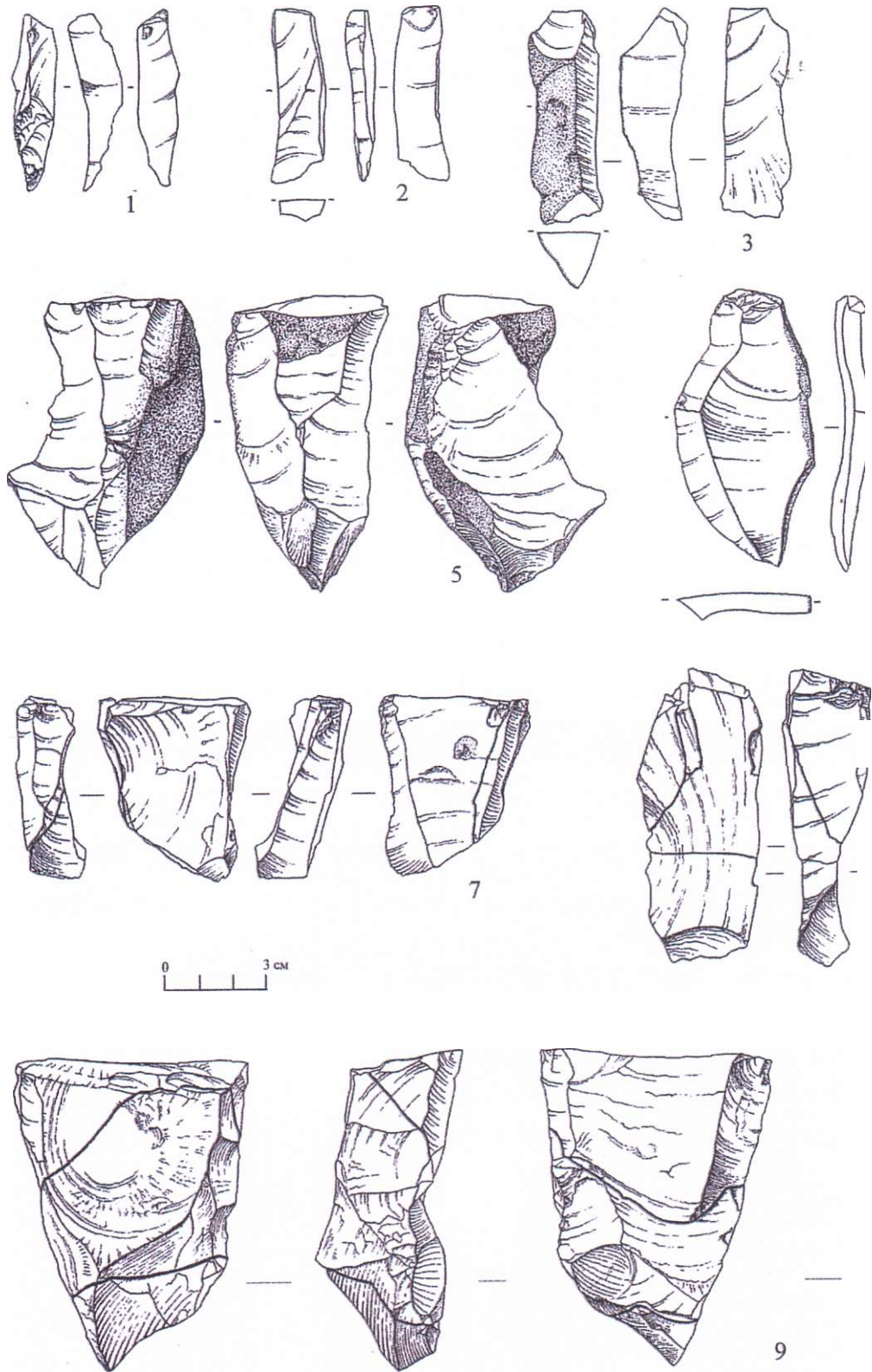


Fig. 2: The Flint knapping technology of Podol III/2 (Dryas III period).

The typological character of the Podol culture assemblage appears to be closely related to the 'traditional' Danish Bromme according to tanged projectile points (Sintysna 2004), burins and scrapers. Particular features are connected mostly with Valdai types of side-scrapers and axes.

The most probable explanation of the processes of cultural diversification may be related both to the adaptation of foreign populations to the local variety of raw material, and to the influence of the neighbouring aboriginal population.

Acknowledgments

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Bibliography

- CHARNIAUSKI, M., Koudriashov, V., Lipnitskaja, O., 1996. *Starazhitnie shakhtseiy na Rosi*, edited by V. Isaenko. Minsk (in Byelorussian).
- FISCHER, A., 1985. Late Paleolithic Finds. *Archaeological Formation Processes. The representativity of archaeological remains from Danish Prehistory*, edited by K. Kristiansen. Copenhagen, 81-88.
- GUSKOVA, E., Raspopov, O., IOSIFIDI, A., SINITSYNA G., SINITSYN, A., 2006. Palaeomagnitnye issledovania otlozhenii mnogoslinoi stoianki Podol III/1 na ozere Volgo v Tverskoi oblasti (Palaeomagnetic investigation of sediments at the multilayer site Podol III/1 at the Volgo lake in the Tver area). *Tverskoi arheologicheskii sbornik (Tver Archaeological Collection)*, edited by I.N. Tchernykh. Vol.6, T. I. Tver, 4-53 (in Russian).
- KSENZOV, V.P., 1988. *Paleolit i mesolit Belorusskogo Podneprovya* (Palaeolithic and Mesolithic of Byelorussian Dnepr basin), edited by N.N. Gurina. Minsk (in Russian).
- LANTSEV, A.P., MIRETSKY, A.V., 1996. Troitskoe 3 - odin iz drevneishikh pamiatnikov Tverskogo Povolzhia (Troitskoye 3 - one of the most ancient site of the Tver-Volga region). *Tverskoi arheologicheskii sbornik*, edited by I.N. Tchernykh. Vol. 2. Tver, 57-64 (in Russian).
- MADSEN, B., 1996. Late Palaeolithic Cultures of South Scandinavia — Tools, Traditions and Technology. In: *The Earliest Settlement of Scandinavia and its relationship with neighbouring areas* (edited by L. Larsson). *Acta Archaeologica Ludensia*. Series in 8°. No. 24. Stockholm, 61-73.
- RIMANTENE, R.K., 1978. Tipologia paleoliticheskikh i mesoliticheskikh nakonechnikov strel Pribaltiki (The typological analysis of palaeolithic and mesolithic points of Subbalticum). In: *Orudiya kamennogo veka (Tools of Stone age)*, edited by D.Ja. Telegin, Yu.G. Kolosov, B.I. Neprina. Kiev, 20-31 (in Russian).
- ROBERTS, A.J., BARTON, R.N.E., 2000. A Lyngby point from Mildenhall, Suffolk, and its implications for the British Late Upper Palaeolithic. *A Veiy Remote Period Indeed. Papers on the Palaeolithic presented to Derek Roe*, edited by S. Milliken, J.Cook. Oxford, 234-241.
- SCHILD, R., 1975. Pozny paleolit. *Prahistoria Ziem Polskich. Paleolit i Mezolit*. t.I, edited by W. Chmielewski, W. Hensl. Wroclaw-Warszawa-Krakow-Gdansk, 159-336.
- SCHILD, R., TOBOLSKI, K., KUBIAK-MARTENS, L., PAZDUR, M., PAZRUR, A., VOGEL, J., STAFFORD J.T., 1999. Stratigraphy, palaeoecology and radiochronology of the site of Calowanie. *Folia Quaternaria*, vol. 70, Krakow, 239-268.
- SINITSYNA, G.V., 1996. *Issledovanie finalnopaleoliticheskikh pamyatnikov v Tverskoi i Smolenskoi oblastjakh (Studies of the Final Palaeolithic sites at Tver and Smolensk regions)*. *Arkheologicheskii izyskaniya*, vyp. 39. St.-Petersburg (in Russian).
- SINITSYNA, G.V., 1997. Lanino I - pamiatnik kamennogo veka (Lanino-I - the site of Stone Age). *Kamennyi vek Verkhnevolzhskogo regiona (Stone Age of the Upper Volga Region)*. *Arkheologicheskii izyskaniya*, vyp. 55, pt. 2. St.-Petersburg, 5-62 (in Russian).
- SINITSYNA, G.V., 2002. Lyngby Points in Eastern Europe. *Archaeologia Baltica*, 5, 83-93.
- SINITSYNA, G.V., 2004. *The Late Palaeolithic of the Valdai Region. Actes of the XIVth UISPP Congress. General Sessions and Poster Section 7: The Mesolithic*. Oxford: BAR IS 1302, 227-234.
- SPIRIDONOVA, E.A. AND ALESCHINSKAYA, A.S., 1999. Rezultaty palinologicheskogo izucheniya mezolita Volgo-Okskogo mezdurechia (Results of the palynological study of Mesolithic in the Volga-Oka inter-river basin). In: L. V. KOLTZOV AND M.G. ZHILIN, 1999. Mezolit Volgo-Okskogo basseina /pamiatniki Butovskoi kultuty/ (*The Mesolithic in the Volga-Oka river basin /Assemblages of the Butov Culture/*), edited by Kh. Amirkhanov. Moscow, 139-153 (in Russian).
- TAUTE, W., 1968. *Die Stielspitzen-Gruppen im nordlichen Mitteleuropa. Ein Beitrag zur Kenntnis der spaten Altsteinzeit*. Fundamenta, Reihe A, Band 5. Koln.
- TRUSOV, A.V., 2004. Finalnopaleoliticheskaya stoianka Rostislavl' /predvaritel'noe soobshchenie/ (Final palaeolithic site Rostislavl' /preliminary information/). *Archaeologia Podmoskovia. Materialy nauchnogo seminar (Archaeology of Moscow surroundings. Materials of a scientific seminar)*. Moscow, 42-52 (in Russian).
- ZALIZNYAK, L.L., 1998. *Predystoria Ukrainy X-V tys. do n.e. (Prehistory of Ukraine X-V th. b.c.)*. Kii'v (in Ukrainian).
- ZHILIN, M.G. AND KRAVTSOV, A.E., 1991. Rannii kompleks stoyanki Yust-Tudovka I (Early complex of the site Ust'-Tudovka I). *Arkheologiya Verkhnego Povolzhia. Materialy k svodu pamiatnikov istorii i kul'tury RSFSR. (Archaeology of the Upper Volga region. Materials to collection of culture-historic monuments of the Upper Volga basin)*. Nizhnii Novgorod, 3-18.

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Bibliography

- CHARNIAUSKI, M., Koudriashov, V., Lipnitskaja, O., 1996. *Starazhitnie shakhtseiy na Rosi*, edited by V. Isaenko. Minsk (in Byelorussian).
- FISCHER, A., 1985. Late Paleolithic Finds. *Archaeological Formation Processes. The representativity of archaeological remains from Danish Prehisloiy*, edited by K. Kristiansen. Copenhagen, 81-88.
- GUS'KOVA, E., Raspopov, O., IOSIFIDI, A., SINITSYNA G., SINITSYN, A., 2006. Palaeomagnitnye issledovania otlozhenii mnogoslinoi stoianki Podol III/I na ozere Volgo v Tverskoi oblasti (Palaeomagnetic investigationa of sediments at the multilayer site Podol III/I at the Volgo lake in the Tver area). *Tverskoi archeologicheskii sbornik (Tver Archaeological Collection)*, edited by I.N. Tchernykh. Vol.6, T. I. Tver, 4-53 (in Russian).
- KSENZOV, V.P., 1988. *Paleolit i mesolit Belorusskogo Podneprovia* (Palaeolithic and Mesolithic of Byelorussian Dnepr basin), edited by N.N. Gurina. Minsk (in Russian).
- LANTSEV, A.P., MIRETSKY, A.V., 1996. Troitskoe 3 - odin iz drevneishikh pamiatnikov Tverskogo Povolzhia (Troitskoye 3 - one of the most ancient site of the Tver-Volga region). *Tverskoi archeologicheskii sbornik*, edited by I.N. Tchernykh. Vol. 2. Tver, 57-64 (in Russian).
- MADSEN, B., 1996. Late Palaeolithic Cultures of South Scandinavia — Tools, Traditions and Technology. In: *The Earliest Settlement of Scandinavia and its relationship with neighbouring areas* (edited by L. Larsson). *Acta Archaeologica Ludensia*. Series in 8°, No. 24. Stockholm, 61-73.
- RIMANTENE, R.K., 1978. Tipologia paleoliticheskikh i mesoliticheskikh nakonechnikov strel Pribaltiki (The typological analysis of palaeolithic and mesolithic points of Subbalticum). In: *Orudiya kamennogo veka (Tools of Stone age)*, edited by D.Ja. Telegin, Yu.G. Kolosov, B.I. Neprina. Kiev, 20-31 (in Russian).
- ROBERTS, A.J., BARTON, R.N.E., 2000. A Lyngby point from Mildenhall, Suffolk, and its implications for the British Late Upper Palaeolithic. *A Very Remote Period Indeed. Papers on the Palaeolithic presented to Derek Roe*, edited by S. Milliken, J.Cook. Oxford, 234-241.
- SCHILD, R., 1975. Pozny paleolit. *Prahistoria Ziem Polskich. Paleolit i Mezolit*. t.I, edited by W. Chmielewski, W. Hensl. Wroclaw-Warszawa-Krakow-Gdansk. 159-336.
- SCHILD, R., TOBOLSKI, K., KUBIAK-MARTENS, L., PAZDUR, M., PAZRUR, A., VOGEL, J., STAFFORD J.T., 1999. Stratigraphy, palaeoecology and radiochronology of the site of Calowanie. *Folia Quaternaria*, vol. 70, Krakow, 239-268.
- SINITSYNA, G.V., 1996. *Issledovanie Jinalnopaleoliticheskikh pamyatnikov v Tverskoi i Smolenskoi oblastjakh (Studies of the Final Palaeolithic sites at Tver and Smolensk regions)*. *Arkheologicheskii izyskaniya*, vyp. 39. St.-Petersburg (in Russian).
- SINITSYNA, G.V., 1997. Lanino I - pamiatnik kamennogo veka (Lanino-I - the site of Stone Age). *Kamennyi vek Verkhnevolzhskogo regiona (Stone Age of the Upper Volga Region)*. *Arkheologicheskii izyskaniya*, vyp. 55, pt. 2. St.-Petersburg, 5-62 (in Russian).
- SINITSYNA, G.V., 2002. Lyngby Points in Eastern Europe. *Arclaeologia Baltica*, 5, 83-93.
- SINITSYNA, G.V., 2004. *The Late Palaeolithic of the Valdai Region. Actes of the XIVth UISPP Congress. General Sessions and Poster Section 7: The Mesolithic*. Oxford: BAR IS 1302, 227-234.
- SPIRIDONOVA, E.A. AND ALESCHINSKAYA, A.S., 1999. Rezultaty palinologicheskogo izucheniya mezolita Volgo-Okskogo mezdurechia (Results of the palynological study of Mesolithic in the Volga-Oka inter-river basin). In: L. V., KOLTZOV AND M.G., ZHILIN, 1999. Mezolit Volgo-Okskogo basseina /pamiatniki Butovskoi kultuty/ (*The Mesolithic in the Volga-Oka river basin /Assemblages of the Butov Culture/*), edited by Kh. Amirkhanov. Moscow, 139-153 (in Russian).
- TAUTE, W., 1968. *Die Stielspitzen-Cruppen im nordlichen Mitteleuropa. Ein Beitrag zur Kenntnis der spaten Altsteinzeit*. Fundamenta, Reihe A, Band 5. Koln.
- TRUSOV, A.V., 2004. Finalnopaleoliticheskaja stoianka Rostislavl' /predvaritel'noe soobshchenie/ (Final palaeolithic site Rostislavl' /preliminary information/). *Archaeologia Podmoskovia. Materialy nauchnogo seminar (Archaeology of Moscow surroundings. Materials of a scientific seminar)*. Moscow, 42-52 (in Russian).
- ZALIZNYAK, L.L., 1998. *Predystoria Ukrainy X-V tys. do ?i.e.(Prehisloiy of Ukraine X-V th. b.c.)*. Kii'v (in Ukrainian).
- ZHILIN, M.G. AND KRAVTSOV, A.E., 1991. Rannii kompleks stoyanki Yust-Tudovka I (Early complex of the site Ust'-Tudovka I). *Arkheologiya Verkhnego Povolzhia. Materialy k svodu pamiatnikov istorii i kul'tury RSFSR. (Archaeology of the Upper Volga region. Materials to collection of culure-historic monuments of the Upper Volga basin)*. Nizhnii Novgorod, 3-18.