Gunflints from 16th/17th century archaeological assemblages from the central part of the Severskiy Donets River (south-eastern Ukraine)

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Abstract – The river Severskiy Donets is a large right-bank tributary of the river Don, a major waterway of the East-European plain. The middle section of the river divides two natural and climatic zones – steppe and forest-steppe. Active colonization of this sector of Eastern Europe began in the 16th century and ended up in the first half of the 18th century, including these territories into the Russian empire as its integral parts. Colonization saw a spontaneous settling of the right-bank Ukraine by natives as well as systematic migration of "servicemen" from major cities. The military-administrative organization of the territories was based on a network of small fortresses and stockaded towns. The first of them was the fortress of Czareborisov (founded in 1599), subsequently followed by the fortresses of Chuguev, Torsk, Maiaki, Kazachia Pristan etc. The fortifications were represented by shallow ditches, underground shelters, palisades (made of logs), and watchtowers. The armament of the garrisons comprised cannons, different types of guns, including guns with flintlocks (so-called battery-locks). During archaeological excavations of these monuments, small series of gunflints were found. The authors examine the gunflints as a special type of geometrical microlithic artefacts with the exclusive function of producing sparks. The gunflints from forts in the middle section of the Severskiy Donets correspond to the 'European-type' (i.e. blade-based gunflints). The gunflints published here are made of different flint raw materials. The majority is produced of quality flint from local Upper Cretaceous deposits. A smaller amount of gunflints is made of flint characteristic of the Upper Volga flint sources (central part of the Greater Moscow area). Apparently, these gunflints were supplied to outlying forts alongside with ammunition.

Key words – archaeology; Ukraine; Severskiy Donets (river); fortress; 16th century; 17th century; 18th century; gunflint

Titel – Flintensteine des 16.-17. Jahrhunderts aus archäologischen Kontexten im zentralen Teil der Severskiy-Donets-Region (Südost-Ukraine)

Zusammenfassung – Der Fluss Severskiy Donets liegt auf der rechten Seite des Flusses Don, einem der großen Wasserwege der osteuropäischen Tiefebene. Sein Mittellauf bildet die Grenze zweier naturräumlich und klimatisch verschiedener Zonen, der offenen Steppe und der Waldsteppe. Die Besiedlung dieses Teils Osteuropas begann im 16. Jahrhundert und endete in der ersten Hälfte des 18. Jahrhunderts, wobei die Territorien ins Russische Reich integriert wurden. Neben einer spontanen Kolonisierung durch Einheimische auf der rechtsseitigen, ukrainischen Seite des Flusses wurde die Region auch durch organisierte Einwanderung von Soldaten aus großen Städten besiedelt. Die militärische Verwaltungsorganisation der Territorien stützte sich auf ein Netzwerk kleinerer Festungen und mit Palisaden gesicherter Städte. Die älteste Festung ist die von Czareborisov (gegr. 1599) gefolgt von den Festungen von Chuguev, Torsk, Maiaki, Kazachia Pristan usw. Die Befestigungen umfassten flache Gräben, unterirdische Ausbausysteme, Palisaden aus Baumstämmen sowie Wachttürme. Die Bewaffnung der Garnisonen bestand aus Kanonen, verschiedenen Gewehrtypen, u. a. solchen mit Steinschlössern (Batterieschlössern). Bei archäologischen Ausgrabungen in derartigen Bodendenkmälern wurden kleinere Serien von Flintensteinen geborgen. Die Autoren betrachten die untersuchten Flintensteine als Sondertyp geometrisch-mikrolithischer Flintartefakte, die ausschließlich der Funkenproduktion dienten. Die Flintensteine aus den Festungen am Mittellauf des Severskiy Donets entsprechen dem „europäischen Typ" (d. h. klingenbasierten Flintensteinen). Die hier vorgestellten Flintensteine bestehen aus unterschiedlichen Rohmaterialien. Die Mehrheit wurde aus qualitativ hochwertigem Flint der lokal anstehenden Oberkreide angefertigt. Eine kleinere Anzahl an Flintensteinen ist aus Feuerstein mit den charakteristischen Merkmalen der Vorkommen an der oberen Wolga (Zentrum der Großregion Moskau). Allem Anschein nach gelangten diese Flintensteine zusammen mit Munitionslieferungen in die Festungen.

Schlüsselwörter – Archäologie; Ukraine; Severskiy Donets (Fluss); Festung; 16. Jahrhundert; 17. Jahrhundert; 18. Jahrhundert; Flintenstein

Резюме – Река Северский Донец – крупный правобережный проток реки Дон, важнейшей водной артерии Восточно-Европейской равнины. Среднее течение реки разделяет две природно-климатические зоны – степь и лесостепь. Активная колонизация этого сектора Восточной Европы началась в XVI веке и закончилась в первой половине XVIII века после включения территорий в состав Российской империи. Колонизация включала стихийное заселение земель выходцами из Правобережной Украины и целенаправленное переселение «служилых людей» из крупных городов Московского царства. Военно-административный каркас территорий был сосредоточен в основном в крепостях Изюмской оборонительной черты. Первой из них была крепость Цареборисов (1599 г.), затем были построены крепости Чугуев, Тор, Маяки, Казачья Пристань и другие. Укрепления состояли из рвов, земляных валов и деревянных (бревенчатых) стен, обмазаных глиной и отдельных фортификационных сооружений. Среди вооружения были также и ружья с кремневыми запальными батареями. В ходе археологических раскопок этих памятников были обнаружены небольшие серии ружейных кремней. Авторы статьи рассматривают ружейные кремни в качестве особых геометрических микролитов-вкладышей со специфической функцией, связанной с высеканием огня. Ружейные кремни из фортов в среднем течении Северского Донца соответствуют европейским типам этой продукции. Публикуемые ружейные кремни изготовлены из различного кремневого сырья. Основная часть произведена из качественного кремня из местных отложений верхнего мела. Часть вкладышей изготовлена из карбонового кремня, характерного для бассейна Верхней Волги (центральная часть Московского царства). Видимо, эти ружейные кремни поступали в слобожанские крепости в составе военной амуниции.

Ключевые слова – река Северский Донец; крепости казацкого периода (XVI - XVIII веков); ружейные кремни

Received: 20 April 2016
accepted: 30 Sept 2016
published online: 25 Aug 2017

Резюме – Ріка Сіверський Донець – крупна правобережна притока ріки Дон, найважливішої водної артерії Східно-Європейської рівнини. Середня течія ріки ділить дві природно-кліматичні зони – степ та лісостеп. Активна колонізація цієї території Східної Європи почалась у XVI ст. та закінсилась у першій половині XVIII ст. після включення цих територій до складу Російської імперії. Колонізація складалась зі стихійного заселення земель вихідцями з Правобережної України та цілеспрямованого переселення «служилих людей» з крупних міст Московського царства. Військово-адміністративний каркас територій був зосереджений здебільшого у форецях Ізюмської укріпленої лінії. Першою з них була фортеця Цареборисів (1599 р.), пізніше були збудовані фортеці Чугуїв, Тор, Маяки, Казача Пристань та ін. Укріплення складалися з ровів, земляних валів та дерев'яних (з колод) стін, мазаних глиною та окремих фортифікаційних споруд. Серед зброї були також рушниці із кремневими запалювальними батареями. У ході археологічних розкопок цих пам'яток були виявлені невеликі серії кременів-вкладишів для рушниць. Автори статті розглядають кременеві вкладиші рушниць як особливі геометричні мікроліти-вкладиші із специфічною функцією, пов'язаною із отриманням іскри. Рушничні кремені з фортів середньої течії Сіверського Дінця відповідають європейським типам цієї продукції. Вкладиші рушниць даної публікації виготовлені з різної сировини. Основна частина вироблена з якісного кременю місцевих відкладень верхньої крейди. Частина вкладишів виготовлена з карбонового кременю, характерного для басейну Верхньої Волги (центральна частина Московського царства). Ймовірно ці рушничні кремені потрапляли до слобідських фортець у скдладі військової амуніції.

Ключові слова – ріка Сіверський Донець; фортеці козацької доби (XVI - XVIII веков); рушничні кремені

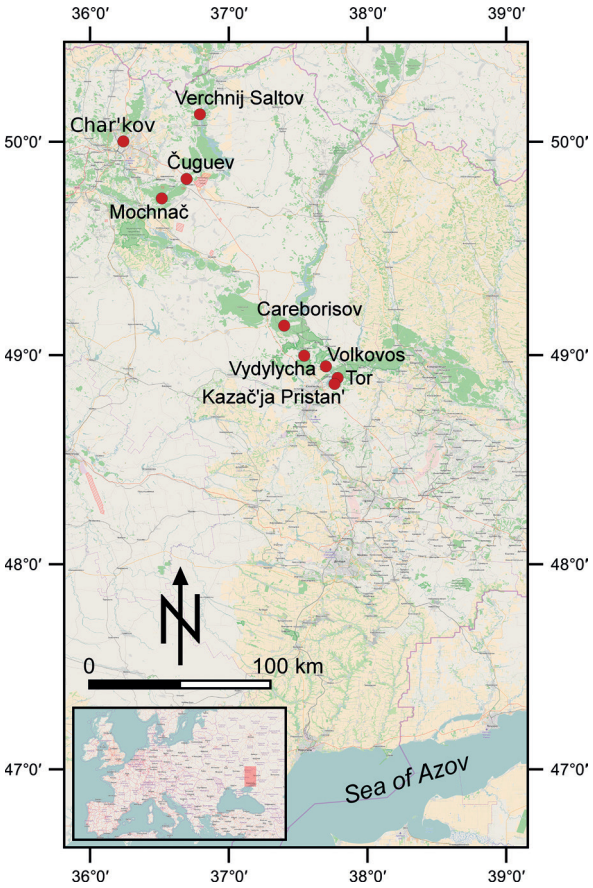

Fig. 1 Map of the Seversky Donets River (W-S Ukraine) fortresses of the 17th and 18th centuries.

Introduction

For hundreds of thousands of years, flint was the main raw material in tool making. In medieval times, it was used in domestic households to strike fire with the help of a steel strike-a-light (firesteel). Later, it led to a revolution in the development of arms and to the rapid dispersal of firearms. The final peak in the use of this traditional type of stone was reached in connection with the manufacture of gunflints in 16th-17th century Europe as well as in connection with the development of particular agricultural tools, such as threshing-sledges, used in processing harvested grain crops.

The interest in the physical and technical properties of flint intensified markedly in European countries in the second half of the 16th century in connection with the dispersal of firearms with different forms of flintlocks. Firearms underwent a long evolution. The first firearms with matchlocks (*'zhagra'* in Russian) spread quickly in Europe at the beginning of the 15th century (Blair, 1962, 41). The wheellock was invented at the turn of the 15th/16th centuries, probably in Italy. This type of lock worked by striking a piece of pyrite, using a rotating denticulated wheel of steel. This invention is often attributed to Leonardo da Vinci (Bosson, 1954). Mass production of such locks started in Nuremberg in 1517, and many Russian-speaking analysts treat this date as the 'birth' of this type of lock (e.g. Sukhanov & Haburzania, 2000). The time when guns with proper flintlocks (*'samopaly'* in Russian) appeared, cannot be determined precisely, as many transitional types are known between the wheellock and the standard flintlock. Surviving guns suggest that locks of this type appear in Italy in the middle of the 16th century (Bosson, 1954; Tarasuk, 1965). The well-known classic flintlock with an S-shaped cock and a combined steel and pan-cover appeared in France during the very early years of the 17th century and survived without major structural changes till the middle of the 19th century (Zhuk, 1997). Flint as a means of discharging firearms is therefore mainly associated with various forms of the standard flintlock. In Eastern Europe different terms are used to characterize such devices, but the key functional part of all these locks was the gunflint.

In Europe, the production of gunflints lasted for almost 300 years. Technical information relating to

gunflint production was generally kept secret by the various producers of gunflints as well as armed forces. Rough flint inserts were also produced for use as 'cutting teeth' in 'threshing-sledges', which were used for threshing grain from Roman times to the beginning of the 20th century in arid southern and south eastern European countries (Skakun, 1987; 2004). In Bulgaria, large settlements are known, whose inhabitants specialized in knapping flint using metal hammers (Mateva, 2009).

In many European countries of the 16th-19th centuries, a distinctive flint industry therefore developed. The study of this industry involves elements of archaeology, history, ethnography and weapons studies, and sources and methodologies relating to these different disciplines. The character of this industry varied between cottage industries and more complex manufacturing systems.

From the morphological point of view, gunflints of the 16th-18th centuries which are dealt with in the present paper, generally resemble geometric microliths of the Stone Age, which is why some archaeologists call them 'gunflint microlith inserts' or 'prismatic gunflints'. According to our knowledge, there is no well-defined morphological division between the different types. Prismatic gunflints have two main structural parts – the striking (leading) edge and the back or heel. The leading edge is always more or less straight, and in most cases also sharp. The heel, hidden in a lead wrap, tends to have a more varied morphology.

Gunflints – a highly important war material for almost 300 years

Gunflint industries of post medieval Eastern Europe were mainly orientated towards military needs, and they were as well organized as in Western Europe (Hamilton, 1968). This is documented by many written documents and archaeological assemblages.

It should be noted that gunflint assemblages, sometimes quite significant ones, are present in 16th-18th century strata of almost all stockade towns and ancient settlements of Eastern Europe, as well as in centers associated with the Slav colonization of Siberia, starting with Ermak's campaigns (Belov et al., 1981; Serikov, 1989; and others).

In Moscow, the logistic systems of the state which supplied Cossack, Strelets, and later regular army detachments with food, funds, weapons and ammunition changed over time, evolving from a simple 'gun-powder allowance' in the times predating Peter the Great to a well-organized procurement service. The correspondence of Moscow's sovereign and 'mandatory' boyars with Zaporozhie Cossack superiors of the 16th-17th centuries includes frequent references to a 'sovereign allowance' to the Kiyans (inhabitants of the Middle Dnieper region), Cherkass (inhabitants of west-bank Ukraine) and other ethnic or social groups for border-guarding service. The Moscow government, which was interested in settling people at its southern borders, introduced a practice of supplying food, clothes, money and weapons towards the end of the 16th century. In the charter of czar Phedor Ivanovich, dated 31st August 1584, an allowance is granted to the Cossacks for a campaign against the Crimean Tatars (Lisiansky, 1973, 45). Similar allowances were granted to other groups up to the beginning of the 18th century. In the description of the Mayatsk stockade town (at the centre of the Severskiy Donets region) in 1666 and 1668, various copper and iron guns are mentioned, as well as arquebuses, cannonballs of different calibers, gun-powder in barrels ('magic powder'), and lead from the 'sovereign treasury' (Pirko et al., 2009). Gunflints probably formed one element of the centralized provision for garrisons in the Severskiy Donets basin. In the special registrar book 'Perepisnaya kniga moskovskih streletskih ukazov' from the first third of the 17th century, an arsenal stock of 16,000 gunflints is mentioned (Margolin, 1941, 88). In 1637, an order from the Oskol war-chief was published, assuring that 'streltsy' (or 'marksman troops') had "*…arquebuses and good locks for arquebuses as well as spare flints*" (Margolin, 1941, 97). The river Oskol is a tributary of the river Severskiy Donets (**Fig. 1**). In the middle of the 18th century, the Cossacks community of Zaporozhskaya Sech daily received colossal volumes of supplies from the treasury, such as food, various goods, materials, and weapons, including up to 500 'poods' (1 pood is c. 16.38 kg; i. e. c. 8.2 metric tons) of gunflints (1755) (Shvydko, 2016).

In addition to the supplies from the treasury, a more flexible system of providing garrisons with gunflints was developed, combining direct supplies with the organization of locally produced gunflints. This can be learned from the correspondence of the Azov governor I. A. Tolstoy with the boyar T. N. Streshnev, who was head of the Ranking Prikaz ('prikaz' = administrative office) in Moscow at the beginning of the 18th century. The first letter refers to a shortage of gunflints in Azov and Troitsk (today Taganrog) garrisons: "*In the year of 1706, on the 12th day, the great sovereign in Moscow and the Ranking Prikaz are informed by mail that in the Azov, Troitsk and Don Cossack townships there is no flint in storage and there is no such stone near the Azov, Troitsk and Don Cossack townships. Flints are needed in case something happens, and how many flints are needed is specified in the above-mentioned mail. Colonels ask for flints to be*

used in soldiers' guns for shooting practice, and there is no flint available".

In the second letter they mention the discovery of local sources: *"And in the year 1708 flint was found along the river Tuzlovaya, which is near Troitsk, and this flint was brought to Troitsk in the form of 11,550 pieces, big and small, but there is nobody in Troitsk to flake this flint, and masters who are accustomed to flaking flint are needed in Troitsk"* (Praslov, 1968, 6). These unique documents give a clear impression of the organization of local gunflint production at the beginning of the 18th century in the large southern military garrisons. It follows from the documents that, at this time, as a supplement to centralized supplies, gunflints were produced locally in the fortresses by specially trained knappers, based on locally procured flint.

Gunflints from archaeological excavations in South-Eastern Ukraine fortresses

The focus of the present paper is a number of assemblages of prismatic gunflints from archaeological sites of the 16th-18th centuries, located in the middle Severskiy Donets basin (today south-east Ukraine). The Severskiy Donets river is a significant tributary of the river Don. Intensive Slav colonization of this region of Eastern Europe did not start until the turn of the 16th-17th centuries in connection with a dedicated policy of the Moscow state to establish control over the southern steppes. At that time, the border between Moscow and the steppes of Crimea went along the Severskiy Donets river. A significant but short episode associated with establishing the Czareborisov fortress on the Oskol river at the very end of the 16th century (1599) signaled the beginning of this process. Following the construction of Czareborisov (in what today is the Kharkov region of Ukraine), the baton was transferred to Svyatogorsk hermitage (in what today is the Donetsk region of Ukraine) and the villages that surround it (Pirko, 1988). It is highly probable that parts of the population of the Czareborisov fortress after its destruction in 1604/1605 moved to the region of Svyatye Gory (Holubieva, 2005 a; b). The most intense process of Slav settlement in the buffer area took place over a period of several decades – from the middle of the 17th to the middle of the 18th century. 'Cherkassy' groups came from the west and 'Muscovites' from the north (Holubieva, 2006). By now, cities in the western Ukraine were mainly settled by Ukrainians, and the southern outskirts of the Grand Duchy of Muscovy mainly by Russian people. These were the core areas of colonization. Settlement in the middle Severskiy Donets region was spontaneous as well as organized by the Moscow government. In the South of the Russian empire, the ethno-political situation only stabilized somewhat during Peter the Great's reign when Russia captured Azov, and when a series of strong forts were constructed, including those along the central part of the Don (Kravchenko & Brovchenko, 2002 a; Pirko, 2003).

The development of the region under permanent threats of Tatar invasion meant that the Slav population needed firearms and other military supplies, including gunflints. Gunflints are expected to be found in all border fortresses as well as in non-fortified settlements. However, only a few sites from that time have been investigated by the application of modern excavating techniques. Most of the gunflints have been recovered from forts. They are absent from villages near the Yavir village in the Krasnolimanskiy area of the Donetsk region (Kravchenko et al., 2002b). However, prismatic gunflints have been found in some seasonal hamlets of the early 17th century in Vydylykha tract near the village Borogodichnoe in the Slavyansk area of the Donetsk region (Kondratiev, 2007). At the same time, no gunflints have been found in the rich Svyatogorsk monastery of the 17th century, although it is well-known from written documents that a small military detachment was stationed there permanently.

Assemblages of gunflints and anvil-produced flint artefacts were recovered during the excavations of the following sites: the Kharkov fortress (Holubieva, 2009b; 2009c), the Chuguev fortress (Svistun, 2007; 2008; in press), the Czareborisov fortress (Holubieva, in press), the Verhniy Saltov settlement (Koloda et al., 2010), the Mokhnach-P settlement, the Vydylykha settlement (Kondratiev, 2007), the Kazachya Pristan settlement (Kravchenko, 1998; Kravchenko & Miroshnichenko, 2007), the Volkovoe settlement, and the Torsk fortress (Kravchenko et al., 2006). The above-mentioned archaeological sites all yielded evidence of prehistoric flint production, as well as the use of gunflints, either produced locally or imported.

The assemblages in detail

Kharkov

The Kharkov area (**Fig. 1**) includes numerous settlements from the Neolithic period to the 'Cossack' period, as well as two hillforts. The Kharkov fortress, situated on a bed-rock promontory near the confluence of the rivers Lopan and Kharkov, was built in 1654 (Bagaley & Miller, 1993). Large-scale archaeological excavations were conducted here in 2008-2009 (Holubieva, 2009b; 2009c).

The combined thickness of the site's cultural strata is significant and amounts to more than 2

Fig. 2 Gunflints of the Chuguev fortress (1-18).

meters. In securely dated deposits from the Cossack period, only two gunflints were found. One of them (**Fig. 3.5**) was recovered from the depths (3.40 m) of a domestic building, and is dated to the first half of the 17th century by accompanying finds (a silver one-and-a-half grosz and a silver kopeck from Peter the Great's reign of 1706-1717, as well as a copper coin from the reign of Anna Ioanovna in the 1730s). The second flint was found at a depth of c. 2 m, stratigraphically dating to the time of the Kharkov fortress' construction.

The flint from the deeper levels of the house is plain, with some traces of having been worked, and it may be a prehistoric piece. The second flint is a typical blade-based gunflint. The leading edge of this piece displays heavy use-wear. Both flints are light-purple, suggesting that they may be based on 'exotic' (High Volga?) raw material.

Chuguev

The ancient Chuguev settlement is located on the western side of a promontory in the Severskiy Donets, near the point where it merges with the Chugovka river. The fortress is located at the centre of the contemporary town of Chuguev in the Kharkov region. Archaeological investigation and testing was started in 1996 (Babenko, 1996). In the years 2006-2007 and 2009 archaeological excavations were conducted within the fortress under the guidance of G. E. Svistun (Svistun, 2007; 2008; 2009). The fortress was built on the order of Mikhail Fedorovich in 1639 (Bagaley, 1886, 15; Albovsky, 2005, 38).

In total, 26 flints were recovered which were identified as either gunflints or anvil-struck pieces (**Figs. 2.1-18; 3.8-15**). Only one of them is made from dark, opaque, coarse-grained, light-purple flint of exotic origin; the raw material used to produce the other gunflints is high-quality local (the so-called 'Donets') vitreous silica in the form of chalcedonic, grey, semi-transparent flint, widely used by the Mesolithic/Neolithic groups in the Donets region.

Most of the gunflints were recovered from cultural strata dating to the 17th century. At least two pieces were found in well-dated contexts. One (**Fig. 3.9**) was found in a Cossack period feature (Pit 10). This date is based on a silver copeck from the reign of Mikhail Fedorovich. The other flint (**Fig. 3.8**) was recovered from another Cossack period feature (pit 11), which was a shallow dwelling of the 'Cherkassy' type. Other gunflints from this assemblage are likely to date to the same period. Some pieces (**Figs. 2.14; 2.4; 3.13**) were recovered from pits which also included material of the Saltov-Mayatsk prehistoric culture. The gunflints from the Chuguev fortress were made from local chalk flint, they are relatively well-dated and show highly standardized pieces. They were clearly produced in a workshop, following a specific template. These prismatic pieces are of approximately the same size, with a trapezoidal outline and straight or rounded heels. In most cases, segments of large blades were used, with two, or rarely three, dorsal ridges. These trapezoidal pieces were formed largely by modifying the blade segments' bulbar ends, and when necessary also the opposite end. In some cases the leading edge of the trapeze was modified by ventral retouch (**Figs. 2.6-12**). For obvious reasons, the longest straight section of a prismatic gunflint became the functional part, or leading edge. This part of the gunflint frequently displays heavy use-wear or damage (**Figs. 2.4; 2.18**).

No gunflint workshops were identified during the excavation of the Chuguev fortress. It is possible that the gunflints were delivered to the garrison from nearby workshops using local high-quality chalk flint.

Czareborisov

The fortress is situated on the western side of the main promontory of the Oskol river where it merges with the Bakhtin river, near the present village of Chervonyi Oskol (called Czareborisov until 1919) in the Izyum district of the Kharkov region. In the 1920s, the site was examined by N. V. Sibilev, and in the 1950s by P. D. Liberov. Systematic annual investigations of the fortress were started in 2004 by one of the authors, and this work is still going on (Holubieva, 2005 a; b; in press; 2005 c; 2007 a; 2007b; 2007c; Zagorovsky, 1980; Anonymus, 1976).

In spite of large-scale archaeological work, only three gunflints were recovered from the cultural layers of the fortress. Two of them, including an impressive piece still in its lead wrap, came from a well-definded context (**Figs. 3.1-2**), whereas the third one (**Fig. 3.3**) was found in a thin disturbed layer, datable to the period between the transition of the 16th-17th centuries to the second half of the 17th century.

The raw material of the former gunflints define them as clearly exotic, and they may have been procured from the High Volga region. The raw material of the third specimen corresponds to local types of flint.

The gunflint, still wrapped in its lead-sheath (**Fig. 3.1**), is based on the bulbar end of a large blade with a broad plain platform remnant. The leading edge is definitely formed by the blade's longest lateral side and not its bulbar end. The gunflint's lateral side has been modified. The piece is trapezoidal. Scratches on the wrap confirm that this specimen has been used.

The second gunflint (**Fig. 3.2**) is a typical prismatic piece based on a blade blank. The functional

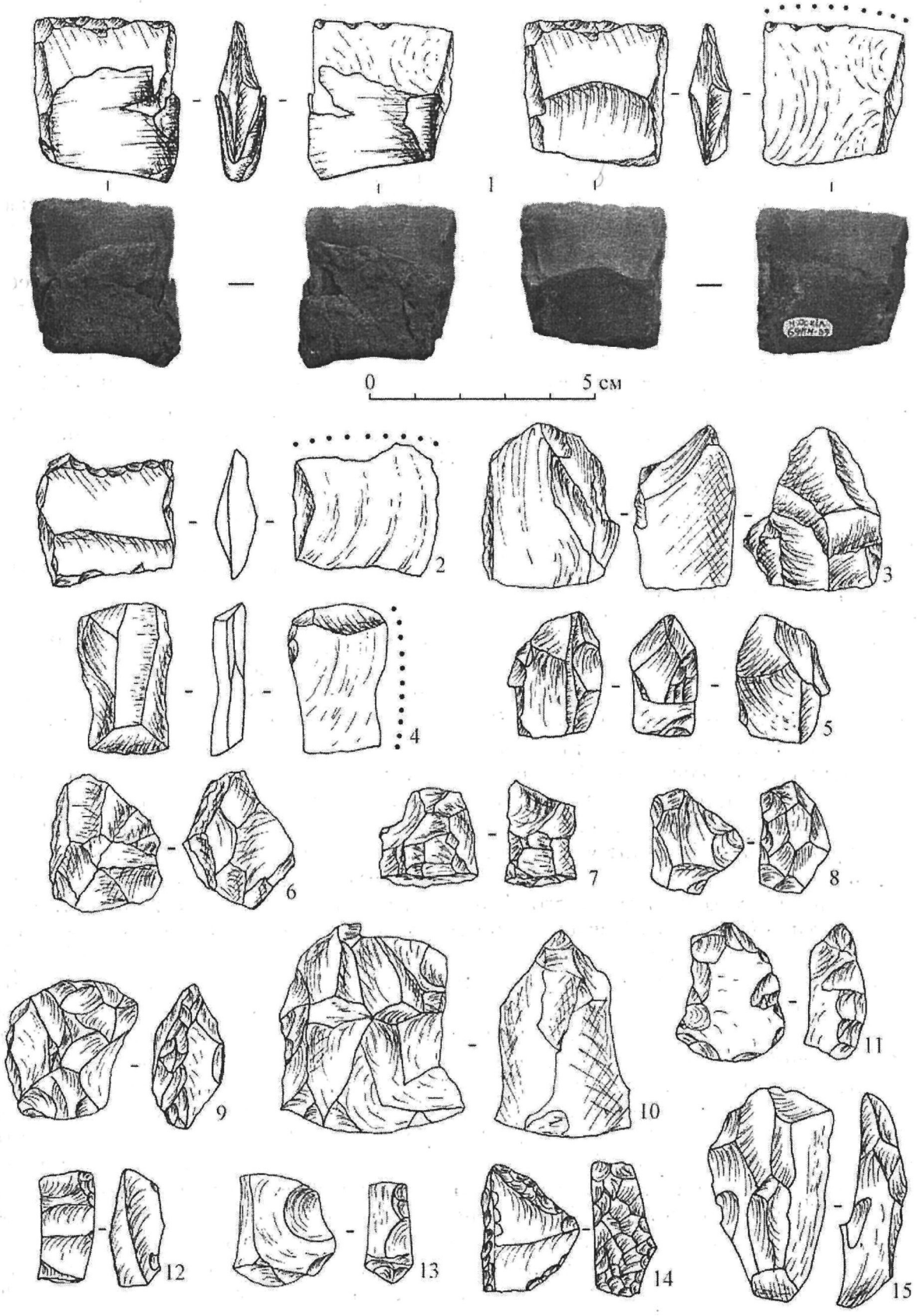

Fig. 3 Gunflints of the Chuguev, Czareborisov, Kharkov, Verkhniy Saltov and Mokhnach fortresses.

part of this gunflint shows extensive use-wear, that is, it has been exhausted completely. A thick flint from the cultural layers (**Fig. 3.3**) may be a prehistoric piece.

Saltov

This fortress is situated on the western bank of the Severskiy Donets river (at a point now referred to as the Pecheneg reservoir), at the centre of the Verkhniy Saltov village in the Volchansk district of the Kharkov region. Over the years, archaeological research of the settlement and its trading quarters has been carried out by M. Y. Makarenko, S. A. Semenov-Zuser, D. T. Beresovets, V. V. Koloda, N. V. Chernigova, V. S. Aksenov, and G. E. Svistun.

In 1650, a charter from the czar ordered the Chuguev 'stanichniks' (Cossack units) to transfer to the medieval Saltov settlement where the Cherkass migration had continued. In 1659, czar Aleksey Mikhailovich ordered a fortress to be built on the site of the Cherkass settlement of Saltov with chieftain Ivan Semenovich as its leader (Babenko, 1905, 439-459). During excavation of layers dating to the Cossack period (Koloda et al., 2005, 22), a gunflint of local raw material was found (**Fig. 3.6**). The flint is thick, suggesting that it may be a prehistoric implement for everyday use.

Mokhnach

The Mokhnach fortification was constructed in 1639 (according to 'Extract on Slobozhanshina regiments of 1734') on the western bank of the Severskiy Donets river on top of remains belonging to the Saltov-Mayatsk archaeological culture (Zaika, 2002). Near the site, in the vicinity of the ancient settlement 'Mokhnach-P', excavations only yielded a small number of ceramic fragments. The excavations were carried out in 2009 (Kolodova, 2009, 13-14). Apart from pottery, a solitary bipolar core in flint was found (**Fig. 3.7**).

Vydylykha

The next site eastwards is Vydylykha, which has been dated by diagnostic pottery to the beginning of the 17th century. It has not been possible to provide a more precise date yet, although imported ceramics and a solitary Polish silver coin (1624) suggest a date in the first quarter of the century. Excavations of this site were undertaken in 2005-2006 under the supervision of one of the authors (Kolesnik et al., 2007). In addition to finds from the Cossack period, a small number of artefacts dating to the early Medieval and Neolithic periods were found. A collection of Cossack period flints includes 70 pieces. The collection contains: one disc-shaped core with signs of unsystematic flaking, part of an elongated piece of flint, 59 chips, three relatively large (4-5 cm) flattened roughly trapezoidal objects with bilateral retouch of varying fineness, a small heavily worn splintered piece, and two small elongated trapezoidal pieces which resemble squat scrapers. Large thick expedient pieces may be failed rough-outs for gun-flints, and small elongated trapezoidal pieces may possibly be gunflints, as they resemble the more standardized pieces of this type. It is thought that gunflint production was carried out in the individual households. The unique composition of the site's faunal evidence (mainly birds and bones of young cloven-footed animals) indicates that this small settlement may have been seasonal.

Kazachya Pristan

A small homogenous assemblage of gun-flints was recovered from the site 'Kazachya Pristan', which is situated in the estuary of the Kazennyi Torets river. This military fort was constructed on a low dune with traces of settlements from the Neolithic and Bronze Age periods, in the vicinity of the strategically important intersection of river and land travel routes. The construction of the fort took place during the active colonization of the southern parts of the Moscow State at the transition of the 17th and 18th centuries. Written sources suggest that it existed from 1684 until 1738-1739. Archaeological excavation of the site was carried out in 1998-1999 and in 2002 under the supervision of E. Y. Kravchenko (Kravchenko, 1998; Kravchenko et al., 2002; Gorbov et al., 2007). The 17th/18th century transition is represented by numerous finds characterized by differential preservation (the site's upper layers are destroyed by ploughing), including several gunflints. The particular value of this complex is its relatively narrow chronological date. According to the coins found at the site, the fort may mainly have been settled in the 20s and 30s of the 18th century (Kravchenko & Miroshnichenko, 2007a, 43-45).

The ploughed cultural layers dating to the time of Peter the Great yielded an assemblage of 16 local gunflints. The flints are not associated with any of the layers' specific structural elements. Additional six gunflints were collected from the plough soil by the Slavic regional ethnographer A. I. Dukhin. It is interesting that all the flints are made of opaque flint with different hues of dark-orange to light-purple (**Figs. 4.1-17; 5.1-5**). The gunflints are of roughly the same size, with their dimensions varying between a length of 30-34 mm and a width of 24-28 mm. Most of these pieces are prismatic gunflints, dominated by squares and rectangles (at least 14 of them; **Figs. 4.3-13; 5.1, 5.4**). Two flints resemble segments (**Figs. 4. 14-15**), one a misshapened trapeze (**Fig. 5.5**), and the form of the remaining pieces are approximate-

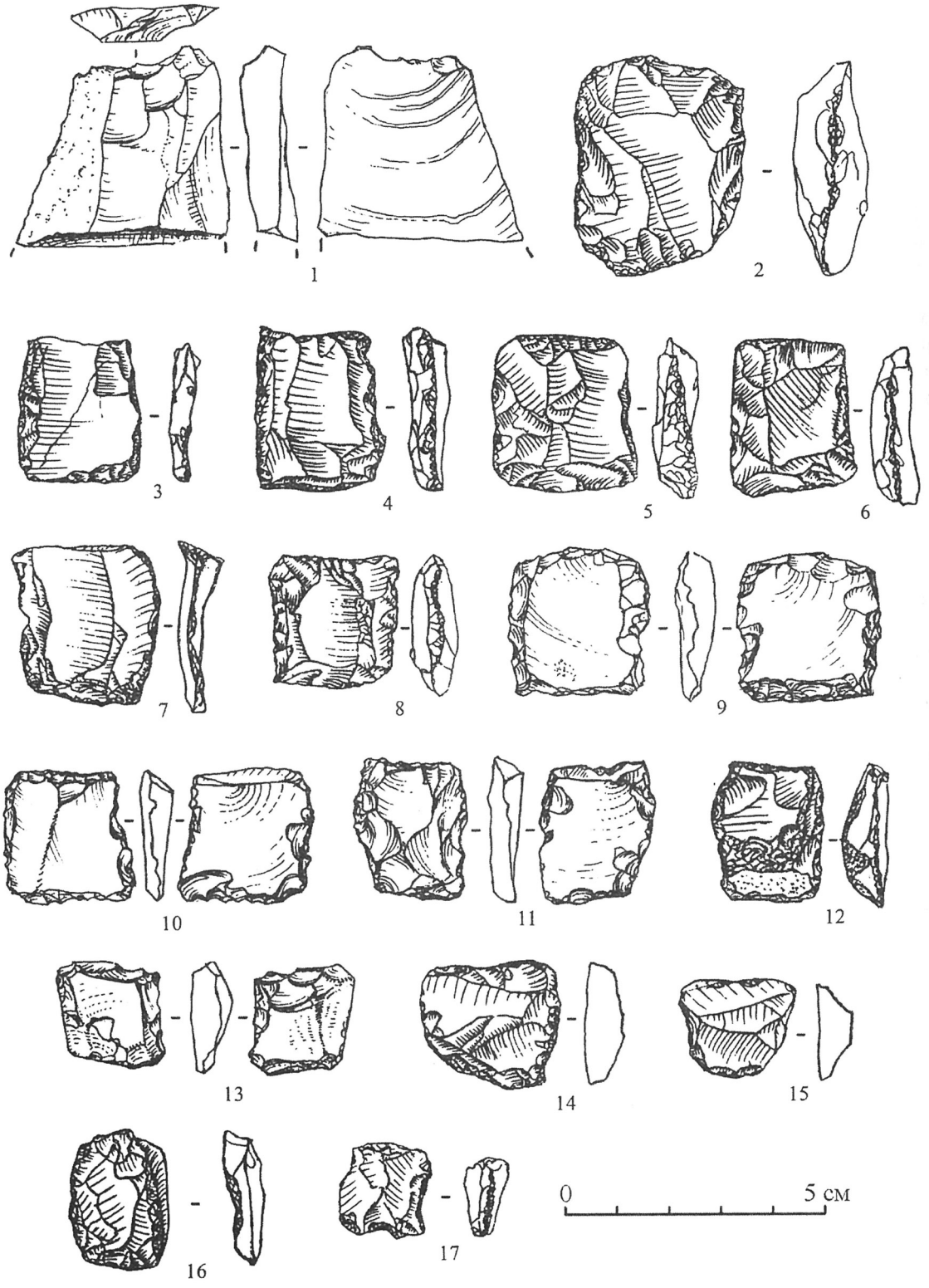

Fig. 4 Gunflints of the Kazachia Pristan fortress (1-17).

ly geometrical (**Figs. 4.16-17; 5.2-3**). The gunflint blanks are mostly proximal and medial fragments of stout blades or flakes. One gunflint blank is a large proximal fragment with continuous trimming of the platform-edge (**Fig. 4.1**). The platforms of the flake blanks are gently curved, with signs of platform preparation. Only one gunflint has no trace of core preparation (**Fig. 4.7**). The lateral sides of some pieces (**Figs. 4.4, 4.10, 4.17; 5.1-6**) have denticulated edges, probably reflecting the degree of wear.

Volokovoe

A small agricultural settlement was situated on the shore of the Volokovoe lake in the Krasnolimansk district of the Donetsk region – possibly a complex of individual households (a 'khutor'?). A number of recovered copper coins suggest a date in the first half of the 18th century. On the ploughed surface of the site, A. I. Dukhin collected a small archaeological assemblage, which includes one obvious gunflint in an exotic (High Volga?) material (**Fig. 5.6**). The raw material used for the flint is opaque, with varying colours of brown, black and white. The gunflint is thick and sub-rectangular, and it has a worn leading edge.

Torsk fortress

In this area, local and imported prismatic gunflints were used to the same degree. This is shown by a small assemblage of high-quality gunflints, collected by A. V. Shamray and E. E. Kravchenko during clean-up of the cultural layers associated with the 17th/18th century transition within the Torsk fortress (today the city of Slavyansk in the Donetsk region) (Kravchenko, 1998; Babenko, 1996; Kravchenko et al., 2006; Kravchenko et al., 2007 b; Shamray, 2007). In the rich and well-preserved cultural deposits, six unmodified flint flakes were found, and more than two dozens of gunflints. One of the latter was still inside its lead wrap. The fortress prospered in the 30s and 40s of the 18th century.

The assemblage of gunflints includes 22 pieces from excavations carried out at the site before 2007. These pieces represent three types of geometric gunflints: 'trapezoidal' (five pieces), 'segmented' (five pieces), and 'sub-square' (five pieces). There are also five pieces with indeterminate shapes. The thickness of the proximal ends of the prismatic gunflints from Torsk varies from 4 mm to 11 mm, most being within the range 7-8 mm. A significant proportion of the Torsk gunflints (10 pieces) are made in local Donetsk flint, varying in colour and quality. A gray vitreous, semi-transparent flint was used, as well as a yellow and grey opaque flint. Another proportion of the prismatic gunflints (12 pieces) are based on a coarse-grained, opaque, dark flint with a purple hue, often with grey-brown inclusions, as well as a dark-brown flint. Sources of these flint types are not known in the Donbass region, but they may be found in connection with coal mining in the Volga and Oka basin. An almost complete absence of flint flakes and other flint artefacts in the fort's cultural layers suggests that prismatic gunflints were imported and that exotic materials were used. Most probably, the gunflints were imported from the central Moscow administration to the garrison of the Torsk fortress, along with military supplies of gun-powder and lead, as was commonly the case at that time throughout the southern borderlands. It is thought that gunflints based on local flint were also supplied to the fortress, as so far no evidence has been found of their manufacture within the fortress.

Production method of gunflints

Production of such gunflints was probably professional work. They were all made by the application of simple hard percussion. The surviving waste chips generally have broad, plain platforms (up to 7 mm), with significantly sloping platform remnants. In some cases, the platform-edges were trimmed. The bulbar areas are convex and cone-shaped. All this confirms that hard percussion was used. Most of the blanks for the large prismatic gunflints are sections of large hard percussion blades and fragments of elongated flakes. Proximal fragments of elongated flakes were often used as blanks. The prismatic gunflint was shaped by steep convex retouch applied along two or three edges. As a result, a D-shaped gunflint was produced, resembling a Neolithic-Eneolithic scraper. The sizes of the gunflints were probably determined by the shape of the gunlocks, and they varied between 24 and 37 mm in length for this type with approximately the same variation in width. As mentioned above, the shape of the gunflints had no practical meaning, as it was almost always wrapped in lead, explaining why its shape could vary from segment-like to sub-square. The most important point during manufacture was the formation of a straight leading edge with an acute cross-section, which had the same function as the firing pin of later guns. In principle, all edges of a gunflint could be transformed into a leading edge. In some cases, the functional edge was carefully modified by fine trimming from the ventral face. This detail is notable on the site's impressive segment-shaped gunflints (**Figs. 6.1-6**). One of them is almost trapezoidal and made on the medial section of a regular blade in high-quality, vitreous Donetsk flint (**Fig. 6.3**). In some cases, a cross-sectional steep scraper-like retouch was used to shape the lateral

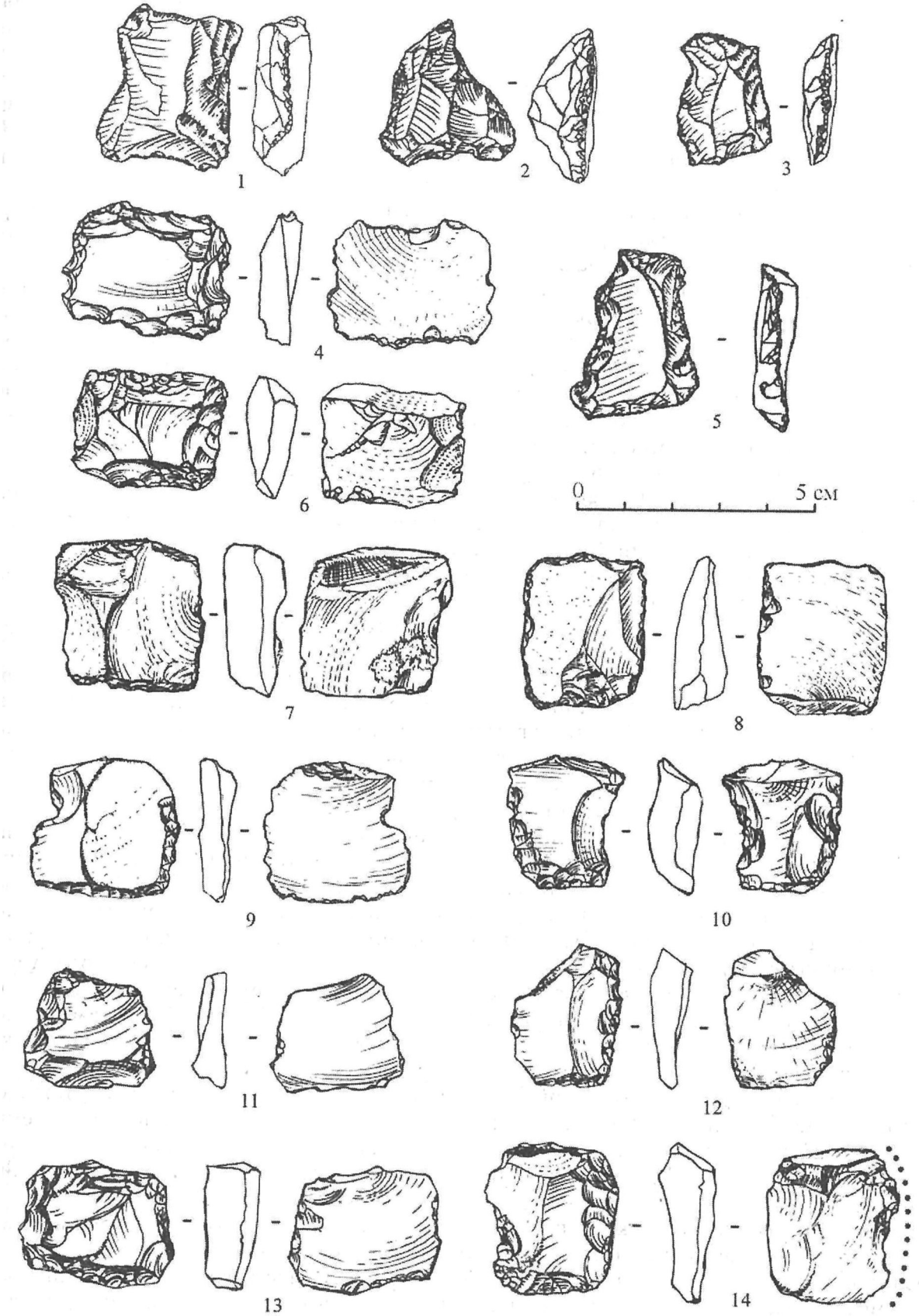

Fig. 5 Gunflints of the Kazachia Pristan fortress (1-14).

side of the gunflint. This is clearly seen on a specimen with traces of corrosion from a lead wrap (**Fig. 6.10** – the functional edge is shown by a dotted line). The lead wrap from Torsk (**Fig. 6.1**) displays a clearly scratched surface, which is a consequence of tight fixation of the gunflint between the cock jaws. The leading edges of some prismatic gunflints have been intensively reworked. The indeterminate shape of some smaller pieces suggests that they may have been subjected to repeated rejuvenation. Most of the gunflints in the Torsk assemblage are broad trapezoidal segments with flat ventral trimming of the leading edge. In general, the prismatic gunflints from the Torsk fortress display notable use-wear. Only a small number of pieces are entirely unused.

An important discovery was made during the investigation of the cultural layers of the fortress, namely two gunflints (**Figs. 6.10-11**) with 27 round lead balls (diameter 12 mm) and a bone cover plate of a former container (Shamray, 2007, 13, photo). The bullets were placed in irregular rows, defining the location of self-made paper cartridges. It is thought that these objects may originally have been stored in a pouch-like container, probably of leather (?) which has not survived.

It is possible that some of the described geometric pieces of indeterminate shape (e. g. **Fig. 6.8**) are fragments of prehistoric flint objects, for example used for domestic fire-making.

The prismatic gunflints discussed in this paper include approximately 70 pieces, all of which originate from reliably documented archaeological contexts. From a statistical point of view, this is a relatively small sample, and it only allows questions to be asked about gunflint typology, as well as questions relating to technological details and trade.

Import versus local production

We mentioned above that the prismatic gunflints were either 'imported' or 'local' in relation to the find contexts of the middle Severskiy Donets. The system of procurement of gunflints for the Cossack regiments and military garrisons in the 16th to 18th centuries on the southern border of the Moscow State, and later the Russian Empire, was a flexible one.

A significant number of the prismatic gunflints were undoubtedly delivered in a ready-made state as part of centralized military supplies. It is possible to determine the place, or more exactly, the region of manufacture of the imported gunflints by the use of characteristic flint types. As mentioned above, gunflints in opaque, mottled, coarse-grained flint almost certainly derive from Upper Cretacious flint deposits which are common in the Severskiy Donets basin. The geological literature suggests that dark flint with these characteristics is common in the vicinity of Rzhev in the High Volga region (Sinitsyna & Kolokoltsev, 2007). Flint with similar colours (but not structure) from the vicinity of the Krasnoe village in the Artemovsk district of the Donetsk region is visually different from these specimens. Unfortunately, petrographic comparison of gunflints is still only in its planning stage. It is estimated that of the gunflints discussed in this paper, 46 % are based on exotic raw material. The quantity of imported pieces in individual assemblages varies greatly. All prismatic gunflints from Kazachya Pristan are clearly made from High Volga flint, whereas in the Chuguev fortress most gunflints are based on local materials.

It has still not been possible to identify local gunflint workshops, although there are clear signs of local raw material use. In the cultural layers of the fortresses there is no evidence of gunflint production. Although the gunflint assemblages of the 16th-18th century fortresses of the middle Severskiy Donets described here may give the impression that all gunflints were imported, workshops could have been located outside the fortifications in the immediate vicinity of the forts. The raw material of the gunflints from the fortresses is almost entirely identifiable as local flint. It is likely that the gunflint workshops of the Donetsk river region of the 16th-18th centuries may be located in the same areas as the classic Neolithic workshops which are well-known here, but that it is not possible to separate the two. At the moment it must be assumed that gunflint production took place beyond the fortress walls as no gunflint workshops have been identified inside the fortresses yet.

It is possible to assess the technology of the gunflint production through the morphology of the gunflints, which reflects different degrees of reduction. All flint artefacts are visually transformed through usage, and gunflints are no exception from this rule. It is interesting that intensive use-wear and signs of rejuvenation are characteristic mainly for gunflints in so-called 'High Volga' raw material. At the same time, many gunflints were deposited in the cultural layers in almost mint condition. This is clear evidence that most garrisons were well provided with gunflints. As can be seen above from the documents relating to the Troitsk fortress (Taganrog), a shortage of flints in the garrison at this location was a concern of the state officials.

The volume of gunflints in 'High Volga' flint increases somewhat at the beginning of the 18th century. This was probably a consequence of weapon standardization in connection with Peter I's reforms.

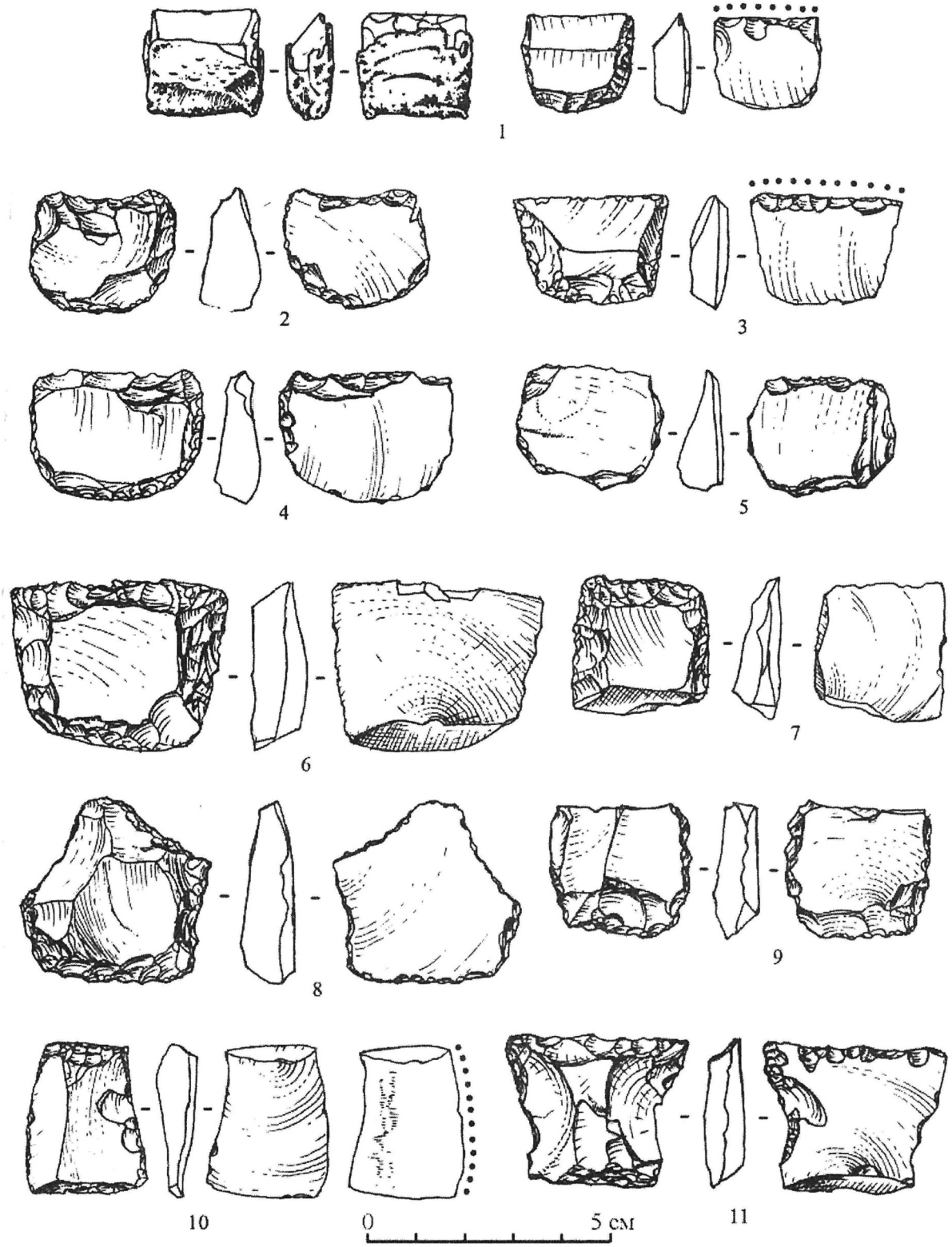

Fig. 6 Gunflints of the Torsk fortress (1-11).

A tentative regional typology

From a typological point of view, the main subdivision of prismatic gunflints can be carried out by analogy with Mesolithic-Neolithic microliths into 'segments', 'rectangulars' and 'trapezes', taking into account the characteristic attributes of the described pieces. We are now able to distinguish between several stylistically and statistically different varieties of prismatic gunflints from the contexts of the 16th-18th centuries in the middle Severskiy Donets region. This typology is demonstrated, first of all, by the gunflints from the Chuguev fortified settlement. An almost identical prismatic gunflint from the same raw material was found in the Torsk fortress (**Fig. 6.3**). These gunflints are trapezoidal, with a rounded heel, and they are based on sections of straight blades; the leading edge of the flints are made on the lateral edges of the blade blanks. This shape is well-known from most of continental Europe. A small but significant number of segment-shaped gunflints with modified sides are notable in the material of the Torsk fortress (**Figs. 6.1-5**). Trapeze-shaped gunflints in High Volga raw material are also present, frequently resembling coarse squat scrapers with the functional area at the blank's proximal end (for example **Fig. 6.6**). It may be possible to use these provisional varieties of prismatic gunflints as the basis for a future definition of East-European types, although more comparative material is required.

Gunflint sheaths of lead

Lead wraps are necessary to fix the gunflints in the army gunlocks. Two gunflints in lead wraps were found in the Torsk and Czareborisov fortresses, one in each fortress. It is possible that musket balls were hammered flat to make leaden sheaths/wraps. There is little doubt that gunflints were considered 'consumables' (along with gunpowder, bullets, wads, etc.) rather than 'durables' (guns and handguns), and stored accordingly.

Army lead wraps for gunflints are in themselves an object of typological interest. In general, they either took the form of a bent strip that held the gunflint around the heel, or they formed a solid jacket that fully enveloped the flint except its leading edge. Such lead sheaths have either straight (early?) or denticulated (late?) edges. Discoveries of unused lead wraps with denticulated edges (at least in the temporary military complexes of Eastern Europe, starting from Minikh and until the 1812 war) suggest that they were pre-fabricated, following a defined template, to be finally adjusted in connection with the fixation of the specific gunflint.

Discoveries of gunflints in lead wraps are relatively rare in the cultural layers of the fortresses and fortified settlements, but they are often described in documents as having been recovered from battlefields. Most probably, the loss of lead wraps happened when worn-out flints were quickly replaced during battle. It has been suggested that gunflints could be used successfully for up to 50 shots, although in the 18th century in the Russian army a flint was intended for 20 shots. From 1791, a German soldier was penalized if he had more than one misfire per 16 shots (Sukhanov & Haburzania, 2000). As mentioned above, the 'flint : bullet ratio' inferred from a disintegrated container in the Torsk fortress was 1:14 (two flints – 27 bullets) (Shamray, 2007, 13). When using flintlock weapons, the 'common norm during battles was 12-16 shots' (Mitko, 2004, 175), although more humble estimates are also known. During the 1812 war, the nominal allowance of ammunition in the Russian army was 14 flints and 192 bullets (relation 1:14).

In the Middle Donets region, gunflints from imported material ('from the treasury') as well as gunflints in 'local' flint are only found in 16th-18th century contexts, although they were mass-produced in the Russian Empire until the 1850s – that is, until percussion guns had become widely available.

On the importance of gunflint research

Documentary evidence and specialist research suggest that prismatic gunflints were produced in Europe in huge quantities, millions of pieces annually. This kind of mass-production is comparable to the quantity of smaller coins minted every year. However, today these coin types are widely known and they are represented in Eastern Europe in various collections, unlike gunflints, which were produced in far greater numbers. It is obvious that these differences are based on different perceptions of the different archaeological objects. Coins still form part of everyday life, whereas gunflints, like for example accessories for sailboats, horse-riding, etc., are only used in marginal parts of our present culture.

The general design of East European gunflints, as well as the technology of their production, clearly correspond to Italian, French and German standards, which were brought here along with the idea and technology of flintlock weaponry in general. This is yet another example of how advanced technical ideas were exchanged as part of technological 'packages'.

Generally speaking, the fact that gunflints produced in 'local' flint are so easily recognizable in the archaeological contexts of the 16th-18th

centuries in the Severskiy Donets basin suggests an approach as to how to locate the workshops responsible for their production, here as well as in the Volga-Oka interfluve area. Analysis of the gunflint reduction process is a task which is no less important. Both tasks can be solved only through archaeological research.

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Nachwort der Herausgeber

Der vorliegende Aufsatz wurde uns auf Vermittlung von Torben Bjarke Ballin (Stirlingshire, UK) und Jürgen Weiner (Pulheim-Sinthern) im April 2016 von den beiden Autoren zur Publikation eingereicht. Im Herbst 2016 riss jedoch der Email-Kontakt zu ihnen trotz wiederholter Versuche gänzlich und nachhaltig ab. Da uns das Manuskript das Thema Flintensteine für diese ferne Region erstmals in einer Übersicht erschließt, haben wir uns dennoch zur Publikation entschlossen. In der Folge hat Jürgen Weiner das Manuskript eingehend und liebevoll redaktionell betreut, wofür wir ihm herzlich danken. Die Karte Abb. 1 erstellte Jochen Reinhard (Zug, CH) nach einer Handskizze der Autoren, bei der Transkription der Ortsnamen in dieser Karte unterstützten uns Stephan Veil (Hannover) und Karina Iwe (Kiel).